UNIVERSITÉ DU QUÉBEC À MONTRÉAL

DÉVELOPPEMENT ET VALIDATION D'UN OUTIL D'ÉVALUATION DES COMPÉTENCES EN COMMUNICATION MOTIVATIONNELLE AUPRÈS DE MÉDECINS

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« Le véritable voyage, ce n'est pas de parcourir le désert ou de franchir de grandes distances sous-marines, c'est de parvenir en un point exceptionnel où la saveur de l'instant baigne tous les contours de la vie intérieure. » - Antoine de Saint-Exupéry

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DÉDICACE

« if you’re walking down the right path and you’re willing to keep walking, eventually you’ll make progress » – Barack Obama

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LISTE DES ABRÉVIATIONS, DES SIGLES ET DES ACRONYMES

4HCS: Four Habits Coding Scheme

BECCI: Behavior Change Conselling Index

BCC: Behaviour change counselling

CCOGC: Calgary-Cambridge Observation Guide Checklist

CIHR: Canadian Institutes of Health Research

CIUSSS-NIM : Centre intégré Universitaire de Santé et Services Sociaux du Nord-de-l'Île-de-Montréal

CM: Communication motivationnelle

CMDO: le réseau de recherche en santé cardiométabolique, diabète et obésité

CME: Continuing medication education

COSMIN: Consensus-based Standards for the selection of health status Measurement Instruments

CVD: Cardiovascular disease

e.g.: exempli gratia (for exemple / par exemple)

FRQS: Fond de la Recherche du Québec en Santé

GCRS: Global Consultation Rating Scale

GP: General practitioner

Hr: Hour

IBTN: International Behavioural Trials Network

iKT: integrated knowledge translation

LCSAS: Liverpool Communication Skills Assessment Scale

MC: Motivational communication

MC-CAT: Motivational Communication Competency Assessment Test/Tool

Min: minutes

MINT: Motivational Interviewing Network of Trainers

MITI: Motivational Interviewing Treatment Integrity

NCD: Non-communicable disease

NP: Non patient

NPV: Negative predictive values

OMS: Organisation mondiale de la santé

OSCE: Objective Structured Clinical Examination

PENS: Player Experience Need Satisfaction

p.ex.: Par exemple

PNV: Positive predictive values

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PROSPERO: International Prospective Register of Systematic Reviews

RCS: Relational Communication Scale

RK : ranking

RP: Real patient

SD: Standard deviation

SEGUE: Skills needed to set the stage, Elicit information, Give information, Understand the patient, and End the encounter

SKIPES: Setting up the interview, assessing patient's Perception, obtaining the patient's Invitation, giving Knowledge and Information, addressing patient's Emotions, Strategy and Summary

SP: Standardized patient

TAD: Théorie de l'autodétermination

TCC: Thérapie cognitive comportementale

VASE-R: Video Assessment of Simulated Encounters – Revised

Vs: versus

LISTE DES SYMBOLES ET DES UNITÉS

% : Pourcentage

α : Alpha

± : Plus ou moins

+ : Plus

- : Moins

= : Égal

n: Nombre de participant

& : Et

© : Copyright

min: Minute

hr : Heure

: Nombre

√ : Présent

* : Symbole pour indiquer que c'est significatif ou multiplication

‡ : Symbole pour indiquer que c'est significatif

p : Probabilité

> : Plus grand que

RÉSUMÉ

L'Organisation mondiale de la santé (OMS) estime maintenant que près de 70% des décès dans le monde résultent de maladies chroniques, y compris les maladies cardio-vasculaires, respiratoires, l'obésité et le cancer. Les maladies chroniques sont fortement influencées par le style de vie lié à un groupe spécifique de comportements de santé nocifs (p.ex., tabagisme, mauvaise alimentation, consommation excessive d'alcool et sédentarité) ayant des conséquences importantes sur le développement et la progression des maladies chroniques. La Communication motivationnelle (CM), basée sur l'entrevue motivationnelle et adaptée aux professionnels de la santé, est un style de communication efficace dans le temps, utilisé par les professionnels de la santé pour promouvoir l'engagement et d'autogestion des maladies chroniques. Il s'appuie sur les sciences du comportement et met l'accent sur une prise de décision partagée, adaptée aux préférences et aux valeurs des patients. Bien que les formations en CM soient maintenant plus communes et disponibles pour les professionnels de la santé, les outils d'évaluation des compétences en CM sont longs, complexes et mal adaptés aux compétences spécifiques en CM et au contexte clinique des médecins spécialistes.

L'objectif général de ce projet doctoral est de créer et de valider un outil d'évaluation des compétences en CM auprès de médecins traitant des maladies chroniques dans leur pratique. Cette recherche a tout d'abord pour but d'effectuer une revue systématique de la littérature en comparant les caractéristiques (p.ex., psychométriques, mode d'administration) d'outils d'évaluation de compétences en communication existants et leur capacité à engager l'utilisateur. Ensuite, cette recherche a pour but de déterminer les comportements à risque pour la santé que les médecins canadiens jugent les plus importants à cibler dans le contexte de la gestion des maladies non transmissibles, ainsi que leurs perceptions et leurs attitudes quant à la possibilité de suivre une formation en matière de changement de comportement. Finalement, en utilisant les résultats de la revue systématique et du questionnaire, cette recherche a pour but de développer et de valider un nouvel outil d'évaluation de compétences en CM qui sera facile à administrer et à coter dans le contexte clinique des médecins spécialistes, et qui sera capable d'engager l'utilisateur.

Afin de répondre à objectif général, cette thèse est divisée en six chapitres. Le premier chapitre traite du contexte actuel des maladies chroniques, de la problématique des comportements reliés à la santé et de la formation des médecins en communication ou counseling pour le changement de comportement. Ensuite, le deuxième chapitre présente une première étude réalisée dans le cadre de ce projet, soit la

revue systématique de la littérature des outils d'évaluation des compétences en communication chez les médecins. Le troisième chapitre présente une deuxième étude, un sondage fait auprès de médecins afin d'évaluer leurs perceptions des comportements de santé à risque les plus présents dans leur pratique et leurs motivations et leurs confiances à conseiller les patients sur le changement de comportement. Le quatrième chapitre présente une troisième étude, portant sur le développement et la validation préliminaire d'un nouvel outil d'évaluation des compétences en communication motivationnelle. Le cinquième chapitre présente la discussion générale de la thèse, notamment sur les implications cliniques, les considérations méthodologiques et les pistes de recherche. Le sixième est dédié à la conclusion de cette thèse.

Les résultats de la première étude révèlent qu'il existe 45 outils d'évaluation de compétence en communication utilisés auprès de médecins. Malgré leur grand nombre, il y a un haut degré d'hétérogénéité entre les outils, et ce, en termes de compétences évaluées et de qualité des études. En plus, la plupart des outils sont très mal validés et ne sont pas développés en tenant compte de modèles théoriques en lien avec la communication ou le changement de comportement. Cette étude a permis d'identifier des critères nécessaires au développement d'un outil d'évaluation des compétences de médecin afin qu'il soit accessible, pratique, ludique et facile à administrer et à noter.

Les résultats de la deuxième étude ont permis d'identifier, à l'aide de réponse de 80 médecins canadiens, que la sédentarité, le tabagisme et la non-observance des traitements sont les trois comportements à risque pour la santé les plus fréquents (prévalence perçue) et les plus importants dans le contexte du traitement des maladies non transmissibles. Également, cette étude révèle que les médecins considèrent comme étant très important (9,1/10) de cibler les comportements à risque, mais qu'ils ne sont que modérément confiants (5,3/10) dans leurs compétences en matière de counseling pour le changement de comportement et modérément disposés à suivre une formation à ce sujet (6,3/10). Les médecins estiment qu'il serait prêt à consacrer quatre heures pour ce type de formation.

Les résultats de la troisième étude sont divisés en cinq sections, reflétant les 5 étapes de développement du nouvel outil d'évaluation des 11 compétences en communication motivationnelle, le Motivational Communication Competency Assessment Test (MC-CAT) version 2. À l'aide des parties prenantes (c.-à-d. : médecins, psychologiques et administrateur.trices en santé), sur une période de trois ans, des vignettes de cas de patients et un système de cotation furent développés et validés. Également, l'expérience de

l'utilisateur fut évaluée auprès d'une population mixte d'étudiants aux cycles supérieurs, de médecins et de professionnels de la santé. Le MC-CAT évalue la compétence MC en 20 minutes en présentant au participant 4 des 16 cas possibles (sélectionnés et ordonnés de manière aléatoire) portant sur diverses cibles comportementales (p.ex., le tabagisme ou l'alimentation). Les scores globaux et par compétence individuelle sont calculés automatiquement pour les 11 items de compétence des 4 cas. Les premiers tests de cohérence interne pour les scores globaux furent très positifs (α=0,78).

Cet outil novateur permettra d'évaluer des médecins spécialistes à travers le Canada et pourra être adapté et utilisé auprès d'un éventail de professionnels de la santé partout dans le monde. De plus, cette thèse génèrera de l'information importante sur la méthodologie derrière la création d'un outil d'évaluation en CM auprès de médecins spécialistes. Également, ce projet aura un impact positif important sur santé de patients aux prises avec des maladies chroniques, par l'entremise de l'acquisition de meilleures habiletés de communication favorisant le changement de comportements primordiaux pour la prévention et le traitement des maladies chroniques.

Mots clés : Communication; Changement de comportement; Outil d'évaluation; Psychométrie; Éducation; Maladie non transmissible.

ABSTRACT

The World Health Organization (WHO) now estimates that nearly 70% of deaths worldwide are the result of chronic diseases, including cardiovascular disease, respiratory disease, obesity and cancer. Chronic diseases are strongly influenced by lifestyle factors related to a specific group of poor health behaviors (e.g., smoking, poor diet, excessive alcohol consumption, and physical inactivity) that have important consequences for the development and progression of chronic diseases. Motivational communication (MC), based on motivational interviewing and adapted for healthcare professionals, is a time-efficient communication style used by health professionals to promote engagement and self-management of chronic diseases. It is based on the behavioral sciences and emphasizes shared decision-making that is tailored to patients' preferences and values. Although MC training is now more common and taught to physicians, existing assessment tools are lengthy, complex, and ill-suited to the specific MC skills and to the clinical context of physician specialists.

The ultimate goal of this doctoral project is to create and validate an MC competency assessment tool for physicians treating chronic diseases in their practice. The purpose of this research is first to conduct a systematic review of the literature by comparing the characteristics (e.g., psychometrics, mode of administration) of existing communication skills assessment tools and their ability to engage the user. Second, this research aims to identify the health risk behaviours that Canadian physicians consider most important to target in the context of NCD management, as well as their perceptions and attitudes regarding possible training in behaviour change counseling. Finally, using the results of the systematic review and survey, this research aims to develop and validate a new MC skills assessment tool that will be easy to administer and score in the clinical setting of physician specialists, and capable of engaging the user.

In order to address the overall objective, this thesis is divided into six chapters. The first chapter discusses the current context of chronic disease, the issue of health behaviors, and physician training in behavior change communication or counseling. The second chapter presents the first study, a systematic review of the literature on physician communication skills assessment tools. The third chapter presents the second study, a survey of physicians to obtain their perceptions of their patients' health risk behaviors and their motivation and confidence to counsel patients about behaviour change. The fourth chapter presents the third study, which details the development and preliminary validation of a new motivational

communication skills assessment tool. The fifth chapter offers a general discussion, specifically highlighting the clinical implications, methodological considerations and future avenues of research. The sixth chapter presents the conclusion for this thesis.

More specifically, the results of the first study reveal that there are 45 communication skill assessment tools used with physicians. Despite their large number, there is a high degree of heterogeneity among the tools in terms of the skills assessed and the quality of the studies. In addition, most tools are poorly validated and were not developed using theoretical models related to communication or behavior change. This study identified criteria for developing a physician skills assessment tool that is accessible, practical, fun, and easy to administer and score.

The results of the second study identified physical inactivity, smoking and non-adherence to treatment as the three most common (perceived prevalence) and important health risk behaviours in the context of NCD treatment, based on responses from 80 Canadian physician. Also, this study found that physicians consider it very important (9.1/10) to address risk behaviors, but are only moderately confident (5.3/10) in their behavior change counseling skills and moderately willing to undergo training in this area (6.3/10). Physicians were willing to devote 4 hours to such a training.

The results of the third study were divided into the five stages of development of the new Motivational Communication Competency Assessment Test (MC-CAT) tool version 2. With the help of stakeholders (i.e., physicians, psychologists and health administrators), over a three-year period, patient case vignettes and scoring systems were developed and validated. The user experience was evaluated with a mixed population of graduate students, physicians and health care professionals. The MC-CAT assesses MC competence in 20 minutes by presenting the participant with 4 of 16 possible cases (randomly selected and ordered) on various behavioral targets (e.g., smoking or diet). Individual and global proficiency scores are automatically calculated for the 11 proficiency items in the 4 cases. Initial tests of internal consistency for global scores were very positive (α=0.78).

This innovative tool will be used to assess medical specialists across Canada and can be adapted and used with a range of health care professionals around the world. Furthermore, this thesis will generate important information on the methodology behind the creation of a CM assessment tool for medical specialists. This project will have a significant positive impact on the health of patients with chronic

diseases, through the acquisition of better communication skills that promote behavioural change that is critical to the prevention and treatment of chronic diseases.

Keywords : Communication; Behavior change; Assessment tool; Psychometrics; Education; Noncommunicable chronic disease.

CHAPITRE 1
CONTEXTE THÉORIQUE

1.1 Les maladies chroniques et le rôle des habitudes de vie

Contrairement aux siècles passés, les maladies infectieuses ne représentent plus la principale menace pour la santé. Ce sont maintenant les maladies chroniques non transmissibles telles que les maladies cardiovasculaires, les maladies pulmonaires chroniques, l'obésité, le diabète et le cancer (World Health Organization, 2018) qui sont à craindre. L'Organisation mondiale de la santé (OMS) évalue que près de 68% des décès dans le monde résultent de maladies chroniques (World Health Organization, 2018). D'autre part, plus de 51% des Canadiens sont atteints d'une maladie chronique (Agence de la santé publique du Canada, 2015). Les maladies chroniques sont responsables de 10% des hospitalisations et de 32% des décès au Canada. Elles représentent un coût approchant les 22 milliards de dollars par année, dont 34,3% de ce montant sont des coûts directs (p.ex., les soins hospitaliers, les médicaments sur ordonnance) et 65,7% sont des coûts indirects (p.ex., la valeur économique qui fut perdue en raison d'un handicap, conséquence d'un décès prématuré) (Agence de la santé publique du Canada, 2009).

Néanmoins, la prévalence des maladies chroniques ne peut être expliquée par une seule cause; il s'agit d'une problématique multifactorielle. Le vieillissement notable de la population entraîne une augmentation des facteurs de risque spécifiques et communs à de nombreuses maladies chroniques. Ainsi, les habitudes de vie contribuent grandement à l'augmentation de la prévalence des maladies chroniques (World Health Organization, 2018). Plusieurs études expliquent que le développement et la progression de la majorité des maladies chroniques sont reliés aux habitudes de vie malsaines, telles que le tabagisme, la mauvaise alimentation et l'inactivité physique (Brisson *et al*., 2000; Noonan *et al.,* 2016; Watts *et al.,* 2016; World Health Organization, 2003). Les risques pour la santé de ces habitudes de vie sont bien documentés (World Health Organization, 2000, 2003). Au Canada, les chiffres concernant les comportements inadaptés sont révélateurs : 75% des Canadiens sont en surpoids ou souffrent d'obésité, 60% consomment moins que la quantité quotidienne recommandée de fruits et de légumes, 78% sont inactifs physiquement, 52% sont sédentaires et 18% fument (Gouvernement du Canada, 2017). En plus, ces comportements inadaptés sont associés à une grande partie de la mortalité mondiale annuelle selon l'OSM: 6 millions de décès dus au tabagisme, 3.2 millions de décès en raison d'un mode de vie sédentaire et d'un faible niveau d'activité physique et 2.8 millions de décès reliés à l'obésité (Allison *et al.,* 2017; World Health Organization, 2018).

La non-adhésion à la médication pour traiter les maladies chroniques et leurs facteurs de risque est un autre exemple de comportement inadapté associé à la détérioration de la santé (Inauen *et al.*, 2017; World Health Organization, 2003). Au Québec, seulement 70% des prescriptions faites par des médecins pour le traitement des maladies chroniques sont remplies en pharmacie par leurs patients. De ce nombre, seulement 50% des patients prennent leurs médicaments tel que prescrit (Tamblyn *et al.,* 2014). L'observance pharmacologique est un des prédicteurs du succès ou de l'échec des objectifs thérapeutiques en réduisant les exacerbations de symptômes, tel que l'ont relevé des études réalisées auprès de patients atteints de troubles cardiaques (Presseau *et al.*, 2017), de maladies respiratoires (Savaria *et al.,* Blais, 2017), d'hypertension (Vrijens *et al.,* 2017) et d'obésité (Han *et al.,* 2017).

Bien que plusieurs facteurs psychosociaux constituent d'importants déterminants de l'ensemble de ces comportements de la santé (p. ex., les connaissances et croyances, le niveau de détresse émotionnelle, le soutien interpersonnel et les aptitudes comportementales; (Gonzalez, Tanenbaum et Commissariat, 2016; Naranjo *et al.,* 2012)), un autre déterminant important chez les patients atteints d'une maladie chronique est leur rapport avec leur médecin.

1.2 Le changement de comportement en médecine : d'hier à aujourd'hui

Le changement des mauvaises habitudes de vie chez les patients atteints de maladies chroniques représente un défi important dans la gestion des ces conditions. Pour inciter les patients à adopter des habitudes de vie plus saines, les médecins utilisent typiquement l'éducation en donnant aux patients des conseils directifs (Elder, Ayala et Harris, 1999). Cependant, ces méthodes sont peu efficaces pour motiver les individus à adopter et maintenir des comportements sains, avec un taux de réussite de 5 à 10% (Chauhan *et al.*, 2012; Kottke *et al.,* 1988). Le système de santé suit certains présupposés relatifs aux changements de comportement (p. ex., le comportement humain est évident / le bon sens; la connaissance et l'information conduisent au changement de comportement) qui ont des impacts significatifs sur le plan des politiques et de l'administration des soins de santé (p.ex., croire que la distribution d'information par l'entremise des dépliants suffit à changer le comportement de patients) (Kelly et Barker, 2016).

Une grande majorité des patients atteints d'une maladie chronique se fait traiter par des médecins de famille et des spécialistes (p.ex., cardiologues, pneumologues, endocrinologues), développant conséquemment une relation importante et échelonnée sur une longue période de temps. Même si les

patients atteints d'une maladies chroniques sont en contact avec plusieurs professionnels de la santé (p.ex., des infirmières, des physiothérapeutes, des éducateurs), les patients se voient assigner un médecin qu'ils verront pendant toute la durée de leurs soins. Ainsi, la patients développent une relation qui deviendra un élément important de leur traitement (Fuertes *et al.,* 2017; Ward, 2018). On peut alors dire que le contexte de la visite du médecin est différent de celui des autres professionnels de santé, où ils ont souvent moins de temps à consacrer aux patients, ce qui fait que ces contacts avec les patients risquent davantage de subir les conséquences d'une mauvaise communication. Cependant, la participation active du patient tout au long de son traitement est nécessaire afin que cette relation soit positive (Wylie et Leedham-Green, 2017). Dans les faits, 50% des patients quittent le bureau de leur médecin embrouillés par les informations reçues et se sentent mal outillés pour suivre leur traitement, prendre leur médication, et entreprendre le changement de comportement (Bodenheimer, 2007; Schillinger *et al.*, 2003). De plus, on estime que le patient participe activement dans les décisions thérapeutiques dans seulement 9% des cas, une réalité assez éloignée de la volonté de 96% des patients de faire partie des décisions concernant leur santé (Bodenheimer, 2007). C'est pourquoi les médecins devraient aller au-delà des simples conseils ou « prescriptions » (médications ou plans d'intervention) et de la dispense d'informations qui est une vision trop simpliste de ce qui est nécessaire afin de convaincre les patients d'atteindre et de maintenir des objectifs de changements de style de vie.

Plusieurs théories et modèles bien établis sous-tendent le changement de comportements de la santé (Sheeran, Klein et Rothman, 2017) tels que la théorie de l'autodétermination (TAD, [Deci et Ryan, 2000]), la théorie sociocognitive (Bandura, 1977) et le modèle transthéorique (Prochaska et Velicer, 1997). Les principes fondamentaux de ces modèles théoriques seront détaillés dans les prochaines sections.

1.3 Théories des changements de comportement

1.3.1 Théorie de l'autodétermination

Selon la TAD (Deci et Ryan, 2000), l'être humain possède trois besoins fondamentaux : la compétence, l'appartenance sociale et l'autonomie. Les conditions sous-jacentes à ces besoins favorisent les formes de motivation et d'engagement optimales pour l'amélioration de la performance, la persévérance et la créativité. Selon la TAD, les raisons pour lesquelles une personne choisit de participer, de faire des efforts et de persister à faire une activité pourraient se situer sur le continuum de la détermination de soi. Une distinction est faite entre les différents types de motivations : la motivation intrinsèque, la motivation

extrinsèque et l'amotivation. Ces motivations sont différenciées à l'aide de processus de régulation se retrouvant elles aussi dans le continuum de la détermination de soi.

La TAD a pris forme au cours des années 80, avec la publication des ouvrages du Dr Richard Ryan et du Dr Edward Deci (Deci, 1980; Deci et Ryan, 2000). De ces études découle le continuum de la détermination (voir la figure 1.1). La motivation est ainsi divisée en trois éléments : pour commencer, la motivation intrinsèque engage la personne vers son intérêt à des fins de plaisir, à une fin en soi ou par innéité. Par la suite, la motivation extrinsèque découle de facteurs externes à la personne qui la mobilise vers l'action (Deci et Ryan, 200; Vallerand, 2004). Il existe aussi l'amotivation qui, par dénomination, se définit comme l'absence de toute forme de motivation et de régulation pour la réalisation d'une activité.

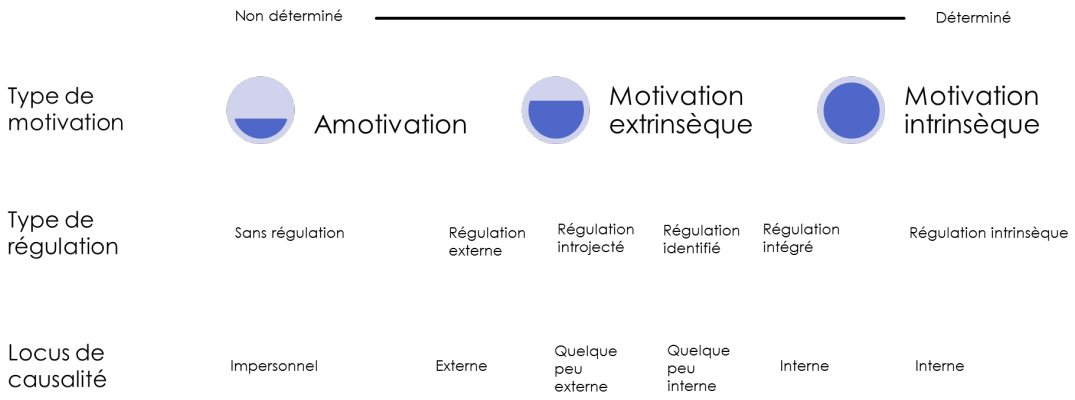

Figure 1-1 Continuum de la détermincation de soir (Selon Deci et Ryan, 2000)

Les types de motivation varient selon la forme de régulation. Ainsi, la motivation extrinsèque est sous l'emprise de mécanismes de régulation externe se définissant par des comportements contrôlés par des récompenses ou des gains et par des dissuasions ou des pertes. La régulation introjectée implique que la personne s'engage dans un comportement provenant d'un sentiment de culpabilité, d'obligation ou du sentiment de devoir prouver quelque chose aux autres ou à soi-même. La régulation identifiée, qui serait la forme la plus internalisée chez la personne, se décrit par l'engagement dans un comportement en raison de l'importance qui y est accordée. Ensuite, la régulation intégrée est présente lorsque des motifs pour la réalisation du comportement sont valorisés chez la personne. Ces motifs doivent être cohérents avec les buts et les valeurs de la personne (Deci et Ryan, 2000; Deci et Vansteenkiste, 2004). Selon le modèle TAD,

l'effet de l'environnement sur la motivation et la régulation comportementale, bien qu'indirect, résulte du soutien et de la satisfaction conséquente des trois besoins psychologiques mentionnés ci-haut (Ryan *et al.,* 2008; Vansteenkiste et Ryan, 2013).

1.3.2 Théorie sociocognitive

Conformément à la théorie sociocognitive, les processus psychologiques influencent le niveau et l'intensité d'auto-efficacité d'un individu (Bandura, 1977). Cette théorie stipule également que la confiance et l'auto-efficacité sont des prédicteurs de l'engagement dans un comportement (Bandura, 1998, 2004). Ainsi, la théorie sociocognitive émet l'hypothèse que les expériences de maîtrise (mise en œuvre réussie d'un changement de comportement) sont des sources d'auto-efficacité, et que l'auto-efficacité augmente à son tour l'opportunité d'avoir des expériences de maîtrise (Warner *et al.*, 2018).

Les croyances concernant l'efficacité personnelle influencent les comportements (p.ex., en matière de santé) et ont un impact sur les objectifs, les attentes, les facilitateurs et les obstacles personnels, situationnels et contextuels (p.ex., le système de santé) tels que perçus par le patient (voir la figure 1.2) (Bandura, 2004). Par exemple, si un patient n'a pas confiance en ses compétences concernant l'adoption ou la modification d'un comportement, ou encore s'il n'a pas accès aux ressources pour réussir ce processus, il est moins susceptible d'être engagé dans le processus de changement.

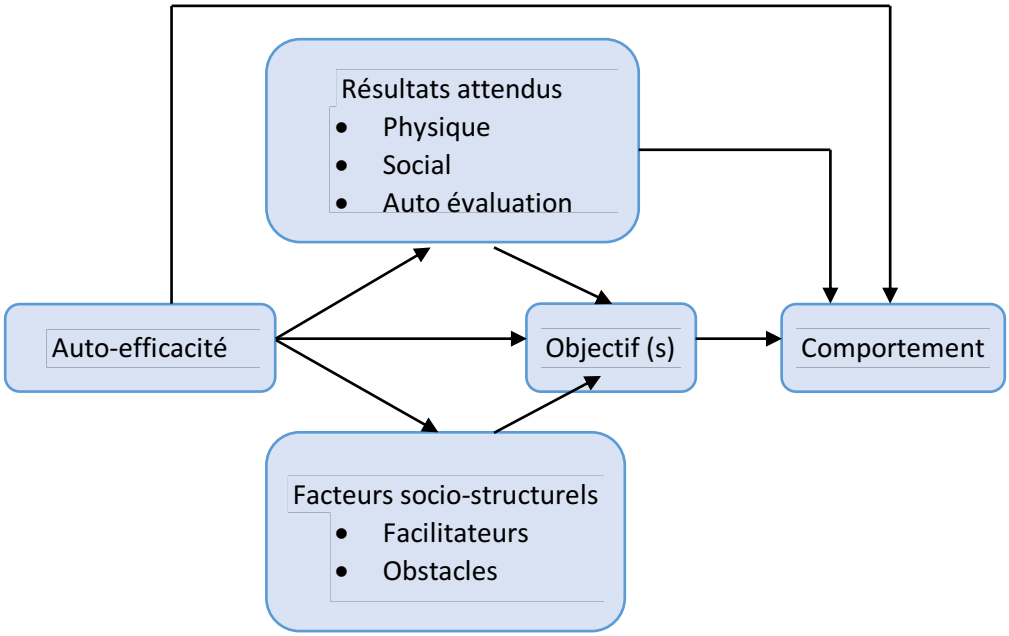

Figure 1-2 Théorie sociocognitive en contexte de santé

1.4 Autres modèles complémentaires

1.4.1 Modèle Transthéorique

Le Modèle Transthéorique est un modèle biopsychosocial qui conceptualise le processus de changement de comportement (voir la figure 1.3; Prochaska et Valicer, 1997). Ce modèle énonce qu'un individu traversera une série d'étapes lors de la modification ou le maintien des comportements, et ce sur des périodes de temps variables. Ces étapes sont la précontemplation, la contemplation, la préparation, l'action et le maintien.

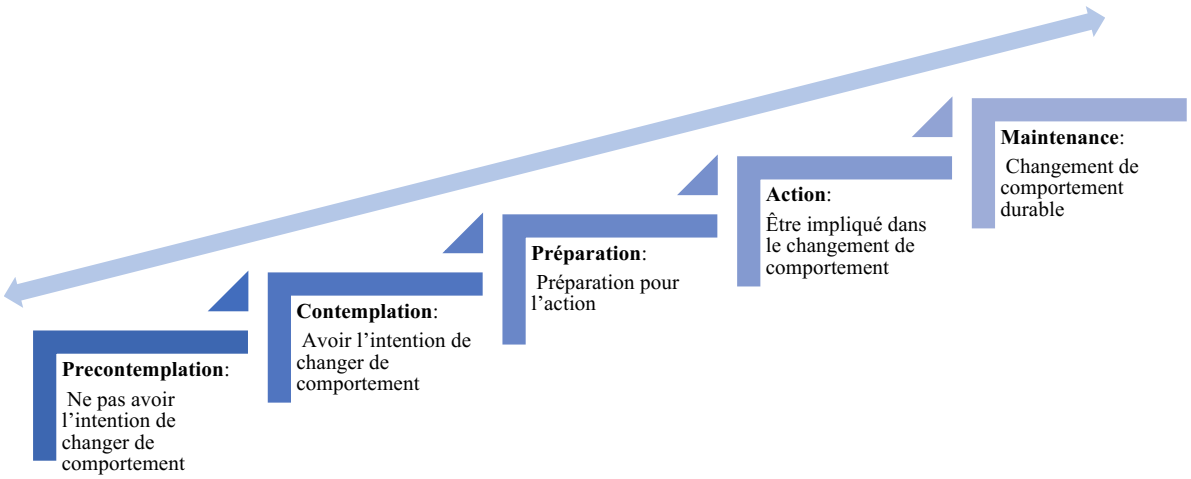

Figure 1-3 Modèle Transthéorique (Selon Prochaska et Velicer, 1997)

Afin d'évoluer à travers les différentes étapes, il existe trois construits qui permettent de réduire la résistance, de faciliter les progrès et de prévoir les rechutes : l'équilibre décisionnel, l'auto-efficacité, et le processus de changement (Prochaska, 2008). Brièvement, l'équilibre décisionnel est conceptualisé comme étant une comparaison des avantages potentiels d'une décision aux désavantages possibles (Janis et Mann, 1977). Ensuite, tel que mentionné précédemment, le concept d'auto-efficacité introduit par Albert

Bandura est l'un des construits du modèle Transthéorique (Bandura, 2004). Finalement, le processus de changement explique comment les changements de comportement se produisent à l'aide de dix processus qui permettent de progresser à travers les étapes du changement (Prochaska, 2008; Romain *et al.,* 2016; voir la Tableau A.1 en Annexe A).

En somme, les éléments centraux du changement sont la motivation intrinsèque et la confiance en ses capacités. Par conséquent, une formation de base des médecins en matière des stratégies de changement de comportement (basé sur ces modèles théoriques), serait potentiellement bénéfique pour maximiser les comportements d'amélioration des habitudes de vies et des issues cliniques des patients souffrant de maladies chroniques.

1.5 Une technique prometteuse pour promouvoir les changements de comportement : la communication motivationnelle

Dans le cadre de la gestion des maladies chroniques, un des rôles centraux des médecins est d'être un communicateur. De plus, le rôle de « communicateur » fut identifié parmi les rôles les plus importants chez le médecin (Royal College of Physicians and Surgeons of Canada, 2019). Ainsi, il est important qu'une relation bidirectionnelle soit bien établie afin d'instaurer un processus de changement de comportements adaptés chez le patient. Une approche prometteuse pour promouvoir les changements de comportement est la Communication motivationnelle (CM; Dragomir *et al.,* 2021). La CM est un style de communication incluant un ensemble de techniques en changement comportemental adapté de l'entretien motivationne pour être utilisé auprès des professionnels de la santé en contexte de gestion des maladies chroniques. Elle est conçue pour augmenter la motivation (intrinsèques) et la confiance face au changement comportemental (Dragomir *et al.*, 2021).

Le groupe de recherche du Centre de Médecine Comportementale de Montréal (CMCM) travaille depuis 2014 à définir et identifier les compétences nécessaires aux professionnels de la santé afin d'optimiser le changement de comportements chez une population atteinte de maladies chroniques. Combinant plusieurs groupes de recherche, plus de 50 experts internationaux en changement de comportement, 50 patients atteints de maladies chroniques et 150 professionnels de santé, l'équipe du CMCM a définit la la Communication motivationnelle et identifié ses compétences essentielles.

Ce style de communication veut encourager l'engagement du patient envers l'adoption d'habitudes de vie saine et l'augmentation de son bien-être vivant avec une ou plusieurs maladies chroniques. La prise de

décision partagée entre le professionnel de la santé et le patient est mise de l'avant et celle-ci est adaptée aux préférences, aux objectifs et aux valeurs du patient (Dragomir *et al.*, 2021). Cette technique a été testée auprès de rheumatologues qui ont suivi une formation MC travaillant auprès de patients atteints d'arthrite rheumatoide (Labbé et al., en révision) et l'éfficacité de la CM auprès de patients asthmatique pour l'adhérence à la médication (Gemme et al., en rédaction). Onze composantes sont incluses dans la CM et peuvent être retenues avec l'aide mnémonique « JOINS LA RECHERCHE » (voir la figure 1.4). Néanmoins, il existe plusieurs distinctions importantes entre la CM et l'entretien motivationnel et plusieurs limites à l'entretien motivationnel dans le contexte médical.

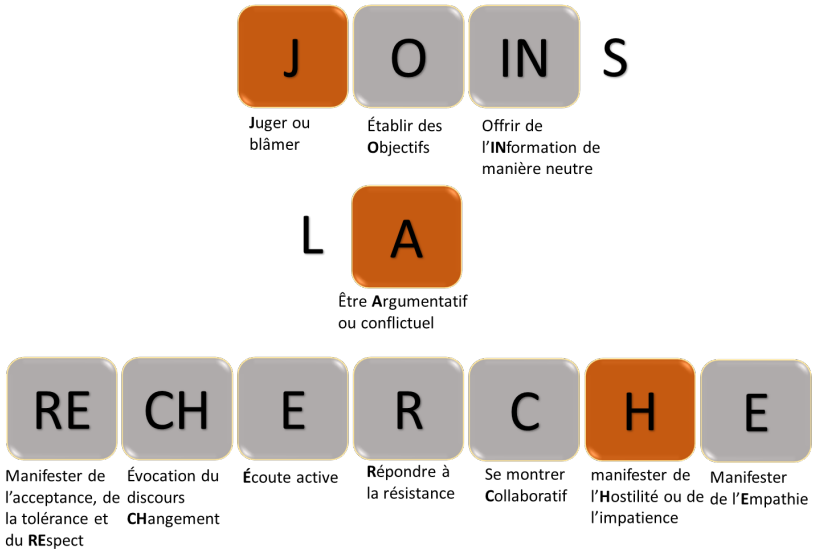

Figure 1-4 Les 11 composantes de la communication motivationnelle sous forme de mnémonique

1.6 L'entretien motivationnel : limites de l'intervention

L'entretien motivationnel fut initialement développé dans le contexte de traitement de la toxicomanie (Miller, 1996; Miller et Rollnick, 2012), mais a été adapté pour cibler le changement comportemental dans le contexte de maladies chroniques (Tuccero *et al.,* 2016). Il est basé, entre autres, sur la TAD et stipule que la motivation intrinsèque, contrairement à la motivation extrinsèque, est le principal ingrédient du changement (Deci et Ryan, 2000).

Plusieurs essais randomisés ont été réalisés pour évaluer l'efficacité de l'entretien motivationnel pour le changement comportemental chez les patients avec des maladies chroniques (Copeland *et al.,* 2015;

Dempsey *et al.,* 2018; Ekong et Kavookjian, 2016). Dans l'ensemble, l'entretien motivationnel a démontré son efficacité en produisant des améliorations sur le plan de l'adhésion à la médication, du taux de cessation tabagique, de la perte de poids et de la promotion de l'activité physique (Lee *et al.,* 2016; Lundahl *et al.,* 2013; Rubak *et al.,* 2005; Soderlund, 2018). L'entretien motivationnel a également démontré son efficacité pour l'amélioration de plusieurs paramètres cliniques : diminution du taux de cholestérol, de la tension artérielle, de la charge virale du VIH et de la mortalité (Dillard, Zuniga et Holstad, 2017; Rubak *et al.*, 2005; Schaefer et Kavookjian, 2017).

Malgré le fait que l'entretien motivationnel ait fait ses preuves, son efficacité n'est pas sans équivoque (Copeland *et al.,* 2015; Hallgren *et al.*, 2018; Lee *et al.*, 2016). Une étude a démontré des changements significatifs du niveau d'adhésion aux médicaments des patients asthmatiques sur une période de six et 12 mois à l'aide d'entretiens motivationnels de courte durée (3 à 5 sessions de 15 à 30 minutes), réalisés par un psychologue expert et formé (Lavoie et Bacon, 2014). À l'opposé, une étude ciblant l'adhésion à la médication de patients atteints d'ostéoporose a intégré l'entretien motivationnel via des appels téléphoniques réalisés par des professionnels de la santé. Au terme de cette étude de 30 mois, aucune différence significative ne fut observée entre le groupe contrôle et le groupe intervention (Solomon *et al.,* 2012). Dans une autre étude réalisée auprès de patients atteints du diabète de type 2 et d'obésité, des modifications significatives des paramètres physiologiques ont été observées après 3 mois (p. ex. : concentration de sucre sanguin, masse grasse) pour les participants du groupe intervention (entretien motivationnel de 30-45 minutes avec le chercheur principal de l'étude) (Wattanakorn *et al.,* 2013). Cependant, une autre étude réalisée auprès de patients atteints de diabète de type 2 n'a démontré aucune différence significative de la concentration de sucre sanguin et des comportements de santé potentiellement problématiques entre le groupe entretien motivationnel (intervenants infirmiers avec 16 heures de formation) et le groupe contrôle (Jansink *et al.,* 2013).

Ainsi, il est possible d'affirmer qu'il y a un manque de cohérence de la littérature entourant les études utilisant l'entretien motivationnel et celle-ci explique l'écart des résultats positifs et négatifs des interventions auprès des patients atteints de maladies chroniques. Plusieurs recensions de la littérature ont soulevé des limites importantes au sein des études (p.ex., modes d'intervention hétérogènes, groupes contrôles souvent absents) (Palacio *et al.,* 2016). Aussi, Hallgren et ses collègues démontrent que la fidélité de l'utilisation de l'entretien motivationnel par les professionnels de la santé varie considérablement et

systématiquement selon le contexte de la recherche (l'efficacité et la formation), ainsi qu'entre les sessions, les intervenants, les sites d'intervention et les contextes de recherche (Hallgren *et al.,* 2018).

Limites de l'entretien motivationnel : Une des critiques portées à l'égard de l'entretien motivationnel réfère à sa rigidité d'administration. Les experts en entretien motivationnel vont promouvoir l'utilisation des techniques d'entrevues telles que les questions ouvertes (pour évoquer la motivation des patients) et la reformulation (pour faire preuve de l'empathie). En revanche, ils vont exclure (voir interdire) l'utilisation concurrente de méthodes classiques de changement de comportement promu par la théorie et thérapie cognitive comportementale (TCC) telles que le renforcement positif (Miller et Rollnick, 2009). Selon l'approche de l'entretien motivationnel, le renforcement positif des patients lors de l'atteinte des objectifs thérapeutiques constitue un jugement (impliquant que certains comportements sont « bons » alors que d'autres ne sont pas « bons »), et est contraire au principe d'avoir une attitude de « non-jugement » (Britt, Hudson et Blampied, 2004). Selon l'entretien motivationnel, il faut éviter toute intervention qui risque de provoquer des changements via la motivation extrinsèque (p.ex., faire plaisir à l'intervenant). Bien que la CM fasse la promotion de l'incitation au changement via l'augmentation de la motivation intrinsèque (tout comme l'entretien motivationnel), la CM va chercher à maintenir le comportement via l'utilisation de techniques empiriquement valides issues de la TCC (p.ex., renforcement positif). Ainsi, la CM est une approche plus complète et considère les techniques de TCC et d'entretien motivationnel comme complémentaires plutôt que mutuellement exclusives.

Une autre limite associée à l'entretien motivationnel réfère à l'exclusivité de la formation. Celle-ci est régie par le MINT (Motivational Interviewing Network of Trainers), un réseau de formateurs, composer principalement des non-psychologues, fondé aux États-Unis (MINT, 2017). Ainsi, si l'on désire être formé en entretien motivationnel ou devenir membre du réseau, un séminaire de 3-4 jours portant sur les méthodes, techniques et esprit de l'approche doit être complété. Seuls les membres ayant suivi le séminaire peuvent recevoir « la certification officielle » du MINT afin d'utiliser l'approche de l'entretien motivationnel dans leur pratique. Bien qu'offrir une formation de 3-4 jours serait idéale, ce n'est malheureusement pas faisable pour la grande majorité de médecins spécialistes, rendant l'entretien motivationnel peu accessible pour les médecins. Au contraire, l'accès à la CM est moins restreint. Les formations peuvent être offertes par n'importe quelle professionnelle qui maitrise les techniques de changement comportemental et de communication utilisées dans l'entretien motivationnel, qui ne sont

pas exclusives à cette approche (p.ex., questions ouvertes, reformulations, affirmations, demander des rétroactions).

Finalement, les méthodes d'évaluations des compétences en entretien motivationnel constituent aussi une des limites de l'approche. Plusieurs outils furent développés dans l'objectif d'évaluer les compétences (p.ex., Motivational Interviewing Treatment Integrity; MITI [Moyers *et al.*, 2003]). Néanmoins, ces méthodes comportent plusieurs limites importantes comme la complexité d'administration et de codification (p.ex., nécessite une formation afin d'utiliser la méthode et la codification), la faisabilité (p.ex., nécessité que des experts en entretien motivationnel codent des transcriptions d'entretiens filmés/enregistrés) et la validité et fidélité des outils relativement peu élevée (Moyers *et al.,* 2003).

Malgré les limites de l'entretien motivationnel, son efficacité démontrée par plusieurs études a fait augmenter de manière importante la demande pour des formations des intervenants de la santé dans les approches « motivationnelles ». De nombreux facteurs ont contribué à la popularité croissante de ces formations dans les établissements de soins de santé. Parmi ceux-ci figurent la large base de preuves empiriques de son efficacité, l'accent mis sur les soins centrés sur le patient, les nombreuses applications de l'approche pour améliorer la participation des patients, la réduction des écarts de connaissances, la favorisation du changement de comportement sain et l'amélioration de la qualité et de l'efficacité des relations médecins-patients (Rouleau *et al.*, 2015). En revanche, il existe présentement peu de données empiriques attestant de l'efficacité des approches motivationnelles en ce qui a trait à la compétence des médecins dans leurs interactions avec leurs patients.

1.7 Les formations en méthodes de « counseling pour le changement de comportement » destinées aux médecins

Le nombre de formations dispensées aux médecins en méthodes de « counseling pour le changement de comportement », tel que l'entretien motivationnel / CM, a augmenté au cours de la dernière décennie (Madson, Loignon et Lane, 2009; Söderlund *et al.,* 2011). La recension réalisée par Soderlund et ses collègues (2011) a examiné 10 études et conclu qu'une formation d'environ 9 heures sur les compétences de base de l'entretien motivationnel serait efficace auprès des travailleurs de la santé, et ce pour plusieurs problématiques (p.ex., le tabagisme, l'abus d'alcool, l'observance thérapeutique). Néanmoins, la recension compile plusieurs différences importantes entre les études, démontrant une grande hétérogénéité sur le plan des types de professionnels, de la durée des formations, de l'utilisation de groupes de comparaison, de l'établissement d'un niveau de base, de l'utilisation d'un outil d'évaluation

de compétences acquises et du respect des critères de rédaction Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Södelund *et al.,* 2011). Ceci rend donc difficile la comparaison entre les études retenues dans cette recension.

Une revue systématique des formations en changement de comportement ciblant les médecins a démontré une amélioration des compétences au sein des 9 études retenues en fonction des critères d'inclusions suivants : articles publiés dans un journal à comité de lecture (français et anglais), échantillons de médecins, programme de formation centré sur l'amélioration des compétences en changement de comportement et évaluation formelle des compétences (Dragomir *et al.,* 2019). Cependant, les programmes de formations étaient hétérogènes et collectivement basés sur 8 théories de changement de comportement (p.ex., Motivational Interviewing principles, Transtheoretical Model of Change, Bandura's Social Learning Theory). Également, la durée des formations variait entre 3 et 20 heures, comptant en moyenne 10,4 heures (Dragomir *et al.,* 2019). Le calendrier des mesures de compétence variait également considérablement, allant de directement après la formation à 4 ans après la formation. Il n'y avait aucun groupe témoin pour les études retenues et aucune information sur la qualification des formateurs en changement de comportement. Les méthodes de formation variaient énormément, et la plupart ne comprenaient que des jeux de rôle avec des patients simulés. Ainsi, il existe une grande hétérogénéité en termes des modalités des formations (p.ex., le temps, le 'dosage', et les techniques d'enseignement; Dragomir *et al.,* 2019). D'autres limites importantes soulevées par cette revue sont d'abord une discordance importante entre les compétences enseignées et les compétences évaluées (en moyenne, que 30% des compétences enseignées étaient évaluées par les chercheurs); et ensuite l'hétérogénéité des méthodes d'évaluation des compétences enseignées lors des interventions (Dragomir *et al.,* 2019). Ainsi, il existe plusieurs limites aux formations en counseling pour le changement de comportement.

1.8 Les outils d'évaluation des compétences des médecins en CM : les limites actuelles

À notre connaissance, trois mesures objectives des compétences dans les approches de Communication motivationnelles existent et ont été validées à ce jour : le Motivational Interviewing Treatment Integrity V4 (MITI; Moyers *et al.,* 2003; Moyers *et al.,* 2007; Moyers *et al.,* 2016), le Behavior Change Counselling Index (BECCI; Lane *et al.,* 2005) et le Video Assessment of Simulated Encounters - Revised (VASE-R; Rosengren *et al.,* 2008).

1.8.1 La Motivational interviewing Treatment integrity

Le MITI est un système de codification permettant une évaluation en une seule passation et conçu pour mesurer les compétences en entretien motivationnel (Moyers *et al.,* 2003). Cet outil peut être utilisé tant pour la formation de cliniciens que comme contrôle de qualité dans des essais cliniques. Le seuil fixé pour signifier l'atteinte d'un niveau de compétence adéquat en entretien motivationnel est un score global de 3,5/5. Une augmentation d'au moins un point entre les scores pré- et post-formation est considérée comme une modification cliniquement significative de la compétence.

Plusieurs limites émergent de l'utilisation de cet outil chez des médecins. Premièrement, le MITI implique un processus de codification d'un comportement complexe, et qui nécessite l'enregistrement d'une consultation, la transcription des celle-ci, ainsi qu'une grande expertise de cotation MITI de la part de l'évaluateur. La nécessité d'enregistrer les entrevues peut potentiellement être intrusive pour le médecin au sein de sa pratique clinique, ce que rend le MITI peu pratique pour une utilisation à grande échelle. Deuxièmement, l'outil fut conçu selon les balises de l'entretien motivationnel, et exclu donc les autres stratégies de changement de comportement (p.ex., renforcement positif). Bien que l'entretien motivationnel et la CM soient inspirés d'une base commune et qu'ils aient été utilisés de manière interchangeable dans le passé, la CM a été conçue en incluant des éléments d'autres théories du changement de comportement (p.ex., thérapie cognitive comportementale). Finalement, les propriétés psychométriques du MITI comportent plusieurs limites et plusieurs valeurs ne sont pas évaluées (p.ex., validité interne). La fidélité interjuge varie énormément selon les différents construits de l'outil (r=0,40-0,90). Également, la validité de convergence du MITI, la mesure étalon pour les compétences d'entretien motivationnel, est égale à 59%, ce qui est relativement faible (Moyers *et al.,* 2007).

1.8.2 Le Behavior Change Counselling Index

Le Behavior Change Counseling Index (BECCI) est un outil développé spécifiquement dans l'objectif de mesurer les compétences en counseling pour le changement de comportement et comporte 11 items, évalués sur une échelle de type Likert à 5 points. Cet outil se prête particulièrement bien à des contextes de consultations brèves et serait donc adapté à la réalité des professionnels en soins de santé (Lane *et al.,* 2005). Contrairement au MITI, qui mesure l'acquisition de plusieurs compétences telles que l'utilisation de questions ouvertes, l'écoute active et l'incitation du discours de changement, la visée du BECCI est plus modeste puisqu'il vise simplement comprendre la perspective du patient. Toutefois, les caractéristiques psychométriques de l'outil BECCI sont relativement faibles avec une validité interne (α=0,19-0,79), une

fiabilité inter évaluateur (coefficient r= 0,79-0,93) et une fiabilité intra évaluateur (coefficient r=0,66-0,90) allant de nul à bien (Lane *et al.,* 2005). Néanmoins, comme le MITI, le BECCI nécessite un enregistrement d'entrevue, la transcription des entrevues et une expertise de cotation de la part de l'évaluateur, qui est complexe, prend du temps et n'est pas pratique pour une utilisation généralisée dans les établissements de soin de santé.

1.8.3 Le Video Assessment of Simulated Encounters

Le VASE-R (Video Assessment of Simulated Encounters - Revised) est un outil vidéo permettant d'évaluer de manière standardisée les interactions avec un patient simulé, et a été développé par des chercheurs de l'Université de Washington (Rosengren *et al.,* 2008). L'instrument comprend 18 items et utilise trois vignettes vidéo standardisées dans lesquelles les acteurs dépeignent des patients présentant une problématique adaptée à la compétence en entretien motivationnel évaluée. Chaque vignette est suivie de questions incitant les participants (cliniciens) à rédiger dans un champ libre. Ces réponses sont ensuite évaluées en fonction des normes de l'entretien motivationnel. L'outil peut être administré individuellement ou en groupe pour évaluer les compétences en entretien motivationnel. L'instrument présente une forte validité concourante avec les évaluations faites par le système et le MITI. À la différence du MITI et du BECCI, le VASE-R ne nécessite pas d'enregistrement, mais les réponses des participants aux différents échanges sont codées par des évaluateurs. De ce fait, elle nécessite une expertise de cotation de la part des évaluateurs, ce qui implique un temps, un coût associé à la formation pour cette tâche, qui peut s'avérer très élevé et n'est pas pratique pour une utilisation généralisée dans les établissements de soin de santé. Aussi, le VASE-R n'évalue pas les compétences en CM, alors son utilité est limitée dans notre contexte.

En raison des limites des outils d'évaluation actuels, principalement ceux qui limitent l'accessibilité, la faisabilité de l'administration et la validité, nous proposons de développer un nouvel outil spécifiquement adapté pour évaluer la CM auprès de médecins spécialistes qui sera ludique et facile à administrer et à noter.

1.9 La technologie au service des outils d'évaluation des compétences en CM

Dans le domaine de l'éducation des médecins, la technologie est de plus en plus présente lors des évaluations de compétences théoriques et pratiques. Plusieurs facteurs expliquent cette augmentation d'utilisation de simulations en éducation médicale : les changements dans la prestation des soins de santé

(p.ex., la prise en charge ambulatoire plus fréquente de plusieurs conditions médicales), la maîtrise des tâches cliniques impliquant des technologies diagnostiques et thérapeutiques innovantes, l'utilisation de technologies par d'autres professions comportant des risques élevés (p. ex. : aviation) et la question éthique de la pertinence de l'utilisation de vrais patients comme ressources d'évaluation ou de formation (Scalese, Obeso et Issenberg, 2008). Depuis plus de deux décennies, les connaissances appliquées des médecins sont évaluées à l'aide de tests papier-crayon et d'acteurs entraînés (ou patient standardisé). Une utilisation plus accrue de la technologie lors des évaluations de compétences a depuis été observée dans les contextes médicaux (Srinivasan *et al.,* 2006). Les nouvelles technologies comme des mannequins intégrés de haute-fidélité (Issenberg *et al.,* 2005) ainsi que les stations cliniques virtuelles ont augmenté la validité écologique des évaluations de critères de performance (p.ex., enseigner la réalisation d'une entrevue avec un patient) et d'action (p.ex., réaliser une entrevue avec un patient) (Srinivasan *et al.,* 2006).

Les environnements virtuels et les jeux vidéo sont de plus en plus utilisés pour la formation et l'évaluation dans le milieu de la santé. Qu'il soit question de patients virtuels (Cook, Erwin et Triola, 2010) ou de l'évaluation des capacités médicales (Cook *et al.,* 2013), la technologie augmente le réalisme des outils d'évaluation et d'apprentissage. De plus, bien que les environnements virtuels puissent susciter une dépendance chez certaines personnes (Chou et Ting, 2003), les avantages des jeux vidéo, plus précisément avec les jeux d'apprentissage, d'immersion et de réalité virtuelle, démontrent des bénéfices pour certains troubles psychologiques (Zyda, 2005), pour évaluer le changement de comportements (Bellotti *et al.,* 2013; Shute et Ke, 2012) et potentiellement pour l'évaluation des compétences en CM des médecins.

1.9.1 Outil d'apprentissage et l'évaluation des changements de comportement

Lors de la conception de jeux vidéo, les compagnies de productions utilisent maintenant la science du comportement humain afin d'optimiser « l'expérience client » pour leurs produits (Rigby et Ryan, 2011). Il est souvent question du modèle du Player Experience Need Satisfaction (PENS) (Burgers *et al.,* 2015; Rigby et Ryan, 2011). Le modèle PENS stipule que peu importe le type de jeux (p. ex., jeux de rôle, jeux d'arcade ou jeux musicaux), les joueurs sont influencés par le contexte de défi, les rétroactions positives et les dimensions de choix dans le jeu. Il y aurait alors satisfaction des besoins soulevés par la TAD (compétence, autonomie et appartenance) (Deci et Ryan, 2000), ce qui encourage une motivation intrinsèque du type intégrée (Burgers *et al.,* 2015). Ainsi, une autorégulation du comportement dans le jeu est favorisée. L'effet des rétroactions positives sur la motivation du joueur par l'entremise de la satisfaction des besoins de compétence et d'autonomie (Burgers *et al.,* 2015) est également impliqué. La

rétroaction, le défi et les récompenses sont des mécanismes souvent présents dans les jeux. La façon dont ces concepts sont opérationnalisés peut affecter les réactions physiques et psychologiques des joueurs (Lyons, 2015). Donc, toujours selon la TAD, l'objectif des jeux vidéo utilisant les rétroactions est de donner des informations riches, d'accroître les sentiments de maîtrise chez le joueur et d'utiliser les rétroactions soutenues, cumulatives ou occasionnelles (Lyons, 2015; Rigby et Ryan, 2011).

Dans la formation médicale, les simulations sont déjà utilisées au sein de la formation et de l'évaluation des compétences cliniques. Le Collège Royal des Médecins et Chirurgiens du Canada emploie des simulations informatisées, des mannequins ainsi que des patients standardisés au sein de leurs examens nationaux de certification en médecine interne (Scalese *et al.,* 2008). L'American Board of Internal Medicine utilise également des simulations similaires dans l'évaluation du module des compétences cliniques, intégré dans leur programme de maintien de la certification en médecine (Scalese *et al.,* 2008). De ce fait, les étudiants en médecine font de plus en plus l'expérience d'outils de simulation comme la réalité virtuelle et l'immersion (Scalese *et al.,* 2008). Il existe entre autres une salle d'opération en réalité virtuelle utilisée pour évaluer les procédures chirurgicales (p.ex., cholécystectomie par laparoscopie) et minimiser l'occurrence d'erreurs procédurales (Seymour *et al.,* 2002). La validation de l'outil virtuel, comparativement à la salle d'opération réelle, ouvre la porte aux technologies en contexte d'évaluation et de formation. De plus, la certification des chirurgiens pour plusieurs types d'opérations pourra être effectuée dans un milieu virtuel (Seymour, 2008). Un autre outil, créé avec des patients virtuels, a été conçu pour enseigner et évaluer des étudiants en médecine lors de l'examen et du diagnostic de troubles du nerf crânien (Hirumi *et al.,* 2016). Cette étude a permis de formuler des recommandations afin d'augmenter l'utilisation et l'engagement des utilisateurs. Parmi celles-ci figurent l'ajout de narration audio afin de susciter davantage d'intérêt et d'empathie, l'ajout d'une histoire afin d'augmenter l'engagement et les attentes à travers les cas dans la salle d'examen et l'ajout de mécanismes de jeu (p.ex., un classement, des marqueurs de score, des avatars étudiants personnalisables et des badges) (Hirumi *et al.,* 2016). Évidemment, il s'agit de recommandations dans une optique éducative et non d'évaluation en tant que telle.

En ce qui a trait aux compétences en communication, quelques essais cliniques et non cliniques ont été réalisés à l'aide d'outils immersifs ou de réalité virtuelle. Andrade et ses collègues (2010) ont réalisé une étude ayant pour objectif d'enseigner à des médecins l'annonce de mauvaises nouvelles aux patients dans un contexte de réalité virtuelle. À l'aide de l'outil Second Life (Linden Labs, San Francisco, CA), les

participants interagissaient avec un avatar qui était contrôlé par un patient standardisé dans un bureau séparé. Les compétences des médecins ont augmenté à la suite de l'intervention, mais aucun suivi ne fut réalisé, ce qui constitue une critique généralisable à l'ensemble des études précédemment mentionnées (Andrade *et al.,* 2010; Hirumi *et al.,* 2016; Seymour, 2008). Un autre groupe de chercheurs a tenté de différencier les interactions entre un médecin et un patient virtuel (un personnage virtuel en tant que patient) ou un patient simulé (un humain réel qui simule un patient) lors de consultations cliniques pour une douleur chronique (Lok, 2006; Raij *et al.,* 2007). Aucune différence significative du niveau d'empathie du médecin envers le patient n'a été décelée. Toutefois, les paramètres non verbaux, tels que le comportement du corps et l'inclinaison de la tête, ont signalé une attitude plus pauvre et une attention réduite lors de l'interaction avec le patient virtuel. La compétence de l'empathie a également été enseignée à l'aide des patients virtuels au sein d'une autre étude contrôlée randomisée pour améliorer la communication à des étudiants en médecine (Foster *et al.,* 2016). Cette étude tentait de différencier les caractéristiques de trois groupes utilisant un patient virtuel : un groupe contrôle avec profil de patient dépressif, un groupe avec vidéo thématique montrant les comportements à adopter pour les médecins et un groupe avec rétroaction immédiate sur la communication empathique. Contrairement aux deux autres groupes, le groupe avec les rétroactions immédiates a démontré une amélioration significative sur le plan de l'empathie.

Pour conclure, les outils utilisant la technologie dans un contexte éducatif ou d'évaluation sont de plus en plus prévalents dans le milieu médical. Néanmoins, la technologie, par définition, ne cessera d'évoluer au fil des années. C'est pourquoi il est important d'identifier les forces ainsi que les faiblesses des outils précédents afin d'optimiser la création des outils futurs.

1.9.2 Les forces et les faiblesses dans l'utilisation de la technologie pour évaluer les compétences en CM pour la gestion des maladies chroniques

L'avenue de la technologie offre des outils permettant la diminution des biais humains au sein de l'évaluation. Il est toutefois important d'en connaitre les forces et les faiblesses dans ce contexte.

Une des critiques faites à l'égard de l'utilisation de simulateurs (immersion et réalité virtuelle) est que les exigences psychométriques d'une évaluation et la validité de prédiction sont problématiques: est-ce que la performance lors d'une évaluation prédira les performances futures en pratiques réelles? Néanmoins, quelques études randomisées ont exploré la validité de prédiction, centrale au modèle d'éducation basée sur les compétences (Grantcharov *et al.,* 2004; Seymour *et al.,* 2002), dans l'utilisation d'outils de

simulation. D'autre part, l'accessibilité des simulateurs en contexte de formations médicales est critiquée (Seymour *et al.,* 2002) : le coût, le temps, et les limitations techniques impliqués dans la création et l'utilisation des outils sont importants. La création d'un outil dépend de facteurs monétaires et temporels ne pouvant pas être négligés, leur coût de production pouvant aller de quelques milliers de dollars à plusieurs centaines de milliers de dollars (Lok, 2006). Cependant, ces types d'outils immersifs permettent d'obtenir une meilleure validité et fidélité. De plus, certains utilisateurs d'outils virtuels ont noté la difficulté relative au manque de repères non verbaux (Andrade *et al.,* 2010). La relation thérapeutique est importante dans un processus de changement de comportement, mais les signaux manquants seraient susceptibles de réduire l'engagement émotif et l'empathie du médecin (Batt-Rawden *et al.,* 2013; Hojat *et al.,* 2009), diminuant conséquemment la validité externe de l'outil d'évaluation.

En ce qui concerne les avantages de l'utilisation des simulateurs en contexte d'évaluation des médecins, il y a entre autres leur degré de fiabilité généralement élevé (c.-à-d., la reproductibilité). En raison de leur programmation, les simulateurs présentent des situations d'évaluation identiques pour chaque médecin et minimisent la variabilité inhérente aux rencontres cliniques (p. ex. : évaluation des médecins avec des cas virtuels). Cette reproductibilité est particulièrement importante en contexte d'évaluation de la performance à des fins de certification ou d'homologation professionnelles (Andrade *et al.,* 2010). Qui plus est, l'utilisation d'outils immersifs permet de mettre en scène plusieurs personnages avatars et de manipuler le sexe, l'ethnicité, la voix, l'âge et la masse corporelle des personnages au sein de différents environnements virtuels (Andrade *et al.,* 2010). La pertinence de cette fonction est l'intégration facile de diversité ethnique dans les scénarios et donc une meilleure représentativité de la population accueillie en rencontre individuelle par un médecin dans le cadre de sa pratique clinique (Bailenson *et al.,* 2006). Ensuite, la capacité d'utiliser les outils indépendamment de la situation géographique de la personne évaluée leur confère un avantage d'accessibilité et faisabilité. Subséquemment, cette qualité rend possible des études et évaluations à une échelle nationale ou internationale (Andrade *et al.,* 2010). Il est donc possible d'atteindre un grand nombre d'individus, sans qu'un investissement de temps de déplacement soit fait par ces derniers.

Il est donc important de noter les critiques portées quant à l'utilisation d'outils immersifs en évaluation. Cependant, les avantages qui y sont associés portent à croire que l'utilisation de ce type d'outil reste prometteuse dans le cadre d'évaluations de médecins. Ainsi, la conception et la validation d'un outil d'évaluation spécifiquement conçu pour évaluer le niveau de compétence CM auprès de médecins

semblent nécessaires et réalistes. Cet outil permettra l'évaluation des interactions médecin-patient de manière interactive et informatisée, en utilisant des cas de patients diversifiés présentant des problématiques propres au domaine des maladies chroniques adressées par le médecin évalué et en abordant des enjeux que la CM est en mesure de cibler efficacement (p. ex. : arrêt tabagique, amélioration de l'observance thérapeutique, début d'un programme d'exercice physique). Ainsi, nous souhaitons optimiser les caractéristiques de l'outil d'évaluation des compétences en CM : (1) en réalisant une revue de la littérature pour comparer les caractéristiques des outils existants; (2) en obtenant la perspective de médecins spécialistes concernant les comportements de santé problématiques de leurs patients; (3) en utilisant un Processus Delphi modifié auprès d'experts en changement de comportement afin de caractériser ce qu'est la CM et ce qui sera intégré à l'intervention auprès de médecins et à l'outil d'évaluation lui-même; (4) en validant l'outil auprès de médecins comparant l'évaluation d'expert en CM lors de situation d'entrevue médicale réelle et l'évaluation des compétences en communication via la nouvelle.

1.10 Objectifs de la thèse

Plusieurs lacunes au sein d'outil d'évaluation des compétences en CM sont notables et soulignent le besoin de créer un nouvel outil valide et fiable afin de bien évaluer l'impact des programmes de formations des médecins en CM : (1) la qualité des outils d'évaluation des compétences en communication existant; (2) le manque de cohérence entre les outils d'évaluation des compétences et les interventions voulant améliorer les compétences en communication des médecins qui ne sont pas soutenus par des théories ou modèles de changement de comportement; et (3) l'inexistence d'outils adaptés à l'évaluation des compétences en CM chez les médecins. L'objectif principal de cette thèse doctorale est de créer et de valider un outil d'évaluation des compétences en CM (le Motivational Communication Competency Assessment Test, MC-CAT) auprès de médecins traitants des maladies chroniques. Cet objectif sera divisé en trois objectifs spécifiques.

1.10.1 Premier article : Objectifs spécifiques

nº1 Déterminer les caractéristiques des outils d'évaluation de la communication les plus valides et les plus fiables sur le plan psychométrique. Nous procéderons à une revue systématique de la littérature comparant des caractéristiques psychométriques (p.ex., fiabilité, validité interne, validité externe) des différents types d'outils d'évaluation des compétences en communication (p.ex., questionnaire, enregistrement audio, observation, jeux sérieux, immersion, réalité virtuelle) ainsi que leur mode et temps

d'administration, leur capacité à engager l'utilisateur, leur méthode de validation et la théorie sous-tendant la création et la passation des outils.

1.10.2 Deuxième article : Objectifs spécifiques

nº2 Déterminer les comportements à risque pour la santé que les médecins canadiens jugent les plus importants à cibler dans le contexte de la gestion des maladies non transmissibles, ainsi que leurs perceptions et leurs attitudes quant à la possibilité de suivre une formation en matière de changement de comportement. Les résultats informeront les cibles comportementales de l'outil afin de garantir la validité et pertinence des cas pour les médecins.

1.10.3 Troisième article : Objectifs spécifiques

nº3 En s'informant des résultats de la revue systématique de littérature sur les caractéristiques des outils d'évaluation les plus valides et efficaces, ainsi que sur l'application intégrée des connaissances de parties prenantes (médecins, experts en changement de comportements), développer et valider un nouvel outil d'évaluation de compétences en CM qui sera facile à administrer et à coter dans le contexte clinique des médecins spécialistes, et qui saura engager les utilisateurs.

CHAPITRE 2

PREMIER ARTICLE : EVALUATION OF COMMUNICATION SKILLS AMONG PHYSICIANS: A SYSTEMATIC REVIEW OF EXISTING ASSESSMENT TOOLS

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Evaluation of communication skills among physicians: A systematic review of existing assessment tools

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2.1 Abstract

Objective: The importance of physician training in communication skills for motivating patients to adopt a healthy lifestyle and optimize clinical outcomes is increasingly recognized. This study inventoried and systematically reviewed the psychometric properties of, and the skills assessed by, existing assessment tools used to evaluate communication skills among physicians.

Methods: This review was conducted in accordance with the PRISMA guidelines (PROSPERO: CRD42018091932). Four databases (PUBMED, EMBASE, PsychINFO and SCOPUS) were searched up to December 2018, generating 3902 unique articles which were screened by two authors. A total of 57 articles met inclusion criteria and underwent full data extraction.

Results: Forty-five different assessment tools were identified. Only 47% of the studies mentioned underlying theories or models for designing the tool. Fifteen communication skills were assessed across the tools, the five most prevalent were information giving (46%) or gathering (40%), eliciting patients' perspectives (44%), planning/goal setting (37%), and closing the session (32%). Most tools (93%) assessed communication skills using in-person role play exercises with standardized (61%) or real (32%) patients, but only 54% described the expertise of the raters who performed the evaluations. Overall, reporting of the psychometric properties of the assessment tools was poor-moderate (4.5 ± 1.3 out of 9).

Conclusion: Despite identifying several existing physician communication assessment tools, a high degree of heterogeneity between these tools, in terms of skills assessed and study quality, was observed and most have been poorly validated. Research is needed to rigorously develop and validate accessible, convenient, "user-friendly" easy to administer and score communication assessment tools.

Keywords: Patient-physician communication; Medical Education; Assessment tool; Chronic disease management

2.2 Introduction

The World Health Organization (WHO) estimates that nearly 71% of all deaths worldwide result from non-communicable diseases, such as cardiovascular diseases, respiratory diseases, diabetes and cancer (World Health Organization, 2018). The development and progression of chronic diseases is strongly influenced by a specific cluster of poor health behaviours, namely smoking, unhealthy eating, excessive alcohol consumption, non-adherence to prescribed treatment and physical inactivity (Brisson et al., 2000; Inauen et al., 2017; Noonan et al., 2016; Watts et al., 2016; World Health Organization, 2003). Therefore, physicians' ability to effectively motivate patients to adopt and maintain a healthy lifestyle is critical for optimizing disease outcomes. Although several psychosocial factors contribute to poor health behaviours (e.g., knowledge and beliefs, levels of emotional distress, interpersonal support and behavioural skills) (Gonzalez et al., 2016; Naranjo et al., 2012), the quality of physicians' communication skills has been increasingly recognized as a critical determinant of patient behaviour change and better disease outcomes (Miller & Rollnick, 2012b; Rouleau et al., 2015). Beyond behavior change applications, effective communication skills have also been recognized as being important for engaging patients in their care, addressing knowledge gaps, helping patients overcome treatment fears, and improving the overall quality and effectiveness of the therapeutic relationship (Levinson, Lesser et Epstein, 2010; Rouleau et al., 2015).

Recognition of the importance of communication skills among physicians has been emphasized by physician regulatory bodies, including the Canadian College of Physicians and Surgeons (Royal College of Physicians and Surgeons of Canada, 2019) and the Royal College of Physicians (Royal College of Physician, 2019), who now identify the role of "communicator" as being one of the core competencies to be mastered by physicians. Communication skills competencies have been defined by the CanMEDS Framework (Royal College of Physicians and Surgeons of Canada, 2019) as the combination of: 1) establishing a professional therapeutic relationship; 2) eliciting and synthesizing of acute and relevant information; 3) sharing health care information and plans; 4) engaging patients and their families in developing plans; and 5) documenting and sharing of written and/or electronic information about the medical encounter. As a result, communication skills are increasingly taught across medical contexts and disciplines. However, there appears to be no consensus on training content or methods, and the assessment of the acquisition of the communication skills is not systematically carried out (Dragomir et al., 2019). For example, a recent systematic review exploring nine communication training programs in the context of behaviour change counseling targeting physicians demonstrated efficacy across all programs (Dragomir et al., 2019). However, training programs varied widely, and there was huge heterogeneity in

the methods and tools used to evaluate skills competency (Dragomir et al., 2019). While most programs used role-play exercises with simulated patients as their primary competency assessment method, there was an important discrepancy between the skills taught by the programs and the skills assessed (on average, only 30% of the skills taught were formally evaluated). A similar review of 17 training programs to improve breaking bad/difficult news by physicians and medical students also reported the use of a range of tools to assess skills competency (Johnson & Panagioti, 2018). While this review indicated whether tools were self or observer-rated, they did not report on the specific tools used to assess skills competency, which limits the ability to interpret the results. Finally, the authors failed to report the specific communication skills taught across the programs or assessed by the tools, which makes it difficult to know what skills are required to break bad/difficult news 'effectively' (Johnson & Panagioti, 2018).

Another recent systematic review examined twenty-five studies assessing the use of verbal and non-verbal communication skills by physicians during interactions with their patients. Among those studies, only twenty mentioned the assessment tool(s) that were used to evaluate those skills (Zill et al., 2014), and their respective psychometric properties (e.g., reliability, external validity) ranged from fair to poor. Of note, tools using external raters, as opposed to real patient or physician-reported measures, had significantly better psychometric property scores. This, coupled with the fact that both patients and physicians have been shown to be poor judges of physician communication skills (Joshi, Ling & Jaeger, 2004; Kirk et al., 2013), highlights the need to use objective assessment tools with trained third parties in this context, improving the inter-rater reliability. Taken together, these reviews highlight that there remain important gaps in our understanding of the relevance and quality of existing physician communication tools, which limits their potential utility and impact.

To our knowledge, no study has systematically or comprehensively reviewed existing physician communication assessment tools, including information about their theoretical foundation, range of skills assessed, relevant rater information (training, expertise), and available psychometric properties. The primary objective of this study was therefore to systematically inventory and critically review the quality of existing physician communication assessment tools, including information about their theoretical foundation, skills assessed, rater characteristics, and psychometric properties. The secondary objective was to compare the tools' administration characteristics (e.g., mode, duration, and cost) and their ability to effectively engage users, with the goal of identifying the properties of the most valid and effective communication assessment tools.

2.3 Methods

This review was conducted in accordance with the PRISMA guidelines (Liberati et al., 2009) and was registered with the International Prospective Register of Systematic Reviews (PROSPERO: CRD42018091932) (Boucher et al., 2018).

2.3.1 Inclusion/Exclusion Criteria

Original studies published up to December 15th 2018 in English or French in any peer-reviewed journal were included if they reported on an assessment tool used to measure physicians' communication skills. Reviews, abstracts only, chapters and theses were excluded, as were studies reporting on translated versions of tools (e.g., English version translated to Spanish). Due to the focus on communication skills in physician, included studies had to target using tools among specialists and/or general practitioners. Studies assessing other healthcare professionals' communication skills (e.g., nurses, pharmacists) were excluded. We only included studies that used tools that relied upon third-party ratings to assess physicians' communication skills; those using patient or physician self-evaluations of communication skills competency were not included due to concerns about bias. Finally, included studies had to report at least one psychometric property (e.g., internal validity, test-retest reliability, intra-rater / inter-rater agreement, sensitivity, specificity, external validity, positive/negative predictive values [PNV/NPV]).

2.3.2 Search strategy and review process

The search was conducted up to December 15th 2018 in the following electronic databases: PUBMED, EMBASE, PsychINFO and SCOPUS using the following keywords: "physician", "clinician", "doctor", "medical student", "medical resident" AND "tool", "instrument" AND "communication", "behaviour change", "behavior change", "motivational interviewing", "counseling", "counselling".

Reference lists of pertinent publications identified through the screening process, as well as those of previous systematic reviews, were examined to identify other relevant studies that could be added to the present review. This search process generated 3902 unique, potentially eligible studies. The following information was extracted from each study: Study characteristics (authors, publication year, assessment tool used [previously validated or not]); participant characteristics (number and type of participants); tool information (name, number of items, communication skills assessed, type of scale, theoretical foundations, administration time, scoring time and cost); rater information (type of rater, rater expertise, and rater training); and psychometric properties (internal validity, test-retest reliability, inter-rater agreement,

intra-rater, sensitivity, specificity, external validity and positive/negative predictive values). Inter-rater agreements and kappa coefficients (McHugh, 2012) with 95% confidence intervals were calculated using the two raters' scores (V.G.B. and C.G.) for all data extracted. Any disagreements were resolved by discussion with a third rater who was a senior member of the research team (K.L.L.).

2.3.3 Study quality

Study quality was assessed by two independent evaluators using the modified Consensus-based Standards for the selection of health status Measurement Instruments (COSMIN) checklist, which is a 10-item rating system assessing the quality criteria for tools design, methods and outcomes (Mokkink et al., 2010). This checklist is useful in helping reviewers identify the methodological qualities and study strengths and weaknesses (e.g., internal consistency, reliability, responsiveness). Since validation studies of translated versions of instruments were excluded, the 'cross-cultural validity' item was removed, leaving us with a 9-item checklist (where scores of 7 or higher may be considered high quality) (Mokkink et al., 2010; Terwee et al., 2012). The inter-rater agreement (V.G.B. and C.G.) scores for the study quality (76%, kappa=0.6) was moderate.

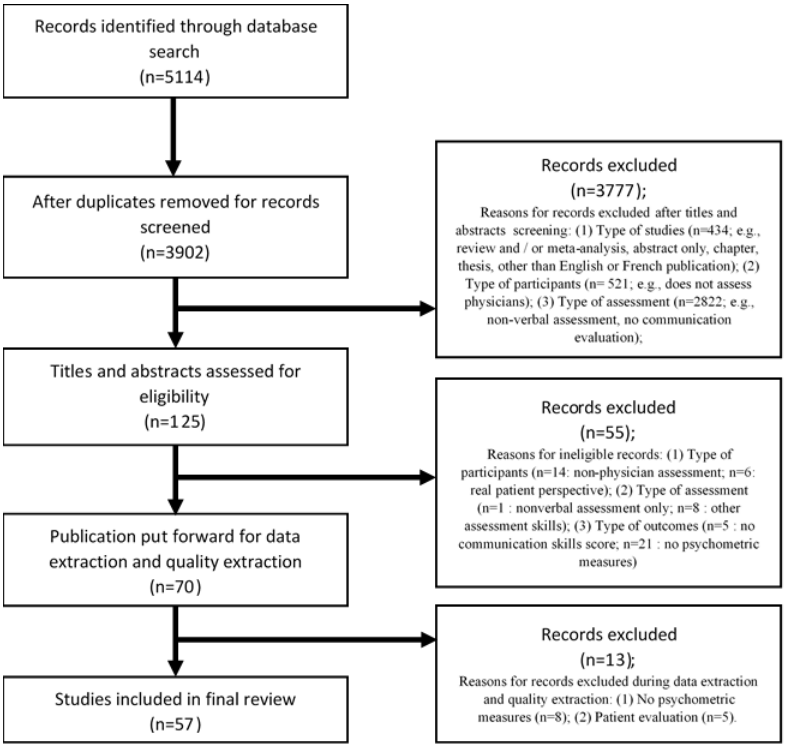

Figure 2-1Flow diagram

2.4 Results

2.4.1 Results of the search

This search process generated 5114 records; 1212 duplicate references were removed, resulting in 3902 unique potentially eligible studies. From these records, 125 full text articles were identified, and 70 publications were put forward for data extraction and quality extraction. As seen in Figure 1, 57 articles fulfilled all inclusion criteria (Ammentorp et al., 2013; Assis-Hassid et al., 2013; Assis-Hassid et al., 2015; Burt et al., 2014; Burt et al., 2018; Bylund & Makoul, 2002; Campbell et al., 2007; Caron et al., 2013; Chesser et al., 2013; Childers et al., 2012; Cohen et al., 2002; Dong et al., 2015; Ellman et al., 2016; Gallagher, Hartung & Gregory, 2001; Graf et al., 2017; Guimond et al., 2003; Gulbrandsen et al., 2013; Gustin et al., 2016; Hoppe et al., 1990; Howells et al., 2010; Huang et al., 2010; Hulsman et al., 2002; Humphris & Kaney, 2001; Huntley et al., 2012; Jerant et al., 2017; Joekes et al., 2011; Joshi et al., 2004; Karnieli-Miller et al., 2018; Kim et al., 2009; Kirk et al., 2013; Krupat et al., 2006; LeBlanc et al., 2009; Lockyer, Violato, & Fidler, 2006; Makoul, 2001; Menear et al., 2018; Mortsiefer et al., 2014; Musick et al., 2010; Newcomb et al., 2018; Niglio de Figueiredo et al., 2019; Park et al., 2019; Ram et al., 1999; Renaud & Cote, 2017; Shayne et al., 2006; Siminoff & Step, 2011; Simmenroth-Nayda et al., 2014; Strayer et al., 2011; Stubenrauch et al., 2012; Suojanen et al., 2018; Suzuki Laidlaw et al., 2006; Szmuilowicz et al., 2010; Teresi et al., 2005; Valverde et al., 2018; Violato, Lockyer & Fidler, 2006; Wouda & van de Wiel, 2013; Wroe et al., 2017; Zabar et al., 2010; Zaidi et al., 2012). The inter-rater agreement scores for the first round of eligibility assessment screening using titles and abstracts was high (85%), and agreement for data extraction was moderate (75%, kappa=0.5).

2.4.2 Study Characteristics

A total of 57 studies (published between 1990-2018) were included in the review, identifying 45 different assessment tools. Study and tool characteristics are summarized in Table 1. Only eight tools were used more than once: 1) the Objective Structured Clinical Examination (OSCE; n=4; 7%; Ellman et al., 2016; Huang et al., 2010; Mortsiefer et al., 2014; Zabar et al., 2010); 2) the Calgary-Cambridge Observation Guide Checklist (CCOGC; n=3; 5%; Ammentorp et al., 2013; Simmenroth-Nayda et al., 2014; Suzuki et al., 2006); 3) the SEGUE assessment tool (n=3; 5%; Assis-Hassid et al., 2013; Assis-Hassid et al., 2015; Makoul, 2001); 4) the Four Habits Coding Scheme (4HCS; n=2; 3%; Gulbrandsen et al., 2013; Krupat et al., 2006); 5) the Global Consultation Rating Scale (GCRS; n=2; 3%; Burt et al., 2014; Burt et al., 2018)); 6) the Liverpool Communication Skills Assessment Scale (LCSAS; n=2; 3%; Hulsman et al., 2002; Huntley et al., 2012); 7) the

Relational Communication Scale (RCS; n=2; 3%; Gallagher et al., 2001; Karnieli-Miller et al., 2018); and 8) the Self-Assessment Questionnaire (n=2; 3%; Lockyer et al., 2006; Violato et al., 2006). Most studies used a tool that been previously validated (33/57; 58%) and the others were original validation studies (24/57; 42%).

2.4.3 Participant Characteristics

Participant characteristics are summarized in Supplemental Content 1. In total, the studies reviewed included a total of 12,258 physicians, and the mean number of physicians participating in each study varied from 2 to 4991. Three different types of physicians were included, the largest groups being composed of practicing physicians (n=22 studies, n=1302; Assis-Hassid et al., 2015; Burt et al., 2014; Burt et al., 2018; Bylund & Makoul, 2002; Campbell et al., 2007; Chesser et al., 2013; Cohen et al., 2002; Guimond et al., 2003; Gulbrandsen et al., 2013; Howells et al., 2010; Hulsman et al., 2002; Jerant et al., 2017; Krupat et al., 2006; Lockyer et al., 2006; Menear et al., 2018; Niglio de Figueiredo et al., 2019; Ram et al., 1999; Siminoff & Step, 2011; Stubenrauch et al., 2012; Teresi et al., 2005; Violato et al., 2006; Zabar et al., 2010). Other types included medical students (n=21 studies; n=10,333 ; Ammentorp et al., 2013; Dong et al., 2015; Ellman et al., 2016; Gallagher et al., 2001; Graf et al., 2017; Huang et al., 2010; Humphris & Kaney, 2001; Huntley et al., 2012; Joekes et al., 2011; Karnieli-Miller et al., 2018; Kim et al., 2009; Kirk et al., 2013; LeBlanc et al., 2009; Makoul, 2001; Mortsiefer et al., 2014; Park et al., 2019; Renaud & Cote, 2017; Simmenroth-Nayda et al., 2014; Strayer et al., 2011; Suojanen et al., 2018; Zaidi et al., 2012) and medical residents (n=14 studies; n=623 ; Assis-Hassid et al., 2013; Caron et al., 2013; Childers et al., 2012; Hoppe et al., 1990; Huntley et al., 2012; Joshi et al., 2004; Musick et al., 2010; Newcomb et al., 2018; Shayne et al., 2006; Suzuki Laidlaw et al., 2006; Szmuilowicz et al., 2010; Valverde Bolivar et al., 2018; Wouda & van de Wiel, 2013; Wroe et al., 2017).

2.4.4 Tool Characteristics

Only 51% (n=23) of the tools mentioned the use of theories or models underlying the conceptualization and design of the tool (Ammentorp et al., 2013; Assis-Hassid et al., 2015; Burt et al., 2014; Burt et al., 2018; Bylund & Makoul, 2002; Chesser et al., 2013; Childers et al., 2012; Ellman et al., 2016; Gallagher et al., 2001; Graf et al., 2017; Guimond et al., 2003; Gulbrandsen et al., 2013; Gustin et al., 2016; Jerant et al., 2017; Karnieli-Miller et al., 2018; Kim et al., 2009; Kirk et al., 2013; Krupat et al., 2006; Menear et al., 2018; Niglio de Figueiredo et al., 2019; Renaud & Cote, 2017; Siminoff & Step, 2011; Strayer et al., 2011; Stubenrauch et al., 2012; Teresi et al., 2005; Zabar et al., 2010; Zaidi et al., 2012). Twenty different theories

or models were identified (see Supplemental Content 2). The most prevalent theories or models were a "patient-centered approach" (n=4; 7%; Assis-Hassid et al., 2015; Chesser et al., 2013; Ellman et al., 2016; Renaud & Cote, 2017), the "Four Habits" approach (n=3; 5%; Gulbrandsen et al., 2013; Karnieli-Miller et al., 2018; Krupat et al., 2006), "motivational interviewing" (n=2; 4%; Childers et al., 2012; Strayer et al., 2011), the "SKIPES" (Setting up the interview, assessing patient's Perception, obtaining the patient's Invitation, giving Knowledge and Information, addressing patient's Emotions, Strategy and Summary) model (n=2; 4%; Niglio de Figueiredo et al., 2019; Stubenrauch et al., 2012), and the "5 or 6 As" model (n=2; 4%; Kirk et al., 2013; Strayer et al., 2011).

Across the 45 tools identified by the review, a total of 15 distinct communication skills were assessed, with an average of 3.6 ± 2.0 per tool (range 1-10 skills) (see Supplemental Content 2). The top five skills assessed by the ensemble of tools were: information giving (n=26; 46%) or gathering (n=23; 40%); eliciting patients' perspectives (n=25; 44%); agenda or goal setting (n=21; 37%); and closing the session (n=18; 32%). Eleven studies, including ten tools, did not report the specific communication skills assessed by their tools (Cohen et al., 2002; Huang et al., 2010; Karnieli-Miller et al., 2018; Lockyer et al., 2006; Musick et al., 2010; Shayne et al., 2006; Teresi et al., 2005; Valverde Bolivar et al., 2018; Violato et al., 2006; Wouda & van de Wiel, 2013; Zaidi et al., 2012), referring to them as "general communication skills" (Stubenrauch et al., 2012) or "interpersonal communication skill behaviours" (Karnieli-Miller et al., 2018).

Most tools assessed physicians' communication competency during interactions with standardized (n=35; 61%) or real patients (n=18; 32%), which were coded by external raters (see below). Only four studies did not use any simulated or in-vivo observations to evaluate physicians, and only used a questionnaire/checklist (Assis-Hassid et al., 2015; Kim et al., 2009; Lockyer et al., 2006; Violato et al., 2006). Just over half of the studies (n=30 ; 53%) specified the administration time of the tool (mean = 52.4 min, range 5-250 min; see Table 1), but the scoring time was reported by only five studies (mean = 12 min; range 0.5-127 min; Campbell et al., 2007; Huntley et al., 2012; Krupat et al., 2006; Mortsiefer et al., 2014; Szmuilowicz et al., 2010). Only two studies (using the tools 4HSC and the OSCE) provided information regarding their costs, e.g., standardized patient fees, administrative assistance, analysis, rater training (mean = $428± $251 USD; Cohen et al., 2002; Ram et al., 1999).

2.4.4.1 Rater Characteristics

Supplemental Content 1 summarizes the characteristics of those who rated physicians' communication skills. Ninety percent of the studies described raters' characteristics or profession (i.e., other physicians, standardized patients, real patients, nurses, psychologists, students/research assistants, other professionals).

Just over half of the studies (n=31; 54%) described other rater qualifications (e.g., "physicians experienced in the teaching of communication skills" (Burt et al., 2018); "social and behavioural scientists"(Gallagher et al., 2001); "communication skills tutors with health care backgrounds" (Joekes et al., 2011)). About two thirds of the studies (n=37; 65%) reported information about the training that raters received prior to performing the assessments (e.g., "training manual, transcriptions of interactions, and videotapes of interactions between doctors and patient" (Teresi et al., 2005)). Finally, less than one third of the studies (n=16; 28%) reported the duration of rater training, with a range between 1.5 and 90 hours (mean = 14 ± 23.4 hours).

2.4.4.2 Psychometric Properties

Even though 42% of the studies in this review were validation studies, it was surprising that 61% (n=35) only reported one psychometric property for their tool. One third of the studies reported having measured two psychometric properties (n=19, 33%) and three studies measured more than two (n=3, 6%). The most commonly reported psychometric property was inter-rater agreement (n=40; 70%), followed by internal validity (n=29; 51%). Other psychometric measures such as test-retest reliability (n=4; 7%), intra-rater reliability (n=3; 5%) (though only seven of these studies provided information about the interval of time between the first and second assessment), sensitivity (n=2; 4%), and external validity (n=6; 11%) were assessed in less than fifteen percent of studies (see Table 1).

2.4.5 Study Quality

Study quality varied considerably, with an average score of 4.5 ± 1.3 (range: 2-7) out of a maximum of 9, which denotes studies of moderate quality (see Supplemental Content 3). The low-quality scores of the studies are mostly attributable to missing information related to psychometric analyses.

2.5 Discussion

This study systematically reviewed the literature on existing assessment tools of physicians' communication skills and summarized their psychometric properties. Additionally, this review examined the theoretical underpinnings of each tools' design, the communication skills assessed, their administration mode, and their validation methods. A total of 45 tools were identified across 57 studies (including 24 original validation studies, whereas 33 studies used a tool that had been previously validated). A great deal of heterogeneity was observed between the different tools in terms of the communication skills assessed, their psychometric properties, and the type of raters used. Only eight tools were used in more than one study, indicating a lack of consistency and consensus in the field. The individual tools had numerous limitations, most of which were attributable to replicability and how they were developed. For example, only 47% of the studies mentioned that the tools were based on any theory or model. Furthermore, of the twenty different theories or models identified, half of them were not clearly defined (e.g., "patient-centered approach", "relational communication", "group communication theory").

The modified COSMIN checklist revealed that the quality of the studies included in the review was low to medium, making it difficult to judge their validity and overall utility in this context (Schulz, Altman & Moher, 2010). One of the greatest limitations was the paucity of psychometric data reported for each tool. The majority of studies (61%) reported on only one psychometric property (e.g., inter-rater reliability) and none described any positive predictive values or negative predictive value analyses, specific for screening or competencies assessment tools (Trevethan, 2017). This indicates that no current tools assessing physician communication skills have psychometric properties or predictive data, which seriously undermines their validity and potential utility in an intervention context.

Forty-five different tools were identified by our review, and none are consistently being used, possibly because of design features that make them invasive/intrusive, time consuming, and minimally engaging. While no study specifically described the degree to which the tools were "user-friendly" and engaging for physicians, all but 4 relied upon in-vivo assessments of real or role played patient interactions (which many physicians may find cumbersome) that lasted on average 52 min (though some assessments lasted as long as 250 mins). This suggests that current tools may be poorly adapted for use by physicians, who have limited time available to complete such assessments. As a possible solution, we could potentially leverage technological advancements in simulation software to both increase physician engagement (e.g., via gamification of physician-patient interactions) and improve time optimization (e.g., via remote or online

assessments), using a standardized assessment method that ensures fidelity. For example, the integration of high-fidelity mannequins (Issenberg et al., 2005) or virtual clinical stations (Srinivasan et al., 2006) that increase the ecological validity of performance criteria assessments (e.g., conducting an interview with a patient) and action criteria assessments (e.g., asking open questions, expressing empathy) could be used. Whether it's an evaluation of a virtual patient (Cook et al., 2010) or physician technical skill assessment (Cook et al., 2013), technology has the ability to add a realistic look, increase, accessibility and optimize the fidelity of assessment or learning tools.

2.6 Limitations and Strengths

This review may be limited by the search criteria used, more specifically, we did not include the words "assessment" and "evaluation" because they lacked sufficient specificity in this context. Instead, we searched the terms "tool" or "instrument" which increased specificity for appropriately identifying assessment tools and instruments. We also excluded studies published in languages other than English or French, which may reduce generalizability among other languages or cultures. We also did not include studies that assessed communication skills among non-physicians (e.g., nurses, pharmacists), so results may only generalize to physicians. Finally, due to the high number and heterogeneity of assessment tools and outcomes that were measured we were unable to conduct any formal meta-analyses.

Despite some limitations, this review also has some notable strengths. To our knowledge, this is the largest and most comprehensive review of existing physician communication assessment tools to date. Previous reviews (e.g., Boon & Stewart, 1998; Zill et colleagues, 2014) have reviewed tools of questionable quality (published in non-peer-reviewed journals) and have included limited information about the tools. For example, these reviews failed to report the communication skills assessed by the tools, the theoretical foundations of the tools or the training and qualifications of raters. These limitations represent major gaps which the current review addresses. In addition to being more comprehensive, the present review was also more transparent in reporting by adhering to the PRISMA guidelines (Liberati et al., 2009). The present review also only included tools with external raters, which increases validity and reduces bias. This review addressed both tool and rater characteristics, especially those that may be relevant for uptake by physicians (e.g., training time, time of assessment), as well as the communication skills assessed. The results highlight a need to develop tools that are both psychometrically valid and predictive, but also have high probability of uptake by physicians.

2.7 Research and Practice Implications

Although the importance of communication skills training is now better recognized in the health sector, pre- and post-training skills assessments need to be consistently conducted, and the methodological considerations mentioned above should be addressed. Without appropriate competency assessments, it is impossible to demonstrate the efficacy or effectiveness of communication training. Thus, it is essential to use rigorously developed and validated tools to assess physicians' communication skills. In light of the results of this review, we offer the following recommendations for advancing research in the assessment of communication skills among physicians:

- All communication skills training programs, as well as their corresponding assessment tools, should be conceptualized and developed based on established theoretical models of communication and/or behaviour change. Relevant theories should be the foundation upon which the components of any training program and their outcomes are chosen, which helps us understand if, why, and how a training program is effective, or not (US Department of Health and Human Services, 2018).

- Communication skills training programs and their corresponding assessment tools should be designed concurrently, and their contents should be inherently linked: what is taught should be assessed pre- and post-training, ideally with an additional follow-up evaluation (Dragomir et al., 2019).

- Communication assessment tools should be appropriately validated and studies using these tools should be transparent and thorough in reporting their psychometric properties.

- There is a need to develop assessment tools that are both engaging (to physicians) and easy to administer and score. Leveraging new technology solutions (e.g., gamification of physician-patient interactions) may reduce the time burden of current tools, improve validity and fidelity, and increase uptake among physicians.

2.8 Conclusions

This systematic review summarized the existing literature on communication assessment tools for physicians. Training physicians to achieve competency in effective communication skills is central for motivating patients to adopt healthier lifestyles and to optimize disease outcomes. Due to the major shortcomings of existing communication assessment tools, we strongly recommend greater

methodological rigor for the development of new tools and the systematic evaluation of each component for which physicians received training. Moreover, assessment tools should be easy to administer and score, i.e., 'user-friendly,' to increase uptake by physicians. Leveraging new technology solutions may hold promise for increasing physician engagement (e.g., via gamification of physician-patient interactions), reducing the time needed for the assessments, and standardizing assessment methods for optimal fidelity and validity.

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Tableau 2-1 Characteristics of the studies and tools

	Tool	First author	Number of items	Type of measure	Patient type (RP, SP, NP)	Administration time (min)	Scoring time (min)	Cost	Validation / Previously validated	Internal validity	Test-retest reliability	Inter-rater agreement	Intra-rater reliability	Sensitivity	Specificity	External validity
1	Objective Structured Clinical Examination (OSCE)	Ellman, 2016	14		SP	20			Previously validated (adaptation paliative)	√		√				
		Huang, 2010	15	Score	SP	15 x 10-20 per station			Previously validated (med)	√						

		Mortsiefer, 2014	4	5-point response scale	SP	40	120hr / 456 students	387.5hr / 456 students	Previously validated (adaptation on complex communication issues)	√				
		Zabar, 2010	16	3-point scale	SP	50			Previously validated (med)	√		*		
2	Calgary-Cambridge Observation Guide Checklist	Ammentorp, 2013	12	5-point Likert scale	SP				No information			√		
		Simmenroth-	28	5-point scale	SP	8			Previously validated (med;		√	√*		

		Nayda, 2014						adaptation short version)			
		Suzuki, 2006		5-point Likert scale + yes / no assessment	SP	60		Previously validated (med)		√	
3	SEGUE assessment tool	Assis-Hassid, 2013	25	Yes/No questions	SP			Previously validated (med)		√	
		Assis-Hassid, 2015	23		NP			Previously validated (med; adaptation		√	

									electronic)			
		Makoul, 2001	25	Yes/No questions	SP	20.95			Validation		√	
4	Four Habits Coding Scheme (4HCS)	Gulbrandsen, 2013	23	5-point scale	RP				Previously validated (med)		√*	
		Krupat, 2006	23	5-point scale	RP	16.1	3.5		Validation	√	√	
5	Global Consultation Rating Scale (GCRS)	Burt, 2014	12	3-point scale	SP				Previously validated (med)		√	
		Burt, 2018	12	3-point scale	RP				Validation		√	

6	Liverpool Communication Skills Assessment Scale (LCSAS)	Humphris, 2001	12	4-point scale	SP	5		Previously validated (med)	√			
		Hunthley, 2012	10	5-point scale	SP	20	0.5	Validation (undergraduate)	√		√	
7	Relational Communication Scale (RCS)	Gallagher, 2001	34		SP	15		Validation (med)	√		√*	
		Kernieli-Miller, 2018	25	7-point likert scale	SP	5		Previously validated (com students)	√			

8	Self-Assessment/ patient/ co-worker/ medical colleague questionnaire / survey	Violato, 2006	37	5-point scale	NP			Previously validated (med)	√							√
		Lockyer, 2006	31	5-point rating scale	NP			Previously validated (med)	√							√
9	360-degree instrument	Joshi, 2004	10	5-point scale	SP			Validation			√					
10	Assessment of Doctor-Elderly Patient Transactions (ADEPT)	Teresi, 2005	23	5-point scale	RP			Validation (erderly patient)	√	√						

11	Case for Change web-based tool	Kim, 2009	8	Narrative response and 5-point Likert scale	NP			Previouly validated (med steudent); Validation		√		
12	CELI instrument	Wouda, 2013		4-point scale	SP			Previouly validated (med steudent : cite a study that cite another one...)		√		
13	Combined Behavioral Change Counseling Assessmen	Strayer, 2011	24	Yes / No questions	SP	11		Validation (adaptai on from previous	√		√	

	t Instrumen t (CBCCAI)							validate tools)							
14	ComOn Checklist	Niglio, 2017	5	5-point scale	RP			Previouly validated (med) / adaptati on		√					
15	Communic ation Assessmen t Tool (CAT)	Newco mb, 2017	14	5-point scale	RP; SP	10		Previouly validated (med)	√					√	
16	Communic ation in Oncology checklist (COM-ON)	Stubenr auch, 2012	31	5-point rating scale	SP			Validatio n		√					

17	Communication Rating System (CRS)	Hulsman, 2002	23	Description and Frequency of occurrence of each observation category + general rating (10-point scale)	RP			Previouly validated (no info)		√		
18	Connect, Identify, Understand, Consent, Help scale (CICCAA)	Valverde, 2018	29	3-point scale	RP	8.8		Previouly validated (health-care professionals / other		√	√	

								language)					
19	Conversation Rating Sheet for Breaking Bad News / direction of care	Szmuilowicz, 2010	18	Yes / No questions	SP	10	10	Previouly validated (med) / adaptation			√*	√	
20	Decision Support Analysis Tool (DSAT)	Guimond, 2003	14	Number of decision support process	RP	20.5		Validation			√		
21	Doctors' Observable Use of Self-Efficacy Enhancing	Jerant, 2017	10	Yes/no questions	SP			Previouly validated (no info)	√		√		

	Interviewing Techniques (DO U SEE IT) measure											
22	Doctor-patient Communication Competency Instrument for medical student (DPCC-MS)	Renaud, 2017	5	4-point response scale	SP			Validation	√			
23	Doctor-Patient (DP) scale	Joekes, 2011	17	5-point scale	SP	10		Previouly validated (med)			√*	

24	Diabetes Risk Factor Interview Scale (DRFIS)	Kirk, 2013	12	5-poin scale	SP	30		Previouly validated (med artery disease) / adaptation (diabetes)	√		√						
25	Essential Elements of Communication (ECC)	Dong, 2015	23	5-point Likert scale	SP			Previouly validated (med)	√					√		√	
26	Empathic Communication Coding	Bylund, 2002	6	6-point scale	RP			Validation (doctoral dissertation)			√						

	System (ECCS)										
27	Family Meeting Behavioral Skills Checklist (FMBSC)	Gustin, 2016	31	Yes/No/not applicable (each item) - 5-point summary rating scale	SP		Validation		√	√	
28	Global Health Delivery Competency Assessment Tool (GHD-CAT)	Wroe, 2017	15	7-point scale	RP		Validation			√	

29	Helpful Responses Questionnaire (HRQ)	Childers, 2012		6 vignettes - Presence or absence (0 or 1)	SP	150			Previouly validated (paraprofessional trainees)		√			
30	Integrated Procedural Performance Instrument (IPPI)	Leblanc, 2009	15	5-point	SP	120			Previouly validated (med)	√				
31	Maastricht Anamnestic and Advice Scoring list, Global	Ram, 1999	12	5-point Likert scale	SP	96		12 cases - 530 US$ and 680 $ for	Previouly validated (med)					√

	(MAAS-Global)							16 cases								
32	Matched-pair instrument (MPI)	Campbell, 2007	19	5-point scale	RP		2		Validation	√		√				√
33	Michigan State University Interaction Scale (MSIS)	Hoppe, 1990	5	6-point rating scale	SP	24			Previouly validated (med)			√				
34	Mini_CEX	Zaidi, 2012	7	8-point scale	RP				Validation?	√						
35	OPTION scale	Menear, 2018	12	5-point scale	RP	28	28		Previouly validated			√	√			

36	Objective, Structured, Communication Assessment of Residents (OSCAR) tool	Caron, 2007	52	4-point scale	SP	40			Validation	√		√		
37	Paediatric Consultation Assessment Tool (PCAT)	Howells, 2010	16	7-point scale	RP	37.5			Validation	√				
38	Physicians Assessment in Medical	Cohen, 2002	14	5-point global ratings	SP	250		250	Validation	√		√		

	Practice (PAMP)											
39	Patient-Centered Observation Form (PCOF)	Chesser, 2013	13	Checklist and number of patient-centered observation (0 to 4)	RP			Validation	√		√	
40	Resident Observation and Competency Assessment (ROCA) tool	Musick, 2010	4	Checklist + 5-point scale	RP	15		Validation	√			

41	Revised University of Illinois Communication and Interpersonal Skills (RUCIS)	Park, 2018	14	4-point scale	SP		Previouly validated (med)	√		√			√
42	Self-perception rating (for students); External perception rating (standardized patients)	Graf, 2017	4	6-point scale	SP		Validation	√	√	√*			

43	Siminoff Communication Content & Affect Program (SCCAP)	Siminoff, 2011		7-point scale	RP	55		Previouly validated (med)		√		
44	Standardized Direct Observation Assessment Tool (SDOT)	Shayne, 2006	26	3-point scale and 5 points scale global score	SP			Previouly validated (med)	√			
45	Communication Assessment tool	Suojanen, 2018	22	5-point scale	SP	10		Validation		√*		

*Authors indicated time of test-retest

Tableau 2-2 Supplemental Content 1. Participants and Rater information of each study

	First authors, publication year	Type of participants	Numbers of participants	Type of rater	Rater details	Did rater receive training?	Type of training	Duration of training
1	Ammentorp, 2013	Medical students	73	2; 5	Medical doctors with clinical experience			
2	Assis-Hassid, 2013	Medical residents	16	6	Authors of this paper	√	Coding rules and a codebook	
3	Assis-Hassid, 2015	Physicians	48	1; 4; 5; 6				
4	Burt, 2014	General practitioners	21	1	Experience in teaching and assessing communication skills using the tool	√	Training video of consultations for evaluation	2h

5	Burt, 2018	Physicians	45	1	Physicians experienced in the teaching of communication skills	√	Training session	2h
6	Bylund,2002	Physicians	20	5		√	Training to code using the tool	
7	Campbell, 2007	Physicians	91	1		√		
8	Caron, 2013	Medical interns	83	2; 6		√		
9	Chesser, 2013	Physician	39	1; 6	Four investigators clinicians and social science researchers	√	Training using video observation and use of the PCOF	

10	Childers, 2012	Third year medical residents	19	6	Experience in practicing and teaching MI scored the HRQ	√	Training with a rater guide and run-in scoring of 12 samples HRQS followed by a meeting to establish consensus	
11	Cohen, 2002	Physicians	45	1	Experienced members from departments of family medicine	√	Orientation prior to the start of the examination	1.5h
12	Dong, 2015	Medical students	167	1; 5		√		
13	Ellman, 2016	Fourth-year medical students	94	1; 2; 4; 6	Experienced standardized patients	√	Robust training	
14	Gallagher, 2001	Medical students	20	5; 6	Social and behavioral scientists	√	Training included reading and discussion of the nature of relational	3h

							communication, the history of the development of the instrument items, and how to view and code interviews	
15	Graf, 2017	Medical students	1027	2; 5	Longstanding experience in medical teaching sessions	√	Training based on video case studies	
16	Guimond, 2003	Family physicians	34		Raters familiar with health care setting and services, and with some understanding of the principal of communication	√	Training manual (included the training schedule, objectives, etc.)	3h

17	Gulbrandsen, 2013	Physicians	62	5	Four experienced psychology students did the rating	√		3 days
18	Gustin, 2016	Medical fellows	16	4	Health psychologists with postdoctoral training			
19	Hoppe,1990	Medical residents	54			√	Trained to rate the audiotaped interviews	
20	Howells, 2010	Physicians	19	1; 4	Paediatricians	√	Trained to use PCAT	1.5-2h
21	Huang, 2010	Medical students	265	1	Physicians specialists in internal medicine, surgery, obstetrics and	√	Training through seminars and communication skills courses	

					gynecology, and pediatrics			
22	Hulsman, 2002	Physicians	21					
23	Humphris, 2001	Medical students	544	6	Trained examiners (clinicians or communication skills teachers)	√		
24	Huntley, 2012	Medical students	731	4; 6	Experience as OSCE examiners and were clinicians, social science or clinical academic research staff, or doctoral students of clinical communication		Written information on the OSCE process including the assessment instrument and associated descriptors	

25	Jerant, 2017	Physician	50			√	Trained to apply the tool	
26	Joekes, 2011	Medical students	626	6	Communication skills tutors with health care backgrounds	√	Training comprised practice with student consultations and comparison of ratings	
27	Joshi, 2004	Medical residents	8	3; 5; 6; 7				
28	Kernieli-Miller, 2018	First-year medical students	36	6				
29	Kim, 2009	Third-year medical students	113	6	Two authors			
30	Kirk, 2013	Medical students	152	2; 5		√	Training regarding the use of the evaluation scale components	10h

31	Krupat, 2006	Physicians	50	5; 6; 7	Health professions students with some exposure to clinical practice	√		8-10h
32	LeBlanc, 2009	Medical students	32	4	Expert clinical raters			
33	Lockyer, 2006	Physicians	187	5				
34	Makoul, 2001	Medical students	446	2		√	Training session and must demonstrate the ability to accurately enact the case scenario and use the checklist	3.5h
35	Menear, 2018	Physicians	114	6		√		
36	Mortsiefer, 2014	Medical students	456	1; 2; 4	Psychologists or physicians recruited from	√	Video-taped doctor-patient encounters	2h

					the university staff		covering scenarios of the OSCE-stations	
37	Musick, 2010	Medical residents	88	6	Resident and faculty used the RO&CA	√		
38	Newcomb, 2017	Medical residents	24	2		√	Trained to complete the CAT using the behavior examples	
39	Niglio de Figueiredo, 2017	Physicians	73	4	Post-graduate education for psychotherapy and working in the psychosomatic liaison service	√	Eight training sessions of 3-4h	24-32h
40	Park, 2018	Second-year medical students (M2) and	360 (M2=190; M4=170)	2		√	Workshop including scoring video-recorded encounters of students	3h

		fourth-year medical students (M4)					of different performance level	
41	Ram, 1999	Family physician	90	1		√	Trained in four sessions, assessed the video recording	
42	Renaud, 2017	Medical students	4991	1	Eleven clinical teachers assessed videos			
43	Shayne, 2006	Medical residents	2	6	Faculty volunteers		Briefed on the purpose of the SDOT	
44	Siminoff, 2011	Physicians	39				Trained in tool procedures and content categories as well as social influence and relational communication theory	

45	Simmenroth-Nayda, 2014	Medical students	5	5; 6	Members from the Department of General Practice	√	Session including a short presentation of the experiment and the tool	1.5h
46	Strayer, 2011	Medical students	116	1; 4; 6	Second-year medical students	√	Read seminal texts and articles describing the theories, discussion about the instrument and guidelines, observation of clinical encounter and practice ratings of videotaped interviews	90h
47	Stubenrauch, 2012	Physicians	40	4	Three experienced psychologists	√	Trained to use the checklist. The raters were also informed about errors of psychological ratings.	

48	Suojanen, 2018	Third-year medical students	19	2; 5				
49	Suzuki Laidlaw, 2006	First- and second-year medical residents	78	6	Expert raters			
50	Szmuilowicz, 2010	Medical residents	49	6				
51	Teresi, 2005	Physicians	46	3; 5		√	Training manual, transcriptions of interactions, and videotapes of interactions between doctors and patient	39-42h
52	Valverde, 2018	Medical residents	119 (60 residents; 59 tutors)	6		√	Trained in the use and management of video	

							recording using the CICAA survey	
53	Violato, 2006	Physicians	100	1; 6; 7				
54	Wouda, 2013	Medical residents	50	4; 5	Principal investigator and psychology students			
55	Wroe, 2017	Medical resident	17	6				
56	Zabar, 2010	Physicians	14	2		√	Highly trained	
57	Zaidi, 2012	Medical students	60	5; 6; 7				
	#			52	31	37	32	16
	%			91	54	65	56	28

*1 day = 8 hours; For type of rater: 1= Physician, 2= Standardized patient, 3= Nurse, 4= Psychologists, 5= Student / Reasearch Assistant, 6= Observer / other professional, 7= Real Patient

Tableau 2-3 Supplemental Content 2. Communication skills assessed by the tools

	Tool	First author, publication year	Underlying theory/ model	Unspecify	Responding to resistance	Initiating the session	Closing the session	Providing a structure	Information (gathering / elicit)	Information (give)	Elicit patient's perspective	Elicit patient's confidence	Expressing empathy	Planification (agenda, change goal)	Questions	Listening	Respect	Response to patients' emotions (feeling)	Non-verbal	Total
1	Objective Structured Clinical Examination (OSCE)	Ellman, 2016	Patient-centered, holistic, bio-psycho-social-spiritual approach			√			√	√	√									4
		Huang, 2010	Not reported	√																1

		Mortsiefer, 2014	Not reported										√				√	√	3
		Zabar, 2010	Kirkpatrick Pyramid		√				√										2
2	Calgary-Cambridge Observation Guide Checklist	Ammentorp, 2013	Social cognitive theory			√	√		√	√	√			√					6
		Simmenroth-Nayda, 2014	Not reported			√	√	√	√	√	√								6
		Suzuki, 2006	Not reported			√	√	√			√								4
3	SEGUE assess	Assis-Hassid, 2013	Not reported						√	√	√								3

	ment tool	Assis-Hassid, 2015	Patient-centered care							√	√	√										3
		Makoul, 2001	Not reported							√	√	√			√							4
4	Four Habits Coding Scheme (4HCS)	Gulbrandsen, 2013	Four Habits Model		√	√						√		√								4
		Krupat, 2006	,, ,,		√	√						√		√								4
5	Global Consultation Rating Scale (GCRS)	Burt, 2014	Calgary-Cambridge guide		√	√	√	√	√	√					√					√		8
		Burt, 2018	,, ,,		√	√	√	√	√	√					√					√		8

6	Liverpool Communication Skills Assessment Scale (LCSAS)	Humphris, 2001	Not reported							√				√			√	√	4
		Hunthley, 2012	Not reported			√	√						√	√	√				5
7	Relational Communication Scale (RCS)	Gallagher, 2001	Relational communication			√	√						√				√		4
		Kernieli-Miller, 2018	Four Habits Model	√															1
8	Self-Assessment/ patient	Violato, 2006	Not reported	√															1

	/ co-worker / medical colleague questionnaire / survey	Lockyer, 2006	Not reported	√														1
9	360-degree instrument	Joshi, 2004	Not reported			√				√				√	√		√		5
10	Assessment of Doctor-Elderly Patient Transactions	Teresi, 2005	The three-function model of the medical interview	√					√	√			√						4

	(ADEPT)																									
11	Case for Change web-based tool	Kim, 2009	Kalamazoo Consensus Statement and Project RESPECT's client-centred counselling model					√		√		√			√											4
12	CELI instrument	Wouda, 2013	Not reported	√							√						√									3
13	Combined Behavioral Change	Strayer, 2011	The 5A's framework; Motivational		√					√	√	√		√	√	√	√	√	√							10

	Counseling Assessment Instrument (CBCCAI)		Interviewing skills and Stages of Change theory																						
14	ComOn Checklist	Niglio, 2017	SPIKES model			√	√	√			√										√		5		
15	Communication Assessment Tool (CAT)	Newcomb, 2017	Not reported						√		√			√		√							4		
16	Communication in Oncology checkli	Stubenrauch, 2012	SPIKES model							√				√									2		

	st (COM-ON)															
17	Communication Rating System (CRS)	Hulsman, 2002	Not reported					√	√			√		√	√	5
18	Connect, Identify, Understand, Consent, Help scale (CICCAA)	Valverde, 2018	Not reported	√												1
19	Conversation Rating Sheet	Szmuilowicz, 2010	Not reported											√		1

	for Breaking Bad News / direction of care																		
20	Decision Support Analysis Tool (DSAT)	Guimond, 2003	Ottawa Decision Support Framework				√	√	√			√	√	√					6
21	Doctors' Observable Use of Self-Efficacy Enhancing Interviewing	Jerant, 2017	Self-efficacy theory				√		√	√		√	√						5

	Techniques (DO U SEE IT) measure																
22	Doctor-patient Communication Competency Instrument for medical student (DPCC-MS)	Renaud, 2017	Patient Centered Clinical Method conceptual framework		√		√				√		√		4

23	Doctor - Patient (DP) scale	Joekes, 2011	Not reported			√	√								√		√			√	5
24	Diabetes Risk Factor Interview Scale (DRFIS)	Kirk, 2013	6 As of counselling				√								√	√					3
25	Essential Elements of Communication (ECC)	Dong, 2015	Not reported			√	√		√		√										5
26	Empathic Communication	Bylund, 2002	Interpersonal communicatio						√		√								√		3

	Coding System (ECCS)		n theory													
27	Family Meeting Behavioral Skills Checklist (FMBSC)	Gustin, 2016	Model of patient- and family-centered communication			√	√	√		√			√		5
28	Global Health Delivery Competency Assessment Tool (GHD-CAT)	Wroe, 2017	Not reported				√				√				2

29	Helpful Responses Questionnaire (HRQ)	Childers, 2012	Motivational interviewing		√				√		√	√		√					5
30	Integrated Procedural Performance Instrument (IPPI)	Leblanc, 2009	Not reported										√				√		2
31	Maastricht Anamnestic and Advice Scoring list, Global (MAAS	Ram, 1999	Not reported			√	√			√			√	√				√	6

	- Global)																
32	Matched-pair instrument (MPI)	Campbell, 2007	Not reported					√		√		√					3
33	Michigan State University Interaction Scale (MSIS)	Hoppe, 1990	Not reported					√									1
34	Mini_CEX	Zaidi, 2012	Positive Deviance Conceptual Framework	√													1

35	OPTION scale	Menear, 2018	Roger' diffusion of innovations theory						√		√	√		3
36	Objective, Structured, Communication Assessment of Residents (OSCAR) tool	Caron, 2007	Not reported								√			1
37	Paediatric Consultation Assessment	Howells, 2010	Not reported		√	√	√	√	√					5

	Tool (PCAT)														
38	Physicians Assessment in Medical Practice (PAMP)	Cohen, 2002	Not reported	√											1
39	Patient-Centered Observation Form (PCOF)	Chesser, 2013	Patient-centered communication using an interdisciplinary			√		√	√	√			√		5

			approach													
40	Resident Observation and Competency Assessment (ROCA) tool	Musick, 2010	Not reported	√												1
41	Revised University of Illinois Communication and Interpersonal Skills	Park, 2018	Not reported			√		√			√	√	√	√		6

	(RUCIS)														
42	Self-perception rating (for students); External perception rating (standardized patients)	Graf, 2017	Gender-specific approach across all dimensions of communication.			√				√				√	3
43	Siminoff Communication Content &	Siminoff, 2011	Group communication theory		√								√		2

	Affect Program (SCCAP)																		
44	Standardized Direct Observation Assessment Tool (SDOT)	Shayne, 2006	Not reported	√															1
45	Communication Assessment tool	Suojanen, 2018	Not reported						√	√								√	3
				Unspecify	Responding to resistance	Initiating the session	Closing the session	Providing a structure	Information (gather	Information (give)	Elicit patient's	Elicit patient's	Expressing empathy	Planification (agenda,	Questions	Listening	Respect	Response to patients' emotio	Non-verbal	Mean (S.D.)

							ing / elicit)		perspe ctive	confide nce		change goal)				ns (feelin g)		
	# (%)	11 (19)	3 (5)	17 (30)	18 (32)	7 (12)	23 (40)	26 (46)	25 (44)	2 (4)	13 (22)	21 (37)	11 (19)	6 (11)	3 (5)	12 (21)	9 (16)	3.6 (2.0)

Tableau 2-4 Supplemental Content 3. Methodological quality of studies - COSMIN checklist modified

	Tool's name	First author, year of publication	Validation / Previously validated	Internal consistency	Reliability	Measurement error	Content validity	Structural validity	Hypotheses testing	Criterion validity	Responsiveness	Interpretability	Total
1	Objective Structured Clinical Examination (OSCE)	Ellman, 2016	Previously validated (adaptation paliative)	√	√b	√	√	√		√		√	7
		Huang, 2010	Previously validated (med)	√		√	√	√				√	5
		Mortsiefer, 2014	Previously validated (adaptation complex communication issues)	√		√	√	√		√		√	6

		Zabar, 2010	Previously validated (med)	√			√					√	3
2	Calgary-Cambridge Observation Guide Checklist	Ammentorp, 2013	Previously validated		√b	√	√	√				√	5
		Simmenroth-Nayda, 2014	Previously validated (med; adaptation short version)		√b	√	√	√				√	5
		Suzuki, 2006	Previously validated (med)		√b	√							2
3	SEGUE assessment tool	Assis-Hassid, 2013	Previously validated (med)		√b		√	√	√			√	5

		Assis-Hassid, 2015	Previously validated (med; adaptation electronic)		√b	√	√	√				√	4
		Makoul, 2001	Validation		√b	√	√	√			√		4
4	Four Habits Coding Scheme (4HCS)	Gulbrandsen, 2013	Previously validated (med)		√b	√				√			3
		Krupat, 2006	Validation	√	√b	√	√	√				√	5
5	Global Consultation Rating Scale (GCRS)	Burt, 2014	Previously validated (med)		√b	√	√		√				4
		Burt, 2018	Validation		√b	√				√		√	4

6	Liverpool Communication Skills Assessment Scale (LCSAS)	Humphris, 2001	Previously validated (med)	√		√							1
		Hunthley, 2012	Validation (undergraduate)	√	√b	√	√					√	5
7	Relational Communication Scale (RCS)	Gallagher, 2001	Validation (med)	√	√b		√	√				√	5
		Kernieli-Miller, 2018	Previously validated (com students)	√		√			√			√	4
8	Self-Assessment/ patient/ co-	Violato, 2006	Previouly validated (med)	√		√	√	√				√	5

	worker/ medical colleague questionnaire / survey	Lockyer, 2006	Previouly validated (med)	√		√			√		√	4
9	360-degree instrument	Joshi, 2004	Validation		√b	√					√	3
10	Assessment of Doctor-Elderly Patient Transactions (ADEPT)	Teresi, 2005	Validation (erderly patient)	√	√a	√	√	√			√	6
11	Case for Change web-based tool	Kim, 2009	Validation		√a	√	√	√			√	5

12	CELI instrument	Wouda, 2013	Previouly validated (med student)		√a	√	√	√				√	5
13	Combined Behavioral Change Counseling Assessment Instrument (CBCCAI)	Strayer, 2011	Validation	√	√b		√					√	4
14	ComOn Checklist	Niglio, 2017	Previouly validated (med)		√b	√	√	√	√				5
15	Communication Assessment Tool (CAT)	Newcomb, 2017	Previouly validated (med)	√		√	√				√	√	5

16	Communication in Oncology checklist (COM-ON)	Stubenrauch, 2012	Validation		√b		√					√	3
17	Communication Rating System (CRS)	Hulsman, 2002	Previouly validated		√b	√	√	√	√			√	6
18	Connect, Identify, Understand, Consent, Help scale (CIACCAA)	Valverde, 2018	Previouly validated (health-care professionals)		√bc	√						√	3
19	Conversation Rating Sheet for Breaking Bad News /	Szmuilowicz, 2010	Previouly validated (med)		√bc	√	√	√	√			√	6

	direction of care												
20	Decision Support Analysis Tool (DSAT)	Guimond, 2003	Validation		√bc		√			√		√	4
21	Doctors' Observable Use of Self-Efficacy Enhancing Interviewing Techniques (DO U SEE IT) measure	Jerant, 2017	Previouly validated	√	√b	√	√	√					5
22	Doctor-patient Communication Competency	Renaud, 2017	Validation	√	√b	√	√	√				√	6

	Instrument for medical student (DPCC-MS)													
23	Doctor-Patient (DP) scale	Joekes, 2011	Previouly validated (med)		√b	√	√	√						4
24	Diabetes Risk Factor Interview Scale (DRFIS)	Kirk, 2013	Previouly validated (med artery disease) / adaptation (diabetes)	√	√b	√	√	√					√	6
25	Essential Elements of Communication (ECC)	Dong, 2015	Previouly validated (med)	√		√	√	√	√		√	√		7

26	Empathic Communication Coding System (ECCS)	Bylund, 2002	Validation		√b	√	√	√					√	5
27	Family Meeting Behavioral Skills Checklist (FMBSC)	Gustin, 2016	Validation		√ab		√	√		√			√	5
28	Global Health Delivery Competency Assessment Tool (GHD-CAT)	Wroe, 2017	Validation		√b								√	2

29	Helpful Responses Questionnaire (HRQ)	Childers, 2012	Previouly validated (paraprofessional trainees)		√b	√	√	√				√	5
30	Integrated Procedural Performance Instrument (IPPI)	Leblanc, 2009	Previouly validated (med)	√	√	√	√	√	√			√	6
31	Maastricht Anamnestic and Advice Scoring list, Global (MAAS-Global)	Ram, 1999	Previouly validated (med)			√	√			√			3

32	Matched-pair instrument (MPI)	Campbell, 2007	Validation	√		√b	√	√						4
33	Michigan State University Interaction Scale (MSIS)	Hoppe, 1990	Previouly validated (med)			√b	√	√	√	√			√	6
34	Mini_CEX	Zaidi, 2012	Validation	√			√							2
35	OPTION scale	Menear, 2018	Previouly validated (review)			√bc	√	√	√	√				5
36	Objective, Structured, Communication Assessment of Residents	Caron, 2007	Validation	√		√b	√						√	4

	(OSCAR) tool													
37	Paediatric Consultation Assessment Tool (PCAT)	Howells, 2010	Validation	√		√		√	√	√				5
38	Physicians Assessment in Medical Practice (PAMP)	Cohen, 2002	Validation	√		√b		√	√			√		5
39	Patient-Centered Observation Form (PCOF)	Chesser, 2013	Validation	√		√b			√	√				4
40	Resident Observation and Competency	Musick, 2010	Validation	√			√		√				√	4

	Assessment (ROCA) tool												
41	Revised University of Illinois Communication and Interpersonal	Park, 2018	Previouly validated (med)	√	√b	√	√	√			√	√	7
42	Self-perception rating (for students); External perception rating (standardized patients)	Graf, 2017	Validation	√	√ab	√							3

43	Siminoff Communication Content & Affect Program (SCCAP)	Siminoff, 2011	Previouly validated (med)		√b	√	√		√				4
44	Standardized Direct Observation Assessment Tool (SDOT)	Shayne, 2006	Previouly validated (med)	√	√	√							3
45	(No name for assessment tool)	Suojanen, 2018	Validation		√b	√	√	√	√				5
	#			29	46	48	44	32	13	8	4	38	Mean : 4.5

%	50.9	80.7	84.2	77.2	56.1	22.8	14.0	7.0	66.7	S.D. : 1.3

a. test-retest reliability; b. inter-rater reliability; c. intra-rater reliability

CHAPITRE 3

DEUXIÈME ARTICLE : PHYSICIAN PERCEPTIONS OF THE IMPORTANCE OF ADDRESSING HEALTH RISK BEHAVIOURS AMONG PATIENTS WITH NON-COMMUNICABLE DISEASES

Article soumis pour la revue SAGE Open Medicine

Physician perceptions of the importance of addressing health risk behaviours among patients with non-communicable diseases

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3.1 Abstract

Supporting patients to adopt a healthy lifestyle is critical for non-communicable disease (NCD) prevention and management but may be perceived as out of scope of medical practice. The goal of this study was to assess physician perceptions of their patient's health risk behaviors (HRB) and their attitudes around behavior change counselling (BCC) training. 80 physicians (22 cardiologists, 22 respirologists, 15 internists, 21 general practitioners) from six Canadian provinces completed the survey, assessing their perceptions and attitudes about addressing HRBs, and their willingness to undergo BCC training. Physical inactivity, smoking and medication non-adherence were identified as the most frequent and most important HRBs in the context of treating NCDs. While physicians rated addressing HRBs as important (9.1/10), they were only moderately confident (5.3/10) in their BCC skills, and moderately willing (6.3/10) to undergo BCC training. Despite believing addressing health behaviours to be important and lacking confidence in their BCC skills, physicians were only moderately interested in receiving training. Physicians recognize the importance of behaviour change counselling for chronic disease management but are ambivalent about receiving training; expanding their scope of practice and providing training incentives may remedy this.

3.2 Introduction

More than 70% of deaths worldwide result from non-communicable chronic diseases (NCDs), including cardiovascular disease (CVD), cancer, and chronic lung diseases (World Health Organization, 2014). The vast majority of NCDs are linked to poor lifestyle factors (i.e., poor health behaviors, such as, smoking, poor diet, and physical inactivity) (World Health Organization, 2018) that are critical to both the development and progression of NCDs. Due to the recognised importance of addressing health behaviors in the context of NCD management, physicians typically attempt to get patients to adopt a healthy lifestyle by giving “persuasive” information and advice (Elder et al., 1999; Sherson, Yakes Jimenez & Katalanos, 2014). However, these methods have been shown to be generally ineffective for motivating people to change, with success rates ranging between 5 to 10% (Bhupendrasinh F. Chauhan et al., 2017; Kottke et al., 1988). This approach seems to be perpetuated by the belief that simple knowledge of ‘what is good or bad’ for you should be sufficient to initiate and maintain behavior change. Behavioral science has repeatedly shown that knowing what to do (or not to do) and ‘common sense’ are poor motivators of behavior change, which tends to require both an intrinsic desire to experience the benefits of change (intrinsic motivation) and the specific skills needed to achieve this change (self-efficacy) (Kelly & Barker, 2016).

The majority of patients with NCDs are treated by either general practitioner’s (GP) or specialist physicians (e.g., cardiologists, pulmonologists, internists), with whom they generally sustain a significant long-term therapeutic relationship. It is necessary to effectively engage patients throughout treatment for this relationship to be positive and effective (Wylie & Leedham-Green, 2017). Indeed, up to 50% of patients leave their doctor’s office confused by the information received and feel ill-equipped to follow their treatment (e.g., taking their medication or undertaking behaviour change) (Bodenheimer, 2007; Schillinger et al., 2003). In addition, while 96% of patients report wishing to collaborate in decisions concerning their health, it is estimated that patients actively participate in therapeutic decisions only 9% of the time (Bodenheimer, 2007). This hints at the need for physicians to go beyond advice-giving and providing collaborative "behavioural” prescriptions to try and help patients to adopt and maintain a healthier lifestyle.

One behaviour change counselling (BCC) approach that shows promise for use by physicians is motivational communication (MC). It is an evidence-based, time-efficient communication style that has specifically been developed for use by healthcare providers in standard clinical settings to promote

sustained patient engagement and self-management of chronic conditions. It emphasises shared decision-making that is tailored to patients' preferences, goals, and values (Dragomir et al., 2021). As a result of its growing popularity and evidence base, the demand for physician training in MC-based approaches has steadily risen over the past decade (Dragomir et al., 2021). Although there is widespread dissemination of these programs, a recent systematic review on the existing MC-based training programs for physicians showed that there is surprisingly little data on their efficacy to change physicians' MC competency (Dragomir et al., 2019). Despite generally positive results, these programs were highly heterogeneous in terms of content, dose and structure, indicating no consensus in the field regarding what skills should be taught or how training should be built or delivered. Moreover, none of the programs studied to date seem to have been developed using an integrated knowledge translation (iKT) approach (Graham et al., 2006), through which all relevant stakeholders are engaged in the process, from program inception through to implementation. This might, in part, explain why these programs are so heterogeneous, and why they have not been successfully implemented into medical practice and curriculums across Canada yet (Gagliardi et al., 2016; Kothari & Wathen, 2017).

The objective of the present study was to determine which health risk behaviours Canadian physicians believe to be most important to target in the context of NCD management, and to assess their perceptions and attitudes about undergoing BCC training.

3.3 Methods

A national online survey was emailed as an open invitation to Canadian physicians from four target specialities that treat a high number of chronic disease patients (i.e., cardiology, respirology, internal medicine, and general/family medicine). Physicians from other specialities (e.g., psychiatry) and allied healthcare professionals (e.g., nurses, physiotherapists) were excluded. The survey was disseminated as widely as possible in January 2018 through relevant medical associations (e.g., Hypertension Canada) and networks (e.g., Canadian Respiratory Research Network). Physicians were invited to complete a brief 10-minute online questionnaire (LimeSurvey©), which was available in both English and French. Ethical approval was provided from the CIUSSS-NIM, Hôpital du Sacré-Coeur de Montréal (#2016-1206) and all participants provided informed consent electronically. This study's results were reported using the STROBE checklist for observational studies (Von Elm et al., 2007).

Physicians were first asked to identify what they believe to be important health risk behaviors and to rank their relative importance. They were presented with a list of fourteen health risk behaviors that were generated by our multi-stakeholder research team that included behavioral experts, physicians, and health psychology graduate students. The list included: 1) Difficulty managing stress; 2) Drug consumption; 3) Excessive alcohol consumption; 4) Misuse of prescription medication; 5) Medication non-adherence; 6) Physical inactivity; 7) Preference for alternative or homeopathic therapies; 8) Refusal to get vaccines other than yearly flu vaccine; 9) Refusal to get yearly flu vaccine; 10) Refusal to participate in rehabilitation programs; 11) Refusal to use an action plan in the event of disease; 12) Refusal to use a self-monitoring device; 13) Smoking; and 14) Unhealthy diet. Physicians were also invited to add any health risk behaviors not included in the original list.

They were then asked to estimate the prevalence of each health risk behaviour among their patients (expressed as a % of patients who exhibited this behaviour within their practice, with the following five options: 0-10%; 11-25%; 26-50%; 51-75%; 76-100%). The prevalence of each behaviour was reported separately. The mean perceived prevalence was calculated for all physicians and as a function of medical specialty using the median of each prevalence choice (e.g., 11-25% = 18%) divided by the number of physicians who identified the health behaviour encountered. Physicians were then asked to rank the relative importance each health behaviours identified, from least to most important in the context of NCD prevention or management. The mean (SD) rank of each identified health risk behaviour (which was converted to an ordinal rank from 1st to least among those physicians who identified each health risk behaviour as important) was then calculated.

The second part of the questionnaire asked physicians to rate their perceived level of confidence in conducting BCC, as well as their level of motivation and commitment towards participating in an accredited BCC continuing medication education (CME) training program. Each were scored on a 10-point scale ranging from “Not at all” to “Extremely”. Finally, physicians were asked to select the number of hours they would be willing to devote to BCC training (1, 4, 8, 16 hours or other). If physicians selected the option “other”, they were invited to write the number of hours they would be willing to spend in training. Average (SD) scores for confidence, motivation, and commitment were calculated. Distributions were provided for the training length.

Demographic data including sex, age, province of practice within Canada, primary language of practice, primary clinical setting, number of years of practice, and average number of patients with NCD seen per week was collected. This study's results were reported using the STROBE checklist for observational studies (Table 3.6; Von Elmet al., 2007). This study was conducted as part of a larger study aiming to design an evidence-based BCC training program in collaboration with physicians.

3.4 Results

3.4.1 Characteristics of participants

A total of 154 survey responses was collected; 38 did not meet inclusion criteria (i.e., were completed by psychiatrists, nurses) and 36 were excluded on the basis of incomplete surveys. A total of 80 physicians (22 cardiologists; 22 respirologists; 15 internal medicine specialists; 21 general/family medicine doctors) were included in the analyses (see Table 3.1 for a summary of physician characteristics by specialty). Just over half of participants were male (n=44; 55%), indicated French as their first language (n=50; 62.5%). Most practiced in the province of Quebec (n=55; 68.8%) or Ontario (n=17; 21.3%). The average age of participants was 49.3 years (±12.9) with an average of 18 (±11.9) years of practice (range from 1 to more than 35 years) and they reported and average of 38 (±24.2) weekly NCD consultations.

(Insert Table 3.1 here)

3.4.2 Patients' health risk behaviours frequency, ranking and prevalence

As presented in Table 3.2, the three health risk behaviours most frequently identified by physicians were physical inactivity (94%), smoking (91%) and medication non-adherence (89%). Four health behaviours were identified by less than one third of physicians: refusal to use a self-monitoring device (32%), preference for alternative or homeopathic therapies (32%), refusal to get other vaccines than yearly flu vaccine (29%) and refusal to use an action plan in the event of disease (16%). Physicians ranked smoking (1st), physical inactivity (2nd), and medication non-adherence (3rd) as the most important health risk behaviours to address in the context of NCD management. The following health risk behaviours were perceived as the most prevalent among their patients: 1) physical inactivity (average prevalence = 58%); 2) unhealthy diet (47%); and 3) difficulty managing stress (45%). For a summary of how these ratings and rankings differed as a function of medical specialty, see Table 3.2 and 3.5.

(Insert Table 3.2 here)

3.4.3 Attitudes among all physicians and as a function of medical specialty

Physicians' attitudes about BCC are presented in Table 3.3. Overall, physicians believed that addressing health risk behaviours was extremely important for NCD management (M=9.1; ranging from an average of 8.9 [Cardiologists] to 9.3 [General/Family Med]). Nevertheless, physicians identified themselves as being only moderately confident in their ability to effectively conduct BCC with their patients (M=5.3; ranging from 4.7 [General/Family Med] to 5.9 [Internal Medicine]). Despite recognising the high importance of addressing health risk behaviours and having generally a low to moderate confidence in their BCC skills, physicians' interest in participating to accredited BCC CME training programs was only moderate (6.3; ranging between 5.0 [General/Family Med] to 7.4 [Respirologists]). Finally, as shown in Table 3.4, just under half (46.3%) of physicians were willing to spend about 4 hours in BCC training, while only 16.3% were willing to devote more than 8 hours to it. On average, physicians were willing to dedicate about 3.8 ± 3.0 hours in total to training.

(Insert Table 3.3 here)

(Insert Table 3.4 here)

Figure 1. Health risk behaviors presented in order of importance in practice

[Insert figure 3.1 here]

3.5 Discussion

Interestingly, the behaviors identified as most prevalent (physical inactivity, unhealthy diet and difficulty managing stress) were not those identified as most important to address (non-adherence to medication and smoking). Physicians also reported that conducting nutritional and stress counselling fell outside the scope of their practice, leading to a higher number of patients exhibiting problematic eating habits and poor stress management (Kolasa & Rickett, 2010). This contrasts with poor medication adherence and smoking, which physicians generally felt more qualified to address (Cornuz et al., 2000; Tarn et al., 2006). This study also revealed that physicians believe it is important to address health risk behaviors in the context of NCD management, but were only moderately confident in their ability to change patient's behaviors. Physicians' acknowledgement of this competency gap suggests they would be motivated to pursue training in BCC. However, our results showed that they were only moderately interested in getting

BCC skills training and only willing to dedicate about 4 CME training hours to this activity. These findings indicate a discrepancy between physicians' perceived importance of addressing health risk behaviors and their willingness to acquire the skills to support patients in their efforts to change their health risk behaviors. Understanding the reasons for this discrepancy and its implications will be critical for improving implementation and uptake of BCC training programs aimed at optimising physicians' capacity to effectively manage NCDs in their practice.

3.6 Limitations and Strengths

This study may be limited by the modest sample size. However, we endeavoured to recruit a similar number of physicians across four major medical specialties (cardiologists, respirologists, internal medicine specialists and general/family medicine doctors), and our sample was very representative of all physicians in Canada. Specifically, the proportion of male (58% vs. 55%) and female (42% vs 45%) physicians was comparable, as was the average age of our sample (49.5 years vs 49.3 years) and their years of practice (22.5 years vs 18 years) (Canadian Insitute for Health Information, 2018). Our study is also strengthened by the use of an iKT approach to assessing physician perceptions and training needs, which will help us design a BCC training program that is acceptable and feasible for physicians (Graham et al., 2006). Finally, to our knowledge, this is the first study to assess physician perceptions and attitudes regarding addressing health risk behaviors in the context of NCD management, which is a critical first step for engaging them in training programs focusing on improving BCC skills.

3.7 Implications for Practice

The association between poor health risk behaviors and the development and exacerbation of NCDs is well known and accepted by the local and global medical communities (World Health Organization, 2018). Furthermore, the growing popularity of approaches like BCC among physicians has been emphasized by regulatory bodies, including the Canadian College of Physicians and Surgeons and the Royal College of Physician, who now identify the role of "communicator" as one of the six core competencies that should be mastered by physicians in their efforts to effectively meet the healthcare needs of the people they serve. An in-depth exploration of this discrepancy was beyond the scope of the present study but should be the focus of future research.

3.8 Availability of data and materials

The data used during this study are available from the corresponding author on reasonable request.

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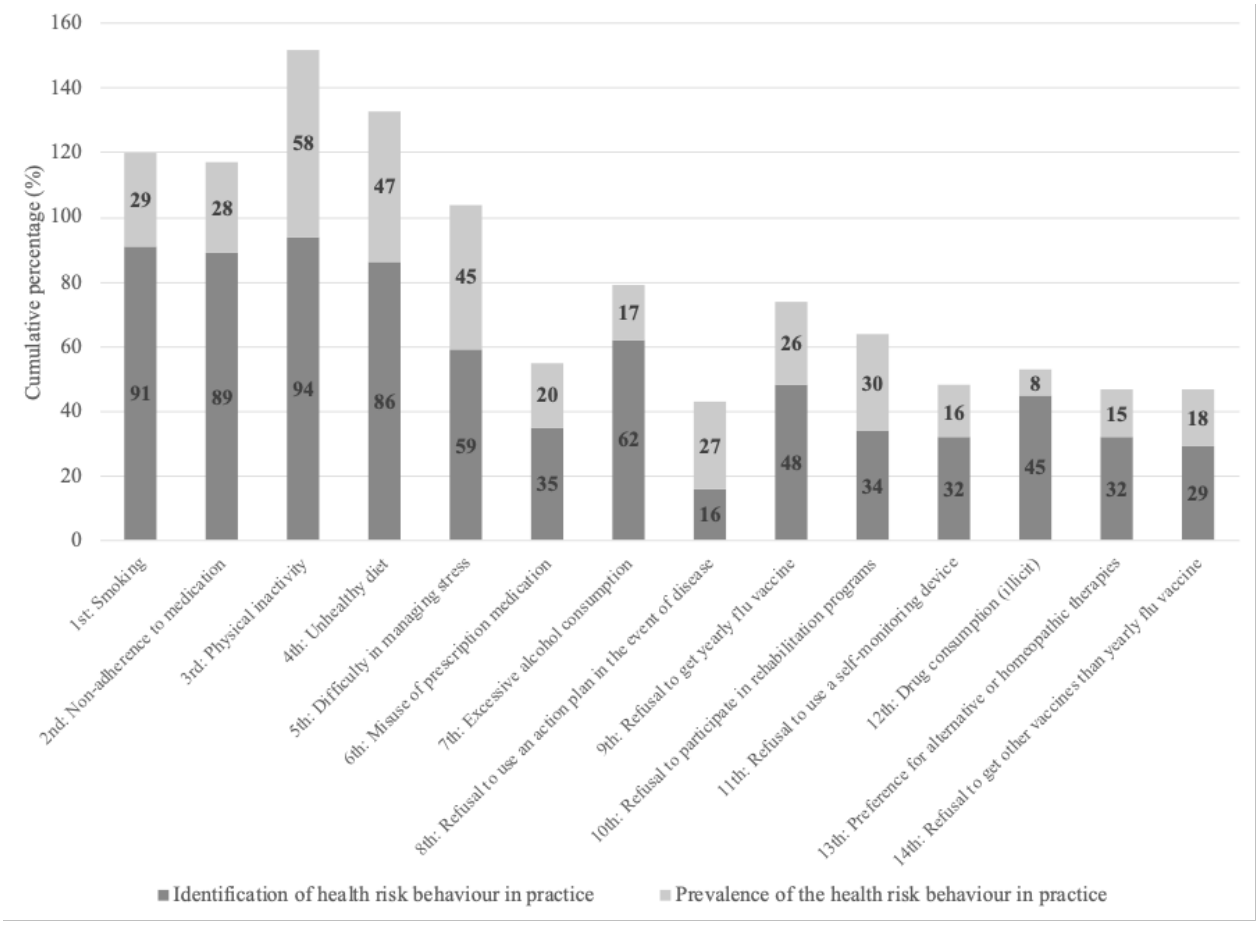

Figure 3-1 Health risk behaviors presented in order of importance in practice

Tableau 3-1 Participants' characteristics

Variable (%)	Total	Cardiology	Respirology	Internal Medicine	General / Family Medicine
Men (Women)	44 (36)	15 (7)	13 (9)	11 (4)	5 (16)
FR speaking (EN)	50 (30)	18 (4)	13 (9)	2 (13)	17 (4)
Age (SD)	49.3 (12.9)	50 (13.7)	51.4 (12.6)	50.3 (11.9)	45.5 (13.2)
Years of practice (SD)	18 (11.9)	17.4 (13.0)	20.0 (11.7)	17.5 (11.0)	17.0 (12.3)
Av # of patients per week (SD)	38 (24.2)	46 (24.4)	42 (25.7)	30 (23.0)	31 (21.1)
Province of practice (%)					
Alberta	2 (2.5)	0 (0)	1 (1.3)	0 (0)	1 (1.3)
British Columbia	3 (3.8)	0 (0)	2 (2.5)	1 (1.3)	0 (0)
New Brunswick	1 (1.3)	1 (1.3)	0 (0)	0 (0)	0 (0)
Nova Scotia	2 (2.5)	0 (0)	1 (1.3)	1 (1.3)	0 (0)
Ontario	17 (21.3)	2 (2.5)	3 (3.8)	9 (11.2)	3 (3.8)
Quebec	55 (68.8)	19 (23.8)	15 (18.8)	4 (5.0)	17 (21.3)

EN: English; FR: French; SD: Standard deviation; Percentage within specialty group

Tableau 3-2 Assessment of patients' health risk behaviours (identification, ranking importance, perceived prevalence)

Health Risk Behaviours (SD)	All Physicians (N=80)			Cardiology (N=22)			Respirology (N=22)			Internal Medicine (N=15)			General / Family Medicine (N=21)		
	N (%)	RK	Prevalence	N (%)	RK	Prevalence	N (%)	RK	Prevalence	N (%)	RK	Prevalence	N (%)	RK	Prevalence
Physical inactivity	75 (94)	3	58.0 (19.7)	21 (95)	4	53.1 (19.4)	20 (91)	3	57.0 (17.3)	13 (87)	4	59.5 (23.9)	21 (100)	1	63.0 (19.4)
Smoking	73 (91)	1	28.7 (19.9)	21 (95)	1	32.2 (21,7)	21 (95)	1	29.9 (16.6)	12 (80)	3	22.8 (21.0)	19 (90)	2	27.3 (20.8)
Non-adherence to medication	71 (89)	2	27.8 (18.9)	16 (73)	2	18.4 (6.1)	21 (95)	2	21.9 (11.5)	14 (93)	1	21.9 (11.5)	20 (95)	5	29.2 (20.9)
Unhealthy diet	69 (86)	4	47.2 (18.2)	21 (95)	3	45.6 (17.1)	17 (77)	6	47.4 (18.6)	11 (73)	2	50.3 (24.5)	20 (95)	3	47.0 (16.3)
Excessive alcohol consumption	50 (62)	7	16.6 (14.7)	13 (59)	8	11.0 (6.7)	8 (36)	11	13.1 (6.7)	10 (67)	6	20.1 (13.6)	19 (90)	7	20.1 (20.0)

Difficulty in managing stress	47 (59)	5	44.8 (18.9)	13 (59)	6	40.7 (14.7)	10 (45)	5	44.5 (20.8)	6 (40)	9	39.7 (20.2)	17 (81)	4	47.4 (18.6)
Refusal to get yearly flu vaccine	38 (48)	9	25.8 (17.6)	5 (23)	12	35.0 (18.6)	14 (64)	7	20.4 (10.6)	6 (40)	12	30.8 (29.9)	13 (62)	9	25.6 (16.4)
Drug consumption (illicit)	36 (45)	12	8.4 (7.3)	6 (27)	7	7.2 (5.3)	9 (41)	10	7.9 (5.7)	7 (47)	10	13.4 (12.4)	15 (71)	12	12.3 (21.4)
Misuse of prescription medication	28 (35)	6	20.0 (15.4)	3 (14)	11	9.3 (7.5)	11 (50)	4	23.4 (16.9)	4 (27)	5	24.8 (16.2)	10 (48)	8	17.5 (15.1)
Refusal to participate in rehabilitation programs	27 (34)	10	30.4 (18.8)	5 (23)	7	30.0 (11.0)	14 (64)	8	34.7 (21.7)	2 (13)	14	21.5 (23.3)	6 (29)	14	23.7 (16.4)

Refusal to use a self-monitoring device	26 (32)	11	16.2 (13.6)	9 (41)	10	11.5 (6.9)	5 (23)	13	16.8 (13.5)	6 (40)	11	27.8 (22.7)	6 (29)	11	13.7 (6.7)
Preference for alternative or homeopathic therapies	26 (32)	13	15.0 (14.6)	5 (23)	5	11.6 (14.8)	5 (23)	14	10.2 (7.1)	7 (47)	13	15.3 (11.9)	9 (43)	10	19.4 (19.6)
Refusal to get other vaccines than yearly flu vaccine	23 (29)	14	18.4 (12.0)	1 (5)	13	38.0 (0.0)	7 (32)	12	21.9 (12.0)	3 (20)	7	13.7 (7.5)	12 (60)	13	15.9 (12.0)
Refusal to use an action plan in the	13 (16)	8	27.5 (25.2)	1 (5)	14	5.0 (0.0)	6 (27)	9	22.5 (13.0)	3 (20)	8	35.3 (29.1)	3 (14)	6	37.0 (44.6)

event of disease		

%: Percentage of behavior identification in their clinical practice with their patients; RK: Average relative rank for importance ; Shaded section represents health risk behavior endorsed by less than third of the physicians.

Tableau 3-3 Physicians' average ratings of attitudes toward health risk behaviours management among patients with NCDs

Variable (SD)	Total	Cardiology	Respirology	Internal Medicine	General / Family Medicine
Level of importance	9.1 (1.2)	8.9 (1.2)	9.2 (1.1)	9 (1.2)	9.3 (1.1)
Level of confidence	5.3 (1.7)	5.2 (1.4)	5.5 (1.4)	5.9 (2.2)	4.7 (1.9)
Level of interest in training	6.3 (2.5)	6.2 (2.2)	7.4 (2.1) ‡	6.8 (2.1)	5 (2.9) ‡

Tableau 3-4 Physicians' ratings of number of hours devote in BCC training

Variable (%)	Total	Cardiology	Respirology	Internal Medicine	General / Family Medicine
Number of hours devote					
1	21 (26.3)	7 (31.8)	4 (18.2)	4 (26.7)	6 (28.6)
4	37 (46.3)	9 (40.9)	11 (50.0)	9 (60.0)	8 (38.1)
8	11 (13.8)	3 (13.6)	3 (13.6)	2 (13.3)	3 (14.3)
16	2 (2.5)	0	1 (4.5)	0	1 (4.8)
Other	9 (11.3)	3 (13.6)	3 (13.6)	0	3 (14.3)
Average	3.8 ± 3.0	3.2 ± 2.4	4.3 ± 3.3	3.7 ± 2.2	3.9 ± 3.7

* Other number of hours devote: 2 x 0 hours, 1 x 30 minutes, 4 x 2hours and 2 x 3hours; Percentage within specialty group

Tableau 3-5 Supplementary Content 1. Physicians' perception of prevalence of patients' health risk behaviours

Health Risk Behaviours (SD)	Prevalence	All Physicians N (%)	Cardiology N (%)	Respirology N (%)	Internal Medicine N (%)	General / Family Medicine N (%)
Physical inactivity	0-10%	1 (1.3)	1 (4.5)	0	0	0
	11-25%	2 (2.5)	0	1 (4.5)	1 (6.7)	0
	26-50%	23 (28.8)	8 (36.4)	5 (22.7)	4 (26.7)	6 (28.6)
	51-75%	35 (43.8)	10 (45.5)	12 (54.5)	4 (26.7)	9 (42.9)
	76-100%	14 (17.5)	2 (9.1)	2 (9.1)	4 (26.7)	6 (28.6)
Smoking	0-10%	9 (11.3)	2 (9.1)	0	4 (26.7)	3 (14.3)
	11-25%	34 (42.5)	9 (40.9)	11 (50.0)	5 (33.3)	9 (42.9)
	26-50%	21 (26.3)	6 (27.2)	9 (40.9)	1 (6.7)	5 (23.8)
	51-75%	6 (7.5)	3 (13.6)	0	2 (13.3)	1 (4.8)
	76-100%	3 (3.8)	1 (4.5)	1 (4.5)	0	1 (4.8)
Non-adherence to medication	0-10%	7 (8.8)	1 (4.5)	0	2 (13.3)	4 (19.0)
	11-25%	37 (46.3)	14 (63.6)	9 (40.9)	8 (53.3)	6 (28.6)
	26-50%	20 (25.0)	1 (4.5)	7 (31.8)	4 (26.7)	8 (38.1)

	51-75%	4 (5.0)	0	3 (13.6)	0	1 (4.8)
	76-100%	3 (3.8)	0	2 (9.1)	0	1 (4.8)
Unhealthy diet	0-10%	0	0	0	0	0
	11-25%	7 (8.8)	2 (9.1)	2 (9.1)	2 (13.3)	1 (4.8)
	26-50%	36 (45.0)	12 (54.5)	8 (36.4)	4 (26.7)	12 (57.1)
	51-75%	21 (26.3)	6 (27.2)	6 (27.2)	3 (20.0)	6 (28.6)
	76-100%	5 (6.3)	1 (4.5)	1 (4.5)	2 (13.3)	1 (4.8)
Excessive alcohol consumption	0-10%	20 (25.0)	7 (31.8)	3 (13.6)	3 (20.0)	7 (33.3)
	11-25%	23 (28.8)	6 (27.3)	5 (22.7)	4 (26.7)	8 (38.1)
	26-50%	6 (7.5)	0	0	3 (20.0)	3 (14.3)
	51-75%	0	0	0	0	0
	76-100%	1 (1.3)	0	0	0	1 (4.8)
Difficulty in managing stress	0-10%	0	0	0	0	0
	11-25%	9 (11.3)	2 (9.1)	3 (13.6)	2 (13.3)	2 (9.5)
	26-50%	20 (25.0)	8 (36.4)	2 (9.1)	2 (13.3)	8 (38.1)
	51-75%	16 (20.0)	3 (13.6)	5 (22.7)	2 (13.3)	6 (28.6)

	76-100%	2 (2.5)	0	0	0	1 (4.8)
Refusal to get yearly flu vaccine	0-10%	5 (6.3)	0	2 (9.1)	1 (6.7)	2 (9.5)
	11-25%	20 (25.0)	2 (9.1)	9 (40.9)	3 (20.0)	6 (28.6)
	26-50%	10 (12.5)	2 (9.1)	3 (13.6)	1 (6.7)	4 (19.0)
	51-75%	2 (2.5)	1 (4.5)	0	0	1 (4.8)
	76-100%	1 (1.3)	0	0	1 (6.7)	0
Drug consumption (illicit)	0-10%	28 (35.0)	5 (22.7)	7 (31.8)	4 (26.7)	12 (57.1)
	11-25%	7 (8.8)	1 (4.5)	2 (9.1)	2 (13.3)	2 (9.5)
	26-50%	1 (1.3)	0	0	1 (6.7)	0 ()
	51-75%	0	0	0	0	0 ()
	76-100%	0	0	0	0	1 (4.8)
Misuse of prescription medication	0-10%	10 (12.5)	2 (9.1)	2 (9.1)	1 (6.7)	5 (23.8)
	11-25%	10 (12.5)	1 (4.5)	6 (27.2)	1 (6.7)	2 (9.5)
	26-50%	7 (8.8)	0	2 (9.1)	2 (13.3)	3 (14.3)
	51-75%	1 (1.3)	0	1 (4.5)	0	0
	76-100%	0	0	0	0	0

	0-10%	5 (6.3)	0	2 (9.1)	1 (6.7)	2 (9.5)
Refusal to participate in rehabilitation programs	11-25%	7 (8.8)	2 (9.1)	4 (18.2)	0	1 (4.8)
	26-50%	11 (13.8)	3 (13.6)	4 (18.2)	1 (6.7)	3 (14.3)
	51-75%	4 (5.0)	0	4 (18.2)	0	0
	76-100%	0	0	0	0	0
	0-10%	10 (12.5)	4 (18.2)	2 (9.1)	2 (13.3)	2 (9.5)
Refusal to use a self-monitoring device	11-25%	12 (15.0)	5 (22.7)	2 (9.1)	1 (6.7)	4 (19.0)
	26-50%	3 (3.8)	0	1 (4.5)	2 (13.3)	0
	51-75%	1 (1.3)	0	0	1 (6.7)	0
	76-100%	0	0	0	0	0
	0-10%	14 (17.5)	4 (18.2)	3 (13.6)	3 (20.0)	4 (19.0)
Preference for alternative or homeopathic therapies	11-25%	8 (10.0)	0	2 (9.1)	3 (20.0)	3 (14.3)
	26-50%	3 (3.8)	1 (4.5)	0	1 (6.7)	1 (4.8)
	51-75%	1 (1.3)	0	0	0	1 (4.8)
	76-100%	0	0	0	0	0
Refusal to get other vaccines	0-10%	7 (8.8)	0	1 (4.5)	1 (6.7)	5 (23.8)
	11-25%	11 (13.8)	0	4 (18.2)	2 (13.3)	5 (23.8)

than yearly flu vaccine	26-50%	5 (6.3)	1 (4.5)	2 (9.1)	0	2 (9.5)
	51-75%	0	0	0	0	0
	76-100%	0	0	0	0	0
Refusal to use an action plan in the event of disease	0-10%	4 (5.0)	1 (4.5)	1 (4.5)	1 (6.7)	1 (4.8)
	11-25%	4 (5.0)	0	3 (13.6)	0	1 (4.8)
	26-50%	3 (3.8)	0	2 (9.1)	1 (6.7)	0
	51-75%	1 (1.3)	0	0	1 (6.7)	0
	76-100%	1 (1.3)	0	0	0	1 (4.8)

Shade sections represents health risk behavior endorsed by less than third of the physicians

Tableau 3-6 Supplementary Content 2 STROBE checklist for cross sectional study.

		Reporting Item	Page Number
Title and abstract			
Title	#1a	Indicate the study's design with a commonly used term in the title or the abstract	p.1
Abstract	#1b	Provide in the abstract an informative and balanced summary of what was done and what was found	p.1
Introduction			
Background / rationale	#2	Explain the scientific background and rationale for the investigation being reported	p.2-4
Objectives	#3	State specific objectives, including any prespecified hypotheses	p.4
Methods			
Study design	#4	Present key elements of study design early in the paper	p.4
Setting	#5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	p.4
Eligibility criteria	#6a	Give the eligibility criteria, and the sources and methods of selection of participants.	p.4

	#7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	p.5-6
Data sources / measurement	#8	For each variable of interest give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group. Give information separately for for exposed and unexposed groups if applicable.	p.5-6
Bias	#9	Describe any efforts to address potential sources of bias	N/A
Study size	#10	Explain how the study size was arrived at	p.4
Quantitative variables	#11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	p.6
Statistical methods	#12a	Describe all statistical methods, including those used to control for confounding	p.6
Statistical methods	#12b	Describe any methods used to examine subgroups and interactions	p.6
Statistical methods	#12c	Explain how missing data were addressed	N/A
Statistical methods	#12d	If applicable, describe analytical methods taking account of sampling strategy	N/A
Statistical methods	#12e	Describe any sensitivity analyses	N/A

Results			
Participants	#13a	Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed. Give information separately for for exposed and unexposed groups if applicable.	p.6
Participants	#13b	Give reasons for non-participation at each stage	p.6
Participants	#13c	Consider use of a flow diagram	N/A
Descriptive data	#14a	Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders. Give information separately for exposed and unexposed groups if applicable.	p.6-7; Tables
Descriptive data	#14b	Indicate number of participants with missing data for each variable of interest	p.6-7; Tables
Outcome data	#15	Report numbers of outcome events or summary measures. Give information separately for exposed and unexposed groups if applicable.	Tables
Main results	#16a	Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	N/A
Main results	#16b	Report category boundaries when continuous variables were categorized	p.7-8

Main results	#16c	If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	#17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	p.7-8
Discussion			
Key results	#18	Summarise key results with reference to study objectives	p.8
Limitations	#19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias.	p.10
Interpretation	#20	Give a cautious overall interpretation considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence.	p.9-10
Generalisability	#21	Discuss the generalisability (external validity) of the study results	Discussion
Other Information			
Funding	#22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	p.11

CHAPITRE 4

TROISIÈME ARTICLE: ASSESSING PHYSICIAN'S MOTIVATIONAL COMMUNICATION SKILLS : DEVELOPMENT OF THE MOTIVATIONAL COMMUNICATION COMPETENCY ASSESSMENT TEST (MC-CAT)

Article soumis pour la revue Journal of Medical Internet Research – Medical Education (JME)

Assessing Physician's Motivational Communication Skills: The development of the Motivational Communication Competency Assessment Test (MC-CAT)

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4.1 Abstract

Background: Training physicians to provide effective behaviour change counselling (BCC) using approaches like motivational communication (MC) is an important aspect of non-communicable chronic disease (NCD) prevention and management. However, existing evaluation tools for MC skills are complex, invasive, time consuming, and impractical for use within the medical context.

Objective: The objective of this study was to develop and validate a short, web-based tool evaluating physician skills in MC, the Motivational Communication Competency Assessment Test (MC-CAT).

Methods: Between 2016 and 2021, starting with a set of core 11 MC competencies previously identified and using a 5-step mixed-methods integrated knowledge translation (iKT) approach, the MC-CAT was created by : 1) developing a series of four base cases and a scoring scheme; 2) validating the base cases and scoring scheme with international experts; 3) creating three alternative versions of the four base cases (to create a bank of 16 cases, four of each type of 'base' case) and translating the cases into French; 4) integrating the cases into the online MC-CAT platform; and 5) conducting initial internal validity assessments with university allied health students.

Results: The MC-CAT assesses MC competency in 20 minutes by presenting HCPs with 4 out of a possible 16 cases (randomly selected and ordered) addressing various behavioural targets (e.g., smoking, physical activity, diet, medication adherence). Individual and global competency scores are calculated automatically for the 11 competency items across the 4 cases providing automatic scores out of 100. From the factorial analysis of variance for the difference in competency and ranking scores, no significant differences were identified between the different case versions across individual and global competency and ranking scores (p's > 0.05). Initial tests of internal consistency for rank order among 31 student participants were in the 'acceptable' range (α = 0.78).

Conclusion: Results suggest the MC-CAT is an internally valid tool to facilitate the evaluation of MC competencies among HCPs, and is ready to undergo comprehensive psychometric property analyses with

a national sample of healthcare providers. Once psychometric property assessments have been completed, this tool is expected to facilitate the assessment of MC skills among HCPs, skills that will better support patients to adopt healthier lifestyles, which will significantly reduce the personal, social, and economic burden of NCDs.

Keywords: Assessment; Motivational Communication; Tool development; Physicians; Health promotion

4.2 Introduction

The World Health Organization (WHO) estimates that over 71% of deaths worldwide result from non-communicable diseases (NCDs), including cardiovascular disease (CVD), cancer, chronic lung disease, diabetes, and obesity (World Health Organization, 2015a). Despite advances in genetic, pharmacological and surgical medicine, the prevalence and associated social and economic burden of NCDs are actually increasing rather than decreasing (World Health Organization, 2021). This is unsurprising given that the underlying cause of most NCDs are not biological factors, but harmful human behaviours (e.g., smoking, physical inactivity, poor diet) that are poorly addressed by current biomedical approaches (Marmot & Bell, 2019; World Health Organization, 2015b).

As part of offering comprehensive care, healthcare providers (HCPs) are often responsible for providing some form of behaviour change counselling (BCC) to patients who exhibit health risk behaviours. At present, this typically takes the form of offering "persuasive information and advice" (Elder, Ayala & Harris, 1999; Ledford et al., 2010; Ubel, Scherr & Fagerlin, 2017), which has been shown to be either ineffective or counterproductive due to patients feeling as if they are being "told what to do" (Bock et al., 2012; Stott & Pill, 1990). When evidence-based BCC approaches are offered by HCPs, they tend to show positive impacts on patient engagement in and adoption of healthy lifestyle choices (Dragomir et al., 2019). However, one of the most popular of these approaches (i.e., motivational interviewing) has demonstrated generally poor uptake by physicians. This has been attributed to perceptions of it being too rigid, taking too much time to implement in practice, and being outside of physician's scope of practice (Adler, 2016; Miller et al., 2003).

In order to address the limitations of motivational interviewing, we co-developed (with behaviour change experts and HCPs) a new BCC approach called Motivational Communication (MC), which is based on motivational interviewing, theoretical models of behaviour change (e.g., self-determination theory (Deci & Ryan, 1985), social-cognitive theory (Bandura, 1977), and transtheoretical model (Prochaska & Velicer, 1997)) and incorporate more Cognitive-Behavioural therapy-based components, and practical considerations regarding real-world clinical encounters in an NCD management context. Designed as a behaviour change communication style specifically developed for HCPs, it is evidence-based, time-efficient, and can be used to promote patient engagement, adoption of healthy behaviours, and sustained self-management of chronic conditions (Dragomir et al., 2020). MC was defined as reflecting 11 core communication competencies that have a solid evidence base for behaviour change in the context of NCD management (Dragomir et al., 2020). These 11 competencies were summarized under the mnemonic LEARN tHE BASICs: reflective Listening, expressing Empathy, demonstrating Acceptance, tolerance, and respect, responding to Resistance, (not) Negatively judging or blaming, (not) expressing Hostility or impatience, Eliciting "change-talk"/evocation, (not) Being Argumentative or confrontational, Setting goals, providing Information neutrally, and being Collaborative (Dragomir et al., 2020).

After defining this new approach for HCPs to deliver BCC, we also developed an accompanying MC competency assessment tool to evaluate skills acquisition among HCPs receiving training in this approach. A recent review of the literature on the quality of existing communication assessment tools among HCPs reveals a great deal of heterogeneity over the 45 different assessment tools that were identified. This review also indicates that few tools were developed using appropriate theoretical models (49%), many failed to clearly define or describe what communication competencies they were designed to evaluate (19%) (Boucher et al., 2020). In addition, 65% used scoring methods that required extensive training on the part of external assessors, and 93% of the tools required the use of standardised (i.e., person playing the role of a patient; 61%) or real patients (32%) to complete their evaluations, (Boucher et al., 2020), potentially undermining the feasibility of implementing this type of evaluation in 'real life'. Existing competency assessment tools are also complex, invasive, time consuming, and impractical for use within many medical contexts.

Effective, feasible and user-friendly competency evaluation tools are important for assessing the quality and efficacy of training programs, but also for ensuring patients benefit from the BCC methods employed by HCPs. Using an integrated knowledge translation (iKT) approach, which is a collaborative model of knowledge production between stakeholders and researchers (Gagliardi et al., 2015; Kothari & Wathen, 2017), the objective of this study was to develop a new online MC competency assessment tool called the Motivational Communication Competency Assessment Test (MC-CAT), to conduct initial internal validity assessments and to evaluate the ranking and competency scores consistency between the base cases and the modified cases as part of a larger iterative development process for this new tool.

4.3 Methods

4.3.1 Concept

The concept for the online MC-CAT assessment tool is to present HCPs with a series of virtual patient cases with a specific behavioural target (e.g., engaging in more physical activity). Each case consists of a simulated interaction between a virtual patient and the provider that focuses on engaging the patient in a discussion about changing their health behaviour. Patient's information (i.e., patient's picture, age, sex, health condition, health behaviour status and medications) is accessible by clicking on the icon in the top right-hand corner (see Figure 4.1). Each MC-CAT assessment consists of completing four cases, selected at random from a 16-case bank, for a total assessment time ranging from 15 to 20 minutes (approximately 5 minutes per case). Cases were designed to be relatively short in order to maximize the tool's acceptability and uptake by busy HCPs. Ethical approval was provided from the CIUSSS-NIM (#2016-1206) and all participants provided informed consent electronically.

4.3.2 Development

We have previously defined the 11 core communication competencies comprising MC (Dragomir et al., 2020) which represent the individual competencies evaluated by the MC-CAT. To develop the MC-CAT, we followed a 5-step mixed methods iKT approach based on established methods for instrument development and validation that engaged relevant knowledge users (physicians, HCPs, researchers, healthcare administrators) (Corbière & Fraccaroli, 2014; MacKenzie, Podsakoff & Podsakoff, 2011; Recker & Rosemann, 2010). The steps are shown in Figure 4.2: 1) developing a series of four base cases and a scoring scheme to assess the 11 communication competencies comprising MC; 2) validating the content

of the base cases and scoring scheme with international experts; 3) creating three alternative versions of the four base cases (to create a bank of 16 cases, four of each type of base case) and translating the cases into French (necessary for a Canadian audience); 4) integrating the cases into the online MC-CAT platform; and 5) conducting initial internal validity assessments with a sample of 31 university allied health students.

4.3.3 Step I: Development of the patient cases and scoring scheme

The goal of this step was to create four base cases (Cases A1, B1, C1, D1) to assess all 11 MC competencies through simulated medical consultations. One of the primary aims was to develop an assessment tool that would accurately reflect real-life medical consultations targeting health behaviour change in the context of NCD management. In order to ensure the behavioural targets of our cases were relevant to clinical practice, we sent an open invitation to Canadian physicians from four target specialities known to treat a high volume of patients with NCDs (i.e., cardiology, respirology, internal medicine and general practitioners) to complete a brief (10 minute) online survey (LimeSurvey ©), which was available in English and French (Boucher et al., Under Review). Invitations were emailed to physicians throughout the month of January 2018 through relevant medical associations (e.g., Hypertension Canada, Diabetes Canada) and networks (e.g., Canadian Respiratory Research Network). In this survey, physicians were asked to identify what they believe to be the most important health risk behaviours that they encounter with patients in their efforts to prevent/treat NCDs (checklist with possibility to add behaviours), and to rank them in order of their relative importance (from most important to least important). This resulted in the identification of the four most common health risk behaviours encountered in the context of NCD prevention and/or management would form the behavioural targets of the four base cases of the MC-CAT.

The research team then proceeded to develop four base cases around the four most important health risk behaviours as identified by physicians, which acted as templates to develop alternate case versions to expand the tool to 16 cases (4 different health behaviours [represented by the letters A, B, C and D] targeted across 4 different patient cases [which are numbered from 1 to 4]). Base cases were designed to simulate a consultation between a HCP and a patient that focuses on engaging the patient in a conversation about changing a health behaviour. Between October 2018 and March 2020, the research team worked on developing four base case scripts. The goal was to create a conversation flow beginning with the patient providing an opening statement of concern, after which the HCP was prompted to reply

by selecting one of five multiple choice responses reflecting the most MC-consistent through to the least MC-inconsistent response (scored from 1 to 5). Each base case includes 6-7 levels of exchanges, each providing the HCP the opportunity to demonstrate one or more of the 11 core MC competencies. This resulted in a scoring scheme that indicates the extent to which responses are MC-consistent or inconsistent on a 5-point scale (2 = very MC consistent; 1 = somewhat MC consistent; 0 = neither MC consistent nor inconsistent; -1 = MC inconsistent; -2 = very MC inconsistent). The scoring format was constructed with a range from +2 to -2 to reflect the non-neutrality of responding in a MC-inconsistent way (which may be counterproductive for behaviour change). Care was taken to provide HCPs multiple opportunities to demonstrate each of the 11 MC competencies across the four cases, to ensure that more than one interaction could be used to calculate an individual competency score. MC competency scores are calculated automatically by averaging the individual competency scores across the four cases, which are then summed and converted to a global score out of 100 reflecting overall MC competency (theoretical range: -93.6 to 100).

4.3.4 Step II: Cases and scoring validation by international experts

After creating the four base cases (A1, B1, C1, D1), we then proceeded to validate both the presence of the different MC competencies reflected in each case as well as their rank order from most to least MC-consistent, using a multi-round survey among a sample of international experts (50% women, average of 21 years' experience in BCC; see Tables 4.1 for a summary of expert characteristics). The first survey was launched in July 2019 and was closed in September 2019. Results were used to calculate consensus score reflecting the level of agreement between the experts and the original classifications attributed by the research team. Our original classifications were considered Good if agreement with the experts was perfect; it was considered Acceptable if the expert rank was +/- 1 point deviation in rank from the research team (e.g., ranked 5 instead of 4); and it was considered Poor if the expert order was +/- 2 deviation in rank from the research team (e.g., ranked 1 instead of 3). These results were used to make some minor modifications to some response items, based on the criteria summarize in Table 4.2. This resulted in the construction of a second confirmatory survey, where the same experts were asked to confirm agreement with the new competency classification and ranking. This survey was launched in October 2019 and was closed in April 2020.

4.3.5 Step III: Finalisation of the cases and scoring scheme

One of the aims was to design the MC-CAT to allow for the variation (or flexible 'programming') of demographic variables of the virtual patient (i.e., age, sex, race/culture, and language), NCD, and contextual variables (e.g., personal information) across the cases. To achieve this, we adapted the four base cases to expand the test bank (i.e., create alternate versions of the four base cases) without altering the core cases' original structure (allowing us to maintain the integrity of the scoring algorithm and conversation branching across established at Step II). As such, every MC-CAT assessment of four randomly selected cases should maintain the integrity and psychometric properties by including a variant of each of the four original cases. This resulted in the creation of 16 unique patient cases (Cases A1-A4; B1-B4; C1-C4; D1-D4) reflecting a variety of cases that would be appropriate for multiple types of NCD management situations that would be relevant across different medical specialties. These 16 cases were then formally translated into French (using back-translation to ensure equivalence; Tyupa, 2011) to permit use with French-speaking physicians, which is relevant in a Canadian context.

4.3.5.1 Scoring algorithm

The MC-CAT provides a subscale score for each of the 11 MC competencies, as well as global score summarizing overall MC competency. Individual competency scores are calculated by considering the number of times the person has chosen responses that included a certain competency (e.g., reflective listening), across the four cases, divided by the total amount of times the competency could have been chosen across the evaluation, multiplied by the relative proportion of opportunities to demonstrate that competency over all the competencies evaluated.

To obtain scores for global competency, the scores for the positive competencies (reflective Listening [LIS], expressing Empathy [EM], demonstrating Acceptance, tolerance, and respect [ATR], responding to Resistance [RTR], Eliciting "change-talk"/evocation [EV], Setting goals [GO], providing Information neutrally [INF], and being Collaborative[COL]) are aggregated together, and the negative competencies (Negatively judging or blaming [JDG], expressing Hostility or impatience [HO] and Being Argumentative or confrontational [ARG]) are subtracted from the sum, as reflected in the following equation:

Competencies score (%) = (((LIS/# LIS occasion * %LIS Cases)) + ((EM/#EM occasion C * %EM Cases)) + ((EV/#EV occasion * %EV Cases)) + ((RTR/#RTR occasion * %RTR Cases)) + ((GO/#GO occasion * %GO Cases)) + ((ATR/#ATR occasion * %ATR Cases)) + ((COL/#COL occasion * %COL Cases)) + ((INF/#INF occasion * %INF Cases))) – ((SUM(HO, JDG, ARG) * (1/# HO, JDG, ARG occasion Cases*100)))

The score for the ranking (i.e., whether the physician selected the most consistent response with MC [1] or the least consistent response with MC [5]), is calculated by adding the number of times a participant selected the ranks of response choices multiplied by a constant ranging from 2 to -2 (e.g., 10 times the 2nd choice is multiplied by 1). Here is the equation for the ranking scores:

Ranking score (%) = ((#1st choice * 2) + (#2nd choice * 1) + (#3rd choice * 0) + (#4th choice * -1) + (#5th choice * -2)) / 50 * 100

4.3.6 Step IV: Case integration into the online MC-CAT platform

Following the completion of Steps I-III, the first online computerized version of the MC-CAT.v1.0, including 32 virtual patient cases (16 in French, 16 in English, which are identical and translated) and a demographic questionnaire (including: sex, age, location of practice, primary medicine specialty, clinical setting, years of practice, number of patients and physician's attitude for addressing health risk behaviours), was designed and created in collaboration with 42 Comets Inc. (https://www.42comets.com/), a software developer with expertise in the creation of electronic education and training programs. In order to test the user interface of the MC-CAT, we conducted user experience research with 27 volunteer graduate students, HCPs, and behaviour change experts from step II. The goal was to determine: 1) the clarity of the instructions and tasks; 2) the navigability of the platform; 3) the synchronicity between audio and video information; and 4) the acceptability of the duration of the assessment. Responses were used to refine aspects of the online interface to optimize the functionality of the program.

4.3.7 Step V : Preliminary internal validity assessment among MC-naïve participants

We refined the aspects of the online interface based on the user experience testing. The final step in the development process was to collect preliminary psychometric properties of the MC-CAT among a sample of MC-naïve undergraduate allied HCP students, who were recruited via email and invited to complete two

MC-CAT assessments approximately 12 weeks apart. Students were assessed with the MC-CAT in the context of a university course on behaviour change (not affecting their evaluations in this course). Each assessment involved completing a basic sociodemographic questionnaire followed by the MC-CAT (four randomly selected cases from the 16-case bank, one from each series A-D).

4.3.7.1 Case consistency analyses.

In order to evaluate the ranking and competency scores consistency between the base cases (Cases A1, B1, C1, D1) and the modified cases (Cases A2-A4; B2-B4; C2-C4; D2-D4), a factorial analysis of variance (ANOVA), for the difference in competency and ranking scores, was used to determine differences between case variations (i.e., Case A1 vs A2 vs A3 vs A4) across individual competency scores, global competency scores, and ranking scores.

4.3.7.2 Internal consistency of the tool.

The internal consistency of the MC-CAT was obtained by calculating Cronbach's alpha coefficient (Tavakol & Dennick, 2011). The rank of the response selected by the participant (ranging from 1 [most consistent with MC] to 5 [least consistent with MC]) for each of the response choices per case (Cases A, B, C, D) and for the entire MC-CAT assessment (all responses over 4 cases) was used to calculate the coefficient. Thus, this analysis was meant to determine whether the responses chosen by the participant were consistent across the 4 cases. An acceptable score for Cronbach's alpha coefficient is between 0.70 and 0.95 (Bujang, Omar & Baharum, 2018; Tavakol & Dennick, 2011), which was adopted as our target criterion for moving forward with the tool.

4.4 Results

4.4.1 Step I: Development of the patient cases and scoring scheme

From previous research (Boucher et al., Under review), 80 physicians (22 cardiologists; 22 respirologist; 15 internists; 21 general practitioners) indentified physical inactivity (94%), smoking (91%), medication non-adherence (89%) and unhealthy diet (86%) as the most frequent health risk behaviours observed among patients in their practice. Physicians ranked smoking (1st), medication non-adherence (2nd), physical

inactivity (3rd), and unhealthy diet (4th) as the most important health risk behaviours to address in the context of NCD management.

Based on these results, we designed the four core cases of the MC-CAT to feature cases with the following health risk behaviours: smoking; physically inactive; non-adherent to medication; and poor diet, and representing a range of NCDs (e.g., obesity, asthma, diabetes, hypertension) (Boucher et al., 2019). The average number of opportunities was 11.4 ± 6.4, with a range of 2 to 24 opportunities.

4.4.2 Step II : Case and scoring validation by international experts

4.4.2.1 Content validity

Initial percentage of agreement between our classification and the experts for rank order of responses across all four base cases was 60.9 ± 14.0% (range 37.1 to 84.3%). The competency identification agreement across all four base cases was 44.9 ± 8.4% (range 30.5 to 60.2%). In response to these results and considering specific feedback provided by our international experts (74 comments over the four cases), we made 8 modifications to the rank ordering of statements, and 23 modifications to aspects of the dialogue (e.g., making a statement more or less consistent with MC) (Table 4.3). Experts were then asked to assess whether or not they agreed with the new rankings of the modified cases and the competencies identified. After this evaluation, an increase was noted in the agreement for the rank order (87.6 ± 16.8%, range 16.7% to 100%) and the competency identification (78.1 ± 14.3%, range 48.6% to 100%), which is considered an acceptable level of agreement (Stemler, 2004).

4.4.3 Step III-IV: Finalizing the cases, scoring scheme, and integration into the online MC-CAT platform

As part of the login process, HCPs are asked to enter basic demographic information including language preference, age, sex, and specialty, the latter of which is used to present HCPs with cases in their area of practice. Each case begins by presenting respondents with relevant patient information (age, sex, diagnosis, basic clinical information) in a ‘file’ that is located at the top right-hand corner of the screen and is accessible anytime during the assessment (see Figure 4.1). The physician is then informed of the behavioural target (e.g., increasing physical activity), and is instructed to engage the patient in a conversation about changing the behaviour. The case always starts with the patient expressing ambivalence about health behaviour change. The physician is then directed to selecting a response from

one of five randomly ordered options (see Figure 4.1 for a visual example of a case). Each response corresponds to an opportunity to demonstrate one or more of the 11 core MC competencies, which are assessed multiple times per case and across cases and averaged to obtain a score for that competency (see Table 4 for distribution of the competencies for each base case).

From the 27 responses received during user experience testing, ten comments reflected audio and visual elements (e.g., synchronization of the voice with the appearance of the text and the mouth movement of the virtual patient) and 19 comments reflected instruction elements (e.g., lack of clarity in sections of the consent form; typos). Based on this, the 29 comments were addressed by the research team and 42 Comets Inc. when creating a new version of the MC-CAT platform (MC-CAT.v2.0).

4.4.4 Step V: Preliminary internal validity analyses

We received a total of 31 MC-CAT responses from undergraduate allied HCP students. All participants had completed both assessments (73% female; living in the province of Quebec, Canada; English speaking; with 0-5 years of practice in BCC and no previous training in MC).

4.4.4.1 Case consistency analyses.

In order to identify possible differences between the different versions of the base cases (Cases A1-A4; B1-B4; C1-C4; D1-D4), ANOVAs were performed comparing the competency and ranking scores. No significant differences were identified between the different versions of a case across the two measurement times for competencies (Time 1: F = 0.748-1.755; p = 0.181-0.533; Time 2: F = 0.270-2.169; p = 0.115-0.847) and ranking scores (Time 1: : F = 0.526-1.957; p = 0.145-0.668; Time 2: : F = 0.168-2.545; p = 0.077-0.917). Results are present in Table 4.5 and Figure 4.3-4.4.

4.4.4.2 Internal consistency of the tool.

The MC-CAT tool showed acceptable values of internal consistency for global scores (25 items) both at time 1 ($\alpha = 0.78$; n=24) and time 2 ($\alpha = 0.80$; n=24).

4.5 Discussion

The objectives of this study were: to develop the MC-CAT, a new online, 'user-friendly' tool for assessing communication competencies among HCPs in the context of changing health behaviours among patients with NCDs; to conduct initial internal validity assessment; and to evaluate score consistency between the base and the modified cases. The MC-CAT was designed to simulate clinical interactions with 'virtual' patients to provide both global and specific scores for 11 core communication skills (Dragomir et al., 2020). It was co-designed in collaboration with key stakeholders (i.e., physicians, HCPs, researchers, healthcare administrators) using an iKT approach to ensure its clinical relevance and feasibility for use in practice. The online platform was also user tested to ensure ease of navigability among target users.

The results of this 5-step mixed methods study indicate that the MC-CAT demonstrates acceptable levels of internal consistency for the global competency score (α = 0.78-0.80) and little variance was found across different versions of the four base cases. This level of internal consistency is higher than levels observed in many existing communication assessment tools such as the Paediatric Consultation Assessment Tool and the Four Habits Coding Scheme, which had Cronbach alpha's between 0.52 (Howells et al., 2010) and 0.66 (Krupat et al., 2006); however, it was slightly lower than the levels seen in other tools (e.g., the CORD Standardized Direct Observation Assessment Tool (Shayne et al., 2006) or the Doctors' Observable Use of Self-Efficacy Enhancing Interviewing Techniques (DO U SEE IT) measure(Jerant et al., 2017), Cronbach alpha's = 0.93 and 0.94 respectively). Several factors can affect the results of a tool's internal consistency analysis (also considered a measure of scale reliability), such as the number of participants included in the analysis (varying between 19 and 82 participants for these 4 tools, in opposition to 32 participants for our analyses), the potential for evaluation biases associated with assessment methods (e.g., self-report surveys and observational scales vs. an objective scoring algorithm) and the number of items (varying between 10 and 26 items for these 4 tools). However, by using a rigorous development process, we have developed an assessment tool that met our internal validity criterion (i.e., alpha between 0.70 and 0.95) and we are satisfied that we can move forward with internal and external validation among HCPs.

To our knowledge, this is the first study describing the development of an online interactive communication skills assessment tool for HCPs (Boucher, et al., 2020). The MC-CAT tool was also developed in parallel to the development of a theory-driven and evidence-informed MC training

framework for HCPs (Dragomir et al., 2020). As such, the MC-CAT addresses the shortcomings of 51% of 45 existing communication competency assessment tools (Boucher, et al., 2020), which our recent review revealed were not informed by established theories of communication or behaviour change. Furthermore, most tools did not explicitly define what communication competencies they were designed to assess (Boucher, et al., 2020), unlike the MC-CAT which was specifically designed to assess the 11 core communication competencies of MC that HCPs and behaviour change experts identified as being most critical for changing health behaviours in the context of NCD management (Dragomir et al., 2020). We developed a tool to assess MC competencies (Dragomir et al., 2020) because MC has become an increasingly popular communication style among HCPs (Dewez et al., 2021; Rouleau et al., 2015). The fact the MC-CAT assesses all the competencies of MC and not a subset of these skills also overcomes the limitations of previous tools that have not been developed to provide comprehensive assessments of specific communication frameworks (Boucher, et al., 2020). The total scores on the MC-CAT also reflect the relative importance of each individual competency proportional to its use in practice. In other words, communication skills that are used more frequently during patient consultations (e.g., asking open 'evocative' questions, reflective listening and expressing empathy) are given greater weight in the final scoring. This is an important strength of the tool as we are aware of no existing tools that take the 'real world' frequency with which certain skills are used into account in their scoring algorithms. We also ensured that the different versions of our four base cases (cases A1-A4; B1-B4; C1-C4; D1-D4) were comparable in terms of competency and ranking scores. This means that our adaptations were consistent with the original scoring algorithm and that we can use them to create further adaptations of the 4 base cases to further extend the case bank of the tool.

One of the most useful and attractive features of the MC-CAT is that it is scored automatically based on a pre-programmed algorithm, which eliminates the need for external raters to conduct the assessments (e.i., interrater reliabilities). The need for external, trained raters is a feature of all existing assessment tools (Boucher, et al., 2020). While more rigorous than self-reported assessments, manual rating is associated with significant costs in terms of time and complexity. The fact that the MC-CAT is scored automatically also reduces potential biases associated with the subjective nature of rater assessments and eliminating a need for multiple raters to assess agreement, which it removes time and complexity. Indeed, in previous studies using external raters to assess physician communication competencies, training time averaged 14

hours and ranged from 1.5 to over 90 hours (Boucher, et al., 2020), which may not be feasible to implement in practice. Most previous studies (61%) also failed to standardise the training of external raters (Boucher, et al., 2020), which can greatly affect the fidelity of the coding process and does not allow for comparison of one evaluation with another. Finally, the MC-CAT was specifically designed to address the practical constraints of many NCD-focused physicians, who may not have the time to undergo complex evaluations (Adler, 2016). The MC-CAT tool is completed online using any electronic device and takes between 15 and 20 minutes to complete, which are features our healthcare provider collaborators have indicated are both acceptable and feasible.

4.6 Study limitations and strengths

This study may be limited by the fact we did not specifically include NCD patients as part of our stakeholder groups. The rationale was that our target users are HCPs, hence our focus on engaging various physician, HCPs, and health administrator stakeholders. There is already an evidence-base demonstrating that patients whose physicians use MC-type approaches feel more understood, have more trust in their providers, are more adherent to treatment, are more satisfied with their care and have better outcomes (Razzak et al., 2016; Boucher et al., 2020; Dragomir et al., 2019; Hanlon et al., 2021; Jacob et al., 2018; Lavoie et al., 2019). As such, our goal was not to validate this work but rather, focus on how to facilitate the implementation of these approaches into practice. Another limitation is that while the MC-CAT includes a range of cases that are intended to reflect real-world clinical encounters, it was not possible to create cases that reflected behavioural issues involved in these diseases, which may limit the generalisability of the tool. Likewise, we attempted to include cases that reflected patient diversity in terms of sociodemographic characteristics (i.e., age, sex, race/culture), but it was not possible to include all combinations and permutations of these characteristics, which may be seen as a limitation. However, now that we have validated the scoring integrity of our 4 base cases and their alternate versions, our next step is to create additional adaptations that will increase the heterogeneity of our case bank. Finally, the MC-CAT relies on computer/internet access which may not be readily available to some providers.

Despite some limitations, this study also has a number of notable strengths. Critical to successfully developing a valid and reliable assessment tool, we integrated several key stakeholders groups in all steps of the development process (e.g., content, testing, recruitment) by using the knowledge transfer cycle as

the basis of our integrated knowledge translation strategy (Gagliardi et al., 2015). This is expected to optimize the uptake and impact of the assessment tool in clinical practice and research. Also, we did not neglect the design of the online platform and conducted careful user-testing using the User Experience Framework (Garrett, 2010) to assess appeal, clarity and navigability. This framework provides several dimensions to consider when designing and testing an online tool, presented on a continuum from abstract to concrete in terms of visual design, interaction design and functional specifications. Through this process, we further refined the tool to make it more 'user-friendly' and intuitive. Another strength of our development process is that we created multiple versions of our base cases and tested that they were comparable using a factorial analysis which revealed no significant differences between cases on competency and ranking scores. This increases our confidence that the MC-CAT is now ready for comprehensive psychometric property analyses among target users (i.e., HCPs: nurses, physicians), which is the next step in the development process.

4.7 Conclusion

The MC-CAT is a new online, interactive, user-friendly MC assessment tool that was co-developed with a range of relevant stakeholders. Results demonstrated acceptable internal consistency for global competency scores, which indicate it is ready for more comprehensive psychometric property analyses, including both internal and external validity tests (e.g., positive and negative predictive values and convergent validity) in a national sample of HCPs across disciplines. We will continue to use an iterative approach during subsequent phases of development and are prepared to further refine the tool and its scoring algorithm as needed. Once developed, the MC-CAT will be the first online MC assessment tool that can be easily and widely accessed by a variety of HCPs, and as an adjunct to and evaluation tool for MC training programs. Its accessibility, convenience and 'user-friendliness' are expected to increase uptake and improve the quality of MC training programs designed to improve HCP's ability to effectively motivate and support patients to adopt health behaviours in the context of NCD prevention and management.

4.8 Acknowledgements

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4.9 Conflicts of Interest

Noe declared

4.10 Abbreviations

ANOVA: Analysis of variance

ARG: being Argumentative or confrontational

ATR: demonstrating Acceptance, Tolerance, and Respect

COL: being Collaborative

CVD: Cadiovascular disease

BCC: Behaviour change counselling

EM: expressing Empathy

EV: Eliciting “change-talk” / Evocation

GO: Seeting goals

HCP : Healthcare providers

HO: expressing Hostility or impatience

iKT : Integrated knowledge translation

INF: providing Information neutrally

JDG: Negatively judging or blaming

LIS: reflective Listening

MC: Motivational Communication

MC-CAT: Motivational Communication Competency Assessment Test

MI: Motivational Interviewing

NCD: Non-Communicable diseases

RTR: Responding to Resistance

WHO: World Health Organization

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Figure 4-1 Example of patient chart and interaction between the physician and the virtual patient case

1 and 2. Patient's information: Always accessible by clicking on the icon in the top right-hand corner; 3. Patient's initial statement (with audio); 4. List of answers: Each answer is associated with a score on the different MC competencies.

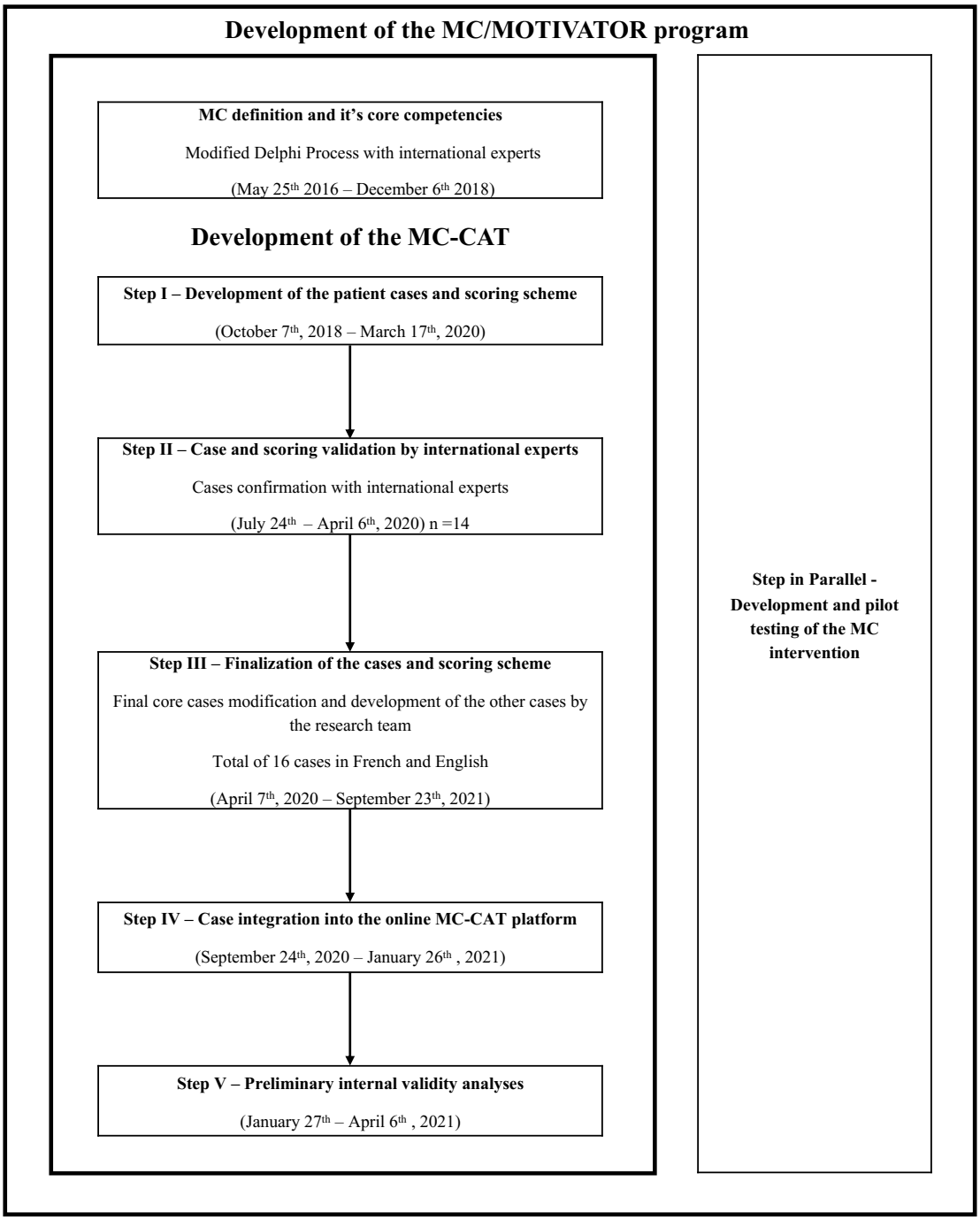

Figure 4-2 Overview of MC-CAT Development Steps

Tableau 4-1 Demographic information of healthcare providers and international experts.

Variable	Healthcare providers	International Experts
Women (Men), n	36 (44)	7 (7)
EN speaking (FR), n	30 (50)	12 (2)
Age N (%)		
Less than 30	2 (2.5)	
30-39 years	27 (33.8)	3 (21.4)
40-49 years	9 (11.3)	6 (42.9)
50-59 years	19 (23.8)	2 (14.3)
60-69 years	23 (28.8)	2 (14.3)
70 years or older		1 (7.1)
Years of practice N (%)		
0-5 years	20 (25)	
6-10 years	9 (11.3)	1 (7.1)
11-15 years	7 (8.8)	3 (21.4)
16-20 years	3 (3.8)	6 (42.9)
21-25 years	13 (16.3)	
26-30 years	10 (12.5)	1 (7.1)
Over 30 years	18 (22.5)	3 (21.4)
Province of practice / Country (%)		
Canada – Alberta	2 (2.5)	2 (14.3)
Canada – British Columbia	3 (3.8)	
Canada – New Brunswick	1 (1.3)	
Canada - Nova Scotia	2 (2.5)	2 (14.3)
Canada - Ontario	17 (21.3)	3 (21.4)
Canada - Quebec	55 (68.8)	4 (28.6)
Sweden		1 (7.1)
United Kingdom		1 (7.1)
United States		1 (7.1)

Tableau 4-2 Criteria for case modification after evaluation by behaviour change experts

Criteria	Modifications	
Ranking the choices of the different base cases physician's options		
≥ 70% of **Good agreement**; AND ≤ 10% of **Poor agreement** between external expert and research team rankings	No modification	If this criterion is not met, the modifications must result in a minimum of 70% perfect agreement OR 90% perfect and partial agreement AND less then 10% of complete disagreement
≥ 90% of **Good** and **Acceptable agreement**; AND ≤ 10% of **Poor agreement** between external expert and research team rankings	No modification	
Competency identification		
≥ 70% agreement between external expert and research team identification	Competencies kept or added if there was agreement	
Between 40% and 69% agreement between external expert and research team identification	Competencies may be kept or added depending on the research team consensus	
≤ 30% agreement between external expert and research team identification	Competencies deleted	

Good agreement: if agreement with the experts and the research team was perfect; **Acceptable agreement**: if the expert rank was +/- 1 point deviation in rank from the research team (e.g., ranked 5 instead of 4); **Poor agreement**: if the expert order was +/- 2 deviation in rank from the research team (e.g., ranked 1 instead of 3).

Tableau 4-3 Agreement of responses' rank order across all 4 base cases

Choice of Responses	Agreement (%)			Agreement after modification (%)		
Case A						
	Good	Acceptable	Poor	Good	Acceptable	Poor
1	57.1	25.7	17.1	78.3	12.9	10.0
2	58.6	37.1	4.3	70.0	25.7	4.3
3	37.1	38.6	24.3	73.3	26.7	0.0
4	70.0	27.1	2.9	80.0	20.0	0.0
5	60.0	30.0	10.0	86.7	13.3	0.0
6	45.7	40.0	14.3	70.0	28.3	1.7
Average	54.8	33.1	12.2	76.4	21.1	2.7
Case B						
	Good	Acceptable	Poor	Good	Acceptable	Poor
1	47.1	27.1	25.7	80.0	15.0	3.3
2	57.1	27.1	15.7	91.7	6.7	1.7
3	78.6	18.6	2.9	78.3	20.0	0.0
4	65.7	30.0	4.3	85.0	11.7	1.7
5	45.7	48.6	5.7	86.7	13.3	0.0
6	68.6	28.6	2.9	81.7	16.7	1.7
Average	60.5	30.0	9.5	83.9	13.9	1.4
Case C						
	Good	Acceptable	Poor	Good	Acceptable	Poor
1	78.6	15.7	4.3	81.7	13.3	3.3
2	45.7	44.3	10.0	86.7	6.7	6.7
3	47.1	40.0	12.9	80.0	16.7	3.3
4	74.3	22.9	2.9	70.0	26.7	3.3
5	78.6	17.1	4.3	81.7	13.3	5.0
6	84.3	14.3	1.4	86.7	13.3	0.0
7	57.1	31.4	11.4	80.0	20.0	0.0
Average	66.5	26.5	6.7	81.1	15.0	3.6
Case D						
	Good	Acceptable	Poor	Good	Acceptable	Poor
1	73.3	18.3	8.3	73.3	18.3	8.3
2	43.3	53.3	3.3	90.0	10.0	0.0
3	76.7	20.0	3.3	76.7	20.0	3.3
4	73.3	23.3	3.3	93.3	6.7	0.0
5	60.0	26.7	13.3	93.3	6.7	0.0
6	48.3	40.0	8.3	81.6	16.7	1.7
Average	62.5	30.3	6.6	84.7	13.1	2.2
Case Average	**61.2**	**29.8**	**8.7**	**81.5**	**15.8**	**2.5**

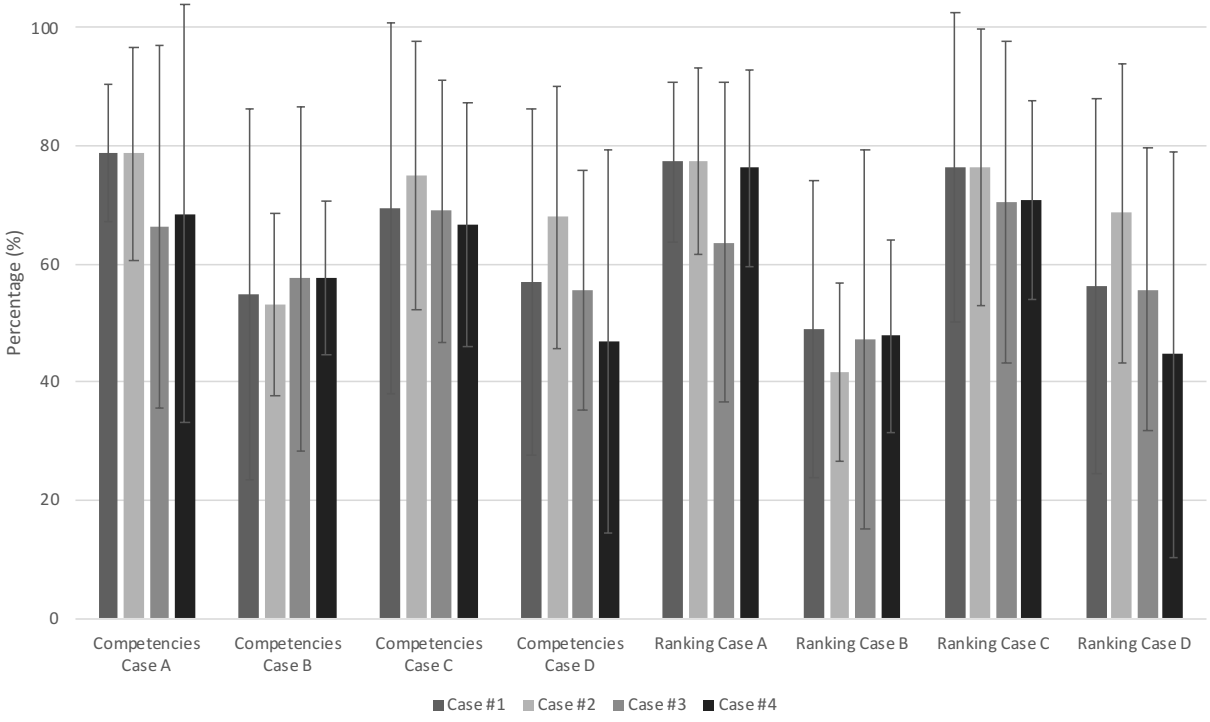

Figure 4-3 Score differences between each case version for Time 1

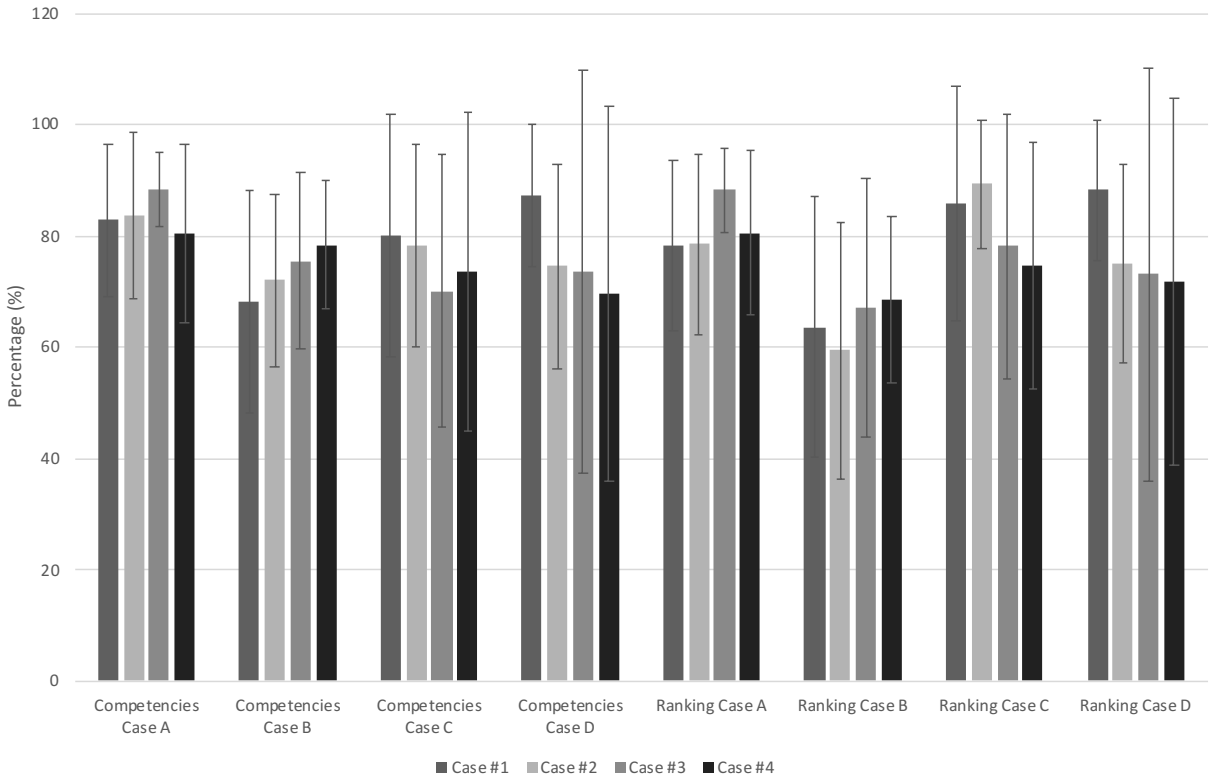

Figure 4-4 Score differences between each case version for Time 2

Tableau 4-4 Distribution of competencies for each of the 4 basic virtual patient cases

MC-CAT competency	Case A	Case B	Case C	Case D		Example
	Target behaviours					
	Physical inactivity	Smoking cessation	Unhealthy diet	No adherence to medication		
	Possibility of expressing it n (%)				Total	
Reflective listening	3	4	5	4	16	"So you recognize the potential benefits of a healthier diet, but it's challenging given your line of work. "
Expressing Empathy	2	3	3	2	10	"Changing your daily eating habits when there are barriers can be challenging. But exploring the benefits may help."
Eliciting "change-talk" / evocation	2	2	3	2	9	"You said you were fed up with feeling breathless, and recognize that smoking might be the cause. What would increase your confidence in your ability to quit?"
Responding to resistance	2	2	0	2	6	"It might help to know the benefits of exercise. Tell me what you think you

						would be able to do if you were in better shape?”
Setting goals	2	1	2	2	7	“Cooking would be a great place to start! And if it's something you enjoy, you are more likely to stick with it. What is your plan to get started?”
Demonstrating Acceptance, tolerance, and respect	4	2	4	3	13	“It sounds like a great plan, and your willingness to getting more information this weekend demonstrates how important this is to you.”
Being collaborative	2	2	1	3	8	“It sounds like we just need to find a routine that works for you. Could we explore some options together?”
Expressing hostility or impatience	1	4	5	1	11	“If you want to avoid exacerbating your diabetes, you need to commit to a diet change, sooner rather than later. “
Negatively judging or blaming	5	6	4	5	20	“I think that's a good place to start, all you need to do is follow through.”
Being argumentative or confrontational	6	6	6	6	24	“Yes, but since you lack confidence you should also get behavioral counselling, you don’t want to fail again!”

Providing information neutrally	0	1	0	1	2	” There are several options: nicotine replacement therapy, medications, and behavioral counselling have all been shown to be effective. What do you think would work best for you?”
Total	29	33	33	31	126	
Number of exchange point	6	6	7	6	25	

Tableau 4-5 Global competency and ranking weighted scores at assessment 1 and 2

% (SD)	All	Case #1	Case #2	Case #3	Case #4	Difference between case	
Time 1						F	p-value
Case A1	N=31	N=8	N=9	N=7	N=7		
Case B1	N=31	N=11	N=7	N=6	N=7		
Case C1	N=31	N=8	N=11	N=4	N=8		
Case D1	N=30	N=8	N=8	N=3	N=11		
Competencies Case A	72.4 (25.5)	81.3 (11.6)	74.3 (19.3)	61.4 (38.0)	70.7 (30.1)	0.765	0.523
Competencies Case B	60.0 (19.9)	65.5 (20.5)	55.0 (17.6)	52.3 (29.5)	63.0 (10.0)	0.748	0.533
Competencies Case C	71.9 (24.8)	68.6 (38.1)	81.2 (14.8)	53.9 (14.8)	71.2 (20.9)	1.313	0.290
Competencies Case D	54.8 (27.7)	56.5 (26.8)	71.5 (23.4)	44.4 (12.9)	44.4 (30.6)	1.755	0.181

Ranking Case A	72.8 (21.6)	79.2 (14.1)	74.1 (16.4)	60.7 (32.9)	76.2 (20.7)	1.031	0.394
Ranking Case B	50.3 (22.2)	54.5 (24.0)	44.0 (17.8)	44.4 (31.9)	54.8 (14.3)	0.526	0.668
Ranking Case C	73.5 (22.8)	75.0 (31.3)	81.2 (14.7)	55.4 (26.3)	70.5 (18.9)	1.360	0.276
Ranking Case D	53.1 (30.3)	55.2 (29.9)	71.9 (25.2)	38.9 (12.7)	41.7 (32.7)	1.957	0.145
Time 2						F	p-value
Case A2	N=31	N=9	N=10	N=4	N=8		
Case B2	N=31	N=7	N=10	N=8	N=6		
Case C2	N=31	N=9	N=5	N=9	N=8		
Case D2	N=31	N=11	N=7	N=7	N=6		
Competencies Case A	82.8 (13.2)	79.1 (15.0)	85.6 (15.2)	86.7 (7.4)	81.6 (11.5)	0.503	0.683
Competencies Case B	71.6 (15.1)	63.6 (19.6)	77.0 (8.5)	68.9 (17.6)	75.5 (12.6)	1.365	0.275

Competencies Case C	71.4 (26.3)	74.9 (25.4)	76.4 (21.7)	65.1 (27.0)	71.3 (32.1)	0.270	0.847
Competencies Case D	71.6 (28.2)	85.0 (12.3)	72.9 (18.1)	52.2 (38.2)	69.1 (37.4)	2.169	0.115
Ranking Case A	80.4 (14.5)	75.9 (17.9)	81.7 (14.6)	85.4 (10.5)	81.3 (13.2)	0.452	0.718
Ranking Case B	61.0 (20.5)	57.1 (18.3)	63.3 (20.9)	59.4 (27.6)	63.9 (14.6)	0.168	0.917
Ranking Case C	78.8 (23.4)	83.3 (25.5)	87.1 (13.7)	73.0 (28.1)	75.0 (21.3)	0.554	0.650
Ranking Case D	72.3 (28.3)	86.4 (11.9)	72.6 (17.2)	51.2 (38.9)	70.8 (36.0)	2.545	0.077

Tableau 4-6 Supplementary. MC-CAT's competency and ranking difference between time 1 and 2

%(SD)	Time 1	Time 2	N	% difference	F	p-value
Reflective listening	76.5 (16.9)	84.5 (15.1)	30	7.94	7.375	0.011
Expressing empathy	58.5 (16.2)	65.1 (19.5)	30	6.67	3.140	0.087
Eliciting "change talk" / Evocation	75.6 (17.3)	80.8 (14.7)	30	5.28	1.745	0.197
Responding to resistance	50.6 (21.2)	62.2 (18.0)	30	11.67	7.851	0.009
Setting goals	87.9 (16.9)	88.3 (13.9)	30	0.42	0.016	0.899
Expressing acceptance, tolerance, respect	69.9 (18.3)	76.5 (14.0)	30	6.60	3.850	0.059
Expressing collaboration	82.9 (14.2)	89.6 (9.5)	30	6.66	7.494	0.010
Not demonstrating hostility or confrontational	98.0 (3.3)	97.9 (7.2)	30	-0.04	0.001	0.972
Not negatively judging or blaming	93.9 (6.9)	97.9 (4.1)	30	4.00	11.045	0.002

Not being argumentative or confrontational	92.9 (7.7)	96.9 (5.7)	30	4.03	10.041	0.004
Providing information neutrally	90.0 (20.3)	93.3 (17.3)	30	3.33	0.659	0.423
Global competency score	79.9 (11.0)	85.0 (9.6)	30	5.07	7.228	0.012
Best choice	62.8 (16.0)	70.4 (14.2)	30	7.54	6.863	0.014
2nd choice	14.4 (8.3)	16.4 (7.5)	30	1.97	0.877	0.357
3rd choice	13.1 (6.9)	9.1 (5.7)	30	-4.06	12.498	0.001
4th choice	7.3 (7.0)	3.5 (6.2)	30	-3.82	9.321	0.005
5th choice	2.4 (4.7)	1.3 (2.9)	30	-1.08	1.256	0.272

CHAPITRE 5
DISCUSSION GÉNÉRALE

L'objectif principal de cette thèse doctorale était de développer et de valider un outil d'évaluation des compétences en CM, le Motivational Communication Competency Assessment Test (MC-CAT), auprès de médecins spécialistes traitants des maladies chroniques. Ce chapitre présente la synthèse et l'interprétation des résultats inclus dans les chapitres précédents. Ce chapitre est divisé en cinq sections : 1) Retour sur les objectifs de la recherche et discussion des résultats; 2) Implications cliniques des résultats; 3) Transfert des connaissances; 4) Considérations méthodologiques; et 5) Pistes de recherche.

5.1 Retour sur les objectifs de thèse et discussion des résultats

Afin d'atteindre l'objectif général décrit ci-haut, trois objectifs spécifiques ont été énoncés précédemment et seront détaillés dans la prochaine section.

5.1.1 Objectif de la première étude

L'objectif de la première étude était d'identifier les outils existants d'évaluation des compétences en communication chez les médecins et de déterminer les caractéristiques des outils d'évaluation les plus valides et les plus fiables sur le plan psychométrique. Nous avons réalisé une revue systématique de la littérature comparant des caractéristiques psychométriques (p.ex., fiabilité, validité interne, validité externe) des différents types d'outils d'évaluation des compétences en communication (p.ex., questionnaire, enregistrement audio, observation, jeux sérieux, immersion, réalité virtuelle) ainsi que leur mode et temps d'administration, leur capacité à engager l'utilisateur, leur méthode de validation et la théorie sous-jacente à leur création et passation (Boucher *et al.,* 2020).

Les résultats de cette revue systématique de la littérature, comprenant 57 articles et 12258 médecins participants, ont permis d'identifier l'existence de 45 outils d'évaluation des compétences en communication des médecins. Néanmoins, cette étude a aussi d'identifié plusieurs limites méthodologiques très importantes, comprenant les thèmes suivants : les caractéristiques des outils, la description des évaluateurs ou utilisateurs des outils, les propriétés psychométriques des outils et la qualité des études incluses dans la revue systématique. Ces limites doivent être abordées dans les futures études.

En ce qui a trait aux caractéristiques des outils, moins de la moitié des outils (49%) ne mentionnent pas qu'ils ont utilisé une théorie ou un modèle afin de contruire l'outil. Ainsi, ces articles ne mentionnent pas que les chercheurs qui ont développé l'outil ont utilisé un modèle théorique pour le faire. Plus surprenant encore, plus de 18% des outils (10 instruments) ne mentionnent pas quelles compétences ils évaluent ou les décrivent avec des termes non précis comme des « aptitudes générales en communication » ou des « aptitudes comportementales en communication interpersonnelle ». Également, 93% des outils nécessitent l'utilisation d'un patient standardisé (c.-à-d., un acteur jouant le rôle de patient) ou d'un vrai patient du médecin évalué. Finalement, seulement deux études (3%) fournissent les coûts associés à l'utilisation de l'outil.

Ensuite, les résultats de notre première étude décrivent les caractéristiques des évaluateurs.trices ou utilisateurs.trices des outils. Près de 53% des études précisent le temps d'administration nécessaire à l'utilisation de l'outil. Ceci est un facteur très important de la convivialité et de la commodité des outils auprès des médecins, qui mentionnent très fréquemment un manque de temps dans leur pratique. Aussi, seulement 54% des études décrivent les qualifications des utilisateurs de l'outil (p.ex., titre de la personne, formation spécifique en lien avec l'utilisation de l'outil) et 28% des études rapportent le temps requis pour la formation. Par ailleurs, 65% des études décrivent la formation que les utilisateurs de l'outil doivent effectuer afin d'acquérir les compétences nécessaires à l'évaluation des médecins et de réduire les biais d'évaluateur.

Concernant les propriétés psychométriques des outils inclus dans la revue systématique, nous avons identifié que 61% des études rapportent seulement une propriété psychométrique par outil, dont les plus rapportées sont la concordance interévaluateur (70%) et la validité interne (51%). Ainsi, il est difficile pour de futurs utiliteurs de l'outil ou des lecteurs de l'étude de déterminer si l'outil évalue réellement ce qu'il présume faire. Également, la qualité des études incluses dans la revue systématique variait entre faible et moyenne, avec un score moyen de 50%.

La formation des médecins à l'acquisition de compétences en matière de communication efficace est essentielle pour motiver les patients à adopter des modes de vie plus sains et améliorer l'issue des maladies. En raison des lacunes importantes des outils existants d'évaluation de la communication, nous recommandons vivement une plus grande rigueur méthodologique pour le développement de nouveaux outils et l'évaluation systématique de chaque élément pour lequel les médecins ont reçu une formation.

En outre, les outils d'évaluation doivent être faciles à administrer et à noter, c'est-à-dire conviviaux, afin d'accroître leur adoption par les médecins. Pour ce faire, il est difficile de penser qu'un outil d'évaluation des compétences en communication pour les médecins puisse être développé dans la collaboration de ceux-ci.

Les résultats de la revue systématique de la littérature sont soutenus par deux autres revues de la littérature réalisées en parallèle à ce projet doctoral. Ils avaient pour objectifs la description : 1) des interventions de promotion de la vaccination auprès de professionnels de la santé travaillant auprès de patients atteints d'arthrite rhumatoïde (voir la revue systématique de la littérature à l'Appendice D; Boucher *et al.,* 2019) et 2) des facteurs associés à l'acceptation et l'hésitation à la vaccination chez les patients atteints d'arthrite rhumatoïde (voir la revue de la littérature à l'Annexe E; Boucher *et al.,* 2021). Brièvement, il existe très peu d'études ciblant la formation des professionnels de la santé travaillant auprès de patients atteints d'arthrite rhumatoïde, et les études existantes se concentrent presque exclusivement sur des stratégies de rappel (p.ex., courriel ou pamphlet), négligeant les mesures d'efficacité de l'intervention sur les professionnels de la santé (Boucher *et al.,* 2019). Également, six facteurs furent identifiés comme barrière à la vaccination chez les patients atteints d'arthrite rheumatoid : les politiques de santé, l'accès au soin de santé, l'influence sociale, la compréhension du patient des bénéfices et des risques, le rôle du professionnel de la santé et les connaissances intégrées.

Ces études ont permis d'identifier d'importantes bases méthodologiques absentes au sein de nombreuses études : les connaissances intégrées (Kothari *et al.,* 2017) et l'intégration des parties prenantes (Boaz *et al.*, 2018; Bourgeois et Hurteau, 2018) dans les différentes étapes de développement. Afin de comprendre ce qui limite le changement d'un comportement ou favorise celui-ci, ce qui influence l'utilisation d'une technique en counseling pour le changement de comportement et ce que sont les comportements cibles, l'accès aux facteurs déterminants est crucial, et ce, à l'aide des parties prenantes.

Ainsi, la première étude a identifié des lacunes importantes au sein des outils existants d'évaluation de la communication, en plus de souligner l'importance d'intégrer les parties prenantes au développement d'un d'outil d'évaluation (et d'une intervention). En réponse à ces résultats, nous avons réalisé une seconde étude auprès de médecins afin d'obtenir leurs perspectives sur les comportements de santé les plus pertinents dans le contexte de la gestion des maladies chroniques. Il s'agit d'une étape d'identification des cibles comportementales importante au développement d'un nouvel outil d'évaluation.

5.1.2 Objectif de la deuxième étude

L'objectif de la deuxième étude était d'identifier les comportements à risque pour la santé que les médecins canadiens jugent les plus importants à cibler dans le contexte de la gestion des maladies non transmissibles. L'objectif secondaire était de connaitre les attitudes des médecins quant à l'importance d'acquérir des compétences en counseling pour le changement de comportement et leur motivation à suivre une formation en ce sens. Cette étude constitue une base au développement de l'outil d'évaluation MC-CAT (étape 1 de la troisième étude).

Les résultats de cette étude ont premièrement permis de noter que les comportements identifiés par les médecins canadiens comme étant les plus répandus chez leurs patients (inactivité physique, mauvaise alimentation et difficulté à gérer le stress) n'étaient pas ceux identifiés comme étant les plus importants à aborder au sein de rencontres médicales (non-observance des médicaments et tabagisme). Il est intéressant de noter que, bien qu'il y ait peu de différences entre les spécialités médicales, les comportements identifiés comme les plus fréquents (mauvaise alimentation, difficulté à gérer le stress) n'étaient pas nécessairement ceux identifiés comme les plus importants à traiter (non-observance des médicaments, tabagisme) par les mêmes médecins. Il est possible que les comportements de santé identifiés comme les plus répandus soient ceux qui sont les plus difficiles à traiter. En effet, de nombreux médecins déclarent que les conseils en matière de nutrition et de stress n'entrent pas dans le cadre de leur pratique, ce qui conduit à un nombre plus élevé de patients présentant des habitudes alimentaires problématiques et une mauvaise gestion du stress (Kolasa et Rickett, 2010). Cela contraste avec la mauvaise observance des médicaments et le tabagisme, que les médecins se sentent généralement plus qualifiés à aborder lors de rencontres médicales (Cornuz *et al.,* 2000 ; Tarn *et al.,* 2006).

Ensuite, afin de répondre à l'objectif secondaire, cette étude a révélé que les médecins considèrent important (moyenne de 9.1/10) d'aborder les comportements à risque pour la santé dans le contexte de la gestion des maladies chroniques non transmissible, mais qu'ils n'ont qu'une confiance modérée (moyenne de 5.3/10) en leur capacité à modifier les comportements des patients. Le fait que les médecins reconnaissent ce manque de compétences suggère qu'ils pourraient être motivés à suivre une formation en counseling pour le changement de comportement. Cependant, nos résultats ont montré qu'ils n'étaient que modérément intéressés par une telle formation (moyenne de 6.3/10) et qu'ils étaient prêts à consacrer qu'environ 4 heures de formation médicale continue à cette activité. Ces résultats indiquent une divergence entre l'importance perçue par les médecins d'aborder les comportements à risque pour la

santé et leur volonté d'acquérir les compétences nécessaires pour soutenir les patients dans leurs efforts pour modifier leurs comportements à risque pour la santé. Il sera essentiel de comprendre les raisons de cette divergence et ses implications pour améliorer la mise en œuvre et l'adoption des programmes de formation en counseling pour le changement de comportement visant à optimiser la capacité des médecins à gérer efficacement les maladies chroniques dans leur pratique. Ce point sera discuté ci-bas dans la section pistes de recherche.

Les résultats de la deuxième étude nous ont aussi permis d'identifier les comportements de santé à risque principaux spécifiques aux différentes spécialités de médecins travaillant avec une population de patients atteints d'une maladie chronique. Ces comportements de santé à risque (c.-à-d., l'inactivité physique, la mauvaise alimentation, la non-observance des médicaments et le tabagisme) seront intégrés au développement de l'outil d'évaluation, plus précisement au développement des différents cas de bases de l'outil, afin d'offrir une diversité et une convergence avec la réalité vécue par les médecins.

5.1.3 Objectif de la troisième étude

En s'informant des résultats de la revue systématique de littérature sur les caractéristiques des outils d'évaluation les plus valides et efficaces (première étude), et des connaissances de parties prenantes (médecins, experts en changement de comportements), l'objectif de la troisième étude était de développer un nouvel outil d'évaluation de compétences en CM qui sera facile à administrer et à coter dans le contexte clinique des médecins spécialistes, et qui saura engager les utilisateurs.

Nous avons développé l'outil MC-CAT en 5 étapes échelonnées sur 3 ans : 1) l'élaboration d'une série de quatre cas de base et d'un système de notation pour évaluer les 11 compétences en communication qui composent la CM ; 2) la validation du contenu des cas de base et du système de notation auprès d'experts internationaux ; 3) la création de trois versions alternatives des quatre cas de base (pour créer une banque de 16 cas) et la traduction des cas en français (nécessaire pour un public canadien) ; 4) l'intégration des cas dans la plateforme en ligne du MC-CAT; et 5) la réalisation d'évaluations initiales de la validité interne auprès d'un échantillon de 31 étudiants universitaires dans le domaine de la santé. Ainsi, l'outil d'évaluation en ligne MC-CAT consiste à présenter au professionnel de la santé une série de cas de patients virtuels ayant un objectif comportemental spécifique (p.ex., pratiquer une activité physique plus intense). Chaque cas consiste en une interaction simulée entre un patient virtuel et le professionnel de la santé, qui vise à engager le patient dans une discussion sur la modification de son comportement de santé. Chaque

évaluation du MC-CAT consiste à compléter quatre cas (entre 15-20 minutes au total), choisis au hasard dans une banque de 16 cas. Les cas ont été conçus pour être relativement courts afin de maximiser l'acceptabilité et l'utilisation de l'outil par des professionnels de la santé très occupés.

À notre connaissance, il s'agit de la première étude décrivant le développement d'un outil interactif en ligne d'évaluation des compétences en communication pour les professionnels de la santé (Boucher, et al., 2020). Les analyses préliminaires de la validation interne ont démontré un niveau acceptable de cohérence interne pour le score global (α = 0,78-0,80) et aucune variance, mesurée à l'aide d'une analyse de la variance des scores global, n'a été constatée entre les cas de bases (A1, B1, C1, D1) et les versions alternatives (A2-A4 ; B2-B4 ; C2-C4 ; D2-D4). Il s'agit d'une niveau de cohérence interne supérieur à plusieurs outils existants, tels que le Paediatric Consultation Assessment Tool et le Four Habits Coding Scheme, dont le coefficient alpha de Cronbach se situe entre 0,52 (Howells et al., 2020) et 0,66 (Krupat et al., 2006), mais il est légèrement inférieur à celui d'autres outils existants (p.ex. : le CORD Standardized Direct Observation Assessment Tool [Shayne *et al.,* 2006] et le Doctors' Observable Use of Self-Efficacy Enhancing Interviewing Techniques (DO U SEE IT) measure [Jerant *et al.,* 2017], coefficient alpha de Cronbach = 0,93 et 0,94 respectivement). Néanmoins, cette variance du coefficient alpha de Cronbach peut s'expliquer par plusieurs facteurs (Bujang *et al.,* 2018) : 1) le nombre de réponses incluses dans l'analyse (variant entre 19 et 82 participants pour les outils précédemment mentionnés, contre 32 participants pour nos analyses) ; 2) l'inclusion de biais d'évaluation selon le type d'outil (sondage, échelle d'observation) que le MC-CAT élimine avec l'intégration d'un algorithme de cotation; 3) le nombre d'items (variant entre 10 et 26 items) ; 4) l'expérience des participants répondant à l'étude ; et 5) le type de cotation, soit s'il est fait par un patient (réel ou standardisé), un autre professionnel de la santé ou un expert externe. En utilisant un processus de développement rigoureux, nous avons développé un outil d'évaluation qui répond à notre critère de fidélité (c.-à-d., alpha entre 0,70 et 0,95). Nous sommes confiants de pouvoir aller de l'avant avec les prochaines étapes de validation (interne et externe) auprès des professionnels de la santé canadiens.

Nous avons conçu un outil précisément pour évaluer les compétences démontrées lors de l'utilisation du style d'interaction CM (Dragomir *et al.,* 2021), qui est devenu un style de communication de plus en plus prisée pour une utilisation en contexte de santé (Dewez *et al.,* 2021 ; Rouleau *et al.,* 2015). Le MC-CAT a été conçu pour évaluer les 11 compétences impliquées dans l'utilisation de la CM, ce qui permet de

surmonter les limites des outils précédents qui n'ont pas été développés pour fournir des évaluations complètes, bien décrites et sans biais d'évaluation, de la CM (Boucher *et al.,* 2020).

L'outil a été spécifiquement conçu pour répondre aux contraintes de temps importantes de nombreux professionnels de la santé, qui peuvent ne pas être disposés à suivre une formation de compétences en communication et counseling pour le changement de comportement (Adler, 2016). L'outil MC-CAT prend entre 15 et 20 minutes pour une évaluation complète, durée que nos collaborateurs prestataires de soins de santé ont jugée acceptable. Les scores totaux de l'outil MC-CAT reflètent également l'importance relative des compétences individuelles dans la pratique. En d'autres termes, les compétences en communication qui sont utilisées plus fréquemment lors des consultations avec les patients (p.ex., poser des questions évocatrices, écouter de manière réflective) ont un poids proportionnel à leur importance dans la notation finale. Il s'agit là d'un atout important de l'outil qui le différencie des outils existants, dont aucun ne semble tenir compte de la fréquence d'utilisation de certaines compétences dans le « monde réel ».

Pour conclure, notre troisième étude a vu le développement d'un outil d'évaluation en ligne, facile d'utilisation et accessible. Son algorithme de notation automatique permet des évaluations plus objectives des compétences en éliminant le besoin d'évaluateurs externes et de patients réels ou standardisés. L'outil pourra être utilisé partout au Canada, potentiellement dans le monde, à la suite des prochaines étapes de validation.

5.2 Implications cliniques

Les implications cliniques sont nombreuses pour cette recherche doctorale. Elle a permis d'identifier les lacunes méthodologiques des outils d'évaluation des compétences en communication des médecins et, basée sur celles-ci, de développer un nouvel outil d'évaluation en ligne, le MC-CAT. Plus spécifiquement, la revue systématique de la littérature a permis de répertorier et de décrire 45 outils d'évaluation des compétences en communication chez les médecins et d'établir des critères nécessaires aux étapes de développement d'un outil valide, fidèle, ludique et engageant. Bien que l'importance de la formation aux techniques de communication soit désormais mieux reconnue dans le secteur de la santé, les évaluations des compétences avant et après la formation doivent être menées de manière cohérente, et les considérations méthodologiques mentionnées au sein de notre première étude doivent être prises en compte. Sans évaluations appropriées des compétences, il est impossible de démontrer l'efficacité ou

l'efficience de la formation en communication. Il est donc essentiel d'utiliser des outils rigoureusement développés et validés pour évaluer les compétences en communication des médecins. Les résultats devraient améliorer la capacité du professionnel de la santé à motiver et à soutenir efficacement tous les Canadiens à adopter de bons comportements en matière de santé, ce qui réduira considérablement la charge personnelle, sociale et économique des maladies chroniques non transmissibles.

La deuxième étude de cette recherche doctorale a révélé que les médecins canadiens considèrent important d'aborder les comportements à risque pour la santé dans le contexte de la gestion des maladies non transmissibles, mais qu'ils n'ont généralement qu'une confiance modérée dans leur capacité à modifier les comportements des patients. Le fait que les médecins reconnaissent ce manque de compétences pourrait suggérer qu'ils seraient motivés à suivre une formation en counseling pour le changement de comportement. Cependant, nos résultats ont montré qu'ils n'étaient que modérément intéressés à suivre une telle formation et qu'ils n'étaient prêts à y consacrer qu'environ 4 heures de formation médicale continue en moyenne. Ces résultats indiquent une divergence entre la grande importance perçue par les médecins d'aborder les comportements à risque pour la santé et leur volonté modérée d'acquérir les compétences nécessaires pour soutenir leurs patients dans leurs efforts pour modifier leurs comportements à risque pour la santé. L'association entre les comportements à risque pour la santé et le développement et l'exacerbation des maladies non transmissibles est bien connue et acceptée par les communautés médicales locales et mondiales (World Health Organization, 2005, 2018). En outre, l'importance d'approches telles que la CM parmi les médecins a été soulignée par les organismes de réglementation, notamment le Collège canadien des médecins et chirurgiens (Collège royal des médecins et chirurgiens du Canada, 2019) et le Collège royal des médecins (Collège royal des médecins, 2019), qui identifient désormais le rôle de « communicateur » comme l'une des sept compétences de base qui devraient être maîtrisées par les médecins dans leurs efforts pour répondre efficacement aux besoins en soins de santé des personnes qu'ils servent. Une exploration approfondie de cette divergence dépassait le cadre de la présente étude, mais devrait faire l'objet de recherches futures. Des études antérieures ont suggéré que les médecins peuvent percevoir un manque de temps et/ou de ressources pour traiter efficacement la complexité de ces problèmes et ont cité le manque de remboursement comme un obstacle à la fourniture de counseling en changement de comportement à leurs patients (Flodgren *et al.,* 2011 ; Hébert, Caughy et Shuval, 2012 ; Kennedy et Meeuwisse, 2003).

Finalement, la troisième étude devrait avoir un impact immédiat en validant le premier outil d'évaluation des compétences en CM en ligne, ludique, flexible et facile d'utilisation pour être utilisé à la fois au Canada et à l'étranger.

Ses principales caractéristiques sont les suivantes : 1) il est noté automatiquement sur la base d'un algorithme préprogrammé, ce qui élimine la nécessité de faire appel à des évaluateurs externes pour effectuer les évaluations ; 2) sa malléabilité permet d'ajouter des cas et de modifier l'âge, le sexe, l'origine ethnique, la maladie, l'état de santé et les médicaments du patient ; 3) il a le potentiel d'être utilisé par de nombreux types différents de professionnels de la santé ; et 4) il peut être effectué n'importe où avec un accès à Internet en utilisant un ordinateur ou une tablette. L'outil MC-CAT a le potentiel d'être inclus dans le cursus des étudiants et résidents candien.nes en médecine afin d'accompagner les interventions de promotions de la communication motivationnelle pour le changement des comportements de santé des patients. Finalement, en améliorant les compétences de communication des médecins, ceci réduira considérablement la charge personnelle (des professionnels de la santé et des patients), sociale et économique des maladies chroniques non transmissibles.

5.3 Transfert des connaissances

Le transfert des connaissances est une partie intégrante de cette recherche doctorale, de par son importance pour la recherche clinique et ses apports méthodologiques. L'objectif du transfert des connaissances est de rejoindre les parties prenantes, dont certaines furent incluses dans plusieurs étapes des ce projet doctoral, et de disséminer l'information sous un format vulgarisé. À travers différentes activités de transfert des connaissances, nous avons rejoint la communauté scientifique, la communauté clinique et le grand public, rejoignant des médecins, des professionnels de la santé et des équipes de recherches dans le domaine de la psychologie de la santé, des communications et de la psychométrie au Canada et partout dans le monde.

5.3.1 La communauté scientifique

Nous pensons qu'il est primordial que les résultats et conclusions des différentes études comprises dans cette recherche doctorale soient accessibles aux professionnels de la santé et aux équipes de recherches travaillant auprès de patients atteints d'une maladie chronique non transmissible. Pour ce faire, la publication des articles scientifiques tirés de cette recherche est nécessaire. La revue systématique a été publiée dans la revue Psychosomatic Medicine (Boucher *et al.,* 2020 ; voir Appendice C). L'article a suscité

de l'attention en générant un commentaire à l'éditeur de la revue, auquel nous avons répondu dans une lettre à l'éditeur qui a été publiée en 2021 (Boucher *et al*., 2021 ; voir Appendice F). L'article provenant de la deuxième étude est en révision par les pairs afin d'être publié dans la revue Sage Open Medicine. Ensuite, l'article provenant de la troisième étude est soumis pour publication dans la revue Journal of Medical Internet Research – Medical Education.

En plus des publications d'articles dans des journaux scientifiques, les résultats de recherche des différentes études pourraient être présentés à des congrès nationaux et internationaux tels que le Canadian Psychological Association, l'International Behavioural Trial Network, l'American Psychosomatic Society et l'European Health Psychology Society. Pour les futures présentations, je viserais également les conférences médicales, axées sur les maladies chroniques tels que le Congrès Canadien sur la santé respiratoire, le Sommet Cannadien en obésité et Congrès Canadien sur la santé Cardiovasculaire, pour attirer l'attention des médecins sur l'impact du counseling pour le changement de comportement des patients. Ces présentations permettraient d'offrir l'opportunité aux chercheurs et professionnels travaillant dans le domaine de la psychologie de la santé, de l'éducation médicale et de l'optimisation des soins de santé d'échanger sur les conclusions et de discuter des pistes pour la mise en place de solutions concrètes. Ceci étant dit, depuis le début de ce projet doctoral, j'ai présenté la progression de la recherche doctorale lors de multiples conférences internationales, nationales et provinciales, notamment le Congrès international de psychologie appliquée (Montréal, 2018), la conférence européenne de psychologie de la santé (Galway, 2018), le congrès de l'IBTN (Montréal, 2018) la conférence européenne de santé publique, (Marseille, 2019), la conférence iCEPS (Montpellier, 2019), et le congrès virtuel de l'IBTN (mai 2020), attestant de la qualité et de l'intérêt international de ce projet.

5.3.2 La communauté clinique

Il est primordial de présenter les résultats et conclusions de cette recherche doctorale à la communauté clinique et multidisciplinaire, incluant les médecins (p.ex, pneumologues, internistes, cardiologues, médecin de famille), les professionnelles de la santé (p.ex., infirmier.ères, psychologues de la santé, kinésiologues) ainsi que les professionnels en administration des institutions de santé du Québec, du Canada et potentiellement dans d'autres pays. Les échanges pourraient être générés entre ces différents groupes et les chercheurs lors de présentations et ainsi faire le pont avec les parties prenantes intégrées dans les différentes étapes de cette recherche. Subséquemment, il sera possible de fournir une solution ludique d'évaluation des compétences en CM, l'outil MC-CAT, tout en rendant accessible la formation

pouvant l'accompagner, le programme MOTIVATOR (en cours de développement par le CMCM). De plus, la vulgarisation ou communication scientifique offre une autre avenue de partage des connaissances. Elle implique une simplification du contenu des étapes permettant une meilleure compréhension par un public non initié. Nous avons par ailleurs publié un article dans la revue universitaire La Fibre en 2021 sur la communication motivationnelle et son potentiel pour la santé (Boucher et Voisard, 2021 ; voir Appendice H). Finalement, les résultats des certaines étapes de développement de l'outil furent présentés lors de la journée de la recherche du CIUSSS NIM (Montréal, 2017 et 2018), où j'ai reçu prix de meilleure présentation par affiche, et au congrès virtuel de l'ACFAS (avril 2021). Le public de ces rencontres scientifiques étant multidisciplinaire, elles offrent une opportunité à l'équipe de recherche de partager ses travaux avec des professionnels variés, ce qui peut mener à des pistes de recherches et de solutions cliniques.

5.3.3 Grand public

L'objectif du transfert de connaissance aux équipes cliniques multidisciplinaires est d'améliorer la communication entre professionnels de la santé et les patients, pour ensuite optimiser la santé de ces derniers. Ainsi, en plus de faire des conférences pour les professionnels de la santé et de distribuer des résumés vulgarisés des conclusions des études, nous voulons organiser des conférences grand public. Celles-ci permettraient les échanges entre les différents groupes. Dans le passé, nous avons organisé plusieurs conférences grand public avec l'IBTN (https://www.ibtnetwork.org/fr/category/evenements/), le CMCM (https://mbmc-cmcm.ca/fr/soiree-conference-sur-la-pneumologie/), le CIUSSS NIM (https://rechercheciusssnim.ca/activites/rester-en-sante-en-temps-de-pandemie-conference-grand-public/) et le réseau de recherche en santé cardiométabolique, diabète et obésité (CMDO). Finalement, les informations ciblées pour le grand public paraîtront sur le site internet du Centre de Médecine Comportementale de Montréal (CMCM ; www.mbmc-cmcm.ca) et du Canadian Network for Health Behavior Change and Promotion (www.can-change.ca) afin que le public puisse prendre connaissance des aspects principaux du counseling en changements de comportements à risque pour réduire les comorbidités chez les patients atteints d'une maladie chronique non transmissible.

5.4 Considérations méthodologiques

Les résultats des études incluses dans cette recherche doctorale doivent être interprétés en tenant compte des limites et des forces des études. Les sections suivantes discuteront des limites et des forces pour la

revue systématique de la littérature, le sondage auprès de médecins et le développement du nouvel outil MC-CAT.

5.4.1 Limites de la thèse doctorale

D'abord, notre revue de la littérature peut être limitée par les critères de recherche utilisés. Plus précisément, nous n'avons pas inclus les mots « assessment » et « evaluation » car ils n'étaient pas suffisamment spécifiques dans ce contexte. Au lieu de cela, nous avons recherché les termes « tool » ou « instrument », ce qui a augmenté la spécificité pour identifier de manière appropriée les outils et instruments d'évaluation. Néanmoins, nous avons reçu une lettre à l'éditeur (commentaire) sur l'article publié (Smith *et al.,* 2021) pourtant sur les termes de recherche utilisés. Nous avons eu la chance de répondre au commentaire dans une lettre à l'éditeur spécifiant quelle a été notre stratégie de recherche à l'aide d'un exemple de termes utilisés dans un moteur de recherche et précisant notre processus décisionnel des choix faits lors de la sélection d'articles dans la revue systématique (Boucher *et al*., 2021 ; voir Appendice F). Nous avons également exclu les études publiées dans des langues autres que l'anglais ou le français, ce qui peut réduire la généralisation à d'autres langues ou cultures. Nous n'avons pas non plus inclus les études qui évaluaient les compétences en communication chez les non-médecins (p. ex., les infirmières, les pharmaciens), de sorte que les résultats peuvent être généralisés uniquement aux médecins et résidents en médecine. Enfin, en raison du nombre élevé et de l'hétérogénéité des outils d'évaluation et des résultats mesurés, nous n'avons pas été en mesure d'effectuer de méta-analyses formelles.

Ensuite, la deuxième étude pourtant sur le questionnaire auprès de médecins peut être limitée par la taille modeste de l'échantillon. Cependant, nous nous sommes efforcés de recruter un nombre similaire de médecins dans les quatre spécialités médicales (c.-à.-d., cardiologie, pneumologie, médecine interne et médecine de famille). De plus, notre échantillon était représentatif des médecins au Canada. Plus précisément, la proportion d'hommes (58 % contre 55 %) et de femmes (42 % contre 45 %) médecins était comparable avec les données canadienne, tout comme l'âge moyen de notre échantillon (49,5 ans contre 49,3 ans) et leurs années de pratique (22,5 ans contre 18 ans ; Institut canadien d'information sur la santé, 2018). Enfin, à notre connaissance, il s'agit de la première étude à évaluer les perceptions et les attitudes des médecins concernant la prise en compte des comportements à risque pour la santé dans le contexte de la gestion des maladies chroniques. Néanmoins, nous n'avons pas pu identifier les raisons de

discordance entre l'importance perçue d'aborder les comportements à risque pour la santé et l'intérêt à participer à un programme pour le counseling pour le changement de comportement.

L'étude pourtant sur le développement de l'outil MC-CAT a également des limites à considérer. Cette étude peut être limitée par le choix des différentes étapes du développement de l'outil. Nous n'avons pas inclus une étape d'enquête auprès des patients ou des familles de patients atteints d'une maladie chronique en relation avec les différentes spécialités médicales (c.-à-d., cardiologie, pneumologie, médecine interne, médecine familiale) afin d'obtenir leur point de vue sur la communication de leurs médecins à leur égard. Néanmoins, plusieurs autres études ont identifié l'attitude des patients envers leurs médecins par rapport aux compétences de communication dans des contextes variés (p.ex., la vaccination, la fin de vie) (Abdul-Razzak *et al.,* 2016 ; Boucher *et al.*, 2021; Colmegna *et al.,* 2021). Les compétences de la collaboration, de l'écoute et du partage d'information seraient nécessaires pour réduire les obstacles à leur changement de comportement (Hanlon *et al.,* 2021). L'outil d'évaluation MC-CAT tente de refléter des situations réelles qu'un médecin peut vivre avec un patient atteint d'une maladie chronique qui a besoin de changer un comportement de santé. Cependant, il existe des limites possibles liées à la généralisabilité au contexte réel d'une 'interaction médecin-patient et à la fluidité de la communication entre deux personnes. Néanmoins, nous prévoyons de comparer l'évaluation d'une situation réelle filmée par des experts (en utilisant les mêmes 11 compétences) avec les scores des compétences individuelles de l'outil MC-CAT. De même, nous avons tenté d'inclure une diversité dans les caractéristiques des patients virtuels de l'outil (c.-à-d., l'âge, le sexe, l'ethnicité/culture), ce qui pourrait modifier les réponses de certains médecins en fonction de leurs préjugés liés à ces caractéristiques (DeAngelis, 2019). Une attention et un temps moindre accordés aux patients, des réponses plus directives et des émotions moins positives sont liés aux préjugés implicites et explicites des médecins (DeAngelis, 2019 ; Phelan *et al.,* 2015). Il convient d'en tenir compte lors de l'analyse des résultats dans les futures étapes de validation. Comme autre limite, nous avons mis l'accent sur les médecins et non sur les autres professionnels de la santé (p.ex., infirmiers, nutritionnistes, kinésiologues) lors du développement de l'outil. Toutefois, la plupart des cas créés peuvent être réalisés par n'importe quel professionnel de la santé. Nous planifions d'adapter les cas afin qu'ils présentent des scénarios pour les différents professionnels de la santé, incluant des discussions dans le contexte de visites d'infirmières, de nutritionnistes, de kinésiologues. Ainsi, le MC-CAT aura le potentiel d'évaluer les compétences CM d'un ensemble de professionnels de la santé. Enfin, l'outil MC-CAT n'est que partiellement validé, avec une analyse de la validité interne et de la variance entre la version des cas avec un échantillon d'étudiants de premier cycle en santé. Ceci n'est pas une limite de l'étude,

laissant maintenant place à nos prochaines étapes pour la validation de l'outil MC-CAT, le raffinement de l'outil et l'amélioration des algorithmes de cotation de l'outil.

5.4.2 Forces de la thèse doctorale

Malgré certaines limites, ce projet doctoral comprenant la revue systématique, le questionnaire auprès de médecins et le développement de l'outil MC-CAT, est soutenu par plusieurs points forts importants.

La revue systématique est, à notre connaissance, la revue la plus vaste et la plus complète des outils d'évaluation de la communication entre médecins existants à ce jour. Les revues précédentes (p.ex., les revues systématique de Boon et Stewart (1998) et de Zill et collègues (2014)) ont examiné des outils de qualité problématique (publiés dans des revues non évaluées par des pairs) et ont inclus des informations limitées sur les outils. Par exemple, ces revues ont omis de signaler les compétences de communication évaluées par les outils, les fondements théoriques des outils ou la formation et les qualifications des évaluateurs. Ces limitations représentent des lacunes importantes, que nous abordons au sein de notre revue. En plus d'être plus complète, la présente étude a également été plus transparente dans ses rapports en adhérant aux directives PRISMA (Liberati *et al.,* 2009). La présente revue n'a également inclus que des outils avec des évaluateurs externes, ce qui augmente la validité et réduit les biais. Cette étude a porté sur les caractéristiques de l'outil et de l'évaluateur, en particulier celles qui peuvent être pertinentes pour l'adoption de l'outil par les médecins (p.ex. : le temps de formation, le moment de l'évaluation), ainsi que sur les compétences de communication évaluées. Les résultats soulignent la nécessité de développer des outils qui soient à la fois psychométriquement valides et prédictifs, mais qui aient également une forte probabilité d'être adoptés par les médecins.

Ensuite, l'étude utilisant un questionnaire auprès de médecins est renforcée par l'utilisation d'une approche intégrée de l'application des connaissances pour évaluer les perceptions et les besoins de formation des médecins, ce qui nous aidera à concevoir un programme de formation en counseling en changement de comportement qui soit acceptable et réalisable pour les médecins (Graham *et al.,* 2006). Enfin, comme nous l'avons mentionné précédemment, à notre connaissance, il s'agit de la première étude à évaluer les perceptions et les attitudes des médecins concernant la prise en compte des comportements à risque pour la santé dans le contexte de la gestion des maladies chroniques non transmissibles. Nous nous sommes concentrés sur les médecins puisque la relation médecin-patient est des facteurs importants de résultat clinique positif chez les patients atteint d'un maladie chronique et que cette relation est

souvent déficiente ou faible en raison du manque de temps et de disponibilité limitée. Ceci constitue une première étape essentielle pour faire participer les médecins à des programmes de formation axés sur l'amélioration des compétences en matière de counseling en changement de comportement.

Finalement, à notre connaissance, notre troisième étude est la première à décrire le développement d'un outil d'évaluation des aptitudes à la communication de type jeu sérieux en ligne (Boucher *et al.,* 2020). Afin de développer un outil d'évaluation valide et fiable, nous avons intégré plusieurs groupes d'intervenants clés à toutes les étapes du processus d'élaboration (p.ex., contenu, essais, recrutement) en utilisant le cycle de transfert des connaissances comme base de notre stratégie intégrée d'application des connaissances (Gagliardi *et al.,* 2015). Cela devrait permettre d'optimiser l'adoption et l'impact de l'outil d'évaluation dans la pratique clinique et la recherche. L'utilisation de l'outil d'évaluation MC-CAT ne nécessite aucun évaluateur externe. Cela réduit les biais dans le processus d'évaluation, les coûts et le temps liés à la formation des formateurs et des évaluateurs et le processus de comparaison des scores entre évaluateurs. De plus, nous n'avons pas négligé l'importance de la clarté, la navigabilité et l'attrait de la plateforme en ligne. Pour ce faire, nous avons effectué des tests d'utilisation minutieux en utilisant le User Experience Framework (Garrett, 2010). Grâce à ce processus, nous avons affiné l'outil pour le rendre plus convivial et intuitif. Un autre point fort de la troisième étude est que nous avons créé plusieurs versions des cas de base et testé leur comparabilité à l'aide d'une analyse factorielle qui n'a révélé aucune différence significative entre les cas. Cela accroît notre confiance dans le fait que le MC-CAT est maintenant prêt à faire l'objet d'analyses complètes de ses propriétés psychométriques auprès des utilisateurs cibles (c.-à-d., les HCP : infirmières, médecins), ce qui constitue la prochaine étape du processus de développement. Enfin, l'outil MC-CAT a été développé en cohérence avec les théories sous-jacentes à la MC et en parallèle avec le développement d'un programme de formation en MC pour les médecins.

5.5 Pistes de recherches

Les résultats de cette recherche doctorale permettent : de dresser un portrait des outils existants et de leurs limites; de fournir la perspective de médecins canadiens sur l'importance des formations en counseling pour le changement de comportement et la prévalence des comportements de santé à risque chez les patients qu'ils traitent; et de décrire les étapes nécessaires au développement et à la validation d'un outil d'évaluation de compétence en ligne spécifiquement pour les médecins.

Les résultats provenant de la revue systématique permettent de dresser une liste d'éléments méthodologiques importants au développement et à la validation d'un outil d'évaluation de compétence. Ainsi, nous proposons les recommandations suivantes pour faire avancer la recherche sur l'évaluation des compétences en communication des médecins :

1) Le développement d'un programme de formation et d'un outil d'évaluation doit être fait selon des théories et modèles en communication et/ou changement de comportements;

2) Le programme de formation et son outil d'évaluation doivent être conçus en parallèle afin que leur contenu soit lié;

3) Les outils d'évaluation de la communication doivent être validés de manière appropriée et les études utilisant ces outils doivent faire preuve de transparence et de rigueur dans la communication de leurs propriétés psychométriques;

4) Il est nécessaire de développer des outils d'évaluation qui soient à la fois attrayants (pour les médecins) et faciles à administrer et à noter. L'exploitation de nouvelles solutions technologiques (p.ex., la « gamification » des interactions médecin-patient) peut réduire la charge de travail des outils actuels, améliorer la validité et la fidélité, et en accroître l'adoption par les médecins;

5) L'intégration des parties prenantes au sein des différentes étapes du projet est nécessaire au développement d'un outil d'évaluation (Boaz *et al.,* 2018). Il est entre autres important : d'être clair dans les objectifs de l'engagement des parties prenantes; d'identifier les ressources nécessaires à l'engagement; et de s'assurer d'avoir un plan d'apprentissage et de récompense de l'engagement efficace.

Par la suite, la deuxième étude recueillant les perspectives de médecins sur les comportements de santé de leurs patients ainsi que leurs attitudes concernant la participation à une intervention en communication a permis de : définir les comportements de santé à risque que chacune des spécialités médicales côtoyait ainsi que d'identifier une divergence entre l'importance perçue d'aborder les comportements de santé à risque et l'intérêt à participer à des séances d'éducation sur le counseling en changement de comportement. Néanmoins, il reste quelques pistes de recherche à explorer que nous énumérons ci-dessous :

1) Il sera important de comprendre les raisons de cette divergence et ses implications pour améliorer la mise en œuvre et l'adoption des programmes de formation au counseling pour le changement de comportement visant à optimiser la capacité des médecins;

2) Dans l'éventualité où l'intervention serait disponible à d'autres professionnels de la santé que les médecins, il serait important de sonder les professionnels de la santé ainsi que les patients sur les comportements à risques;

3) Également, l'organisation de groupe de discussion avec des patients aux prises avec des maladies chroniques permettrait de recueillir leurs perspectives sur l'interaction avec les professionnels de la santé et les comportements de santé.

Finalement, les résultats de l'étude décrivant les étapes du développement d'un nouvel outil d'évaluation des compétences en communication ont permis d'identifier plusieurs pistes pour les recherches futures. Nous proposons les étapes méthodologiques suivantes afin de peaufiner et continuer la validation de l'outil d'évaluation MC-CAT :

1) Recueillir les propriétés psychométriques de base de l'outil MC-CAT auprès d'un échantillon de la population cible. Nous évaluerons la structure interne de l'outil MC-CAT en analysant sa fiabilité de cohérence interne (alpha de Cronbach), les corrélations entre les items, l'analyse classique des éléments (c'est-à-dire les statistiques descriptives et indices discriminatifs), la modélisation par équations structurelles et l'analyse factorielle confirmatoire ;

2) Cet échantillon effectuera les tâches MC-CAT deux fois sur une période de deux semaines afin d'évaluer la fiabilité test-retest ;

3) Les commentaires des participants seront recueillis et intégrés au besoin afin d'ajuster le système de cotation, la clarté des énoncées et les composantes techniques de la plateforme ;

4) Par la suite, l'objectif sera de recueillir des données sur la validité de convergence et de critère auprès d'un échantillon national plus restreint, également recruté proportionnellement à leur représentation géographique nationale, estimée à partir du comportement réel de la pratique à partir de consultations de patients filmées (virtuelles ou en clinique). Pour évaluer la validité des critères, nous

comparerons les scores globaux des médecins sur le MC-CAT à leur comportement réel dans la pratique à partir de consultations filmées de patients qui seront évaluées par deux experts en CM à l'aide d'un instrument d'évaluation conçu pour évaluer spécifiquement les 11 compétences évaluées par le MC-CAT ;

5) Les données provenant de la deuxième étape seront analysées pour établir la validité de convergence et de critère de l'outil MC-CAT. La plateforme sera ajustée (si nécessaire) en considérant toutes les étapes précédentes.

6) Finalement, nous pensons qu'il serait important d'intégrer l'outil d'évaluation et du programme de counseling en changement de comportement basé sur la CM dans les programmes universitaires en médecine du Canada et les formations d'éducation continues.

Pour conclure, il est important de continuer la validation de l'outil MC-CAT afin d'assurer sa validité et fidélité. Il est toujours possible de revenir aux étapes précédentes de développement de l'outil, ce qui rend ce processus de développement circulaire et non linéaire.

CONCLUSION

Les résultats de ce projet auront un impact immédiat en générant un outil d'évaluation des compétences des médecins en CM novateur, ludique, engageant, facile à utiliser, rapide et fidèle, le MC-CAT. Il pourra éclairer la conception et la prestation de programmes de formation en CM à travers le Canada ainsi qu'à l'étranger. Il pourra aussi fournir des critères de formation et de compétences qui pourront facilement être implémentés dans les facultés de médecine, mais aussi adaptés pour et utilisés par d'autres professionnels de la santé à travers le monde (p.ex., infirmières, travailleurs sociaux, etc.). Considérant que la grande majorité des maladies chroniques (p. ex., cardiovasculaires, pulmonaires chroniques, cancers) sont au moins partiellement dues à des comportements de santé inadéquats, l'impact potentiel de la maîtrise de la CM par les médecins spécialistes, qui voient des millions de patients chaque année, pourrait être énorme. D'autant plus qu'au Canada, la moyenne des consultations d'un patient atteint d'une maladie chronique avec son médecin est de 8 par année (OECD, 2018). En permettant l'évaluation des compétences d'un grand nombre de médecins à l'aide d'un outil en ligne novateur, la possibilité d'améliorer leurs compétences en CM sera optimisée et les comportements de santé inadéquats des patients pourront être modifiés par l'entremise d'une meilleure relation médecin-patient. D'un point de vue clinique, l'impact potentiel de cette étude sur la qualité de vie et la santé générale des patients est significatif, et les résultats devraient avoir un impact majeur sur la santé des patients qui sont des utilisateurs réguliers des centres hospitaliers canadiens.

ANNEXE A

PROCESSUS EXPÉRIENTIELS ET COMPORTEMENTAUX MÉDIATEURS DE LA PROGRESSION DES ÉTAPES DE CHANGEMENT DE COMPORTEMENT

Selon Prochaske, Redding et Everts (2008) et Romain et collègues (2016)

ÉTAPES	PROCESSUS	DECRIPTION
Précontemplation	Prise de conscience	Efforts réalisés par l'individu afin de rechercher des informations sur le comportement
	Réaction émotionnelle	Aspects affectifs liés au changement de comportement
	Réévaluation environnementale	Évaluation par l'individu de son comportement et des conséquences sur son environnement physique et social
Contemplation	Auto-réévaluation	Réévaluation des valeurs que l'individu a de lui par rapport au comportement
Préparation	Auto libération	S'engager à modifier son comportement et croire en ses capacités à effectuer cet engagement
Action	Contre-conditionnement	Remplacement du comportement problématique (voir aucun comportement) par un autre comportement plus sain
	Relations d'aide	Utilisation du support d'autrui (p.ex., famille, ami) pour modifier le comportement

Gestion des renforcements	User du renforcement et de système de récompense afin de renforcer le comportement positif
Contrôle des stimuli	Modifier l'environnement pour encourager le comportement positif

*La libération sociale n'est pas intégrée ici puisque son lien avec les étapes de changement de comportement n'est pas clair.

APPENDICE A

FOMULAIRE DE CONSENTEMENT DU PROJET VALIDATION D'UN OUTIL D'ÉVALUATION DES COMPÉTENCES EN COMMUNICATION MOTIVATIONNALLE (CM) – POUR LES EXPERTS EN CM

Centre intégré universitaire de santé et de services sociaux du Nord-de-l'Île-de-Montréal
Québec

Réservé au CÉR CIUSSS NIM
Protocole N° : 2016-1206
Date : 24 avril 2019
Approuvé : Julie Hammamji

AFFILIÉ À Université de Montréal

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT[1]

Titre de l'étude: Validation d'un outil d'évaluation des compétences en Communication Motivationnelle : Sondage d'experts, de patients et de médecins à l'aide d'un Processus Delphi Modifié

Chercheure principale :

Kim Lavoie, Ph.D; Professeur adjoint, Département de psychologie, Université du Québec à Montréal, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM) (kiml_lavoie@yahoo.ca; 514-338-2222 poste 3709).

Co-Chercheur :

Simon Bacon, Ph.D.; Professor associé, Département des Sciences de l'exercice, Université Concordia, Chercheur régulier, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (simon.bacon@concordia.ca; 514-338-2222 poste 3709).

Collaborateurs :

Catherine Laurin, Ph.D.; Psychologue clinicienne, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (catherinelaurin@yahoo.ca; 514-436-6041).

Geneviève Szczepanik, Ph.D.; Coordonnatrice de recherche, Centre de médecine comportementale de Montréal, Centre de recherche de l'Hôpital du Sacré-Coeur de Montréal, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM; Coordonnatrice du Centre de réadaptation Jean-Jacques-Gauthier (genevieve.szczepanik@gmail.com; 514-338-2222 #7819; 514-334-3113 #229).

Anda Dragomir, M.Sc.; Candidate au doctorat, Département de psychologie, Université du Québec à Montréal, Chercheure étudiante, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (anda.dragomir22@gmail.com; 514-791-4450).

Vincent Gosselin Boucher, M.Sc.; Candidat au doctorat, Département de psychologie, Université du Québec à Montréal, Chercheur étudiant, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (vincent.gosselin.boucher@gmail.com; 438-880-8310).

[1] L'expression sujet de recherche couvre la notion de participant à un projet de recherche. Le genre masculin, employé pour alléger le texte, désigne autant les femmes que les hommes.

PRÉAMBULE

Nous sollicitons votre participation à un projet de recherche. Le but de cette étude est de confirmer quelles sont les attitudes et les compétences conformes avec l'approche de la Communication Motivationnelle que les médecins devraient utiliser afin de soutenir des changements d'habitudes de vie durables chez leurs patients atteints de maladies chroniques. Trois groupes d'individus seront approchés pour étudier cette question: des patients souffrant d'une maladie chronique, des médecins spécialistes traitant ces patients et des experts en stratégies pour le changement des habitudes de vie. Cependant, avant d'accepter de participer à ce projet et de signer ce formulaire d'information et de consentement, veuillez prendre le temps de lire, de comprendre et de considérer attentivement les renseignements qui suivent. Ce formulaire d'information et de consentement concerne les experts en stratégies pour le changement des habitudes de vie.

INFORMATION

1. NATURE ET OBJECTIFS DE L'ÉTUDE

La Communication Motivationnelle (CM), basée sur l'entrevue motivationnelle et également inspirée d'autres stratégies de changement de comportements des sciences comportementales, est un style de communication centrée sur le patient visant à renforcer la motivation intrinsèque de celui-ci à suivre des conseils médicaux et adopter et maintenir un mode de vie sain.

La demande des médecins à se faire former en CM a augmenté sensiblement au cours de la dernière décennie. Malgré une large diffusion de ces programmes, il existe étonnamment peu de données probantes sur leur efficacité à améliorer les connaissances et à changer les attitudes et comportements des médecins qui participent à ces programmes, particulièrement parmi les médecins spécialistes.

Le but de cette portion de l'étude est de sonder un groupe d'experts en Communication Motivationnelle en utilisant un processus Delphi modifié, afin d'arriver à un consensus au sujet des compétences et attitudes importantes dans la CM. Cela permettra la création d'un outil d'évaluation standardisé servant à l'évaluation des compétencses en CM.

2. PROCÉDURE ET MÉTHODOLOGIE DE L'ÉTUDE

Un total d'environ 25 experts internationaux en stratégies pour le changement des habitudes de vie, seront invités à participer au processus Delphi et constitueront l'échantillon pour ce projet.

Le consentement sera obtenu au moyen d'un système électronique sécurisé. Nous vous demanderons de lire le formulaire d'information et de consentement approuvé par le comité d'éthique. Si vous acceptez de participer, vous devrez cocher une case confirmant que vous avez « pris connaissance de l'information dans ce formulaire d'information et de consentement », que vous consentez à participer au projet et que « votre participation est volontaire et entièrement confidentielle. »

Votre participation se fera en deux étapes :

1. Définir les compétences et attitudes compatibles avec une approche en CM :
   Après avoir obtenu votre consentement, nous vous demanderons de répondre à un questionnaire électronique sur la CM. Vous devrez également donner votre expertise sur la CM en classant les items du questionnaire selon leur importance. Nous vous demanderons de prendre part à plusieurs rondes du processus Delphi et à chaque ronde, vous recevrez une version révisée du questionnaire et devrez donner votre avis en évaluant les items en fonction de votre expertise. Chaque étape du processus est conçue de façon à atteindre un consensus entre les participants sur le sujet donné.

2. Générer et valider un schéma de classification des compétences basé sur des vignettes de cas qui seront utilisées pour évaluer la compétence en CM, avant et après la formation :
   Nous vous présenterons plusieurs groupes d'énoncés de médecins qui seront éventuellement inclus dans les cas de patients simulés utilisés dans notre outil d'évaluation des compétences en CM. Ces cas incluront une série de dialogues entre patient et médecin représentant des compétences et attitudes chez les médecins. Nous vous demanderons de classer ces énoncés du « meilleur » (le plus compatible avec la CM) au « pire » (le moins compatible avec la CM). Ensuite, nous vous demandons d'indiquer les attitudes et compétences qui sont présentes dans chaque énoncé.

3. RESPONSABILITÉ DU PARTICIPANT

Si vous acceptez de participer à cette étude, vous serez invité à compléter un questionnaire interactif à chaque ronde.

4. RISQUES ET INCONVÉNIENTS ASSOCIÉS AU PROJET DE RECHERCHE

Il n'y a pas de risques associés à votre participation à cette étude.

Le seul inconvénient possible associé à la participation à cette étude est le temps nécessaire pour compléter les questionnaires, qui devraient vous prendre environ 10 minutes, par ronde.

5. AVANTAGES DU PROJET DE RECHERCHE

L'avantage principal à prendre part à cette étude est de contribuer à la création scientifiquement rigoureuse d'un programme de formation et d'un outil d'évaluation de la CM basés sur des données probantes, ainsi que de faire progresser les connaissances concernant l'impact des programmes de formation en CM.

6. PARTICIPATION VOLONTAIRE ET DROIT DE RETRAIT DE L'ÉTUDE

Vous êtes libre de choisir si vous souhaitez participer à cette étude. Si vous choisissez maintenant d'y prendre part, vous pourrez changer d'avis plus tard et vous retirer à tout moment et pour toute raison.

Si vous choisissez d'arrêter ou de vous retirer de l'étude, l'information qui a déjà été recueillie sur vous sera entreposée durant une période de 10 ans pour assurer votre sécurité ainsi que celle des autres participants à l'étude, et ce, aussi longtemps que la loi l'exige.

7. CONFIDENTIALITÉ

Durant votre participation à ce projet, les chercheurs et l'équipe de recherche recueilleront et conserveront des informations démographiques vous concernant dans un dossier de recherche sécurisé. Seules les informations nécessaires à l'étude seront recueillies.

Tous les renseignements recueillis demeureront strictement confidentiels dans les limites prévues par la loi. Afin de préserver votre identité et la confidentialité des renseignements, vous ne serez identifié que par un numéro de code, connu seulement de ceux qui sont directement impliqués dans ce projet de recherche.

Toutes les informations qui pourraient permettre de vous identifier seront conservées dans des classeurs verrouillés dans un bureau sous clé au CIUSSS du Nord-de-l'Île-de-Montréal – Hôpital du Sacré-Cœur de Montréal, et seront seulement accessibles à l'équipe de recherche travaillant directement sur les données de l'étude.

Les données pourront être publiées dans des revues médicales ou partagées avec d'autres personnes lors de rencontres scientifiques, mais il sera impossible de vous identifier. En signant ce document, vous consentez à l'utilisation de vos données à des fins de recherche et comprenez que votre identité ne sera pas révélée dans toute description ou publication qui résultera de cette recherche.

Avec votre permission, il se peut que les renseignements que vous fournirez soient utilisés, avant la date prévue de destruction, dans le cadre de quelques projets de recherche académiques en lien avec le sujet à l'étude. Ces projets éventuels seront sous la responsabilité du chercheur principal et seront autorisés par le Comité d'éthique de recherche respectif. L'équipe de recherche s'engage à maintenir et à protéger la confidentialité de vos données aux mêmes conditions que pour le présent projet.

À des fins de surveillance et de contrôle, votre dossier de recherche pourra être consulté par une personne mandatée par le comité d'éthique de la recherche.

À des fins de protection, notamment afin de pouvoir communiquer avec vous rapidement, vos noms et prénoms, vos coordonnées et la date de début et de fin de votre participation au projet seront conservés pendant un an après la fin du projet dans un répertoire à part, maintenu par le chercheur responsable, Dre Kim Lavoie.

Vous avez le droit de consulter votre dossier de recherche afin de vérifier les informations collectées, et les corriger au besoin, dans la mesure où Dre Kim Lavoie conserve cette information. Cependant, une fois l'étude terminée, vous n'aurez accès qu'à certaines des informations, dans le but de protéger la qualité de la recherche.

En signant ce document, vous consentez à ce que les données collectées soient utilisées pour des fins de recherche, et vous comprenez que votre identité ne sera révélée dans aucune description ou publication résultant de cette étude.

8. COMPENSATION

Vous recevrez une carte-cadeau Amazon de 100$ à titre de compensation pour votre temps après avoir complété la deuxième tâche de l'étude (classement des énoncés de médecins).

9. CONTACTS

Si vous avez des questions au sujet de l'étude ou si vous voulez vous retirer de l'étude, vous pouvez contacter Dre Kim Lavoie, la chercheuse principale en charge de l'étude, au numéro suivant : (514) 338-2222, poste 3709.

Si vous avez des questions à un professionnel ou un chercheur qui ne sont pas impliqués dans le projet, vous pouvez communiquer avec Dr Gilles Lavigne, chercheur au CIUSSS du Nord-de-l'Île-de-Montréal - Hôpital du Sacré-Cœur de Montréal au (514) 343-6005 (Université de Montréal).

Si vous avez des questions à poser concernant vos droits en tant que participant ou si vous avez des plaintes ou commentaires à formuler, vous pouvez communiquer avec le commissariat aux plaintes et à la qualité des services du Centre intégré universitaire de santé et des services sociaux du Nord-de-l'Île-Montréal (CIUSSS du Nord-de-l'Île-de-Montréal) au (514) 384-2000, poste 3316.

10. GESTION DES ASPECTS ÉTHIQUES DE L'ÉTUDE

Le comité d'éthique du CIUSSS du Nord-de-l'Île-de-Montréal a approuvé ce projet de recherche et il en assure le suivi. De plus, il révisera et approuvera toute modification future du formulaire d'information et de consentement et du protocole de recherche.

Centre intégré universitaire de santé et de services sociaux du Nord-de-l'Île-de-Montréal
Québec

FORMULAIRE DE CONSENTEMENT

Titre de l'étude: Validation d'un outil d'évaluation des compétences en Communication Motivationnelle : Sondage d'experts, de patients et de médecins à l'aide d'un Processus Delphi Modifié

Consentement du participant

J'ai pris connaissance du formulaire d'information et de consentement. Je consens à participer à ce projet de recherche aux conditions énoncées précédemment.

En apposant mon nom à la suite de ce formulaire, je ne renonce cependant à aucun de mes droits légaux ni ne libère les chercheurs, l'hôpital et le commanditaire de leur responsabilité civile et professionnelle.

J'accepte volontairement de participer à cette étude. Je demeure libre de m'en retirer en tout temps sans que cela ne nuise aux relations avec l'équipe de recherche et sans préjudice d'aucune sorte.

- ○ Oui, j'accepte de participer à cette étude
- ○ Non, je n'accepte pas de participer à cette étude. (Remarque : la sélection de cette option met fin au sondage

Nom du participant	**Date**

APPENDICE B

FOMULAIRE DE CONSENTEMENT DU PROJET VALIDATION D'UN OUTIL D'ÉVALUATION DES COMPÉTENCES EN COMMUNICATION MOTIVATIONNALLE (CM) – POUR LES ÉTUDIANTS

Centre intégré universitaire de santé et de services sociaux du Nord-de-l'Île-de-Montréal
Québec

Savoirs partagés
RECHERCHE CIUSSS NÎM

Réservé au CÉR CIUSSS NIM
Protocole N° : **2016-1206**
Date : 18 mars 2021
Approuvé : Julie Hammarsj

FORMULAIRE D'INFORMATION ET DE CONSENTEMENT

Titre de l'étude: Validation d'un outil d'évaluation des compétences en Communication Motivationnelle : Sondage d'experts, de patients et de médecins à l'aide d'un Processus Delphi Modifié

Chercheure principale :

Kim Lavoie, Ph.D; Professeure, Département de psychologie, Université du Québec à Montréal, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM) (lavoie.kim@uqam.ca; 514-338-2222 poste 3709).

Co-Chercheur :

Simon Bacon, Ph.D.; Professeur, Département de Santé, kinésiologie et physiologie appliquée, Université Concordia, Chercheur régulier, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (simon.bacon@concordia.ca; 514-338-2222 poste 3709).

Collaborateurs :

Catherine Laurin, Ph.D.; Psychologue clinicienne, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (catherinelaurin@yahoo.ca; 514-436-6041).

Geneviève Szczepanik, Ph.D.; Coordonnatrice de recherche, Centre de médecine comportementale de Montréal, Centre de recherche de l'Hôpital du Sacré-Coeur de Montréal, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (genevieve.szczepanik@mbmc-cmcm.ca; 514-338-2222 #7819; 514-334-3113 #229).

Anda Dragomir, M.Sc.; Candidate au doctorat, Département de psychologie, Université du Québec à Montréal, Chercheure étudiante, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (anda.dragomir22@gmail.com; 514-791-4450).

Vincent Gosselin Boucher, M.Sc.; Candidat au doctorat, Département de psychologie, Université du Québec à Montréal, Chercheur étudiant, Centre de recherche, CIUSSS du Nord-de-l'Île-de-Montréal – HSCM (vincent.gosselin.boucher@gmail.com; 438-880-8310).

Organisme subventionnaire : Instituts de recherche en santé du Canada

PRÉAMBULE

Nous sollicitons votre participation à un projet de recherche. Le but de cette étude est de valider un nouvel outil d'évaluation des compétences conformes avec l'approche de la Communication Motivationnelle que les professionnels de la santé devraient utiliser afin de soutenir des changements d'habitudes de vie durables chez leurs patients atteints de maladies chroniques. Des médecins, des professionnels de la santé et des étudiants universitaires dans des domaines liés à la santé seront approchés pour cette étude. Cependant, avant d'accepter de participer à ce projet et de signer ce formulaire d'information et de consentement, veuillez prendre le temps de lire, de comprendre et de considérer attentivement les renseignements qui suivent. Ce formulaire d'information et de consentement concerne les étudiants universitaires en santé travaillant auprès de patients atteints de maladies chroniques.

INFORMATION

1. NATURE ET OBJECTIFS DE L'ÉTUDE

La Communication Motivationnelle (CM) est un style de communication centrée sur le patient visant à renforcer la motivation des patients à suivre des conseils médicaux et adopter et maintenir un mode de vie sain.

La demande des professionnels de la santé à se faire former en CM a augmenté sensiblement au cours de la dernière décennie. Malgré une large diffusion de ces programmes, il existe étonnamment peu de données probantes sur leur efficacité à améliorer les connaissances et à changer les attitudes et comportements des professionnels de la santé qui participent à ces programmes.

Le but de cette portion de l'étude est de valider un nouvel outil d'évaluation de compétence en CM (appelé le *Motivational Communication Competency Assessment Test,* ***MC-CAT***), en analysant les composantes psychométriques.

2. PROCÉDURE ET MÉTHODOLOGIE DE L'ÉTUDE

Un total d'environ 200 étudiants universitaire en santé (50% femmes, 50% Francophones) seront invités à participer au processus de validation du nouvel outil d'évaluation des compétences en CM et constitueront l'échantillon pour ce projet.

Votre participation implique deux étapes :

1. Répondre à un questionnaire en ligne (5 minutes):

   Après avoir obtenu votre consentement, vous serez invité à compléter en ligne le questionnaire démographique et sur les pratiques professionnelles.

2. Effectuer les tâches en ligne associées à l'outil MC-CAT (20 minutes) :

   Vous devrez réaliser les tâches faisant partie de l'évaluation MC-CAT à deux reprises. Une première évaluation aura lieu au début de votre session. Quatre vignettes cliniques (cas) vous

seront présentées. Ces cas virtuels incluront une série de dialogues entre les patients et les professionnels de la santé. À la fin de votre session, vous recevrez un deuxième courrier électronique avec un lien pour répéter l'évaluation (avec un ensemble comparable mais différent de vignettes/cas). Cela nous permettra de déterminer la fiabilité scientifique de notre outil.

Aux fins de l'étude de validation, aucun retour d'information sur les performances ne sera émis après l'évaluation initiale du MC-CAT. Cependant, vous recevrez un retour détaillé sur votre performance aux deux évaluations MC-CAT à la fin de l'étude.

Si vous avez déjà participé à la première évaluation MC-CAT au début de votre session, nous vous demandons votre autorisation pour inclure les données déjà recueillies dans cette étude.

4. RISQUES ET INCONVÉNIENTS ASSOCIÉS AU PROJET DE RECHERCHE

Il n'y a pas de risques associés à votre participation à cette. Le seul inconvénient ou désavantage possible associé à la participation à cette étude est le temps nécessaire afin de compléter les tâches de l'outil MC-CAT, qui devraient vous prendre environ 30 minutes par passation.

5. AVANTAGES DU PROJET DE RECHERCHE

L'avantage principal à prendre part à cette étude est de contribuer à la création scientifiquement rigoureuse d'un programme de formation et d'un outil d'évaluation de la CM basés sur des données probantes, ainsi que d'un outil d'évaluation en CM spécialement conçu pour les professionnels de la santé, afin d'améliorer la mesure des compétences cliniques acquises après la participation à ces programmes de formation. Après votre participation, vous recevrez également un rapport détaillé sur votre performance aux deux évaluations avec l'outil MC-CAT, ce qui pourrait s'avérer utile dans votre apprentissage.

6. PARTICIPATION VOLONTAIRE ET DROIT DE RETRAIT DE L'ÉTUDE

Vous êtes libre de choisir si vous souhaitez participer à cette étude. Si vous choisissez maintenant d'y prendre part, vous pourrez changer d'avis plus tard et vous retirer à tout moment et pour toute raison. Ces décisions n'auront aucun impact sur vos cours ou sur vos relations avec vos professeurs.

Si vous choisissez d'arrêter ou de vous retirer de l'étude, l'information qui a déjà été recueillie sur vous sera entreposée durant une période de 10 ans.

7. CONFIDENTIALITÉ

Durant votre participation à ce projet, le chercheur responsable de ce projet, ainsi que les membres de son personnel de recherche recueilleront, dans un dossier de recherche, les renseignements vous concernant et nécessaires pour répondre aux objectifs scientifiques de ce projet de recherche par l'entremise de la plateforme en ligne MC-CAT, qui est fournies par la compagnie 42 Comets. Seules les informations

nécessaires à l'étude seront recueillies. Cette plateforme est stockée sur des serveurs sécurisés gérés par la compagnie 42 Comets, au Canada.

Afin de préserver votre identité et la confidentialité des renseignements, vous ne serez identifié que par un numéro de code, connu seulement de ceux qui sont directement impliqués dans ce projet de recherche. Toutes les informations qui pourraient permettre de vous identifier seront conservées dans des dossiers verrouillés dans un serveur au CIUSSS du Nord-de-l'Île-de-Montréal – Hôpital du Sacré-Cœur de Montréal, et seront seulement accessibles à l'équipe de recherche travaillant directement sur les données de l'étude. Toutes les données seront stockées pendant une période de 10 ans.

Tous les renseignements recueillis demeureront strictement confidentiels dans les limites prévues par la loi. Les données agrégées pourront être publiées dans des revues médicales ou partagées avec d'autres personnes lors de rencontres scientifiques, mais il sera impossible de vous identifier.

Avec votre permission, il se peut que les renseignements que vous fournirez soient utilisés, avant la date prévue de destruction, dans le cadre de quelques projets de recherche académiques en lien avec le sujet à l'étude. Ces projets éventuels seront sous la responsabilité du chercheur principal et seront autorisés par le Comité d'éthique de recherche respectif. L'équipe de recherche s'engage à maintenir et à protéger la confidentialité de vos données aux mêmes conditions que pour le présent projet.

À des fins de surveillance, de contrôle, de protection et de sécurité, votre dossier de recherche pourra être consulté par une personne mandatée par l'établissement, l'organisme subventionnaire ou le comité d'éthique de la recherche. Ces personnes et ces organismes adhèrent à une politique de confidentialité.

Vous avez le droit de consulter votre dossier de recherche pour vérifier les renseignements recueillis et les faire rectifier au besoin.

À des fins de protection, notamment afin de pouvoir communiquer avec vous rapidement, vos noms et prénoms, vos coordonnées et la date de début et de fin de votre participation au projet seront conservés pendant un an après la fin du projet dans un répertoire à part, maintenu par la chercheure responsable, Dre Kim Lavoie.

8. FINANCEMENT DU PROJET DE RECHERCHE

La chercheure principale du projet a reçu un financement des Instituts de recherche en santé du Canada.

9. COMPENSATION

Vous ne recevrez aucune compensation financière pour votre participation à cette étude.

10. CONTACTS

Si vous avez des questions au sujet de l'étude ou si vous voulez vous retirer de l'étude, vous pouvez contacter Dre Kim Lavoie, la chercheure principale responsable de l'étude, au numéro suivant : (514) 338-2222, poste 3709.

Si vous avez des questions à un professionnel ou un chercheur qui ne sont pas impliqués dans le projet, vous pouvez communiquer avec Dr Gilles Lavigne, chercheur au CIUSSS du Nord-de-l'Île-de-Montréal - Hôpital du Sacré-Cœur de Montréal au (514) 343-6005 (Université de Montréal).

Si vous avez des questions à poser concernant vos droits en tant que participant ou si vous avez des plaintes ou commentaires à formuler, vous pouvez communiquer avec le commissariat aux plaintes et à la qualité des services du Centre intégré universitaire de santé et des services sociaux du Nord-de-l'Île-de-Montréal (CIUSSS du Nord-de-l'Île-de-Montréal) au (514) 384-2000, poste 3316 ou au commissaire.plaintes.cnmtl@ssss.gouv.qc.ca.

11. GESTION DES ASPECTS ÉTHIQUES DE L'ÉTUDE

Le comité d'éthique du CIUSSS du Nord-de-l'Île-de-Montréal a approuvé ce projet de recherche et il en assure le suivi. De plus, il révisera et approuvera toute modification future du formulaire d'information et de consentement et du protocole de recherche.

Centre intégré universitaire de santé et de services sociaux du Nord-de-l'île-de-Montréal
Québec

FORMULAIRE DE CONSENTEMENT

Titre de l'étude: Validation d'un outil d'évaluation des compétences en Communication Motivationnelle : Sondage d'experts, de patients et de médecins à l'aide d'un Processus Delphi Modifié

Consentement du participant

J'ai pris connaissance du formulaire d'information et de consentement. Je reconnais que l'on m'a expliqué le projet, que l'on a répondu à mes questions et que l'on m'a laissé le temps voulu pour prendre une décision. Je consens à participer à ce projet de recherche aux conditions énoncées précédemment.

En apposant ma signature sur ce formulaire, je ne renonce cependant à aucun de mes droits légaux ni ne libère les chercheurs, l'établissement et l'organisme subventionnaire de leur responsabilité civile et professionnelle.

J'accepte volontairement de participer à cette étude. Je demeure libre de m'en retirer en tout temps sans que cela ne nuise aux relations avec l'équipe de recherche et sans préjudice d'aucune sorte.

Une version PDF signée et datée du présent formulaire d'information et de consentement me sera envoyée par courriel.

_____
Prénom et nom du participant

_____ _____
Date

Signature et engagement du chercheur responsable du projet

Je certifie qu'on a expliqué au participant les termes du présent formulaire d'information et de consentement, que l'on a répondu aux questions que le participant avait à cet égard et qu'on lui a clairement indiqué qu'il demeure libre de mettre un terme à sa participation, et ce, sans préjudice.

Je m'engage, avec l'équipe de recherche, à respecter ce qui a été convenu au présent formulaire d'information et de consentement et à en remettre une copie signée au participant.

_____
Nom du chercheur responsable du projet de recherche

_____ _____
Signature du chercheur responsable du projet de recherche Date

APPENDICE C

EVALUATION OF COMMUNICATION SKILLS AMONG PHYSICIANS: A SYSTEMATIC REVIEW OF EXISTING ASSESSMENT TOOLS

Article publié dans la revue scientifique *Psychosomatic Medicine* en 2020

SYSTEMATIC REVIEW/META-ANALYSIS

Evaluation of Communication Skills Among Physicians: A Systematic Review of Existing Assessment Tools

Vincent Gosselin Boucher, MSc, Claudia Gemme, BA, Anda I. Dragomir, MSc, Simon L. Bacon, PhD, Florent Larue, MD, and Kim L. Lavoie, PhD

ABSTRACT

Objective: The importance of physician training in communication skills for motivating patients to adopt a healthy life-style and optimize clinical outcomes is increasingly recognized. This study inventoried and systematically reviewed the psychometric properties of, and the skills assessed by, existing assessment tools used to evaluate communication skills among physicians.

Methods: This review was conducted in accordance with the PRISMA guidelines (PROSPERO: CRD42018091932). Four databases (PUBMED, EMBASE, PsychINFO, and SCOPUS) were searched up to December 2018, generating 3902 unique articles, which were screened by two authors. A total of 57 articles met the inclusion criteria and underwent full data extraction.

Results: Forty-five different assessment tools were identified. Only 47% of the studies mentioned underlying theories or models for designing the tool. Fifteen communication skills were assessed across the tools, the five most prevalent were information giving (46%) or gathering (40%), eliciting patients' perspectives (44%), planning/goal setting (37%), and closing the session (32%). Most tools (93%) assessed communication skills using in-person role play exercises with standardized (61%) or real (32%) patients, but only 54% described the expertise of the raters who performed the evaluations. Overall, reporting of the psychometric properties of the assessment tools was poor-moderate (4.5 ± 1.3 out of 9).

Conclusions: Despite identifying several existing physician communication assessment tools, a high degree of heterogeneity between these tools, in terms of skills assessed and study quality, was observed, and most have been poorly validated. Research is needed to rigorously develop and validate accessible, convenient, "user-friendly," and easy to administer and score communication assessment tools.

Key words: patient-physician communication, medical education, assessment tool, chronic disease management.

INTRODUCTION

The World Health Organization estimates that nearly 71% of all deaths worldwide result from noncommunicable diseases, such as cardiovascular diseases, respiratory diseases, diabetes, and cancer (1). The development and progression of chronic diseases is strongly influenced by a specific cluster of poor health behaviors, namely, smoking, unhealthy eating, excessive alcohol consumption, nonadherence to prescribed treatment, and physical inactivity (2–6). Therefore, physicians' ability to effectively motivate patients to adopt and maintain a healthy life-style is critical for optimizing disease outcomes. Although several psychosocial factors contribute to poor health behaviors (e.g., knowledge and beliefs, levels of emotional distress, interpersonal support, and behavioral skills) (7,8), the quality of physicians' communication skills has been increasingly recognized as a critical determinant of patient behavior change and better disease outcomes (9,10). Beyond behavior change applications, effective communication skills have also been recognized as being important for engaging patients in their care, addressing knowledge gaps, helping patients overcome treatment fears, and improving the overall quality and effectiveness of the therapeutic relationship (10,11).

Recognition of the importance of communication skills among physicians has been emphasized by physician regulatory bodies, including the Canadian College of Physicians and Surgeons (12) and the Royal College of Physicians (13), who now identify the role of "communicator" as being one of the core competencies to be mastered by physicians. Communication skills competencies have been defined by the CanMEDS Framework (12) as the combination of a) establishing a professional therapeutic relationship, b) eliciting and synthesizing of acute and relevant information, c) sharing health care information and plans, d) engaging patients and their families in developing plans, and e) documenting and sharing of written and/or electronic information on the medical encounter. As a result, communication skills are increasingly taught across medical contexts and disciplines. However, there seems to be no consensus on training content or methods, and the assessment of the acquisition of the communication skills is not

SDC Supplemental Content

From the Montreal Behavioural Medicine Centre (Boucher, Gemme, Dragomir, Bacon, Larue, Lavoie), Centre Intégré Universitaire de Santé et Services Sociaux du Nord-de-l'Île-de-Montréal (CIUSSS-NIM), Hôpital du Sacré-Cœur de Montréal; Department of Psychology (Boucher, Gemme, Dragomir, Lavoie), Université du Québec à Montréal; Department of Health, Kinesiology, and Applied Physiology (Bacon, Larue), Concordia University, Montreal, Canada; and Faculty of Medicine of Montpellier (Larue), Montpellier, France.

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systematically carried out (14). For example, a recent systematic review exploring nine communication training programs in the context of behavior change counseling targeting physicians demonstrated efficacy across all programs (14). However, training programs varied widely, and there was huge heterogeneity in the methods and tools used to evaluate skills competency (14). Although most programs used role-play exercises with simulated patients as their primary competency assessment method, there was an important discrepancy between the skills taught by the programs and the skills assessed (on average, only 30% of the skills taught were formally evaluated). A similar review of 17 training programs to improve breaking bad/difficult news by physicians and medical students also reported the use of a range of tools to assess skills competency (15). Although this review indicated whether tools were self- or observer-rated, they did not report on the specific tools used to assess skills competency, which limits the ability to interpret the results. Finally, the authors failed to report the specific communication skills taught across the programs or assessed by the tools, which makes it difficult to know what skills are required to break bad/difficult news "effectively" (15).

Another recent systematic review examined 25 studies assessing the use of verbal and nonverbal communication skills by physicians during interactions with their patients. Among those studies, only 20 mentioned the assessment tool(s) that was used to evaluate those skills (16) and their respective psychometric properties (e.g., reliability and external validity) ranged from fair to poor. Of note, tools using external raters, as opposed to real patient or physician-reported measures, had significantly better psychometric property scores. This, coupled with the fact that both patients and physicians have been shown to be poor judges of physician communication skills (17,18), highlights the need to use objective assessment tools with trained third parties in this context, improving the interrater reliability. Taken together, these reviews highlight that there remain important gaps in our understanding of the relevance and quality of existing physician communication tools, which limits their potential utility and impact.

To our knowledge, no study has systematically or comprehensively reviewed existing physician communication assessment tools, including information on their theoretical foundation, range of skills assessed, relevant rater information (training, expertise), and available psychometric properties. The primary objective of this study was to therefore systematically inventory and critically review the quality of existing physician communication assessment tools, including information on their theoretical foundation, skills assessed, rater characteristics, and psychometric properties. The secondary objective was to compare the tools' administration characteristics (e.g., mode, duration, and cost) and their ability to effectively engage users, with the goal of identifying the properties of the most valid and effective communication assessment tools.

METHODS

This review was conducted in accordance with the PRISMA guidelines (19) and was registered with the International Prospective Register of Systematic Reviews (PROSPERO: CRD42018091932) (20).

Inclusion/Exclusion Criteria

Original studies published up to December 15, 2018, in English or French in any peer-reviewed journal were included if they reported on an assessment tool used to measure physicians' communication skills. Reviews, abstracts only, chapters, and theses were excluded, as were studies reporting on translated versions of tools (e.g., English version translated to Spanish). Because of the focus on communication skills in physician, included studies had to target using tools among specialists and/or general practitioners. Studies assessing other healthcare professionals' communication skills (e.g., nurses and pharmacists) were excluded. We only included studies that used tools that relied on third-party ratings to assess physicians' communication skills; those using patient or physician self-evaluations of communication skills competency were not included because of concerns about bias. Finally, included studies had to report at least one psychometric property (e.g., internal validity, test-retest reliability, intrarater/interrater agreement, sensitivity, specificity, external validity, and positive/negative predictive values).

Search Strategy and Review Process

The search was conducted up to December 15, 2018, in the following electronic databases: PUBMED, EMBASE, PsychINFO, and SCOPUS using the following keywords: "physician," "clinician," "doctor," "medical student," "medical resident" AND "tool," "instrument" AND "communication," "behavior change," "behavior change," "motivational interviewing," "counseling," "counseling".

Reference lists of pertinent publications identified through the screening process, as well as those of previous systematic reviews, were examined to identify other relevant studies that could be added to the present review. The following information was extracted from each study: study characteristics (authors, publication year, assessment tool used [previously validated or not]), participant characteristics (number and type of participants), tool information (name, number of items, communication skills assessed, type of scale, theoretical foundations, administration time, scoring time, and cost), rater information (type of rater, rater expertise, and rater training), and psychometric properties (internal validity, test-retest reliability, interrater agreement, intrarater, sensitivity, specificity, external validity, and positive/negative predictive values). Interrater agreements and κ coefficients (21) with 95% confidence intervals were calculated using the two raters' scores (V.G.B. and C.G.) for all data extracted. Any disagreements were resolved by discussion with a third rater who was a senior member of the research team (K.L.L.).

Study Quality

Study quality was assessed by two independent evaluators using the modified Consensus-based Standards for the selection of health status Measurement Instruments checklist, which is a 10-item rating system assessing the quality criteria for tools design, methods, and outcomes (22). This checklist is useful in helping reviewers identify the methodological qualities and study strengths and weaknesses (e.g., internal consistency, reliability, and responsiveness). Because validation studies of translated versions of instruments were excluded, the "cross-cultural validity" item was removed, leaving us with a nine-item checklist (where scores of 7 or higher may be considered high quality) (22,23). The interrater agreement (V.G.B. and C.G.) scores for the study quality (76%, $\kappa = 0.6$) were moderate.

RESULTS

Results of the Search

This search process generated 5114 records; 1212 duplicate references were removed, resulting in 3902 unique potentially eligible studies. From these records, 125 full-text articles were identified, and 70 publications were put forward for data extraction and quality extraction. As seen in Figure 1, 57 articles fulfilled all inclusion criteria (17,18,24–78). The interrater agreement scores for the first round of eligibility assessment screening using titles and abstracts were high (85%), and agreement for data extraction was moderate (75%, $\kappa = 0.5$).

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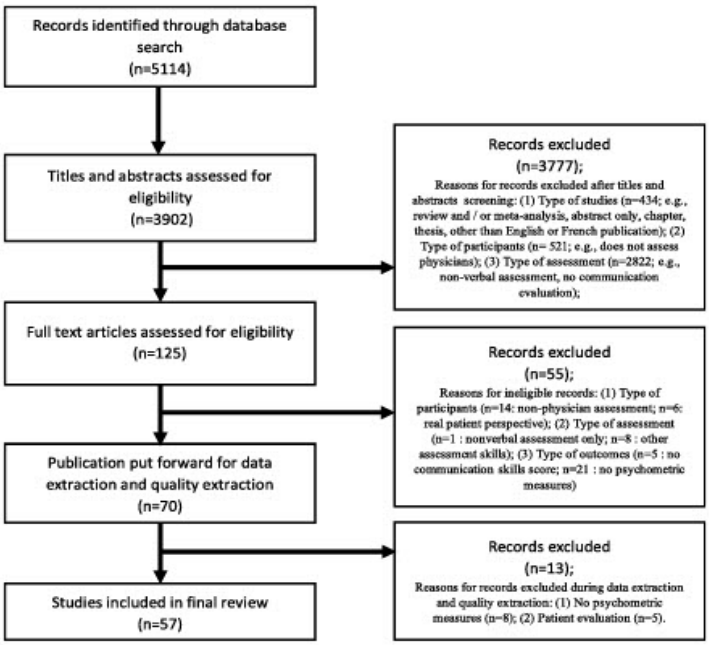

FIGURE 1. Flow diagram.

Study Characteristics

A total of 57 studies (published between 1990 and 2018) were included in the review, identifying 45 different assessment tools. Study and tool characteristics are summarized in Table 1. Only eight tools were used more than once: a) the Objective Structured Clinical Examination (n = 4; 7%) (36,44,57,77), b) the Calgary-Cambridge Observation Guide Checklist (n = 3; 5%) (24,66,70), c) the SEGUE assessment tool (n = 3; 5%) (25,26,55), d) the Four Habits Coding Scheme (n = 2; 3%) (40,52), e) the Global Consultation Rating Scale (n = 2; 3%) (27,28), f) the Liverpool Communication Skills Assessment Scale (n = 2; 3%) (45,47); g) the Relational Communication Scale (n = 2; 3%) (37,50); and h) the Self-Assessment Questionnaire (n = 2; 3%) (54,74). Most studies used a tool that been previously validated (33/57; 58%), and the others were original validation studies (24/57; 42%).

Participant Characteristics

Participant characteristics are summarized in Supplemental Content 1, http://links.lww.com/PSYMED/A613. In total, the studies reviewed included a total of 12,258 physicians, and the mean number of physicians participating in each study varied from 2 to 4991. Three different types of physicians were included, the largest groups being composed of practicing physicians (n = 22 studies, n = 1302) (26–30,32,34,39,40,43,45,48,52,54,56,60,62,65,68,72,74,77). Other types included medical students (n = 21 studies; n = 10,333) (18,24,35–38,44,46,47,49–51,53,55,57,61,63,66,67,69,78) and medical residents (n = 14 studies; n = 623) (17,25,31,33,42,47,58,59,64,70,71,73,75,76).

Tool Characteristics

Only 51% (n = 23) of the tools mentioned the use of theories or models underlying the conceptualization and design of the tool (18,24,26–29,32,33,36–41,48,50–52,56,60,63,65,67,68,72,77,78). Twenty different theories or models were identified (Supplemental Content 2, http://links.lww.com/PSYMED/A614). The most prevalent theories or models were a "patient-centered approach" (n = 4; 7%) (26,32,36,63), the "Four Habits" approach (n = 3; 5%) (40,50,52), "motivational interviewing" (n = 2; 4%) (33,67), the "SPIKES" (*S*etting up the interview, assessing patient's *P*erception, obtaining the patient's *I*nvitation, giving *K*nowledge and *I*nformation, addressing patient's *E*motions, *S*trategy and Summary) model (n = 2; 4%) (60,68), and the "5 or 6 As" model (n = 2; 4%) (18,67).

Across the 45 tools identified by the review, a total of 15 distinct communication skills were assessed, with an average of 3.6 ± 2.0 per tool (range = 1–10 skills; Supplemental Content 2, http://links.lww.com/PSYMED/A614). The top 5 skills assessed by the ensemble of tools were as follows: information giving (n = 26; 46%) or gathering (n = 23; 40%), eliciting patients' perspectives (n = 25; 44%), agenda or goal setting (n = 21; 37%), and closing the session (n = 18; 32%). Eleven studies, including 10 tools, did not report the specific communication skills assessed by their tools (34,44,50,54,58,64,72–75,78), referring to them as

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TABLE 1. Characteristics of the Studies and Tools

	Tool	First Author	No. Items	Type of Measure	Patient Type (RP, SP, NP)	Administration Time, min	Scoring Time, min	Cost	Validation/ Previously Validated	Internal Validity	Test-Retest Reliability	Interrater Agreement	Intrarater Reliability	Sensitivity	Specificity	External Validity
1	Objective Structured Clinical Examination	Elman (36)	14		SP	20			Previously validated (adaptation palliative)	√		√				
		Huang (44)	15	Score	SP	15 × 10–20 per station			Previously validated (med)	√						
		Mortsiefer (57)	4	5-point response scale	SP	40	120 h/ 456 students	387.5 h/ 456 students	Previously validated (adaptation complex communication issues)	√						
		Zabar (77)	16	3-point scale	SP	50			Previously validated (med)	√		*				
2	Calgary-Cambridge Observation Guide Checklist	Ammentorp (24)	12	5-point Likert scale	SP				No information			√				
		Simmenroth-Nayda (66)	28	5-point scale	SP	8			Previously validated (med; adaptation short version)		√	√*				
		Suzuki Ladlaw (70)		5-point Likert scale + Yes/no assessment	SP	60			Previously validated (med)			√				
3	SEGUE assessment tool	Asis-Hasid (25)	25	Yes/no questions	SP				Previously validated (med)			√				
		Asis-Hasid (26)	23		NP				Previously validated (med; adaptation electronic)			√				
		Makoul (55)	25	Yes/no questions	SP	20.95			Validation			√				
4	Four Habits Coding Scheme	Gulbrandsen (40)	23	5-point scale	RP				Previously validated (med)			√*				
		Krupat (52)	23	5-point scale	RP	16.1	3.5		Validation	√		√				
5	Global Consultation Rating Scale	Burt (27)	12	3-point scale	SP				Previously validated (med)			√				
		Burt (28)	12	3-point scale	RP				Validation			√				
6	Liverpool Communication Skills Assessment Scale	Humph (46)	12	4-point scale	SP	5			Previously validated (med)	√						
		Huntley (47)	10	5-point scale	SP	20	0.5		Validation (undergraduate)	√		√				

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TABLE 1. *(Continued)*

	Tool	First Author	No. Items	Type of Measure	Patient Type (RP, SP, NP)	Administration Time, min	Scoring Time, min	Cost	Validation/ Previously Validated	Internal Validity	Test-Retest Reliability	Interrater Agreement	Intrarater Reliability	Sensitivity	Specificity	External Validity
7	Relational Communication Scale	Gallagher 2001 (37)	34		SP	15			Validation (med)	√		√[a]				
		Kamieli-Miller (50)	25	7-point Likert scale	SP	5			Previously validated (com students)	√						
8	Self-Assesment/ patient/ coworker/ medical colleague questionnaire/ survey	Violato (74)	37	5-point scale	N P				Previously validated (med)	√						√
		Lockyer (54)	31	5-point rating scale	NP				Previously validated (med)	√						√
9	360-degree instrument	Joshi (17)	10	5-point scale	SP				Validation			√				
10	Assessment of Doctor-Elderly Patient Transactions	Teresi (72)	23	5-point scale	RP				Validation (elderly patient)	√	√					
11	Case for change web-based tool	Kim (51)	8	Narrative response and 5-point Likert scale	NP				Previously validated (med student); Validation			√				
12	CELI instument	Wouda (75)		4-point scale	SP				Previously validated (med student: cite a study that cite another one...)			√				
13	Combined Behavioral Change Counseling Assesement Instrument	Strayer (67)	24	Yes/no questions	SP	11			Validation (adaptation from previous validate tools)	√		√				
14	ComOn Checklist	Niglio de Figueiredo (60)	5	5-point scale	RP				Previously validated (medf/ adaptation			√				
15	Communication Assesment Tool	Newcomb (59)	14	5-point scale	RP; SP	10			Previously validated (med)	√				√		
16	Communication in Oncology checklist	Stubenrauch (68)	31	5-point rating scale	SP				Validation			√				

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17	Communication Rating System	Hulsman (45)	23	Description and Frequency of occurrence of each observation category + general rating (10-point scale)	RP			Previously validated (no info)		√			
18	Connect, Identify, Understand, Consent, Help scale	Valverde (73)	29	3-point scale	RP	8.8		Previously validated (health care professionals/ other language)		√	√		
19	Conversation Rating Sheet for Breaking Bad News/ direction of care	Szmuilowicz (71)	18	Yes/no questions	SP	10	10	Previously validated (med)/ adaptation		√[a]	√		
20	Decision Support Analysis Tool	Guimond (39)	14	Number of decision support process	RP	20.5		Validation		√			
21	Doctors' Observable Use of Self-Efficacy Enhancing Interviewing Techniques (DO U SEE IT) measure	Jerant (48)	10	Yes/no questions	SP			Previously validated (no info)	√	√			
22	Doctor-patient Communication Competency Instrument for medical student	Renaud (63)	5	4-point response scale	SP			Validation	√				
23	Doctor-Patient scale	Joekes (49)	17	5-point scale	SP	10		Previously validated (med)		√[a]			
24	Diabetes Risk Factor Interview Scale	Kirk (18)	12	5-point scale	SP	30		Previously validated (med artery disease)/ adaptation (diabetes)	√	√			
25	Essential Elements of Communication	Dong (35)	23	5-point Likert scale	SP			Previously validated (med)	√			√	√

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TABLE 1. *(Continued)*

	Tool	First Author	No. Items	Type of Measure	Patient Type (RP, SP, NP)	Administration Time, min	Scoring Time, min	Cost	Validation/ Previously Validated	Internal Validity	Test-Retest Reliability	Interrater Agreement	Intrarater Reliability	Sensitivity	Specificity	External Validity
26	Empathic Communication Coding System	Bylund (29)	6	6-point scale	RP				Validation (doctoral dissertation)			√				
27	Family Meeting Behavioral Skills Checklist	Gastin (41)	31	Yes/no/not applicable (each item); 5-point summary rating scale	SP				Validation		√	√				
28	Global Health Delivery Competency Assesment Tool	Woe (76)	15	7-point scale	RP				Validation			√				
29	Helpful Responses Questionnaire	Childers (33)	6	6 vignettes: presence or absence (0 or 1)	SP	150			Previously validated (paraprofessional trainees)			√				
30	Integrated Procedural Performance Instrument	Leblanc (53)	15	5-point	SP	120			Previously validated (med)	√						
31	Maastricht Anamnestic and Advice Scoring list, Global	Ram (62)	12	5-point Likert scale	SP	96		12 cases: 530 US$ and 680 US$ for 16 cases	Previously validated (med)							√
32	Matched-pair Instrument	Campbell (30)	19	5-point scale	RP		2		Validation	√		√				√
33	Michigan State University Interaction Scale	Hoppe (42)	5	6-point rating scale	SP	24			Previously validated (med)			√				
34	Mini_CEX	Zaidi (78)	7	8-point scale	RP				Validation?	√						
35	OPTION scale	Mercar (56)	12	5-point scale	RP	28	28		Previously validated			√	√			
36	Objective, Structured, Communication Assesement of Residents tool	Caron (31)	52	4-point scale	SP	40			Validation	√		√				

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37	Pediatric Consultation Assessment Tool	Howells (43)	16	7-point scale	RP	37.5		Validation	√				
38	Physicians Assessment in Medical Practice	Cohen (34)	14	5-point global ratings	SP	250	250	Validation	√		√		
39	Patient-Centered Observation Form	Chesser (32)	13	Checklist and number of patient-centered observation (0–4)	RP			Validation	√		√		
40	Resident Observation and Competency Assessment tool	Musick (58)	4	Checklist +5-point scale	RP	15		Validation	√				
41	Revised University of Illinois Communication and Interpersonal Skills	Park (61)	14	4-point scale	SP			Previously validated (med)	√		√		√
42	Self-perception rating (for students); External perception rating (standardized patients)	Graf (38)	4	6-point scale	SP			Validation	√	√	√*		
43	Siminoff Communication Content & Affect Program	Siminoff (65)		7-point scale	RP	55		Previously validated (med)			√		
44	Standardized Direct Observation Assessment Tool	Shayne (64)	26	3-point scale and 5 points scale global score	SP			Previously validated (med)	√				
45	Communication Assessment tool	Suojanen (69)	22	5-point scale	SP	10		Validation			√*		

NP = no patient; RP = real patient; SP = standardized patient
*Authors indicated time of test-retest.

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"general communication skills" (68) or "interpersonal communication skill behaviors" (50).

Most tools assessed physicians' communication competency during interactions with standardized (n = 35; 61%) or real patients (n = 18; 32%), which were coded by external raters (see hereinafter). Only four studies did not use any simulated or in vivo observations to evaluate physicians, and only used a questionnaire/checklist (26,51,54,74). More than half of the studies (n = 30; 53%) specified the administration time of the tool (mean = 52.4 minutes, range = 5–250 minutes; Table 1), but the scoring time was reported by only 5 studies (mean = 12 minutes; range = 0.5—127 minutes) (30,47,52,57,71). Only two studies (using the tools Four Habits Coding Scheme and the Objective Structured Clinical Examination) provided information regarding their costs, for example, standardized patient fees, administrative assistance, analysis, and rater training (mean = US $428 ± $251) (34,62).

Rater Characteristics

Supplemental Content 1 (http://links.lww.com/PSYMED/A613) summarizes the characteristics of those who rated physicians' communication skills. Ninety percent of the studies described raters' characteristics or profession (i.e., other physicians, standardized patients, real patients, nurses, psychologists, students/research assistants, other professionals).

More than half of the studies (n = 31; 54%) described other rater qualifications (e.g., "physicians experienced in the teaching of communication skills," (28) "social and behavioral scientists," (37) and "communication skills tutors with health care backgrounds" (49)). Approximately two-thirds of the studies (n = 37; 65%) reported information on the training that raters received before performing the assessments (e.g., "training manual, transcriptions of interactions, and videotapes of interactions between doctors and patient" (72)). Finally, less than one third of the studies (n = 16; 28%) reported the duration of rater training, with a range between 1.5 and 90 hours (mean = 14 ± 23.4 hours).

Psychometric Properties

Although 42% of the studies in this review were validation studies, it was surprising that 61% (n = 35) only reported one psychometric property for their tool. One-third of the studies reported having measured two psychometric properties (n = 19, 33%), and three studies measured more than two (n = 3, 6%). The most commonly reported psychometric property was interrater agreement (n = 40; 70%), followed by internal validity (n = 29; 51%). Other psychometric measures such as test-retest reliability (n = 4; 7%), intrarater reliability (n = 3; 5%; although only seven of these studies provided information on the interval of time between the first and second assessments), sensitivity (n = 2; 4%), and external validity (n = 6; 11%) were assessed in less than 15% of studies (Table 1).

Study Quality

Study quality varied considerably, with an average score of 4.5 ± 1.3 (range = 2–7) of a maximum of 9, which denotes studies of moderate quality (22,23) (Supplemental Content 3, http://links.lww.com/PSYMED/A615). The low-quality scores of the studies are mostly attributable to missing information related to psychometric analyses.

DISCUSSION

This study systematically reviewed the literature on existing assessment tools of physicians' communication skills and summarized their psychometric properties. In addition, this review examined the theoretical underpinnings of each tool's design, the communication skills assessed, their administration mode, and their validation methods. A total of 45 tools were identified across 57 studies (including 24 original validation studies, whereas 33 studies used a tool that had been previously validated). A great deal of heterogeneity was observed between the different tools in terms of the communication skills assessed, their psychometric properties, and the type of raters used. Only eight tools were used in more than one study, indicating a lack of consistency and consensus in the field. The individual tools had numerous limitations, most of which were attributable to replicability and how they were developed. For example, only 47% of the studies mentioned that the tools were based on any theory or model. Furthermore, of the 20 different theories or models identified, half of them were not clearly defined (e.g., "patient-centered approach," "relational communication," and "group communication theory").

The modified Consensus-based Standards for the selection of health status Measurement Instruments checklist revealed that the quality of the studies included in the review was low to medium, making it difficult to judge their validity and overall utility in this context (79). One of the greatest limitations was the paucity of psychometric data reported for each tool. Most studies (61%) reported on only one psychometric property (e.g., interrater reliability), and none described any positive predictive values or negative predictive value analyses, specific for screening or competencies assessment tools (80). This indicates that no current tools assessing physician communication skills have psychometric properties or predictive data, which seriously undermines their validity and potential utility in an intervention context.

Forty-five different tools were identified by our review, and none are consistently being used, possibly because of design features that make them invasive/intrusive, time-consuming, and minimally engaging. Although no study specifically described the degree to which the tools were "user-friendly" and engaging for physicians, all but four relied on in vivo assessments of real or role played patient interactions (which many physicians may find cumbersome) that lasted on average 52 minutes (although some assessments lasted as long as 250 minutes). This suggests that current tools may be poorly adapted for use by physicians, who have limited time available to complete such assessments. As a possible solution, we could potentially leverage technological advancements in simulation software to both increase physician engagement (e.g., via gamification of physician-patient interactions) and improve time optimization (e.g., via remote or online assessments), using a standardized assessment method that ensures fidelity. For example, the integration of high-fidelity mannequins (81) or virtual clinical stations (82) that increase the ecological validity of performance criteria assessments (e.g., conducting an interview with a patient) and action criteria assessments (e.g., asking open questions and expressing empathy) could be used. Whether it is an evaluation of a virtual patient (83) or physician technical skill assessment (84), technology has the ability to add a realistic look, increase, accessibility, and optimize the fidelity of assessment or learning tools.

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LIMITATION AND STRENGTHS

This review may be limited by the search criteria used; more specifically, we did not include the words "assessment" and "evaluation" because they lacked sufficient specificity in this context. Instead, we searched the terms "tool" or "instrument," which increased specificity for appropriately identifying assessment tools and instruments. We also excluded studies published in languages other than English or French, which may reduce generalizability among other languages or cultures. We also did not include studies that assessed communication skills among nonphysicians (e.g., nurses and pharmacists), so results may only generalize to physicians. Finally, because of the high number and heterogeneity of assessment tools and outcomes that were measured, we were unable to conduct any formal meta-analyses.

Despite some limitations, this review also has some notable strengths. To our knowledge, this is the largest and most comprehensive review of existing physician communication assessment tools to date. Previous reviews (e.g., Boon and Stewart (85) and Zill et al. (16)) have reviewed tools of questionable quality (published in non–peer-reviewed journals) and have included limited information on the tools. For example, these reviews failed to report the communication skills assessed by the tools, the theoretical foundations of the tools, or the training and qualifications of raters. These limitations represent major gaps that the current review addresses. In addition to being more comprehensive, the present review was also more transparent in reporting by adhering to the PRISMA guidelines (19). The present review also only included tools with external raters, which increases validity and reduces bias. This review addressed both tool and rater characteristics, especially those that may be relevant for uptake by physicians (e.g., training time, and time of assessment), as well as the communication skills assessed. The results highlight a need to develop tools that are both psychometrically valid and predictive, but also have high probability of uptake by physicians.

Research and Practice Implications

Although the importance of communication skills training is now better recognized in the health sector, pretraining and posttraining skills assessments need to be consistently conducted, and the methodological considerations mentioned previously should be addressed. Without appropriate competency assessments, it is impossible to demonstrate the efficacy or effectiveness of communication training. Thus, it is essential to use rigorously developed and validated tools to assess physicians' communication skills. In light of the results of this review, we offer the following recommendations for advancing research in the assessment of communication skills among physicians:

- All communication skills training programs, as well as their corresponding assessment tools, should be conceptualized and developed based on established theoretical models of communication and/or behavior change. Relevant theories should be the foundation upon which the components of any training program and their outcomes are chosen, which helps us understand if, why, and how a training program is effective or not (86).
- Communication skills training programs and their corresponding assessment tools should be designed concurrently, and their contents should be inherently linked: what is taught should be assessed before and after training, ideally with an additional follow-up evaluation (14).
- Communication assessment tools should be appropriately validated, and studies using these tools should be transparent and thorough in reporting their psychometric properties.
- There is a need to develop assessment tools that are both engaging (to physicians) and easy to administer and score. Leveraging new technology solutions (e.g., gamification of physician-patient interactions) may reduce the time burden of current tools, improve validity and fidelity, and increase uptake among physicians.

CONCLUSIONS

This systematic review summarized the existing literature on communication assessment tools for physicians. Training physicians to achieve competency in effective communication skills is central for motivating patients to adopt healthier life-styles and to optimize disease outcomes. Because of the major shortcomings of existing communication assessment tools, we strongly recommend greater methodological rigor for the development of new tools and the systematic evaluation of each component for which physicians received training. Moreover, assessment tools should be easy to administer and score, that is, user-friendly, to increase uptake by physicians. Leveraging new technology solutions may hold promise for increasing physician engagement (e.g., via gamification of physician-patient interactions), reducing the time needed for the assessments, and standardizing assessment methods for optimal fidelity and validity.

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APPENDICE D

INTERVENTIONS TO IMPROVE VACCINE ACCEPTANCE AMONG RHEUMATOID ARTHRITIS PATIENTS: A SYSTEMATIC REVIEW

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REVIEW ARTICLE

Interventions to improve vaccine acceptance among rheumatoid arthritis patients: a systematic review

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Abstract

Introduction/objective National guidelines emphasize the importance of annual immunization for patients living with rheumatoid arthritis (RA), but vaccination rates remain suboptimal in this population. Evaluating the efficacy of patient and/or provider-targeted interventions to improve vaccination uptake among RA patients could inform practice.

Methods We conducted a systematic review (SR) to examine the efficacy of interventions (exposure) aiming to improve vaccination uptake in patients with RA (outcome). English and French language, peer-reviewed interventional studies to improve vaccination rates in RA patients published between 2009 and 2018 were included.

Results The search yielded a total of 450 records. Five articles met inclusion criteria. All interventions focused on changing provider behavior using some form of vaccination reminder as the primary intervention strategy, though only two studies reported provider prescribing behavior as an outcome (which was 4% and 58%). Overall, studies varied greatly regarding intervention delivery mode (e.g., educational sessions, e-mail reminders, best practice alerts), and behavior change techniques used to encourage providers to prescribe vaccination (e.g., feedback and monitoring, shaping knowledge, self-regulation). For influenza, pneumococcal and herpes zoster, post-intervention (mean 12–16 months follow-up) vaccination rates increased by a mean of 16.6% (± 15.4%).

Conclusions Interventions to enhance vaccine uptake in RA focused almost exclusively on improving provider prescription of vaccines using reminder-type interventions. Although effective in improving vaccination rates, those studies used heterogeneous interventions and behavior change techniques. Few studies measured provider prescribing behavior as an outcome. Future studies targeting providers should measure relevant provided-related outcomes and their impact on patient outcomes, to determine overall efficacy.

Keywords Behavioral interventions · Rheumatoid arthritis · Systematic review · Vaccination

Rheumatoid arthritis (RA), the most common musculoskeletal inflammatory disorder worldwide [1], affects approximately 1% of the population [2]. RA is a chronic systemic autoimmune inflammatory disease that primarily manifests with synovitis, usually polyarticular. This disease is more common among women (F/M ratio = 2:1), and the lifetime risk of developing RA in adulthood is 3.6% for women and 1.7% for men [3]. From a public health perspective, the costs associated with RA are substantial and estimated at > $39.2 billion annually in the USA [4].

A substantial burden of RA relates to the increased morbidity and mortality associated with infectious diseases [5]. RA patients have higher risk of two major vaccine-preventable respiratory organisms: influenza and pneumococcus [6]. Further, people living with RA are two times more likely to develop medical complications that frequently require hospitalization due to those respiratory diseases than age-matched healthy controls [7, 8]. This highlights the need to target RA patients for vaccination [5]. Despite current recommendations that identify RA patients as a high-priority group for vaccination [9], vaccination coverage among RA

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patients is suboptimal [10]. Reported immunization rates range between 25–90% for influenza and 17–62% for pneumococcus [10–15]. This is often below the target proposed by the World Health Assembly for seasonal flu vaccination coverage in at-risk populations which is 75% [16].

Improving vaccination rates is therefore a public health priority as it may enhance protection in adults living with RA as well as the community at large. Several factors have been associated with low vaccination rates in RA. Patient-related factors include high perceived vaccine risk and low perceived efficacy [17]. Provider-related factors include the failure to advocate for and prescribe vaccines to RA patients [14]. Although this topic is of high interest from a public health perspective, to our knowledge, no study has systematically reviewed the evidence on the nature and efficacy of interventions aiming to improve vaccination uptake among RA patients. Thus, the purpose of this review was to fill this knowledge gap by assessing the efficacy of existing interventions targeting either patients and/or health care providers aiming to improve vaccine uptake among RA patients. Since vaccination acceptance is a health-related behavior, we were particularly interested in behavioral interventions addressing vaccine uptake. Also, we aim to dissect the specific components (e.g., content, format, structure) of the most efficacious interventions.

Methods

The PRISMA checklist was followed to ensure transparent and comprehensive reporting throughout the systematic review [18]. The review was registered with the International Prospective Register of Systematic Reviews (PROSPERO: CRD42018103564) [19].

Inclusion and exclusion criteria

Studies reporting the results of interventions to improve vaccination uptake in RA were included. More specifically, studies on behavioral interventions [20] targeting providers and/or patients to enhance vaccination uptake among RA patients. There was no restriction on vaccine type (e.g., influenza, pneumococcal, herpes zoster). Only English or French publications in peer-reviewed journals reporting pre- and post-intervention measures of vaccination (e.g., vaccination rates) were included. Studies assessing interventions to improve vaccination rates in the general population or in chronic diseases other than RA (e.g., cancer, pulmonary disease) were excluded.

Search strategy and review process

PUBMED, PsychINFO, SCOPUS, and Cochrane searches up to July 25th 2018 were conducted. The keyword terms used were: "vaccination" AND "rheumatoid arthritis" AND "behaviour change", "behavior change", "motivational interviewing", "motivation communication", "counseling", "counselling", "behavioral", "intervention".

Reference lists of selected publications were screened to identify additional studies (see Table 1). This search process generated 450 unique and potentially eligible studies. As seen in Fig. 1, only five articles fulfilled the inclusion/exclusion criteria [21–25]. The following information was extracted from those five studies: participants (number and type of provider and RA patients included); outcomes of interest (e.g., vaccination rates, provider behaviors around vaccination prescribing); intervention characteristics (e.g., type, timing, structure, components of the intervention, follow-up period); comparison group characteristics (when applicable)

Study quality

Study quality was assessed by two independent evaluators using the Downs and Black checklist, a 27-item rating system assessing the methodological quality of randomized and non-randomized interventions [26]. This checklist helps reviewers identify the strengths and weaknesses of the methodological design and reporting quality (e.g., randomization, blinding, reporting bias) of each reviewed study. Inter-rater agreements and kappa coefficients [27] were calculated with a 95% confidence interval using the two raters' scores (V.G.B. and S.L.) for each study included in this review. This was done at the data extraction phase (86%, kappa = 0.7) and after study inclusion (study quality, 89%, kappa = 0.7). The inter-rater agreement score for the first round of eligibility assessment by titles and abstracts screening was also very high (90%).

Results

Study characteristics

Study characteristics are summarized in Table 1. Out of five studies, three targeted providers and two providers and patients. The number of providers participating in the studies was generally small (8–35) or was not reported ($n = 3$ studies) [21, 24, 25]. Patients in the studies ranged from 197 to 3717. The identified objective of the intervention was "improving vaccination rates" (in patients) [21–24], "reducing the frequency of any missed opportunities for vaccination" (in providers) [25], and "increase the documentation of prescriptions (in providers)" [21, 24]. Three studies reported follow-up periods [22, 23, 25]. Time to post-intervention evaluations was generally 1 year, with two studies assessing patient vaccination rates monthly, for a median follow-up period of 12 [23] to 16 months [22].

Table 1 Intervention study details

Author [ref]	Study design	Outcome and target	Provider sample	RA patients (*n*)	Intervention	Comparison group	Post-evaluation
Interventions targeting providers							
Ledwich et al. [21]	Pre-post quasi experimental intervention design	Vaccination rates (patient) and Documentation of prescription (provider)	Health care providers; physician, fellow, resident, or nurse practitioner (n not reported)	758	Electronic Health record (EHR) best practice alert (BPA)	None	Did not report
Desai et al. [22]	Cluster, Controlled trial; Quality improvement intervention strategy	Vaccination rates (number of patients up to date) (patient)	Rheumatologists ($n = 14$)	3717	Point-of-care paper reminder forms	21 Rheumatologists	Assessed monthly (for a median of 16 months)
Interventions targeting providers and patients							
Baker et al. [23]	Quasi-experimental: Pre-post system-level intervention for quality improvement	Vaccination rates (patient)	Rheumatologists and primary care physician ($n = 8$)	1255	Reminders to prescribe vaccination, performance feedback to physicians and letters to patients	None	Assessed monthly for 12 months
Sheth et al. [24]	Pre-post quasi-experimental quality improvement intervention design	Vaccination rates (patient) and documentation rate (provider)	Physicians and staff (n not reported)	1554	Real-time electronic medical record (EMR) based alert system (BPA), coupled with patients and staff education and physician feedback and interval assessment	None	Did not report
Broderick et al. [25]	Quasi-experimental, Pre-post multimodal intervention	Decrease frequency of any missed opportunities for vaccination and vaccine attitude (0–100) (provider)	Rheumatologists (n not reported)	197	Multimodal intervention using education session, EMR-based alerts and personalised e-mail reminders for patient	None	Assessed each 3 months for 12 months
Author [ref]	Pre-intervention measures (HCPs)		Post-intervention measures (HCPs)		Pre-intervention measures (patients)	Post- intervention measures (patients)	
Interventions targeting providers							
Ledwich et al. [21]	NA		NA		Influenza vaccination rates: 47%; Influenza documentation: 47%; Pneumococcal vaccination rates: 19%; Pneumococcal documentation: 19%	Influenza vaccination rates: 65%; Influenza documentation: 67%; Pneumococcal vaccination rates: 41%; Pneumococcal documentation: 45%	
Desai et al. [22]	NA		NA		Intervention group rates of patients who were up-to-date for pneumococcal: 67.6%; Control group rate: 52.3%	Intervention group rates of patients who were up-to-date for pneumococcal: 80% ($p < 0.006$); Control group rate: 52.0% / (pre-post: $p = 0.941$)	
Interventions targeting providers and patients							
Baker et al. [23]	Not reported		Action rate[a]: first 2 months = 45–57%; months 3 to 5 = low of 38%; months 6–12 = 42–58%		Influenza: Ever received (90.2%); in previous season (79.4%); Pneumococcal: Ever received (28.7%); Herpes Zoster: Ever received (2.5%)	Influenza: Ever received (86.1%), in previous season (78.2%); Pneumococcal: Ever received (45.8%); Herpes Zoster: Ever received (4.5%)	
Sheth et al. [24]	Not reported		"Among 1002 patients for whom the BPA appeared, 581 (58%) resulted in either a vaccination (252; 43% vaccinated, 21; 4% vaccine prescribed) or documentation of reasons the vaccine was not prescribed (308; 53%)"		Herpes Zoster vaccination rates: 10.1%; vaccines documentation rates: 28%	Herpes Zoster vaccination rates: 51.7% ($p < 0.0001$).; vaccines documentation rates: 72.9% ($p < 0.0001$).	
Broderick et al. [25]	NA		NA		Frequency of any missed influenza vaccination: 47%; vaccination attitude: 50 ± 9	Frequency of any missed influenza vaccination: 23% ($p < 0.001$); vaccination attitude: 51 ± 9	

[a] The proportion of patients who were seen by their rheumatologist who had: a vaccination given, a historical vaccination documented, or a documented medical or patient reason for not giving a vaccination

Interventions' characteristics

Intervention target, duration, content, and delivery mode varied considerably. All studies included interventions that targeted provider behavior to increase vaccination rates, and all provider interventions involved some form of vaccination reminder to discuss or prescribe vaccination as the primary intervention, including Electronic Health Record (EHR) or Electronic Medical Record (EMR) alerts and Point-of-care paper reminder forms. Only three studies also targeted patients and included education [24] or letters/e-mail reminders [23, 25] to improve vaccination rates. Intervention components varied considerably between studies. For this review, we defined an intervention component as any intervention strategy, implicitly or explicitly stated by the original study, as summarized by Michie's Taxonomy [20]. To achieve an adequate comparison of each intervention's content, the first (V.G.B.) and second (S.L.) reviewers identified their unique components and linked them to the Behavior Change Techniques (BCT's) identified by Michie and colleagues [20]. Among provider-targeted interventions, we identified a total of three BCTs used across the two studies and included: (1) adding objects to the environment (i.e., paper reminder forms, 1/2 studies) [22], (2) monitoring behavioral outcomes (EHR best practice alerts, 1/2 studies) [21], and (3) pharmacological support (provided vaccination documentation or advice to get vaccinated, 2/2 studies) [21, 22]. Among patient-targeted interventions, we identified a total of five BCTs including (1) adding objects to the environment (i.e., paper reminder forms, 2/3 studies) [23, 25], (2) providing feedback on behavior (i.e., performance feedback, 2/3 studies) [23, 24], (3) monitoring behavioral outcomes (EMR-based alert, 2/3 studies) [24, 25], (4) instruction on how to perform the behavior (educational session (s) with follow-up assessments; 2/3 studies) [24, 25], and (5) pharmacological support (provided vaccination documentation or advice to get vaccinated, 3/3 studies) [23–25] (see Table 2).

Few studies provided information on the structure of the intervention. Only two studies provided formal education sessions [24, 25], the content of which varied: Broderick et al. focused on the rationale, efficacy, and recommended uses of vaccination [25], while Sheth and colleagues [24] had providers engage in small group discussions to address concerns, clarify misconceptions, and update recommendations regarding vaccination [24]. The interventions were brief at only one [24] or two [25] sessions. None of these studies reported the duration (e.g., total minutes/hours/days) of the sessions, trainers' qualifications, trainee attendance or participation, or training program fidelity.

Interventions' results

Due to the high heterogeneity of intervention components and the lack of standardized reporting of outcomes, we were unable to perform a formal meta-analysis. However, the interventions included in this review were shown to be effective (see Table 1). For the three types of vaccines targeted (influenza, pneumococcal, and herpes zoster), pre-intervention vaccination rates ranged from 47 to 79.4% for influenza vaccine [21, 23], 19 to 28.7% for pneumococcal vaccine [21, 23], and 2.5 to 10.1% for herpes zoster vaccine [21, 23]. Post-intervention (12-month follow-up) vaccination rates increased by a mean of 8.4 ± 13.6% for influenza, 19.6 ± 3.5% for pneumococcal, and 21.8 ± 28.0% for herpes zoster vaccine. These were statistically significant improvements. Broderick and colleagues measured the frequency of any missed influenza vaccination pre-intervention (47%) and post-intervention (23%; $p < 0.01$). In the only controlled study with a comparison group, rheumatologist did not receive paper reminder [22], pre-intervention rates of pneumococcal vaccination were 67.6% in the intervention group and 52.3% in the control group. Post-intervention (median of 16-month follow-up) pneumococcal vaccination rates were 80% (+ 12.3, $p < 0.01$) in the intervention group and 52% (− 0.3, $p = 0.09$) in the comparison group.

Although all studies targeted providers, only two reported post-intervention measures of prescription behaviors [23, 24] and none baseline frequencies. Baker and colleagues [23] reported the "action rate" of providers (the proportion of patients who were seen by their rheumatologist who had a vaccination given, a historical vaccination documented, or a documented medical or patient reason for not giving a vaccination), which varied from 38 to 58% during the 12 months of implementation. The second study reported the proportion of patients that were vaccinated (43%) or for whom a vaccine was ordered (4%) or for whom a reason for not getting vaccinated was documented (3%: physician deferred [27%] or patients declined [73%]). Also, two studies reported pre-post vaccination prescription documentation rates with a mean increase of 30% [21, 24]. Finally, one study evaluated vaccination attitudes among RA patients (the Vaccine Attitudes Questionnaires, score 0–100) [25] and showed no change from pre-post intervention (50 ± 9 to 51 ± 9; $p = 0.58$).

Study quality

The methodological quality of the studies varied considerably (Downs and Black [26] checklist score range: 11–15) with an average score of 13 out of 28 denoting moderate quality. None of the studies received an excellent rating (26–27) or scores below 10 that are considered of poor quality (see appendix for scores). The low-quality scores of the studies were mostly attributable to non-randomized designs and the lack of comparison groups.

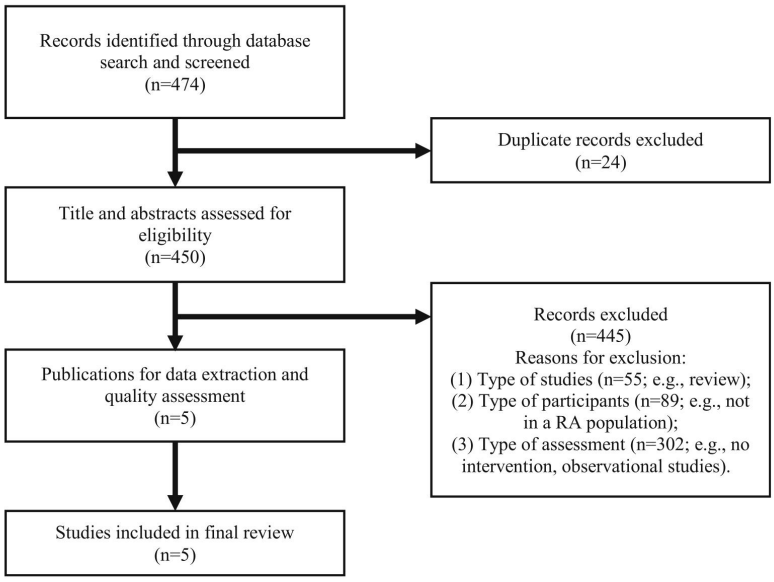

Fig. 1 Flow diagram

Discussion

This study reviewed the existing literature addressing the impact of behavioral interventions on vaccine uptake among RA patients. Overall, few studies have been conducted to date targeting this topic in this population. Reminder-type interventions were the most commonly used interventions to improve provider prescription of vaccines and vaccine uptake among RA patients. Despite the narrow focus on primarily provider-targeted interventions involving reminders to vaccinate, intervention strategies (e.g., Electronic Medical Record [EMR] alerts, point-of-care paper and electronic reminders, practice feedback) were heterogeneous, making impossible to conduct a formal meta-analysis to assess the overall magnitude of their effects. Although all studies reported improvements in vaccination rates among RA patients, none actually measured provider prescription behavior pre- and post-intervention, which makes it difficult to determine the true efficacy of the intervention. When conducting behavioral interventions, measuring behavioral mediators (e.g., vaccination prescription by providers),

Table 2 Intervention components

Behavior Change Technique Taxonomy (Michie et al. 2013)	Ledwich et al. [21]	Desai et al. [22]	Baker et al. [23]	Sheth et al. [24]	Broderick et al. [25]
Interventions targeting providers only					
Feedback and monitoring (2.) Monitoring of outcomes behavior without feedback (2.5)	√				
Regulation (11.) Pharmacological support (11.1)	√	√			
Antecedents (12.) Adding objects to the environment (12.5)		√			
Interventions targeting providers and patients					
Feedback and monitoring (2.) Feedback on behavior (2.2)			√	√	
Monitoring of outcomes behavior without feedback (2.5)				√	√
Shaping knowledge (4.) Instruction on how to perform the behavior (4.1)				√	√
Regulation (11.) Pharmacological support (11.1)			√	√	√
Antecedents (12.) Adding objects to the environment (12.5)			√[a]		√[a]

[a] Only the patients

it is key to assess the interventions' hypothesized mechanism(s) of action on clinical outcomes [28] (e.g., vaccine uptake among patients). All studies reviewed focused on changing provider vaccination prescribing behavior as the primary means of increasing vaccination rates, but all failed to systematically assess pre- and post-intervention rates of vaccination prescription. Investigators in this area are encouraged to measure changes in these intermediate behavioral targets, as well as the association between these changes and clinical outcomes, in order to determine the true effectiveness of these interventions. Finally, generalizability of the reminder-type interventions is limited by the poor methodological reporting of intervention details including intervention schedule (number of sessions), dose (duration of intervention), or educator details. Failure to report this information does not allow study replication, limiting their value and potential impact.

Only three studies included interventions that also targeted patients. However, the failure to measure provider prescription behavior makes it impossible to know which intervention targets were more effective: those targeting the providers or those targeting providers and patients, as only patient-level outcomes (vaccination rates) were measured.

In general, the results of this review are consistent with similar studies using reminder-based interventions targeting physicians to improve vaccination rates in the context of vaccination [29, 30]. However, they were not consistent (no significant change post-intervention) with one study that provided letters to physicians with the aim of reducing missing vaccination opportunities to improve MMR vaccination among children [31]. It is possible that when vaccines target children, where parents are making decisions on their behalf, provider reminders that do not address the complex concerns of parents are not as effective. Additionally, the results of the present review were also consistent with studies using reminder-based interventions targeting patients with other diseases. For example, two studies using brochure reminders [32] or mailed reminders [33] showed significant increases in vaccination rates post-intervention among patients at high risk of infections (ranging from 1.6 to 6% higher rates). However, not all studies using reminder-based interventions with patients at risk of infection were effective [34, 35]. Finally, two studies failed to observe increases in MMR immunization rates in association with text messages targeting pregnant women [35] and telephone reminders with home visits among parents [34]. Once again, it is possible that reminder-based interventions are insufficient to address the complex concerns of parents around immunization of their children.

Limitations

This review is limited by the low number of studies meeting inclusion criteria, the variety of their interventions and the methodological heterogeneity that precludes conducting a formal meta-analysis, and the inclusion of studies of generally moderate methodological quality. Key limitations of the studies included in this review include the lack of randomized designs and absence of comparison groups, low sample sizes, inadequate reporting of methodological details (duration, dose), and the failure to measure targeted behavioral outcomes (vaccination prescription) among providers. An additional missing component of all studies was the lack of reported stakeholder involvement in intervention protocol development. The integration of stakeholders (e.g., patients, HCPs, administrators) is encouraged to identify research priorities, define relevant outcomes, and help clinical translation/implementation [36, 37].

Conclusion

This review highlights the paucity of research on the efficacy of interventions designed to improve vaccination uptake among RA patients, despite the sub-optimal vaccination rates and the fact that RA patients are a high-risk population. Furthermore, this review indicates that all interventions to date have focused on changing provider behavior to improve vaccination rates, without interventions targeting specifically patients' factors such as perceived lack of vaccine efficacy or concerns over side effects. Accepting to be vaccinated is a complex behavior that relies upon both provider and patient factors that will likely be inadequately addressed in interventions focusing exclusively on one or the other. Consequently, future studies should develop and test interventions targeting both provider and patient behavior. One such intervention may be motivational communication (MC), which help providers educate, motivate, and enable patients to engage in appropriate and beneficial self-management behaviors to improve chronic disease outcomes [38, 39]. This approach involves training providers in evidence-based behavior change techniques that focus on shared-decision-making that links patients' health objectives (e.g., higher number of pain-free days, improved mobility) to engaging in positive health behaviors (e.g., vaccination). Interventions using MC-based strategies have been shown to be associated with improvements in a wide range of health behaviors (e.g., medication adherence, physical activity, and exercise) and clinical outcomes (e.g., patient health). The extent to which MC may be efficacious for improving vaccination rates among RA patients remains to be determined, but could be promising to address this complex behavior.

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Compliance with ethical standards

Disclosures None.

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APPENDICE E

UNDERSTANDING FACTORS ASSOCIATED WITH VACCINE UPTAKE AND VACCINE HESITANCY IN PATIENTS WITH RHEUMATOID ARTHRITIS: A SCOPING REVIEW

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REVIEW ARTICLE

Understanding factors associated with vaccine uptake and vaccine hesitancy in patients with rheumatoid arthritis: a scoping literature review

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Abstract

Due to higher risk of complications associated with vaccine-preventable infections (e.g., influenza, pneumococcus), patients with rheumatoid arthritis (RA) are a priority group for vaccination. However, vaccination rates among RA patients are low, indicating a need to understand the determinants of vaccine hesitancy in this group. This study conducted an evidence synthesis of various stakeholders' (patients, physicians/rheumatologists) perspectives about the determinants of vaccine hesitancy and uptake among patients with RA. We searched three bibliographic and reference databases (PUBMED, PsychINFO, and SCOPUS) for relevant English or French articles published in peer-reviewed journals through July 2019 that conducted either qualitative or quantitative assessments of vaccine hesitancy or uptake. Key themes associated with vaccination hesitancy themes according to different stakeholders were extracted and summarized. Of 783 unique citations, 16 articles met the inclusion criteria. Most studies (78%; $n = 134{,}787$ RA patients) examined barriers reported by patients, 13% ($n = 114$) by rheumatologists. Two principal themes and six sub-themes associated with vaccination hesitancy were identified among both patients and rheumatologists: 'social and contextual factors' (including healthcare policies, access to care/high patient loads, and social/media influences) and 'patient and provider factors' (including patient understanding of benefits and risks, provider awareness of guidelines and perceived responsibility for vaccination, and implementation challenges). Determinants of vaccine hesitancy and uptake in RA identified by different stakeholders implicate patient-, provider-, and healthcare system-related factors. This information is relevant for the design of interventions that target improving vaccine uptake in RA patients.

Keywords Immunization · Reluctance · Uncertainty · Vaccination · Vaccine-hesitant

Introduction

Rheumatoid arthritis (RA) is a chronic, inflammatory, systemic, autoimmune disease that primarily affects the joints. It occurs in about five per 1000 people and can lead to severe joint damage, disability, and premature mortality [1, 2], which is 50% higher among RA patients than in the general population [3]. Serious infections are a major concern in patients with RA and contribute to increased mortality. Several factors contribute to the infection risk in RA patients, including the immunological defects associated with RA itself, its treatments, and RA-associated comorbidities [4].

Vaccination, one of the most cost-effective disease-prevention interventions, has greatly reduced the burden of infectious diseases [5, 6]. However, vaccine hesitancy—the reluctance or refusal to vaccinate despite the availability of vaccines—is a global problem that threatens to reverse progress made in reducing or eradicating vaccine-preventable diseases. The magnitude of this issue is such that the World Health Organization (WHO) listed vaccine hesitancy among its top 10 priorities for 2019 [7]. Vaccine hesitancy is conceptualized

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as a continuum ranging from high vaccine demand to complete refusal [8]. Within the continuum, different variations of acceptance and refusal are described, such as accepting vaccines but remaining unsure, refusing some vaccines and accepting others, or refusing vaccines but remaining unsure. The reasons why people choose not to vaccinate are complex; a vaccine advisory group to the WHO identified complacency, inconvenience in accessing vaccines, and lack of confidence as key reasons underlying hesitancy [8, 9]. Moreover, they suggest that contextual influences (e.g., culture, influential leaders, and the media), individual and system influences (e.g., patient awareness of benefits, access to care), and vaccine-specific issues (e.g., evidence of risk/benefit ratio and uncertainty about the efficacy of new vaccines) play a role in vaccine acceptance [8, 10, 11].

Vaccine uptake is particularly low among RA patients. One study reported suboptimal vaccination rates for influenza (48%), pneumococcus (42%), hepatitis B (34%), and herpes zoster (5.6%) among RA patients [12], despite guidelines strongly recommending RA patients receive yearly influenza and 5-year pneumococcus vaccines [13, 14]. While reasons for vaccine hesitancy and uptake in general have been well studied, less is known about the reasons for sub-optimal rates of vaccination among RA patients. Vaccine hesitancy is a multifaceted phenomenon that is not uniform across different chronic diseases and countries [8, 10]. Thus, interventions that improve vaccine uptake among RA patients need to be designed to address patients' potentially unique reasons for vaccine hesitancy. The purpose of this study was to synthesize the literature on various stakeholders' perspectives (e.g., patients, physicians/rheumatologists, and other providers) on the determinants of vaccination hesitancy in RA to identify potential intervention targets.

Methods

This article reports on the results of a scoping review that allows for the synthesis of knowledge in a shorter timeframe than a classic systematic review (with concessions made regarding the scope and depth of the process) to identify important issues related to the topic under investigation [15]. Here, results would help identify potential factors that could be targeted by interventions to more rapidly improve vaccination rates among RA patients. However, the review did employ several methods for systematic reviews, including being structured according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines [16].

Search strategy

A comprehensive literature search of English and French language publications was conducted through July 2019 in the following reference and bibliographic databases: PUBMED, PsychINFO, and SCOPUS. The general search terms were as follows: (1) vaccination (vaccination OR influenza vaccine OR pneumococcal vaccine); (2) vaccination perception (hesitancy OR uncertainty OR reluctance OR indecision); and (3) targeted disease (rheumatoid arthritis).

Study selection

Two members of the research team (VGB, SL) included studies that fulfilled all the following criteria using Endnote (X7, Clarivate ©, Phila, PA):

1- Original studies published in peer-reviewed journals, excluding reviews, the abstract only, book, or chapter;
2- Reported on the perspectives of at least one RA stakeholder (i.e., patients [adults or children/adolescents], general practitioners (GPs), rheumatologists or other health care providers);
3- Reported at least one qualitative or quantitative outcome measure of vaccination beliefs and/or attitudes (e.g., hesitancy or uncertainty).

Data extraction

Data extraction was conducted independently by two members of the research team (VGB, SL). The following information was extracted from each study: (1) article characteristics (e.g., publication year, country; funding sources); (2) participant information (e.g., sample size, demographic information); (3) study characteristics (e.g., study design, objectives, data collection methods, location of the study and type of participants); and (4) qualitative or quantitative outcome measure of vaccine uptake (e.g., coverage rate) or vaccine hesitancy beliefs or attitudes. For the qualitative or quantitative outcome measure of vaccination beliefs or attitudes, key terms were used to determine whether the authors of the study identified at least one hesitancy factor (i.e., attitude, barrier, beliefs) and, ultimately, whether or not the study could be included in the present review [8, 17].

A thematic analysis [18, 19] of the findings related to RA stakeholders' perceptions of vaccination and their reasons for hesitancy was conducted independently by two members of the research team (VGB, SP); no software was used for the analysis due to the rather small amount of data and minimize the possible distraction generated by software [20]. This deductive analytic strategy requires the investigator to understand the context and environment in which the data is produced and builds on an existing theoretical perspective described in the previous section [8, 9, 21]. The identified themes were compared, and a consensus was reached. The themes were organized according to the pattern prevalence following the determinants of vaccine hesitancy model [10,

11, 22]. Any disagreements in the data extraction and analysis were resolved by discussion and if needed, a third investigator from the research team acted as a third party (KLL) decided and classified (e.g., included the article or not; exactitude of data extract).

Results

The search process identified 783 unique citations, from which 16 articles met the inclusion criteria and their full texts were reviewed [23–38] (Fig. 1).

Study characteristics

The characteristics of the studies included in this review are presented in Table 1. All 16 studies were published between 2003 and 2019. Most of them (62.3%) focused on both influenza and pneumococcal vaccine coverage ($n = 10$); 31.2% ($n = 5$) focused on influenza, pneumococcal, and "other" vaccine coverage; and 6.3% ($n = 1$) focused on influenza only. Study designs included surveys (31.2%, $n = 5$) [30, 32, 34–36], retrospective studies (18.8%, $n = 3$) [24, 26, 31], observational studies (18.8%, $n = 3$) [28, 29, 37], prospective studies (12.5%, $n = 2$) [27, 38], quasi-experimental studies (12.5%, $n = 2$) [23, 25], and an observational cross-sectional study (6.3%, $n = 1$) [33].

Most studies were conducted in the UK (18.8%, $n = 3$) [26, 37, 38], the USA (18.8%, $n = 3$) [23, 25, 35], and Germany (18.8%, $n = 3$) [27, 30, 31]. Others were conducted in Brazil (12.5%, $n = 2$) [33, 36], Ireland (12.5%, $n = 2$) [28, 32], France (6.3%, $n = 1$) [24], and Denmark (6.3%, $n = 1$) [34]. There was only one multicentre study (17 countries) [29].

The primary research focus among most studies was the evaluation of vaccination uptake and reasons for vaccination (or not) among RA patients (75%, $n = 12$) [23, 25–31, 33, 35, 37, 38] (Table 1). Three studies evaluated the vaccine implementation practices among providers (e.g., shared care options with the patient or surveillance of vaccine cards) [32, 36]; one study reported on the rheumatologists' reasons for non-vaccination [24]. Most of the studies (62.5%, $n = 10$) included information about funding sources (2 reported no funding; 8 reported industry funding [e.g., NIH, Pfizer, Roche]).

Participants' information and vaccination outcomes are summarized in Table 2. In the majority of the studies, RA patients were the primary stakeholders assessed (81.2%; totaling 133,819 patients) while three studies assessed the rheumatologist's opinion (18.8%; totaling 77 rheumatologists), with an average response rate of 79.6 ± 21.2%. RA patients were on average 58.2 ± 4.8 years ($n = 12$), 77.2 ± 10.7% women ($n = 13$), and had the disease for an average of 11.4 ± 3.1 years ($n = 4$). There was no demographic information reported concerning the rheumatologists. Measures of vaccination coverage and attitudes were

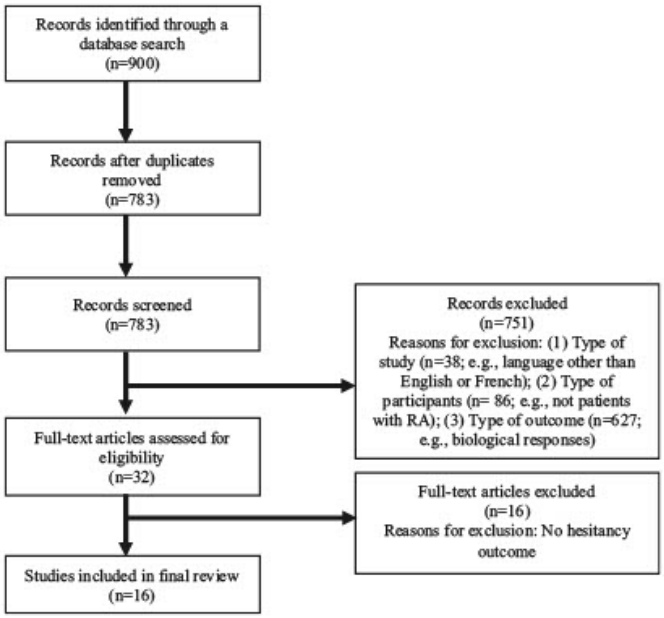

Fig. 1 PRISMA study flow diagram

Table 1 Study description sorted by study design

First author	Years	Country	Funding sources	Study design	Clinical area	Study objective(s)
Survey design						
1. Krasselt [30]	2017	Germany	Lecture fees from Merck, MSD, Mundipharma and Pfizer.	Patient Survey	Outpatient clinic belonging to a Hospital	To evaluate the current vaccination rates among German RA patients with emphasis on the recommended vaccines
2. McCarthy [32]	2012	Ireland	There was no funding received for this work.	Physician Survey	Public hospitals	To establish the knowledge, attitudes, and clinical practice of rheumatologists with respect to vaccination
3. Nguyen [34]	2017	Denmark	-999	Patient Survey	Clinic of rheumatology at University Hospital	To investigate predictors of influenza and pneumococcal vaccine coverage among rheumatoid arthritis (RA) patients and explores possible differences according to the type of RA therapy
4. Sandler [35]	2016	United States	Pfizer award #8392087 and NIH Grant P60AR064464.	Patient Survey	Academic rheumatology clinic	To assess self-reported vaccination status and to compare that status with electronic health record (EHR) data
5. Silva [36]	2010	Brazil	-999	Physician Survey	Department of Pediatric Rheumatology	To evaluate the clinical practice of pediatric rheumatologists in the state of São Paulo for children and adolescents with rheumatic diseases, similar to the British study, and to reveal a possible association between increased frequency of immunization prescription by professionals and longer practice in the specialty
Retrospective design						
6. Brocq [24]	2016	France	-999	Retrospective cross-sectional questionnaire study	Hospitals	To evaluate the pneumococcal and seasonal influenza vaccine coverage rates in a cohort of patients receiving outpatient follow-up for chronic inflammatory joint disease and to identify the reasons for not administering these two vaccines
7. Costello [26]	2016	UK	The Arthritis Research UK Centre for Epidemiology (20380). WD was supported by an MRC clinician scientist fellowship (G0902272). BB was supported by a Wellcome Trust Research Training fellowship (104,438/Z/14/Z)	A retrospective cohort study	Primary care	To describe the uptake of influenza and pneumococcal vaccinations in patients with RA in the UK; to compare the characteristics of those vaccinated to those not vaccinated and to compare vaccination rates across regions of the UK
8. Luque Ramos [31]	2016	Germany	Sponsored by the Federal Ministry of Education and Research (01EC1405).	A retrospective cohort study	–999	To assess the vaccination status for influenza and pneumonia and the prevalence of hospitalized pneumonia in rheumatoid arthritis (RA) patients and population controls in Germany.

Table 1 (continued)

First author	Years	Country	Funding sources	Study design	Clinical area	Study objective(s)
Observational design						
9. Haroon [28]	2011	Ireland	-999	Observational study	Tertiary university hospital	To assess influenza and pneumococcal vaccination uptake among our rheumatology outpatients who are immunosuppressed; and to identify the factors influencing immunization uptake among our sample of patients
10. Hmamouchi [29]	2015	Multicentre	Unrestricted grant from Roche.	Observational cross-sectional multicentre international study	Rheumatology centres from the 17 countries	To describe pneumococcal and influenza vaccine coverage in RA patients across various countries and to identify factors associated with their usage
11. Sowden [37]	2007	United Kingdom	-999	Audit research	Outpatient rheumatology clinics	To establish dual vaccination rates and significant influencing factors among hospital rheumatology outpatients
Prospective design						
12. Feuchtenberger [27]	2012	Germany	Funding for this study was provided by an unrestricted grant of Roche Pharma AG.	Prospective study	–999	To evaluate the vaccination status in rheumatoid arthritis (RA) patients during routine clinical practice, data from a German non-interventional cross–sectional study
13. Subesinghe [38]	2016	UK	No external funding supported this research	Prospective study	College Hospital and Fife Rheumatic Diseases Unit	To (assess) vaccine uptake in routine clinical practice and evaluated the relationship between vaccination and the burden of infection in RA patient
Quasi-experimental design						
14. Broderick [25]	2018	USA	Supported by an unrestricted research grant from Pfizer as part of the Pfizer Independent Grants for Learning and Change program.	Multisystem Intervention	University Medical Center	To assess a multimodal intervention for reducing missed opportunities for outpatient influenza vaccination in individuals with rheumatoid arthritis (RA)
15. Baker [23]	2016	United States	NIH grant: P60AR064464; Pfizer award #8392087	System-level interventions	Academic, multispecialty group practice	To implement and test a system-level intervention that included multiple quality improvement strategies to improve adherence to PVX, annual IVX, and HZVX among patients with RA, including electronic reminders with linked order sets, audit, and feedback to rheumatologists about their vaccination rates and how they compare to their peers, and outreach to patients
Cross-sectional design						
16. Muniz [33]	2014	Brazil		Cross-sectional study	Clinic of Rheumatology at University Hospital	To evaluate the frequency of vaccination and the orientation (by the doctor) about vaccines among patients with early RA diagnosis

Table 2 Participants information and vaccination outcomes sorted by study design

First Author	Number of participants	Demographic information	Response rate	Main outcome(s)	Collection method(s)	Vaccine rate/uptake
Survey design						
1. Krasselt [30]	331 patients with RA	Age, 66 ± 12.73 years Sex, 80.4% women (n = 266) Disease duration, 13.8 ± 11.9 years	100%	Vaccination rates	Vaccination cards and Survey	Tetanus toxoid, 55.6% (booster 10 years 43.5%); diphtheria, 35.7%; pertussis, 12.1%; poliomyelitis, 16.9%; hepatitis A and B, 8.5% and 11.8%; influenza, 53.2%; haemophilus influenza B, 1.5%; *Streptococcus pneumoniae*, 33.2%; Neisseria meningitides, 2.7%; MMR, 9.7%, 1.5%, and 2.1%; herpes zoster, 76.6%; TBE, 20.8%; BCG, 16%; HPV, 0%
2. McCarthy [32]	44 Rheumatologists	-999	55%	Knowledge, clinical practice and attitudes to vaccinations	Survey	N/A
3. Nguyen [34]	192 patients with RA	Age, 18–65 years = 53% (n = 102); + 65 years = 47% (n = 90) Sex, 70% women (n = 134)	84.2%	Vaccines uptake and source of information	Questionnaire	Influenza vaccine for previous season, 49%; pneumococcal vaccine ever, 6%
4. Sandler [35]	102 patients with RA	Age, 57.8 ± 14.5 years Sex, 85.3% women (n = 87)	52.2%	Vaccination status, attitude about vaccination and perceptions of provider communication	Survey	Influenza vaccine for previous season, 79.4%; Pneumococcal vaccine ever, 53.9%; herpes zoster vaccine ever, 7.8%
5. Silva [36]	25 Pediatric rheumatologists	-999	-999	Immunization practice (e.g., personal opinion regarding the indication and contraindication of specific vaccines in patients with rheumatic diseases)	Questionnaire	N/A
Retrospective design						
6. Brocq [24]	584 patients (307 RA; 277 SpA)	Age, RA 59 ± 13 years SpA 48 ± 12 years Sex, RA 83.4% women (n = 256) SpA 51.2% women (n = 142)	-999	Vaccines coverage and reasons for not receiving vaccines	Questionnaire	Influenza vaccine for previous season, 44%; pneumococcus vaccine during the past 5 years, 62%
7. Costello [26]	15,724 patients with RA	Age, 18–44 years (n = 2910: 18.5%); 45–54 years (n = 3005: 19.1%); 55–64 years (n = 4054; 25.8%); 65–74 years (n = 3502; 22.3%); over 75 years (n = 2253: 14.3%) Sex, 69% women	-999	Vaccination status	Large database	Influenza vaccine received at least one, 80%; pneumococcal vaccination during the follow-up (mean 5.3 years) 50%
8. Luque Ramos [31]	111,482 patients with RA,557410 control patients	Age: Cases, 66.2 ± 13.7 years Controls, 66.2 ± 13.7 years Sex: Cases, 79.7% women (n = 88,812) Controls, 79.7% women (n = 444,060)	-999	Vaccination coverage	Data cohort	Influenza vaccine for previous season, 40.8% (vs 31.2% for control); pneumococcal vaccination performed, 15% (vs 10% for control)
Observational design						
9. Haroon [28]		Age, 55 ± 13.49 years	100%		Questionnaire	

Table 2 (continued)

First Author	Number of participants	Demographic information	Response rate	Main outcome(s)	Collection method(s)	Vaccine rate/uptake
	110 patients (79 RA; 15 psoriasis and seronegative SpA; 6 Ankylosing spondylitis; 6 SLE; 2 Scleroderma; 1 Beçhet's disease)	Sex, 66% women		Vaccination status and reasons if not being vaccinated		Influenza vaccine, 34%; pneumococcal vaccination, 11%; influenza and pneumococcal vaccination, 11%
10. Hmamouchi [29]	3920 patients with RA (Optimal use $n = 617$; No optimal use $n = 1826$)	Age: Optimal use, 60 ± 12 years No optimal use, 56 ± 12 years Sex: Optimal use, 82.8% ($n = 511$) women No optimal use, 81.3% ($n = 1484$) women	–999	Vaccination status	Database	Influenza vaccination, 25.3%; pneumococcal vaccination, 17.2%
11. Sowden [37]	101 patients with RA	Age, 60.6 years (range 32 to 87 years) Sex, 69% women ($n = 70$)	-999	Vaccination profile (e.g., status, factors influencing influenza vaccination)	Questionnaire	major immunosuppressants were vaccinated than patients with additional clinical risk factors against influenza (53% vs 93%) or streptococcus pneumoniae (28% vs 64%)
Prospective design						
12. Feuchtenberger [27]	301 RA patients (treated with conventional DMARDs (cohort I: $n = 125$); TNF-blocking agents (cohort II: $n = 117$); the B cell depleting antibody rituximab (cohort III: $n = 59$)	Age: Cohort I, 59.42 years Cohort II, 58.44 years Cohort III, 56.36 years Disease duration: Cohort I, 13.94 years Cohort II, 13.26 years Cohort III, 12.07 years	-999	Attitudes around immunization (e.g., awareness of risk)	Interviewed using a standardized questionnaire	Streptococcus pneumoniae vaccine actually performed by cohort: I (20.2%), II (36.8%), III (39%); Influenza vaccine actually performed by cohort: I (64.5%), II (69.2%), III (55.7%); Mumps vaccine by cohort: I (75%), II (71.8%), III (72.9%); Measles vaccine by cohort: I (97.6%), II (94.9%), III (94.9%); Rubella vaccine by cohort: I (91.1%), II (92.3%), III (91.5%); Diphtheria vaccine by cohort: I (54.8%), II (56.4%), III (59.3%); Tetanus vaccine by cohort: I (84.7%), II (79.5%), III (89.8%); Hepatitis B vaccine by cohort: I (23.2%), II (12.8%), III (3.4%)
13. Subesinghe [38]	929 RA patients	Age, 63.1 years Sex, 74.9% women ($n = 686$) Quasi-experimental design	-999	Vaccination history and reasons for non-vaccination	Questionnaire	Influenza vaccine administered, 85.9% Pneumococcal vaccination, 44%
14. Broderick [25]	197 RA patients	Age, 58 ± 15 years Sex, 88% women ($n = 199$) Disease duration, 9.5 years (range 4 to 20 years)	86.4%	Frequency of any missed vaccination opportunities	A Vaccine Attitudes Questionnaire	Missed opportunities for influenza vaccination, 47% pre to 23% post intervention

Table 2 (continued)

First Author	Number of participants	Demographic information	Response rate	Main outcome(s)	Collection method(s)	Vaccine rate/uptake
15. Baker [23]	8 Rheumatologists; 1255 RA patients	RA patients Age, 56.8 ± 14.5 years Sex, 83.5% women (n = 1048)	–999	Vaccination rates	Focus Group EHR	Influenza vaccination rates: 78.2% pre to 86.1% post intervention; Pneumococcal vaccination rates: 28.7% pre to 45.8% post intervention; Zoster vaccination rates: 2.5% pre to 4.5% post intervention
16. Muniz [33]	68 RA patients	Cross-sectional design Age, 50.7 ± 13.2 years Sex, 94.1% women (n = 64) Disease duration, 6 ± 2.8 years	–999	Vaccination status (vaccination card)	Direct interview	Influenza, 42.6%; MMR, 8.8%; dT, 44%; H1N1, 61.7%; Pneumonia, 5.8%; Meningitis, 1.4%; Varicella, 1.4%

BCG, Bacillus Calmette-Guérin; *dT*, diphtheria and tetanus; *EHR*, electronic health record; *H1N1*, influenza type A subtype; *HPV*, human papillomavirus; *MMR*, measles, mumps, rubella; *RA*, rheumatoid arthritis; *SLE*, systemic lupus erythematosus; *SpA*, spondyloarthritis; *TBE*, tick-borne encephalitis

collected via questionnaires/surveys (62.5%, n = 10) [24, 25, 28, 30, 32, 34–38], databases (COMORA cohort, Clinical Practice Research Datalink, CLAIms data; 18.8%, n = 3) [26, 29, 31], and direct interviews (12.5%, n = 2) [27, 33]. Only one study used the focus group methods for data collection [23]. For influenza (87.5%, n = 14) and pneumococcal vaccines (81.3%, n = 13), vaccination rates ranged from 25.3 to 93.0% (means of 59.5 ± 18.7%) [23, 24, 26–31, 33–35, 37, 38] and 5.8 to 64% (means of 31.7 ± 19.7) [23, 24, 26–31, 33–35, 37, 38], respectively. Eighteen other vaccines (e.g., tetanus toxoid, diphtheria, pertussis, poliomyelitis, herpes zoster, hepatitis) were assessed (31.3%, n = 5) and rates ranged from 0 (HPV) to 95.8% (measles) with a mean uptake rate of 28.4 ± 31.5% [23, 27, 30, 33, 35].

Vaccine uptake and vaccine hesitancy: Identified themes

Two principal themes and six subthemes associated with vaccine hesitancy were identified across studies. The themes were (1) social and contextual factors and (2) patient and provider factors (Table 3).

1. Social and contextual factors affecting vaccination rates

Social and contextual factors refer to broader policy, access to care, and third-party social influences that may affect vaccination behaviour. Three subthemes were identified across studies: 1.1 healthcare policies; 1.2 access to care and practice loads; and 1.3 social and media influences.

1.1 *Healthcare policies.* Variations in vaccine policies and healthcare coverage between countries were identified by rheumatologists as a potential cause of lower vaccination uptake (e.g., vaccination rates among people over age 65 are lower in jurisdictions that do not include vaccination as part of publicly funded healthcare plans) [29].

1.2 *Access to care and practice loads.* Patients identified poor access to specialists (e.g., low visit frequency) [25] and rheumatologists identified high patient loads (e.g., the high number of rheumatology patients requiring vaccination was often deemed beyond the scope of general rheumatology practice) as factors influencing vaccination rates among RA patients [37].

1.3 *Social and media influence.* Patients reported that negative stories reported in the media had a strong influence on their decision to get vaccinated [33]. One study also reported that RA patients often refused vaccines due to the negative opinions from others (e.g., personal or third party [relatives, friends, neighbours] experience with past vaccination) [24].

Table 3 Vaccination hesitancy among RA patients sort by stakeholders

Subthemes	Stakeholders	Description
1. Social and contextual influences affecting vaccination rates		
1.1 Healthcare policies	RHs	Vaccination rates among people over age 65 are lower in jurisdictions that do not include vaccination as part of publicly funded healthcare plans [29]
1.2 Access to care and scope of practice	Patients	Low visit frequency [25]
	RHs	The high number of rheumatology patients requiring vaccination was often deemed beyond the scope of general practice [37]
1.3 Social and media influence	Patients	Negative stories reported in the media had a strong influence on their decision to get vaccinated [33]
	Patients	The negative opinions conveyed about it by others: experience with past vaccination [24]
	Patients	Heard the vaccine described in negative terms by a third parties (e.g., relatives, neighbours or acquaintance) [24]
2. Patient and provider influences affecting vaccination rates		
2.1 Patient understanding of benefits and risks	Patients and RHs	The lack of knowledge or incorrect beliefs about vaccines as important components of vaccination hesitancy [23–25, 28, 29, 32, 34, 35, 37, 38]
	Patients	The lack of patient knowledge about different vaccines [23, 29]
	Patients	The lack of patient knowledge about how RA (the disease and its treatment) increases risks of infection [32]
	Patients	The lack of patients' understanding of what is means to be immunocompromised when you have RA and the increased risk of infection associated with an RA diagnosis [37]
	Patients	Perceived themselves to be in good health and not needing vaccines [34]
	Patients	General fear of vaccines (e.g., side effects, adverse reactions [24, 28, 34, 38]
	Patients	Forgetting as a factor related to not getting vaccinated [24]
	Patients	Fears of having an allergic reaction to the vaccine [37]
2.2 Role of healthcare professionals	Review (by RHs), patients, RHs	The lack of reminders for providers [38]
	Review, patients, RHs	No clear vaccination targets for immunosuppressed populations and older age groups [38]
	Patients and RHs	RH's failure to clearly recommend vaccination [33–35, 38]
	RHs	Inconsistent messages from different clinical specialists regarding the importance of vaccination [30]
	RHs	Not keeping a record of vaccination history [32]
2.3 Knowledge translation	RHs	No training on how to use follow-up tools in the context of vaccination and found it difficult to record previous vaccinations using an electronic health records (EHRs) [23]

RHs, rheumatologists; *RA*, rheumatoid arthritis

2. Patient and provider influences affecting vaccination rates

This theme related to factors specific to patients and providers, from which three subthemes were identified: 2.1 patient understanding of benefits and risks; 2.2 rheumatologist's awareness of guidelines and perceived responsibility for vaccination; and 2.3 implementation challenges.

2.1 *Patient understanding of benefits and risks.* Most studies (61%) in both patients and rheumatologists identified the lack of knowledge or incorrect beliefs about vaccines (in general) as important reasons for vaccine hesitancy, as well as lack of awareness that RA (the disease and its treatment) increases the risk of infection [23–25, 28, 29, 32, 34, 35, 37, 38]. Some studies reported that patients do not believe vaccines are efficacious or perceived themselves to be in good health and not needing vaccines [34]. Other studies mentioned that patients feared vaccines (e.g., side effects, adverse or allergic reactions [24, 28, 34, 37, 38]) and related these fears to

education levels [34] and negative vaccine attitudes [25]. Also, one study reported that forgetting was a factor related to not getting vaccinated [24].

2.2 *Rheumatologist's awareness of guidelines and perceived responsibility for vaccination.* Likewise, awareness of guidelines and rheumatologist's perceived responsibility for vaccination was an issue highlighted by previous reviews and both patients and rheumatologists. In particular, rheumatologist's cited lack of system reminders (to vaccinate) and no clear vaccination targets for immunosuppressed populations and older age groups as reasons for not vaccinating patients [38]. Others reportedly forgot to prescribe vaccines to their patients or did not keep a record of vaccination history [32]. Many studies among rheumatologists and patients mentioned the rheumatologist's failure to give advice regarding vaccination or to clearly recommend vaccination [33–35, 38] as important determinants of vaccination. While assuming that consulting a rheumatologist would play a major role in increasing patient with RA's vaccine coverage [30], one study concluded that only 66% of patients who were advised to get vaccinated by their rheumatologist got vaccinated as recommended [31].

2.3 *Implementation challenges.* Finally, rheumatologists and other providers highlighted a lack of training on how to use follow-up tools in the context of vaccination and difficulties accessing vaccination history using electronic health records (EHRs) as factors associated with lower vaccination rates [23].

3. Recommendations to reduce vaccine hesitancy

In addition to the identification of several barriers, many of the studies also made recommendations to address vaccine hesitancy that targeted providers alone, both patients and providers, or were directed at the system/policy level.

3.1 *Recommendations targeting providers.* Three distinct recommendations were identified to get providers to collaborate in supporting patients to get vaccinated [23, 24, 32, 35]. Firstly, it was suggested that providers' consistent provision of education and advice to get vaccinated should help increase vaccination uptake [24, 35]. Secondly, the promotion of 'patient-centred vaccination programs' (not defined in the study) was also proposed [23]. Finally, it was suggested that providers could work with patients to better monitor vaccination through the use of tools such as a 'vaccination passport' [32], which is a notebook listing the different vaccines received by the patient.

3.2 *Recommendations targeting providers and patients.* Two studies recommended targeting both patients' and providers' knowledge and beliefs about the importance and value of vaccination among RA patients [23, 32]. Increasing the knowledge among rheumatologists of the Advisory Committee on Immunization Practices should reduce the lack of uptake and uncomfortable feeling of prescribing vaccinations [23].

3.3 *Recommendations at the system/policy level.* Finally, several studies proposed making various system/policy level changes. Two studies recommended promoting a broader implementation of current guidelines as well as an expanded use of state immunization registries to facilitate the physicians' prescription process (quicker and with greater confidence) [23, 31]. One study recommended that a care team member (e.g., a nurse or the GP) should be mandated to maximize the rates of vaccination by providing help/support [23]. There was also a recommendation to develop a vaccine or general rheumatology clinics that could increase accessibility and facilitate better vaccination coverage among patients with RA [32].

Discussion

This study reviewed the existing literature addressing the factors associated with vaccination hesitancy among patients with RA from the perspectives of both patients and providers (rheumatologists). The limited amount of published studies specifically aiming to understand the attitudes and perspectives of different stakeholders in this population demonstrated a lack of information about this important topic. Across the 16 studies reviewed, attitudes towards vaccination and rates of uptake of influenza, pneumococcal, and other vaccine types were assessed. Two principal themes and six sub-themes associated with vaccination hesitancy and uptake were identified among both patients and rheumatologists: 'social and contextual factors' (including healthcare policies, access to care/high patient loads, and social/media influences) and 'patient and provider factors' (including patient understanding of benefits and risks, provider awareness of guidelines and perceived responsibility for vaccination, and implementation challenges).

Across all studies, the main themes that emerged among patients with RA included problems with access to care and negative peers and social media influences. Conversely, rheumatologist's identified the lack of time, resources, clear role definitions, and organizational/implementation challenges as possible causes of vaccination hesitancy. However, both patients and rheumatologists identified lack of knowledge, low perceived importance, and forgetting to prescribe vaccine (rheumatologists) and forgetting to get vaccinated (RA patients) as being important determinants of hesitancy and/or vaccine uptake.

Overall, the results of this review are generally consistent with those of the existing literature about vaccination hesitancy in the context of other chronic diseases [8, 10, 11, 39–41]. In 2012, an international working group (SAGE) affiliated with the World Health Organization reviewed different models of vaccination hesitancy [8] and the different strategies for addressing vaccine hesitancy [39, 41] among the general population (childhood and adulthood) and clinical populations. This group created a system approach to understand the reasons for vaccine hesitancy: the model of determinants of vaccine hesitancy [11, 22]. We identified themes that were generally similar to the SAGE primary themes including contextual influences, vaccines and vaccination-specific issues, and individual/social group influences [8]. In particular, the individual/social group influences subtheme identified by SAGE, which included beliefs, attitudes, and motivation about health and prevention and personal experience with and trust in the health system and provider, were almost identical to our subtheme: *patient understanding of benefits and risks* [8]. However, we also identified factors that were more specific to RA than the broad SAGE categories (e.g., scope of practice, role of healthcare professionals).

In addition to the identification of several barriers, many of the studies also made recommendations to address vaccine hesitancy that targeted either providers alone, patients and providers, or were at the system-policy level. These were often vague or poorly operationally defined, and few provided precise strategies for real-world implementation. However, what is clear is that interventions need to target all levels of practice (system/policies, providers) as well as patients, with clear plans for implementation.

Regarding patient-focused interventions, our results suggest that vaccine hesitancy occurs along a continuum among patients with RA. Thus, a parallel can be drawn with the transtheoretical model of behaviour change [42] and the vaccine hesitancy continuum defined by SAGE [8]. The vaccine hesitancy continuum defines vaccination behaviour according to three stages: accept vaccines but unsure, refuse some/accept some vaccines, and refuse vaccines but unsure. These stages could reflect the behavioural intentions depicted in the transtheoretical model represented by the stages of change (pre-contemplation [e.g., patients are not aware of the benefits of vaccines], contemplation [e.g., patient is aware of benefits but unconvinced of the need to be vaccinated], and preparation [e.g., patient is aware and convinced, but unsure how to get vaccinated]). This suggests that in order to improve vaccination acceptance among hesitant patients, interventions need to be 'matched' to the patients' location along the vaccine hesitancy continuum or stage of change. Consistent with theories of behaviour change [43–46], getting patients to go from vaccination hesitancy to yearly commitment would require the combination of behaviour change techniques that address knowledge and beliefs, increase motivation and perceived benefits, and increase confidence or ability to access vaccines [47]. As mentioned by other studies, vaccination hesitancy is a complex behaviour in gross need of attention. A better understanding of vaccine-related hesitancy, addressing hesitancy on a global, national, and regional levels, and improving the implementation and uptake of best practices and tools aiming to overcome vaccine hesitancy are all improvements that should be targeted by future interventions [40].

Strengths and limitations

This review is limited by the modest number of studies identified, the lack of more in-depth qualitative studies to assess stakeholder perspectives, and the heterogeneity of study designs (e.g., randomized control trial, observational) and data collection methods (e.g., questionnaire, interviews). Also, most studies have been conducted from the perspective of patients and rheumatologists, so we have little understanding of the perceptions of vaccine hesitancy from the perspective of policymakers, family member, nurses, or health administrators. This suggests there is an important stakeholder gap, particularly if some recommendations require policy changes. Another limitation is that we could not conduct a risk of bias of assessment across individual studies due to the heterogeneity of the designs (which made it impossible to apply a single bias assessment tool). Few studies examined the perspectives of multiple stakeholders within the same study (e.g., both patients and providers). In order to have more details on barriers and facilitators of vaccination coverage, future studies should conduct more in-depth qualitative studies assessing perceptions of vaccine hesitancy among different stakeholders (patients, rheumatologists, nurses, GPs), so that these perspectives may be triangulated to identify promising intervention strategies. Finally, there are methodological limitations related to the fact that this is not a systematic review of the literature (no risk of bias assessment, very structured database searches); nevertheless, data extraction and qualitative analysis were carried out independently by two members of the research team, we searched of all articles in a time frame and we used PRISMA reporting guidelines.

Despite some limitations, this review also has a number of strengths. To our knowledge, this is the first systematic review summarizing factors related to vaccine hesitancy among patients with RA and other relevant stakeholders that identify the specific barriers reported by each stakeholder, patient with RA, and rheumatologists. We also summarized where barriers overlapped and where they diverged, in order to help inform the development and implementation of strategies to improve vaccine prescription and uptake among patients with RA. While other reviews have been done in other types of participants (children) [11, 48], their barriers may be different from those of adults with a chronic disease like RA, which makes

this review novel and RA-specific. Finally, in addition to being more comprehensive, the present review was also more transparent than previous reviews in reporting and adhering to the PRISMA guidelines [16], which add to its methodological rigour.

Conclusion

This review identified social and contextual influences and patient and provider influences as being important determinants of vaccine hesitancy, with patients reporting problems with access to care and negative peers and social media influences and rheumatologists identifying lack of time, resources, clear role definitions, and organizational/implementation challenges as important. Interestingly, both identified lack of knowledge and low perceived importance as determinants of vaccine hesitancy. Accepting vaccination is a complex behaviour that relies upon organizational, provider, and patient factors that are likely to be inadequately addressed in any single intervention. Consequently, future studies should develop and test interventions targeting all levels of the healthcare system, while including all relevant stakeholders in the development process.

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Data availability The data used and analysed during this study are available from the corresponding author on reasonable request.

Compliance with ethical standards

Disclosures None.

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APPENDICE F

EVALUATION OF COMMUNICATION SKILLS AMONG PHYSICIANS: A REPLY TO THE COMMENTARY BY SMITH, KOVAR-GOUGH, AND GRAYSON-SNEED

Article publié dans la revue scientifique Psychosomatic Medicine en 2021

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Evaluation of Communication Skills Among Physicians: A Reply to the Commentary by Smith, Kovar-Gough, and Grayson-Sneed

We thank Smith et al. (1) for their constructive feedback on our work (2). They raised a number of important points that we are pleased to have the opportunity to clarify and address. We hope our response add clarification:

1. "We sought to repeat their search but found an incomplete search strategy in the article, its supplementary material, and in the Prospero protocol […] Creating comprehensive and reproducible search strategies is essential to conducting systematic reviews." We agree that the replicability of search strategies is critical in the context of systematic reviews. We regret not reporting our detailed search strategy in our review, which was an oversight on our part. We had originally included it in the main article, but because of word limits, we decided to move it to the supplemental material, where we now see it does not appear. To clarify our search strategy, we have provided the details of the syntax used for one of the databases, PubMed, as per PRISMA (3).

(((((Tool[Title/Abstract] OR instrument[Title/Abstract]) AND ((physician[Title/Abstract] OR clinician[Title/Abstract] OR doctor [Title/Abstract] OR medical student[Title/Abstract] OR medical resident[Title/Abstract])) AND ((communication[Title/Abstract] OR behavior change[Title/Abstract] OR behavior change [Title/Abstract] OR motivational interviewing[Title/Abstract] OR counseling[Title/Abstract] OR counseling[Title/Abstract])))))

2. "We believe [our papers] (4–6) were missed because of the small list of keywords with few synonyms and no controlled vocabulary use." Given the overlap in subject areas, we understand how disappointing it may have been for Grayson-Sneed et al. not to have seen their important work included in our review. We believe this may have happened because the scope of our selected search terms did not include "research coding methods," which were the terms used in the titles and abstracts of the three articles written by Grayson-Sneed et al. Our objective was to identify studies describing the psychometric properties of *communication assessment tools or instruments* used among physicians in clinical practice. One of the reasons why we may not have identified any of the articles by Grayson-Sneed et al. is due to our use of specific search terms such as "tool" and "instrument" rather than "research coding method," which seems to describe a methodology (for use in research rather than practice) and not the psychometric properties of an existing tool per se. To optimize the identification of all relevant articles, we carefully designed our search strategy in collaboration with our knowledge synthesis coordinator. We first conducted several informal searches to identify important keywords (i.e., piloting trials for search terms) that are present in the literature and representative of the information we were aiming to extract, which yielded the final list reported in the article. We then proceeded with a syntax testing with the different search terms by several databases (7). We also tested the recommendations put forth by Smith et al. by modifying our search terms by adding a MESH term for "resident." With this modification, we still failed to identify any of the articles by Grayson-Sneed et al. As stated in the Limitations section of our review, a few potential shortcomings were highlighted, including those associated with the choice of specific search terms used (e.g., not using "assessment" or "evaluation" [which identified too many irrelevant articles]), which was done to optimize specificity. Achieving the right balance between sensitivity and specificity was taken into account in order to answer the research question, as any finite set of search terms is likely to miss some potentially relevant articles. We regret that this happened here; however, it serves as an important reminder to carefully select the terms used, especially for the title and abstract, as a function of the trends in specific domains of the literature and audience we want to reach.

3. "We were concerned, however, to find that Boucher et al. had omitted the following recent papers of ours… [from their review]." As mentioned previously, our choice of keywords and search terms likely contributed to a failure to identify articles by Grayson-Sneed et al. for inclusion in our review. A chief concern for our research team, following the comments made by Smith et al., was if including these three articles would have fundamentally changed our results and consequent recommendations. We therefore proceeded to extract the relevant data from these three studies for the following research coding methods: The Patient-Centered Coding Sheet (4), The Coding Sheet for Cigarette Cessation (5), and The Behavioral Health Treatment Model for Medically Unexplained Symptoms Coding Sheet (6). We are pleased to report that this exercise resulted in providing further support for our main findings and recommendations, including those highlighting the high heterogeneity in current assessment tools (these three articles

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themselves describe three different coding methods), the importance of conducting rigorous validation studies (which they did), and the need to improve the ease of administration/scoring of these tools to ensure they are feasible for use in clinical contexts. The fact that the three coding methods described by Grayson-Sneed et al. rely on "expert" coding of hours of videotaped clinical interviews suggests that they, like many others identified in our review, may not be adapted for widespread clinical use.

To conclude, our team appreciates the letter received from Grayson-Sneed et al., and we hope that they raise awareness about the importance of methodological rigor for both original studies and systematic reviews.

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APPENDICE G

TRAINING PHYSICIAN IN BEHAVIOURAL CHANGE COUNSELING: A SYSTEMATIC REVIEW

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Review article

Training physicians in behavioural change counseling: A systematic review

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ABSTRACT

Background: Poor health behaviours (e.g., smoking, physical inactivity) represent major underlying causes of non-communicable chronic diseases (NCDs). Prescriptive behaviour change interventions employed by physicians show limited effectiveness. Physician training in evidence-based behaviour change counselling (BCC) may improve behavioural risk factor management, but the efficacy and feasibility of current programs remains unclear.
Objective: (1) To systematically review the efficacy of BCC training programs for physicians, and (2) to describe program content, dose and structure, informing better design and dissemination.
Methods: Using PRISMA guidelines, a database search up to January 2018, yielded 1889 unique articles, screened by 2 authors; 9 studies met inclusion criteria and were retained for analysis.
Results: 100% of studies reported significant improvements in BCC skills among physicians, most programs targeting provider-patient collaboration, supporting patient autonomy, and use of open questions to elicit "change-talk". Limitation included: poor reporting quality, high program heterogeneity, small sample sizes, 78% of studies having no comparison group, and less than 30% of skills taught being formally assessed.
Conclusion: Training programs were efficacious, but methodological weaknesses limit the ability to determine content and delivery. Caution is necessary when interpreting the results.
Practice implications: Further research emphasizing rigorous training program development and testing is warranted.

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1. Background

Currently, over 60% of deaths worldwide result from non-communicable chronic diseases (NCDs), including cardiovascular diseases (CVD, 17.5 million deaths/year, worldwide), cancer (8.2 million), chronic lung diseases (CLD: 4.0 million) and diabetes (1.5 million) [1]. Major factors accounting for the development and progression of NCDs are poor health behaviours such as smoking, poor diet, excessive alcohol consumption, physical inactivity/increased sedentary time, and among those being treated for risk factors - medication non-adherence [1–7].

Physicians play a crucial role in facilitating health behaviour change with their patients. Traditionally, they have employed prescriptive, informative/educative or "advice-giving" interventions to encourage their patients to change their health behaviours [8]. Because these approaches do not take patient motivation perceived ability to change into account, they have typically been met with patient resistance, ambivalence or apathy [9], ultimately limiting their effectiveness [10]. Behaviour change in the context of NCD prevention and/or treatment involves a complex interaction between the provider'scounseling style and a patient's level of motivation and ability to change.

Evidence suggests that successful behaviour change counseling (BCC) can be enhanced by engaging the patient as an active collaborator in their treatment [11,12]. However, only 9% of patients report being active participants in therapeutic decisions, and 50% of patients report leaving their physician's office confused by the information received and poorly equipped to follow treatment recommendations [11].

Interest in training physicians in BCC has increased in recent years [13,14]. However, many of these programs were not designed to teach evidence-based BCC, tending to rely upon didactic teaching of theoretical concepts rather than improving physician attitudes and skills needed to effectively engage patients in their care [13]. A 2011 systematic review [13] examined 10 studies aimed at training various healthcare professionals (including physicians) in BCC skills. The review showed that on average, 9 h of training involving a didactic instruction, supervised practice and consultation in "motivational counseling" was effective in improving BCC skills [13]. This review included a mix of healthcare professionals (physicians, nurses, dieticians and social workers) and the BCC skills were mostly measured using self-reported instruments, increasing the risk of biased self-assessments. Indeed, evidence suggests that physicians may have a limited ability to accurately self-assess their clinical competence, so it may preferable to focus on objective or expert-rated assessments [15].

To our knowledge, no study has systematically reviewed the literature on the efficacy of BCC training programs targeting physicians using objective measures competency post-training (i.e., interviews or expert-rated physician-patient interactions).

The primary objective of this study was to systematically review the literature on the efficacy of BCC training programs targeting physicians using objective measures of BCC skills competency pre to post-training. The secondary objective was to describe the content, dose and structure of training programs associated with the best post-training competency scores in order to help inform the design and delivery of future physician training programs.

2. Methods

PRISMA's checklist was followed to ensure the transparent and comprehensive reporting of this systematic review [16]. The review was registered with the International Prospective Register of Systematic Reviews (PROSPERO: CRD42017048991) [17].

2.1. Inclusion criteria

Studies that objectively assessed physicians' competency in BCC skills before and after participating in a BCC training program were included. The review focused specifically on studies that primarily (>90%) included medical doctors (general practitioners, specialists, or residents). Studies that primarily enrolled other healthcare professionals (e.g., dentists, social workers or pharmacists) were excluded. BCC was operationalized to include any type of health behaviour or lifestyle counseling training program aimed at reducing poor health behaviours (e.g., smoking, over-eating, sedentariness, etc.) or increasing good health behaviours (e.g., eating a healthier diet, engaging in more physical activity). The following additional inclusion criteria were used:

1 Peer reviewed journals published in English or French.
2 Randomised and non-randomised controlled trials and pre-post intervention studies, with or without comparison groups.
3 Training programs focusing on increasing BCC skills using established approaches (e.g., motivational communication/interviewing or behaviour change/lifestyle counseling strategies).
4 Outcome measures of BCC skills competency had to be assessed pre and post training using an objective, validated rating scale

(e.g., expert-rated/coded patient-physician interactions). Studies with exclusive use of self-reported BCC competency assessments were excluded.

2.2. Search strategy and review process

Searches up to 24th January 2018 were conducted in the following electronic databases: Cochrane, EMBASE, PsycINFO and PubMed. The following keyword terms were applied: "doctor", "physician", "medical resident" AND "education", "training" AND "counseling", "motivational interviewing", "motivational communication", "behavior change counseling". Full electronic research strategy available upon request.

Reference lists of selected publications and previous systematic reviews [13,18] were screened to identify additional studies. This search process yielded 1793 unique and potentially eligible abstracts. Study authors were contacted to retrieve additional (missing) information where applicable. As seen in Fig. 1, application of the inclusion/exclusion criteria resulted in nine articles [19–27] being selected based on fulfilling all eligibility criteria (See Table 1). The following information was extracted from each study: Participants (number and type of physicians included in final sample); Country where study took place; Behavioural targets of interest to NCDs (e.g. smoking cessation, increasing physical activity) or clinical outcomes (e.g. weight loss); Training characteristics (type of training, duration and number of sessions, follow-up period, trainer characteristics/qualifications, fidelity assessments); Comparison group characteristics (when applicable); and training outcome measure used (competency evaluation tool), not all of which is reported below.

2.3. Study quality

Study quality was assessed, by two independent evaluators, for all selected studies using the Downs and Black checklist, a rating the methodological quality of randomised and non-randomised health care interventions [28]. This checklist provides a quick profile of the paper it evaluates, alerting reviewers to its particular methodological strengths and weaknesses on topics such as: clear description of study outcomes and blinding procedures or reporting of study power.

3. Results

3.1. Study characteristics

Selected studies were published between 1995 and 2016, all but one being published after 2000. Samples were generally small, ranging from 12 [19] to 60 [23] participants, and were composed of general practitioners and specialists (e.g., internal medicine, pediatrics, psychiatry). The clinical application of the training program varied from providing general BCC skills to providing treatment adherence counseling among HIV patients. Despite training programs varying significantly in terms of duration, content and delivery mode, just over half of the studies (5) described their training program as being "Motivational Interviewing" (MI) or MI-derived [19–21,24,25]. Training duration varied from one 3-hour session [20] to workshops lasting over 20 h [23,26] (Mean = 10.4 h). Most studies (7/9) did not have a comparison group or did not report post-training competency results in the comparison group [19–21,24,25,27,29]. The Motivational Interview Treatment Integrity (MITI, Version 2.0, 3.0 or 3.1) was the competency assessment tool used in 4/9 studies [19,20,24,25], but authors were inconsistent in their reporting of global scores and specific component scores. Time to post-training evaluations was short (range = 0–365 days, median = 42), only one study assessing participants' performance every year, over 4 years [26].

3.2. Training components

Individual training components of the programs differed between studies. A *component* was defined as any training target (implicitly or explicitly stated by the original study) which could complete the statement: "by the end of this training program, the trainee will be able to . . . " To facilitate comparison of their content, and in accord with PRISMA guidelines, the first (A.I.D) and second reviewer (C.A.J)

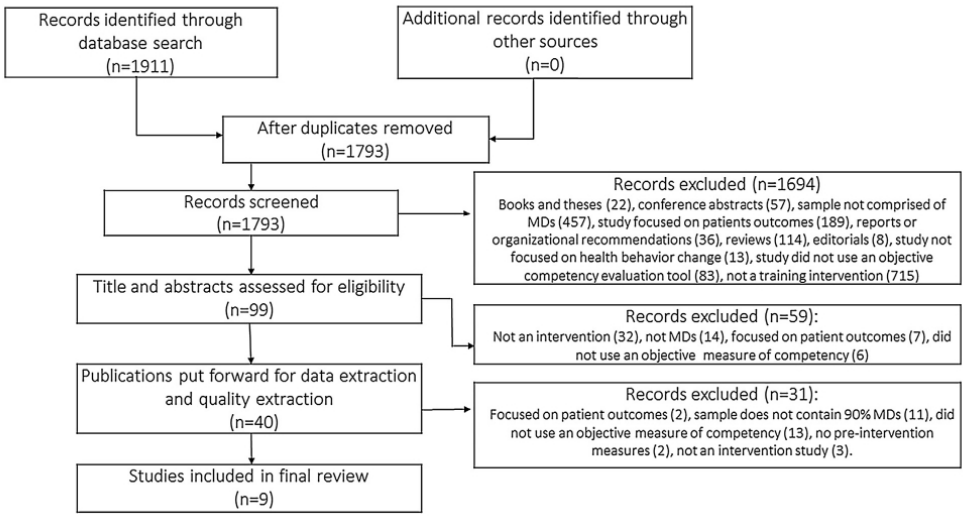

Fig. 1. Flow chart of study inclusion and exclusion.

Table 1
Behavioural Change Counseling Training Studies Details.

	1st Author	Country	Target	Sample (MDs)	Intervention Group	Comparison Group	Post-eval	Outcome Measure	Result	Summary results	Quality Assessment Score (Downs & Black Checklist)
1	Bofill, [19]	Argentina (Buenos Aires)	Counseling for HIV care	12 HIV care physicians	Motivational Interviewing (MI): 2 × 3.5-hours = 7 hours + revision. (1) Lecture on principles of MI (OARS), Practical examples (videos). Review of own pre-workshop video. (2) Group discussion and Role play exercises. OARS: O: open questions A: affirmations R: reflections S: summaries	NA	1-2 months	Video coded provider-patient interactions for use of MI techniques AND Standard Of Care (SOC) checklist Comprised of 5 subscales, 34 items ("Yes, No, Don't Know") assessing standard of care delivered at the site.	9/12 participants showed appropriate utilization of at least one MI technique: 9/12 used open ended questions and active listening, 6/12 used positive feedback and reformulations, 6/12 used guiding style, 2/12 quantified readiness of change, 2/12 did not apply any MI techniques. 1 recording was unreadable. SOC: There was a significant increase in education ($t = 3.59$, $p = .006$) and support in consecutive visits ($t = 3.29$, $p = .009$) and a trend for increase in planning and general support	Most participants showed increased pre-post competency on outcome measures.	15
2	Burton, [20]	USA	Obesity prevention counseling	86 Internal medicine and Paediatric residents	MI: 3 hours, 4 sections: (1)Lecture on obesity epidemic and Current obesity treatment guidelines. (2)Spirit of MI and communication techniques (OARS). (3) Practical exercises. (4) Role play	NA	immediate	Motivational Interview Treatment Integrity 3.1 (MITI 3.1): coding system developed and used to assess competence in MI skills: Evocation, Collaboration, Autonomy/Support, Direction and Empathy, Open/Closed Questions, Reflections and MI Adherent MI non-adherent statements	Results available for 52 residents. Mean[SD] Global score PRE: 15.29 [3.88], POST: 19.73 [3.58], $p < .001$ Open/Closed Question PRE: 0.56 [0.34], POST: 0.83 [0.97], $p = .03$ No. of Reflections PRE: 4.04 [2.80], POST: 4.90 [2.81], $p = .05$ No. MI adherent statements: PRE: 2.88, POST: 5.42, $p < .001$ No. MI non-adherent statements: PRE: 6.74, POST: 2.33, $p < .001$	Significant pre-post increase in competency on 4 of the 5 outcome measures.	16
3	Childers, [21]	USA	Health behaviour change counseling	19 Medical residents	MI: 12 hours Didactic sessions, DVD examples, role play exercises and written examples teaching: MI spirit, patient-centered communication skills (OARS), change talk and responding to resistance	NA	Immediately after the training	Helpful Responses Questionnaire – Primary Care (HRQ): long-development questions on clinical vignettes developed to assess listening skills and empathy. Analyzed on five dimensions: open/close-ended questions, % reflections, MI roadblocks, MI-consistent statements	Mean [SD] Closed-ended questions: PRE: 1.13 [1.39], POST: 0.37 [0.62], $p = .036$ MI roadblocks: PRE: 4.00 [2.09], POST: 1.08 [0.9], $p < .001$ Reflections: PRE: 1.87 [1.89], POST: 4.87 [1.55]. $p < .001$ MI adherence strategies: PRE: 0.45 [0.71], POST: 0.97 [0.68], $p = .017$ Open-ended questions: 1.97 [1.88], POST: 1.05 [1.58], $p = .023$ Also, residents rated behaviour change counseling skills as more important post-training.	Significant pre-post increase in competency on all 5 outcome measures.	17

Table 1 (*Continued*)

	1st Author	Country	Target	Sample (MDs)	Intervention Group	Comparison Group	Post-eval	Outcome Measure	Result	Summary results	Quality Assessment Score (Downs & Black Checklist)
4	Flocke, [22]	USA	Smoking cessation counseling	31 Primary care clinicians (94% Internal + Family med, 6% Nurses)	Teachable moment communication process (TCMP): 2 X 3 hours + 1 hour = 7 hours (Intervention group N = 16) Didactics in 5 skills (identify salient concern and link to smoking, provide brief intervention, assess and respond in alignment with readiness of change), video demos, practice exercises, role play,	Attention control (multimedia educational resource for colon cancer screening; N = 15)	35 days after the training	Coding system determines rates (%) TMCP elements (e.g.: brief advice statements, eliciting readiness, responding in alignment with readiness) that are present in the audio-recorded visits.	One participant withdrew from intervention group (N = 15) INT: Intervention; CTRL: Control; Linking smoking to patient's concern PRE: INT: 39%, CTRL: 39%, p = .99; POST: INT: 58%, CTRL: 44%, p = .01 Brief advice skills (Mean %): Quit Statement: PRE: INT: 34, CTRL: 33, p = .83; POST: INT: 38, CTLR:44, p = .50 Concern: PRE: INT: 1, CTRL: 2, p = .40; POST: INT:18, CTRL: 2, p = .007 Optimism: PRE: INT: 6, CTRL: 2, p = .18; POST: INT: 36, CTRL: 3, p < .001 Partnership: PRE: INT: 9, CTRL: 10, p = .94; POST: INT: 40, CTRL: 12, p = .003 Engage: PRE: INT: 15, CTRL: 20, p = .51; POST: INT: 51, CTRL: 22, p = .005 Eliciting readiness: Pre: INT: 68, CTLR: 63, p = .64; POST: INT: 84, CTRL: 65, p = .006 Responding in alignment to readiness (Mean [SD]) PRE: INT: 4.2 [2.0], CTRL: 4.6 [1.9], p = .36; POST: INT: 5.3 [2.2], CTRL: 4.1 [1.8], p < .001	Pre-post increase in competency on all outcomes measured, for both the intervention and the control groups.	24
5	Kim, (2012) [23]	Mexico	Interpersonal communication in primary care	60 Resident doctors	Interpersonal Communication & Counseling (IPC/C) : 2 day workshop+1/2 day refresher = total 20 hours Aimed at developing skills in counseling, verbal and non-verbal communication, interviewing, listening and helping with decision making. Included supervision, self-assessment and self-learning activities.	Received IPC/C course but no follow-up, supervision, self-assessment or self-learning activities.	5 months later	Audiotaped consultations coded with Roter Interaction Analysis System (RIAS). Analysis of doctor utterance on 48 coding categories e.g.: giving medical info, asking open-ended questions, showing concern. Additional longitudinal results: The number of supervisions, of audiotapes sessions, of self-assessments performed and of times the homework log was used, were associated with more use of Facilitative communication. The number of times the homework log was used, and the number of audiotapes made, was associated with increased	CROSS-SECTIONAL (INT: Intervention N = 36, CTRL: Control N = 24) Frequency of Facilitative communication: INT: 47.7%, CTLR: 29.6%, p < .001 Freq. of Bio-medical information-giving: INT: 27.5%, CTRL: 16.6%, p < .001 Specific skills: Partnership: INT: 12.7%, CTLR: 7.3%, p < .001 Acknowledge/Empathy: INT: 12.3%, CTLR: 6.2%, p < .001 Personal/Social: INT: 10.5%, CTRL: 8.6%, NS Positive emotion/Reinforcement: INT: 5.9%, CTRL: 2.9%, p < .001 Psychosocial info: INT: 5%, CTRL: 3.5%, NS Psychosocial questions: INT:1.3%, CTLR: 1.1%, NS LONGITUDINAL (Intervention N = 21, Control N = 7) Facilitative communication rise was significant in intervention group	Significant pre-post increase in competency on one of the 2 outcomes measured longitudinally, in the intervention group.	19

								use of bio-med information giving.	(β = 0.23, p < .001) not for control (β = 0.20, NS). Bio-medical info rose significantly in both the intervention (β = 0.44, p < .001) and control (β = 0.42, p < .05) groups.		
6	Malan, [24]	South Africa	Health behaviour change Counseling	18 Primary care doctors	Integrated the 5-As and a guiding style derived MI: 4 X 2 hrs sessions = 8hrs Each session provided evidence of the deficiencies and the need for a new approach, modeled the approach and participants practiced the 5 skills: ask about behavior, alert about the risk, assess readiness, provide practical assistance, arrange follow-up.	NA	Immediately and 6 weeks later	Motivational Interviewing Treatment Integrity (MITI 3.1)	Mean [SD] compared to baseline %Complex Reflection: post: +4.9 [1.8], p = .008; post-6weeks: +3.33[1.81], p = .06 %MI Adherent: post: +35[8.2], p < .001; post-6w: +18[8.2], p = .03 %Open Questions: post: +9[5.7], p = .17; post-6w: +5.2[5.7], p = .36 Global: post: +1.2[0.22], p < .001; post-6w: +0.74[0.22], p < .001 Reflection/Question: post:+0.17 [0.08], p = .03; post-6w: +0.09 [0.08], p = .26	Post: Significant increase in competency on 3 of the 5 outcome measures. Post 6-weeks: Significant increase in competency on two of the 5 outcome measures.	18
7	Mitchell, [25]	USA	Counseling for colorectal cancer screening	13 Primary care residents and physicians	Virtual-world platform delivered MI training: 8 to 10 hours Mixed educational approaches (didactic, role play, observation, coaching and feedback) focusing on MI skills, eliciting change talk, developing empathetic partnership.	NA	Immediately after training	Motivational Interviewing Treatment Integrity (MITI 3.0)	Post-training, 12/13 participants scored above proficiency (score 3.5/5) Compared to baseline, MI skills scores increased significantly in 4 of the 5 component skills and global score. Empathy (+0.73, p = .001), Autonomy (+0.78, p < .001), Collaboration (+0.58, p = .02), and Evocative response or eliciting change talk (+0.81, p = .008), Direction (No change). Global score: (+0.75, p = .001).	Significantly pre-post increase in competency on 5 of 6 outcome measures.	15
8	Nawaz, [26]	USA	Health behaviour change counseling	20 Preventative and Internal Medicine Residents	Didactics + Institute of Lifestyle Medicine (ILM) Rotations: 6 h/year for 4 years (total = 24hours) (Preventative med residents, N = 20) Program included didactics on health behaviours and lifestyle medicine skills, practical tips and role play.	Internal med residents participated in didactics but not ILM rotations (N = 77)	Once every year for 4 years	Objective Structured Clinical Examinations (OSCE). Videotaped assessments with standardized patients evaluated by a patient-centered assessment tool each year. Score was reported as a percentage.	15% increase in residents' discussions of lifestyle issues with patients. Performance on OSCEs increased each year (score: Y1 = 73%, Y2 = 83%, Y3 = 87%, Y4 = 91%, p < .01). Control group lower average (76% vs. 80%, p = 0.11).	Higher pre-post increase in competency, year after year, in the intervention group.	16
9	Ockene, [27]	USA	Nutrition counseling for lipid lowering	27 Physicians	Lipid Intervention Physician Training (LIPT: grounded in social learning theory) 3 hours of counseling	Usual care comparison group, outcome data not reported	6 weeks	14 item scoring instrument used to code audiotaped physician–patient interaction with simulated patient.	Increase in 7/14 dietary counseling skills: ask about past experiences (p = .004), review diet (p = .005), written assessment (p < .001), prioritize areas of fat intake (p < .001), reinforce positive habits (p < .001), ask about expected problems (p < .001) and solutions (p < .001). Non-significant increases in the other 7 counseling skills: Advise to lower cholesterol, ask about previous problem and solutions, define cholesterol goals, summarize dietary goal, provide written goal handout, and plan for follow-up.	Significant pre-post increase in competency in half (7/14) outcome measures. Non-significant increases in the other half.	15

identified each training program's unique components and linked them to an element of an established theory or taxonomy (see Table 2 for a summary) [30–38]. The five most popular training components were: MI spirit; questioning/open questions; collaboration; eliciting "change-talk"; and use of the 5 A's.

Most of these skills are part of a traditional MI curriculum: a client-centred non-judgemental counseling style, derived from other BCC theories, designed to help patients explore and resolve ambivalence about behaviour change [39]. The typical MI curriculum includes lessons on the use of specific techniques (i.e.: OARS), such as: open-ended questions (O), active listening (A), reflections (R), summaries (S), as well as recognizing ambivalence and eliciting change talk. The 5-As is a set of evidence-based guidelines, initially developed by the American Agency for Healthcare Research and Quality, to assist with smoking cessation [40]. This model provides a simple structured approach to behaviour change, and includes: 1) Asking about risky behaviour, 2) Alerting about the risk, 3) Assessing readiness to change, 4) providing practical Assistance, and 5) Arranging a follow-up [24].

3.3. Delivery mode

Table 3 summarizes the delivery mode of each study's training program.

3.3.1. Structure

Most of the training programs were delivered in person, with the exception of one study [25] where training was delivered via an online virtual platform (using the Second Life gaming infrastructure). Another study [26] supplemented in-person lessons with online modules.

3.3.2. Format

All studies included a didactic component. Six studies employed some form of modeling of the approach taught [19,20,22,24,25,27]. All but one [24] employed role-playing exercises and four studies used exercises with simulated patients [21,22,25,27]. Four studies offered supervision or coaching [20,22,24,25].

Table 2
Training components according to theory.

THEORY	SKILL	Bofill et al. [19]	Burton et al., [20]	Childers et al. [21]	Flocke et al. [22]	Kim et al. [23]	Malan et al. [24]	Mitchell et al. [25]	Nawaz et al. [26]	Ockene et al. [27]	TOTAL
Core Communication Conditions (Rogers, [33] and [34])	empathy			√		√		√			3
	acceptance and warmth		√			√		√			3
	active listening	√		√	√	√					4
Interpersonal Communication (Hargie, [31])	opening interaction					√					1
	non-verbal communication		√			√					2
	questioning	√	√	√	√	√		√		√	7
	reflections	√	√	√		√					4
	positive reinforcement		√	√	√	√					4
Behaviour Change Technique Taxonomy (Michie, [30])	goals and planning			√	√				√	√	4
	natural consequences of poor behaviour				√	√	√			√	4
	regulation								√		1
5 A's (US Department of Health and Human Services [40])	5 As		√	√		√	√			√	5
	ask						√				1
	advise			√		√				√	2
	assess										0
	assist						√				1
	arrange					√	√			√	3
Transtheoretical Model (Prochaka, [36])	assessing readiness for change			√	√		√		√		4
	responding according to readiness			√	√						2
Motivational Interviewing (Miller & Rollnick, [35])	recognize ambivalence	√		√				√			3
	eliciting change talk/ elicit readiness for change	√		√	√	√		√		√	6
	MI spirit	√	√	√	√		√	√	√	√	8
	evocation	√	√	√						√	4
	collaboration	√	√	√	√	√	√		√		7
	autonomy support	√	√	√			√				4
	honor patient autonomy	√									1
	open-ended question	√	√	√	√	√		√		√	7
	affirmations		√	√	√	√					4
	reflections	√	√	√		√					4
	summaries	√	√	√		√					4
	rolling with resistance			√							1
	information-giving					√					1
Experiential Learning Theory (Kolb, [74])	experiential learning								√		1
Social learning theory (Bandura, [38]; Miller & Rollnick, [35])	support self-efficacy									√	1
TOTAL		13	14	21	12	19	9	7	6	11	

Table 3
Training delivery Modes and Methods.

	Delivery Mode	Bofill et al. [19]	Burton et al. [20]	Childers et al. [21]	Flocke et al. [22]	Kim et al. [23]		Malan et al. [24]	Mitchell et al. [25]	Nawaz et al. [26]		Ockene et al. [27]
						INTERVENTION	COMPARISON			INTERVENTION	COMPARISON	
Structure	1 session		√									
	2 sessions	√		√	√	√	√	√	√			√
	More than 2 sessions									√	√	
	In person	√	√	√	√	√	√	√		√	√	
	Remote / Virtual								√	√	√	
	Duration (hr/day)	2 half days: 8 hours	3	12	6	2 days + half day refresher: 20 hours		8	8 to 10	24		3
Learning methods/ activities	Didactic lectures	√	√	√	√	√	√	√	√	√	√	√
	Modeling of the approach taught	√	√		√			√	√			√
	Group discussions	√		√	√				√	√		√
	Role play / real play/ Group practice	√	√	√	√				√	√	√	√
	Simulated patient exercises			√	√				√			√
	Interactive exercises on material learned		√					√		√	√	√
	Written exercises			√								
	Specific supervision					√						
	Supervision/ coaching provided		√		√		√		√	√		
	Evaluate video-taped patient-provider examples								√			√
	In vivo observations (mentors interacting with patients)					√	√			√		
	Self-assessments	√			√	√	√			√		
Materials	Video education material provided	√	√	√	√							√
	Audio education material provided		√									
	Written education material provided		√		√					√		√
	Tutorial											√

3.3.3. Materials

Six studies provided audio/video [19–23,27] or written educational materials to the participants [20,22,23,26,27]. Participants in four studies completed self-evaluations of their performance [19,22,23,26]. Two studies gave their participants video of patient-provider interactions to study [25,27], while for two others trainees participated in in-vivo observations of interactions between their mentors and patients [23,26].

3.4. Trainer qualifications and assessments of training fidelity

Six [19–21,23,25,26] of the nine studies reported limited information about the qualifications and experience of the individuals delivering the programs (See Table 4). No studies reported information on training fidelity (i.e., the extent to which programs were delivered as intended) and less than half of the studies [20,22,25,26] assessed and/or reported trainee adherence (which was usually measured by assessing trainee attendance rather than engagement or participation level).

3.5. Competency outcome measures and time to post-training evaluation

There was a large amount of heterogeneity in the expert-rated evaluation tools used. Four studies [19,20,24,25] used the Motivational Interview Treatment Integrity (MITI, version 2.0, 3.0 or 3.1), a validated [41] behavioural coding of patient-provider interactions [42]. The *Helpful Response Questionnaire (HRQ) for Primary Care*, a validated tool developed to assess listening skills and empathy [43], was used by one study [21]. One study [23], used the *Roter Interaction Analysis System (RIAS)* pre and 5-months post intervention. Another study [26] used the *Objective Structured Clinical Examinations (OSCE)* evaluation of video-taped interactions with standardized patients [44]. Two studies developed their own assessment tools: one [22], being a comprehensive coding system which determined the percent of audio-recorded provider-patient interactions that included the key elements of the *Teachable Moment Communication Process*; the other [27] being a 14-item instrument used to code audiotaped patient-provider interactions with simulated patients.

Table 4
Trainer characteristics, training program fidelity and trainee attendance.

		Bofill et al. [19]	Burton et al., [20]	Childers et al. [21]	Flocke et al., [22]	Kim et al. [23]		Malan et al. [24]	Mitchell et al. [25]	Nawaz et al. [26]		Ockene et al. [27]
	INTERVENTION					COMPARISON	INTERVENTION			COMPARISON		
	Qualifications (degrees)	Clinical psychologists and psychiatrists	MDs	Internist (MD)	NA	NA	NA	NA	MI expert trainer	Faculty Member	Faculty Member	NA
Trainer Characteristics	Received training to deliver intervention	√		√		√	√		NO			
	Type of training	Motivational Interview		MI		Interpersonal communication			MI			
	Received training in person	√		√		√	√					
	Received training virtually	√										
	Received education material											
	If received training: duration (hr/day)	7 hours				3 day	3 day					
Training Program Fidelity	Assessed training program fidelity (trainer)											
	Reported training program fidelity (trainer)											
Trainee Adherence	Assessed trainee adherence to the program				√				√			
	Reported trainee adherence to the program		√		√				√		√	

Time to post-training evaluations was typically short (range = 0–365 days, median = 42) [26,45].

To facilitate comparison of the different outcome measures across the nine studies, a similar method to that employed to compare training components was adopted. Each study's unique outcome measures were identified and linked them to an element of an established theory or taxonomy (See Table 5 for the results of this exercise).

3.6. Training results

Due to the heterogeneity of the training programs and assessment tools used across studies and the outcomes not being expressed in a standardized format, we were unable to perform a formal meta-analysis [46]. However, the overall efficacy of the BCC training programs assessed in this review was positive (See Table 1).

In general, all studies demonstrated significant improvements in participants BCC skills from pre-post training across a variety of outcomes except two, which saw a significant decrease in the use of open-ended questions [21] and no change in the use of "direction" as a skill, post-training [25]. The two most common outcomes (five studies) were "asking open-ended questions" and "using reflections or summaries or reformulations". "Goal setting and planning" and "partnership and collaboration" were assessed by 4 studies, while "general questioning techniques", "eliciting readiness for change", "offering information/ education", "empathy", and "MI Global Score" were assessed by three studies. However, careful examination of these studies revealed discrepancies between the components included in the training programs and the outcomes measured. On average, less than thirty percent of the skills taught were measured and some studies assessed skills which were never explicitly listed as being part of the training program components (Table 6).

3.7. Study quality

A formal assessment of study quality using the Downs and Black Checklist was performed by two authors (A.I.D. and C.A.J.). The studies meeting our eligibility criteria varied greatly in terms of quality [19–27], with the average score being 17.2 (range: 15–24) out of 28, which is considered *fair* [47]. No individual study received an excellent rating (26–28) (see Table 1). The overall low quality score of the studies was mostly due to the lack of comparison groups [28]. Moreover, the majority of studies failed to report potential confounders, none reported adverse effects, and most (7/9) did not perform or report power analyses.

4. Discussion

This study conducted a systematic review of the literature on the efficacy of BCC training programs for physicians (where competency was measured using expert-rated pre-/post-training evaluations), and described the content, dose and structure of these programs. Overall, the results suggest that BCC training programs targeting physicians have been successful, as demonstrated by mostly statistically significant increases in competency, using a variety of measures, across various medical specialties.

This review also shows that most training programs focused on teaching physicians how to adopt a "MI spirit" (defined as: evocation, collaboration and autonomy support). The "use of open-ended questions" and "eliciting change-talk" were the most frequently taught components. The most measured competency outcomes were shown to be "asking open-ended questions" and "using reflections or summaries or

Table 5
Outcome measures.

	Bofill et al. [10]	Burton et al. [20]	Childers et al. [21]	Flocke et al. [22]	Kim et al. [23]	Malan et al. [24]	Mitchell et al. [25]	Nawaz et al. [26]	Ockene et al. [27]	TOTAL
Questioning		√						√	√	3
Closed-ended question			√							1
Open-ended question	√	√	√			√		√		5
Active listening								√		1
Positive feedback/ Reinforcement/ Affirmation	√			√					√	3
Reformulations/ Reflections/ Summaries	√	√	√			√		√		5
Elicit readiness				√	√		√			3
Respond with readiness				√						1
Education/ Information	√				√			√		3
Goals and Planning	√			√				√	√	4
Empathy				√			√	√		3
Acceptance and warmth								√		1
MI Global score		√				√	√			3
MI Adherent		√				√				2
MI non-adherent		√	√							2
MI roadblocks/ Rolling with resistance			√							1
MI spirit	√									1
Partnership / Collaboration	√			√			√	√		4
Autonomy				√			√			3
Arrange follow-up	√								√	2
Advise (5As)									√	1
Opening statement								√		1
Closing statement								√		1
Natural consequences				√				√		2
Direction							√			1
Non-verbal communication								√		1
TOTAL	8	6	5	8	2	4	6	13	5	

Table 6
Taught versus measured training components.

	Bofill et al. [19]	Burton et al. [20]	Childers et al. [21]	Flocke et al. [22]	Kim et al. [23]	Malan et al. [24]	Mitchell et al. [25]	Nawaz et al. [26]	Ockene et al. [27]	Average (%)
total skills taught	13	14	21	12	19	9	7	6	11	
total skills measured	11	8	7	8	2	7	6	15	5	
taught and measured	6	5	6	6	1	0	0	2	4	
measured not taught	5	3	1	2	1	7	6	13	1	
taught not measured	7	9	15	6	18	9	7	4	7	
% taught and measured	46	37	28.6	50	5.26	0	0	33	36.4	26.2
% measured but not taught	45.5	37.5	14.3	25.0	50.0	100.0	100.0	86.6	20	53.21
% taught but not measured	53.85	64.29	71.43	50.00	94.74	100.00	100.00	66.67	63.64	73.80

reformulations", followed by "goal setting and planning" and "partnership and collaboration."

4.1. Limitations of this review

The results from this review must be considered within the context of certain limitations. Given the heterogeneity of the outcome measures used across studies, it was impossible to perform a meta-analysis to estimate the effect size of BCC training programs aiming for physicians. However, we have attempted to synthesize the data qualitatively, with the goal of providing recommendations for future research. Another limitation is the small number of studies that met our inclusion criteria, which lead to a small overall sample of physicians (n = 200). This is largely due to our inclusion criteria that targeted BCC training programs in physicians only, and the requirement that competency be measured using an expert-rated evaluation tool. Moreover, most participants were residents and not established physicians, which might reflect the difficult nature of recruiting established MDs into research and motivate them to change their own behaviour. Therefore, results may be more generalizable to residents as opposed to more experienced physicians.

4.2. Limitations of the studies included in the review

While results of the studies included in this review were overwhelmingly positive, this should be interpreted with caution given important methodological limitations across this literature. First, studies failed to achieve high standards in terms of methodology and research rigour, as demonstrated by their low scores on the Downs and Black checklist. In fact, transparent and adequate reporting was a major limitation across studies. None of the trials reported using any standardized guidelines for reporting, such as the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND, CDC [48]) or Consolidated Standards for

Reporting Trials (CONSORT [49]) and CONSORT Non-Pharmacological Extension [50], which emphasize description of the intervention design and information needed to assess possible biases.

Second, none of the studies reported basing their training program on any recognized behavioural intervention development process such as the MRC's *complex intervention guideline* or the ORBIT (Obesity-Related Behavioral Intervention Trials) Model [51,52]. The strength of these models is providing a systematic framework for developing interventions, using an iterative process to define and refine components through structured testing. This ensures the clinical relevance, feasibility and acceptability of the intervention/training program.

Third, only three studies [20–22] explicitly reported basing their training program on an established theory of behaviour change in the context of changing physician practice behaviour, such as Social Cognitive Theory [38] or the Transtheoretical model [53]. While basing interventions on theories does not necessarily guarantee their success, this does allow to improve upon them in a more structured way [54]. Health education interventions (e.g. [55–57],) have shown limited and varied efficacy [58,59], which may be due, in part, to a lack of theoretical basis for the intervention choice, and the use of inappropriate methods to design and test the interventions [59,60].

Fourth, there were major discrepancies between what was taught in the various training programs, and what was measured. Only 26% of skills taught across programs were measured, and 53% of skills that were measured were not taught. Due to the overall poor quality of the reporting, it is unclear if this represents a systemic design issue, a lack of understanding of how to measure the skills being taught, a lack of availability of appropriate assessment tools, or simply poor reporting. This limitation further makes it difficult to affirm with confidence that the positive results reported by the studies included in this review are representative of true competency achieved in the participants. Future studies are encouraged to conduct valid assessments of the full range of skills being taught and to ensure transparent reporting of all methods and assessment procedures in order to facilitate the interpretation of study findings.

Fifth, most studies failed to measure and/or report on trainer qualifications, expertise and experience, nor did they assess trainee adherence (attendance and/or engagement), all of which are critical to report to ensure intervention reproducibility and feasibility [61].No studies reported assessing training program fidelity, which is the extent to which training programs were delivered per-protocol. This is critical to successful translation of evidence-based interventions into practice, as well as to a study's validity and reliability [62–64]. Despite the trainings being generally successful, without assessing fidelity, it is impossible to conclude that the training effects were due to the program and not spurious [62,65,66].

Finally, there was a high heterogeneity of training programs in terms of duration, dose, and delivery mode. Though most of the trials delivered training across two sessions, dose varied from 3 h to 12 h, and one study delivered one training session every year for 4 years. We were not able to determine the optimal dose or duration of training associated with achieving long-term competency in BCC among physicians. However, the literature has shown that programs offering supervision or coaching to their participants, as well those using role-play or interactive group exercises that give participants the opportunity to practice skills with simulated patients (as opposed to a purely didactic approach), are preferable [67–69].

5. Research implications

In light of these limitations, future studies in this area are encouraged to consider the following recommendations to improve both the design of training programs and methods for testing their efficacy:

- Consider developing training programs using a standardized framework such as the ORBIT model [51] and potentially exploring the effectiveness of traditional didactic teaching, experiential learning exercises (e.g., role play), ongoing supervision, coaching (with feedback) and follow-up assessments [67–69].
- It is recommended that reporting follow standardized reporting guidelines, such as the CONSORT [49,50] for randomised or TREND [48] for non-randomized trials, to facilitate interpretation of results and study quality and to improve reproducibility.
- Studies are encouraged to recruit larger samples of physicians to enhance generalizability and increase power. This may be achieved by recruiting through medical associations (who can partner with research teams to co-develop training programs and provide wide access to many physicians via email and annual conferences) and offering Continuing Medical Education (CME) accredited training programs.
- Efficacy trials should incorporate assessments of training program fidelity to ensure that trainers/facilitators deliver the training program per-protocol [70].
- Studies should ensure that the skills taught in the training program are also assessed and vice versa.
- Regarding competency assessment tools, many studies in this area do not use expert-rated competency measures. However, existing objective measures also suffer from certain limitations such as: requiring invasive procedures like audio or video-recording of patient-provider interactions; necessitating the involvement of "experts" to code; and being time consuming to administer and score. Future studies should consider the development of more user-friendly competency assessment tools, for example, the use of e-technologies incorporating machine-learning and eliminating the need for an expert-rater altogether [71–73].

6. Conclusion

Training programs aimed at improving BCC skills among physicians in the context of NCD management seem to be generally efficacious according to expert-rated evaluation tools. Training physicians in BCC is of high clinical importance as facilitating behaviour change is arguably one of the most important and, when done correctly, effective strategies for NCD prevention. Unfortunately, studies to date have notable limitations which make it difficult to adequately inform exactly *how* and *what* should be delivered as part of BCC curriculums. Designing, testing and implementing rigorous and feasible programs is critical to ensuring the success of these trials, to maximising physician competency to effectively counsel NCD patients to change their lifestyles, and ultimately to improve healthcare services and health outcomes.

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Competing interest statement

All authors have completed the ICMJE uniform disclosure form and declare: no support from any organisation for the submitted work, no financial relationships with any organisations that might have an interest in the submitted work in the previous three years, no other relationships or activities that could appear to have influenced the submitted work.

Transparency declaration

The lead author (the manuscript's guarantor) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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APPENDICE H

AN INTERNATIONAL DELPHI CONSENSUS STUDY TO DEFINE MOTIVATIONAL COMMUNICATION IN THE CONTEXT OF DEVELOPING A TRAINING PROGRAM FOR PHYSICIANS

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An international Delphi consensus study to define motivational communication in the context of developing a training program for physicians

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Abstract

Poor health behaviors (e.g., smoking, poor diet, and physical inactivity) are major risk factors for noncommunicable chronic diseases (NCDs). Evidence supporting traditional advice-giving approaches to promote behavior change is weak or short lived. Training physicians to improve their behavior change counseling/communication skills is important, yet the evidence for the efficacy and acceptability of existing training programs is lacking and there is little consensus on the core competencies that physicians should master in the context of NCD management. The purpose of this study is to generate an acceptable, evidence-based, stakeholder-informed list of the core communication competencies that physicians should master in the context of NCD management. Using a modified Delphi process for consensus achievement, international behavior change experts, physicians, and allied health care professionals completed four phases of research, including eight rounds of online surveys and in-person meetings over 2 years (n = 13–17 participated in Phases I, III, and IV and n = 39–46 in Phase II). Eleven core communication competencies were identified: reflective listening, expressing empathy, demonstrating acceptance, tolerance, and respect, responding to resistance, (not) negatively judging or blaming, (not) expressing hostility or impatience, eliciting "change-talk"/evocation, (not) being argumentative or confrontational, setting goals, being collaborative, and providing information neutrally. These competencies were used to define a unified approach for conducting behavior change counseling in medical settings: *Motivational Communication*. The results may be used to inform and standardize physician training in behavior change counseling and communication skills to reduce morbidity and mortality related to poor health behaviors in the context of NCD prevention and management.

Implications

Practice: "LEARN THE BASICS" proposes a simple way to introduce behavioral change counseling (BCC) in a fast-paced, time-efficient clinical setting and suggest that its successful application could significantly improve patient–provider relationships, chronic disease management, and health outcomes.

Policy: Implementing this training within Continuing medical education (CME)-accredited programs is expected to improve patient care and reduce morbidity and mortality related to poor health behaviors in noncommunicable chronic disease (NCD) patients.

Research: This study responds to the need for the development of an evidence-based, stakeholder-driven, and time-efficient communication style that may be used to improve BCC in the context of NCD management, and results from this study will be used to develop, in collaboration with stakeholders, an innovative *Sequential Multiple Assignment Randomized Trial* (SMART) that will allow to pragmatically test the clinical effectiveness of these BCC competencies to ensure longitudinal research engagement, which is critical for the future success of "LEARN THE BASICS".

Keywords

Delphi process, Motivational communication, Behavioral change counseling, Physician training

INTRODUCTION

According to the World Health Organization (WHO), nearly 71% of deaths worldwide are the result of noncommunicable chronic diseases (NCDs), including cardiovascular disease, cancer, chronic lung disease, diabetes, and obesity [1–5]. NCDs are heavily influenced by a cluster of common health risk *behaviors,* that is, smoking, poor diet, and physical inactivity [2,5–8], which have become the focus of treatment efforts among primary care and specialist physicians [9–11]. Traditionally, physicians have relied upon giving "persuasive information, education, and advice" as their primary approach to encourage patients to change health risk behaviors [12,13]. While well intentioned, this approach is met with low success rates [12,14], probably, because it fails to address issues related to motivation and confidence, both of which are critical for successful behavior change [15].

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Despite the urgent need to address health risk behaviors in the context of NCD management, training in evidence-based behavior change counseling (BCC) techniques is not routinely offered as part of standard medical curricula [16–19]. This has led to an increased demand for BCC training through continuing medical education programs. Results from a recent systematic review focusing on the efficacy of BCC training programs for physicians in the context of NCD management suggests that these programs have been generally successful [20]. However, this review highlighted several important limitations of this literature, including the largely atheoretical nature of the training programs, as well as significant heterogeneity in terms of training structure and content. For example, 28 skills were taught across the nine studies reviewed; programs taught an average of 12 skills (range 6–21), and no study assessed the same training program or skill set more than once. Reporting quality was also very poor, which undermines reproducibility and hinders our ability to define appropriate "core" BCC training content and modalities for physicians. Furthermore, the studies reviewed did not appear to adhere to recommendations regarding stakeholder engagement and an integrative knowledge translation approach to program design, which may have led to the development of competencies that are of limited relevance to the end user [21,22]. Emerging evidence suggests that engaging relevant stakeholders play a key role in improving the translation and uptake of the results of interventions into clinical practice [23], a major criticism of BCC interventions for NCD management [24,25]. While existing programs may have demonstrated efficacy to improve BCC skills, the lack of stakeholder involvement in the development process (combined with no consensus on core content) will likely perpetuate the failure to translate effective BCC strategies into clinical practice as target audience "buy-in" is key to implementation success.

Despite the limitations highlighted by our previous review [20], results suggested that the most frequently taught BCC skills included the use of open-ended questions, eliciting "change-talk", and, more broadly, using "motivational interviewing (MI) like" techniques (which includes the use of open-ended questions and eliciting "change-talk", as well as reflective listening and collaborative goal setting). Despite its popularity and efficacy, there has been some resistance among physicians to undergo training in MI due to it being viewed as an "interviewing" technique that falls within the domain of psychosocial counseling, psychology, psychiatry, and "self-help" approaches [26]. MI has also been criticized as being too rigid, time consuming, and impractical for use in busy medical settings [27]. Finally, there is little research on the long-term uptake and maintenance of these techniques among physicians' postmotivational interviewing training, and evidence suggests that even with ongoing training, supervision, and follow-up, proficiency levels rarely exceed beginner level [28].

There are a number of established theories that underlie BCC and motivational interviewing [15,29–31], and a systematic integrative knowledge translation approach could leverage these to determine the core set of BCC competencies that physicians should acquire to, then, define a new BCC approach for medical settings. In this study, the Canadian Network for Health Behavior Change and Promotion (CANChange, www.can-change.ca) has endeavored to make BCC training more appealing and acceptable to physicians by defining a new approach called *Motivational Communication (MC)*. The purpose of this study was: (a) to determine the core content of a BCC training program in terms of the specific communication competencies to teach physicians and (b) to determine expert consensus on the definition of MC as an evidence-based communication approach for improving BCC in the context of NCD management.

METHODS

We conducted an international, modified Delphi study to determine expert consensus on the core communication competencies that physicians would need to acquire to effectively deliver BCC in practice. The Delphi method is a widely accepted group communication process for gathering information within a domain of expertise for the purpose of achieving a convergence of opinion on a specific issue [32–34]. The modified Delphi process is similar to the full Delphi in terms of procedure and purpose, the major difference being that the modified process begins with a set of carefully selected questions [32]. The advantages of this approach are that it improves the initial response rate and provides a solid theoretical grounding in previous work [32,35]. The present study was conducted as part of a larger program aimed at determining the core set of BCC competencies that physicians should acquire in the context of NCD prevention and management, which will form the basis of a training program that will undergo formal efficacy testing. This study represents the initial competency definition phase (consistent with ORBIT Model Phase I: define and refine phases) [36].

In the present study, the Delphi process involved four iterative phases (see Fig. 1): (a) generation, confirmation, and definition of all potentially relevant BCC attitudes and skills by a core development panel, culminating in a mid-term meeting with additional stakeholders to achieve consensus on the initial round of competencies that would be evaluated by an international panel of experts; (b) a two-round electronic survey among a larger sample of international experts to rank the competencies in order of importance for behavior change; (c) a consensus meeting with an expanded development panel (including

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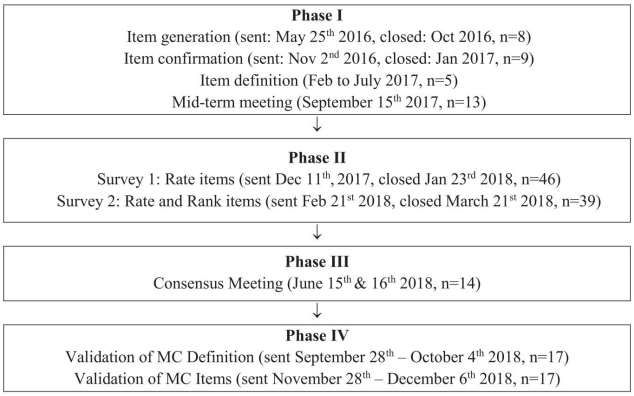

Fig 1 | Delphi process flow.

physician stakeholders) to finalize the list of core BCC competencies and define a new BCC approach for physicians: MC; and (d) a final validation phase of the definition of MC through email correspondence with consensus-meeting participants. Ethical approval was provided from the Centre Intégré Universitaire de Santé et Services Sociaux du Nord-de-l'Ile-de-Montréal, Hôpital du Sacré-Coeur de Montréal, and all participants signed informed consent.

Participants

All behavior change experts included in this study were recruited by accessing relevant research networks and mailing lists through the International Behavioural Trials Network (IBTN; https://ibtnetwork.org/) and Can-Change [20]. In order to standardize the level of expertise, all behavioral experts were selected on the basis of being recognized experts in their field (e.g., having verifiable experience designing or delivering behavior change interventions), ≥7 years of clinical and/or research experience in the area of health behavior change, and self-rating their behavior change expertise as ≥7 on a 0 (no expertise) to 10 (expert) point Likert Scale. Participants were contacted by email with directions on how to access an electronic survey platform (Lime Survey). Once they had accessed the platform, they were invited to provide informed consent and complete the surveys. In total, 46 international behavior change experts and physicians completed eight rounds of surveys or in-person meetings (5–46 participants per round, 2 completing all 8 rounds; see Tables 1 and 3).

Delphi phases

Phase I: item generation, confirmation, and definition and mid-term meeting

Item generation. A total of nine behavior change experts were contacted, of which eight (89% response rate) participated in the item generation phase of the Delphi process and formed our core development panel. Participant characteristics can be found in Table 1. The aim of the survey was to select the attitudes and skills that would ultimately form the core content of a BCC training program for physicians. Respondents were asked to answer the following question: "In a health care setting, what are the key attitudes and skills (behaviours) of the healthcare provider that facilitate or inhibit behavior change among patients?" Participants were invited to draw from the existing literature of evidence-based competencies for behavior change. In general, Behaviour change techniques found in Michie's Taxonomy [37] and meta-analyses observing positive effects for MI-consistent communication skills [20,38] were considered evidence based. All items generated by the participants were accepted in the first list without any exceptions. The survey was launched in May 2016 and was closed in October 2016.

Item confirmation. The same nine behavior change experts were contacted (100% response rate, eight of which were continuing from the previous round) and completed the confirmation round, which consisted of completing a second online survey. This round was composed of two questions. For the first question, all the attitudes and skills identified in the previous round were presented and the participants were asked to confirm that the list was exhaustive and that the results reflected their expert opinion on the core facilitative and inhibitory attitudes and skills for behavior change. No items were cut at this stage, only added. For the second question, participants were asked to rank all the attitudes and skills in order of their importance in facilitating or inhibiting behavior change in medical settings. The survey began in November 2016 and was closed in January 2017.

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Table 1 | Demographic information

	Phase I			Phase II			Phase III	Phase IV
	Generation round	Confirmation round	Definition round	Mid-term meeting	Survey 1	Survey 2	Consensus meeting	Validation round
Total (*n*)	8	9	5	13	46	39	14	17
Female (*n*, %)	4 (50)	5 (55)	3 (60)	6 (46)	29 (63)	25 (64)	7 (50)	8 (47)
Age (*m*, range)	44 (29–61)	44.2 (29–61)	38.4 (27–44)	40.1 (26–62)	45 (28–68)	44 (28–68)	41.2 (24–62)	45.6 (24–63)
Self-identified primary profession (*n*, %)								
University professor	4	4	2	3	25 (54.3)	23 (59)	2	3
Clinical psychologist	4	5	0	3	13 (28.3)	12 (30.1)	2	3
Other	0	0	2	2	11 (23.9)	9 (23)	2	2
Senior grad psyc student	0	0	1	3	4 (8.7)	3 (7.7)	4	3
Physician	0	0	0	1	3 (6.5)	3 (7.7)	4	6
Nurse	0	0	0	1	0	0	0	0
Division of work for (average %)[a]								
Research	48.8	48.9	75	47.5	49.6	51.6	47.5	42.9
Teaching	24.4	21.7	12.5	20.7	24.4	23.8	11.3	15.4
Clinical	18.8	22.2	7.5	23.8	15	16.9	34.4	34.5
Other	8.2	7.2	5	8.2	11	7.6	6.9	7.1
Years of experience in behavior change[a]								
Average	20	20	19	17.8	14.9	14.3	16.3	18.8
Experience self-rating[a]								
Average	9.1	9	9	8.9	8.07	8.10	8.5	8.3
Country of origin								
Canada	8	9	5	13	30	25	14	17
USA	–	–	–	–	1	1	–	–
Europe	–	–	–	–	14	12	–	–
Belgium	–	–	–	–	1	1	–	–
France	–	–	–	–	2	2	–	–
Ireland	–	–	–	–	3	3	–	–
Israel	–	–	–	–	1	1	–	–
Netherlands	–	–	–	–	2	2	–	–
Sweden	–	–	–	–	1	1	–	–
United Kingdom	–	–	–	–	4	2	–	–
Middle East	–	–	–	–	1	1	–	–
Saudi Arabia	–	–	–	–	1	1	–	–

[a]Scores of students and staff members were not included in the calculations as they did not qualify as behavioral change counselling experts. Other professions included: physiotherapist, dietician, nurse, occupational therapist, and social worker. Other type of work division included: consulting, administrative, and program development. All participants in Survey 2 took part in Survey 1.

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Table 2 | Phase II: mid-term meeting

Category	Communication competencies
Listening	Active listening
	Reflective listening/using reflections
Empathy	Empathy
Nonjudgmental curiosity	Evocation
	Open questions
	Eliciting "change-talk"
Providing information (in Socratic manner)	Providing information
Assess and recognize readiness for change	Responding to resistance
	Responding to ambivalence
	Goal setting
	Behavior shaping
	Stimulus control
	Reinforcement management
Fostering a change-based relationship	Acceptance, tolerance, and respect
	Guiding relational style
	Collaboration/working toward a common goal
	Willingness to understand
	Affirmation
Taking on the expert role	Telling patients what to do (being prescriptive)/advice giving
Manipulating	Guilting or shaming patients
	Being argumentative or confrontational
	Negatively judging and blaming
	Displaying hostility and impatience

Item definition. Our research team (A.I.D., K.L.L., S.L.B., and G.S.) worked to provide a working operational definition for each of the attitudes and skills identified by consulting behavior change theory and intervention literature [37,39–42]. Items were removed from the list if the group determined that their definitions overlapped significantly (agreement achieved by consensus).

Mid-term meeting. A total of 13 behavior change experts (five of whom were part of the core development panel) were invited to attend an in-person mid-term meeting that was held during September 14–16, 2017 (see Table 1 for participant characteristics). All participants were supported to attend (if living outside Montreal) with study research funds. At this stage, more physician stakeholders were included to gather feedback from targeted end users. The aim of the meeting was to reduce redundancy between the different attitudes and skills and to confirm their operational definitions. The meeting started with a visual presentation detailing the results from the initial surveys, during which operational definitions of attitudes and skills were discussed and modified according to the discussion and validated by the group. Item redundancy was also discussed, and the panel voted to determine which items should be retained or removed from the list. Consensus was obtained for item inclusion or exclusion for all items discussed.

Phase II: Delphi surveys

This phase was conducted with the goal of distilling the information generated during the previous phase to arrive at an international consensus about which core attitudes and skills should be included in a BCC training program targeting physicians. In Survey 1, participants were presented the list of attitudes and skills (and their definitions) and asked to rate their importance (low importance = item is helpful but behavior change could be achieved without it [bottom third]; medium importance = item is desired for behavior change but not essential [middle third]; high importance = item is essential for effective behavior change [top third]). Survey 1 also included a brief demographic questionnaire, gathering information on: sex, country of residence/practice, number of years of research or clinical experience in behavior change, and self-ratings of expertise level (0 = no expertise and 10 = expert). Survey 1 was live from December 11, 2017, to January 23, 2018, and complete data were received from 46 participants (see Table 1).

Thirty days after they completed Survey 1, all participants were contacted by email and invited to complete Survey 2. Participants were presented with their previous personal rating, as well as the groups' average rating from Survey 1 and asked to rate the importance of each attitude and skill (low, medium, or high). Participants were also asked to rank each attitude and skill according to their relative importance to each other. Survey 2 was live from February

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Table 3 | Ratings of communication competencies cut after Phase III, Survey 1 and 2

	Survey 1			Survey 2		
	Rating					
Communication competencies	Low (%)	Med (%)	High (%)	Low (%)	Med (%)	High (%)
Negatively judging or blaming	10.9	0.0	89.1	0	0	100
Active listening	2.2	10.9	87.0	0	12.8	87.2
Displaying hostility and impatience	10.9	2.2	87.0	0	0	100
Acceptance, tolerance, and respect	6.5	13.0	80.4	2.6	2.6	94.9
Empathy	2.2	19.6	78.3	0	7.7	92.3
Setting goals	0.0	28.3	71.7	0	15.4	84.6
Willingness to understand	6.5	21.7	71.7	0	25.6	74.4
Responding to resistance	6.5	23.9	69.6	0	10.3	89.7
Eliciting "change-talk"	2.2	30.4	67.4	0	12.8	87.2
Collaboration/working toward a common goal	4.3	28.3	67.4	2.6	20.5	87.2
Guilting or shaming patients	13	26.1	60.9	0	25.6	74.4
Evocation	4.3	39.1	56.5	0	20.5	79.5
Responding to ambivalence	4.3	39.1	56.5	0	10.3	61.5
Being argumentative or confrontational	15.2	28.3	56.5	2.6	20.5	76.9
Reflective listening/using reflections	2.2	47.8	50.0	0	10.3	59.0
Open questions	0	50.0	50.0	0	43.6	56.4
Affirmation	6.5	43.5	50.0	0	53.8	46.2
Guiding relational style	10.9	41.3	47.8	–	–	–
Reinforcement management	23.9	32.6	43.5	–	–	–
Providing information (in a Socratic manner)	6.5	54.3	39.1	–	–	–
Behavior shaping	10.9	52.2	37.0	–	–	–
Stimulus control	21.7	47.8	30.4	–	–	–
Telling patients what to do (being prescriptive)/advice giving	19.6	67.4	13.0	–	–	–

21 to March 21, 2018, and 39 participants completed the survey (85% of which also completed Survey 1).

For both surveys, cutoff scores for the inclusion of the attitudes and skills into the next round were established prior to examining the data. There is no universally accepted standard for the minimum percentage of agreement. Consensus, which can be either agreement or disagreement with a statement, is defined as a percentage higher than the average percentage of majority opinion, where majority is defined as a percentage above 50% [43,44]. In this study, it was determined that attitudes and skills rated "high" less than 50% of the time in Survey 1 and less than 75% in Survey 2 would be excluded from the final list. Consensus thresholds chosen are similar to those adopted in other Delphi studies [45,46]. In Survey 2, a more conservative threshold was chosen to maximize the degree of stakeholder endorsement of the items present on the final list (see Table 3).

Phase III: final consensus meeting

A total of 14 participants (including 12 who attended the mid-term meeting and 5 from the core development panel) met in person from June 15 to 16, 2018 (see Table 1 for participant characteristics). All participants were supported to attend. Data from all phases of the process was presented and discussed until consensus on the final core list of attitudes and skills was achieved, and a working definition of MC was drafted. An independent qualitative research expert acted as a moderator for the meeting in order to ensure that all meeting objectives could be discussed within the available timeframe and all participants had an opportunity to share their views regarding every discussion point.

Phase IV: definition validation

Following the consensus meeting, the core list of communication competencies and the final definition of MC were emailed to all consensus-meeting participants for validation. All participants had 2 months (September 28–December 6, 2018) to provide feedback. Consensus was achieved on the core list of competencies and MC definition before concluding this phase of the research.

RESULTS

Phase I: item generation, confirmation, and definition

The item generation and confirmation rounds yielded 47 items (13 facilitative interpersonal attitudes, 10 inhibitory interpersonal attitudes, 15 facilitative communication skills, and 9 inhibitory

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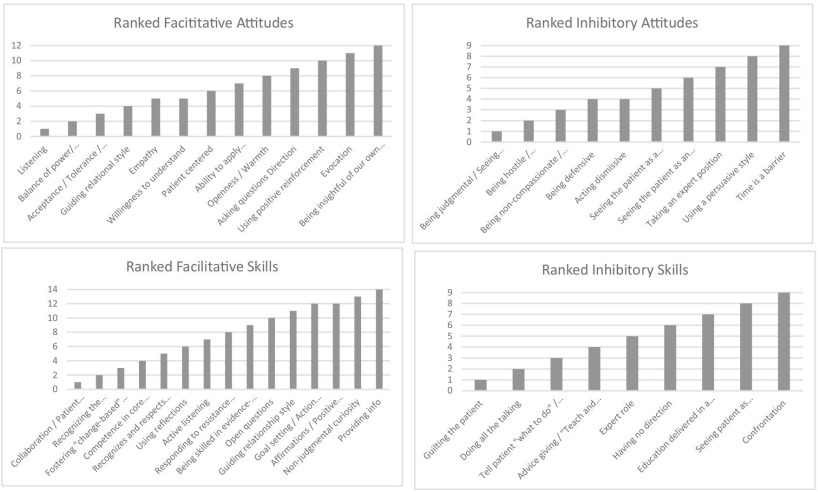

Fig 2 | Results from Phase I Rank of each facilitative and inhibitory attitudes and skills, where the smaller the number, the higher the item was ranked on average.

communication skills; see Fig. 2). Following these two rounds, results showed that "Listening," "Collaboration," and "Tolerance" were the most highly endorsed attitudes considered to facilitate behavior change. Moreover, adopting a "Patient-centred counseling style," "Understanding patients' values," and "Responding to ambivalence" were the most highly endorsed skills considered to facilitate behavior change. Regarding inhibitory attitudes, "Being judgmental" was the most highly endorsed inhibitory attitude, while "Shaming the patient," "Doing all the talking," and "Using a prescriptive counseling style" were the most highly endorsed inhibitory skills. Some items appeared as both "attitudes" and "skills" (e.g., "Listening," Taking an expert role," and "Guiding relational style). Though the distinction between "interpersonal attitudes" and "communication skills" was useful in the Generation and Confirmation rounds, following the Definition round, duplicate items were removed from the list in order to avoid redundancy and the "attitude versus skill" distinction was eliminated, with all items being, henceforth, referred to as *communication competencies*. Thus, following the Definition round, 39 communication competencies remained (see Supplementary Tables 1 and 2).

Phase II: mid-term meeting

During this phase, participants discussed further reducing redundancy in the list of communication competencies by grouping them into categories according to their definition. The aim was to ensure minimal overlap between the different items (i.e., every item is a unique competency not otherwise represented by another). This phase reduced their number from 39 to 23 (17 facilitative and 5 inhibitory communication competencies; see Table 2).

Phase III: Delphi surveys

A total of 256 behavioral experts were contacted, 90 of whom returned answers (35% response rate). Of these, 24 were excluded because they did not meet cutoff criteria for sufficient expertise in BCC and 20 were excluded because they provided only partial responses to the questionnaire. Survey 1 was completed by 46 individuals, and 39 of those (85%) completed Survey 2. Demographic information on participants who completed Surveys 1 and 2, respectively, is summarized in Table 1. Following the cutoff criteria previously described, 17 communication competencies remained after Survey 1, and 11 communication competencies after Survey 2 (see Table 3).

Phase IV: consensus meeting

A consensus meeting was held in Montreal on June 15 and 16, 2018, which began with a summary presentation of the results of the previous phases. Each of the 11 communication competencies that were identified in Phases I–III was individually discussed and a vote was held to determine consensus on whether each item should be included in the set of core communication competencies that should be taught to physicians. Consensus was reached regarding the inclusion of the 11 communication competencies. However, some participants

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suggested that "providing information neutrally" was a critical competency that should be returned to the list, despite it having been excluded during Survey 1. After a group discussion, a consensus was reached on readmitting this item to the list. Then, while discussing the overlapping operational definitions of "Evocation" and "Eliciting change-talk", it was also agreed to merge these items into "Evocation of change-talk." Other small modifications were made to the labeling and definitions of the different competencies to ensure uniformity of the list (see Supplementary Table 3). This left the following 11 items:

(1) Reflective listening
(2) Expressing empathy
(3) Demonstrating acceptance, tolerance, and respect
(4) Responding to resistance
(5) (not) Negatively judging or blaming
(6) (not) Expressing hostility or impatience
(7) Evocation of "change-talk"
(8) (not) Being argumentative or confrontational
(9) Setting goals
(10) Being collaborative
(11) Providing information neutrally.

The second objective of the consensus meeting was to determine and agree upon a definition of MC based on the core communication competencies identified in Phases I–III. All participants were asked to suggest elements that should be included in this definition. The following elements arose:

- "should be a communication style";
- "developed to enhance the typical provider-patient interaction";
- "for multidisciplinary health-care providers";
- "approach informed by the behavioural sciences";
- "facilitates a long-term provider-patient relationship";
- "tailored to and consistent with meeting the patient's needs, values, preferences and priorities";
- "facilitates informed decision-making by patients";
- "is time efficient and not an "add-on" intervention";
- "focuses on targeted outcomes: long-term behaviour change promotion/reduced risk behaviours/maintenance of changes/moving patients through the process of change";
- "achieves three goals: increases patients' awareness of the 'behavioural' problem(s); their motivation to change behaviour; and their confidence in their ability to change behaviour."

Using this list of elements identified, the research team drafted the following working definition of MC: "Motivational Communication (MC) is defined as an evidence-based, time-efficient communication style used by health care providers to promote sustained patient engagement and self-management of chronic conditions. It is informed by the behavioural sciences and emphasizes shared decision-making that is tailored to patients' preferences, goals and values."

Phase V: definition validation

In the early fall after the June consensus meeting (September 28, 2018), the working definition of MC was circulated by email to all consensus-meeting participants, in addition to three behavioral experts involved in earlier phases of the study (n = 17) for final validation. Consensus was achieved on the following definition of MC:

"Motivational Communication (MC) is defined as an evidence-based, time-efficient communication style used by health care providers to promote patient engagement, adoption of healthy behaviours, and sustained self-management of chronic conditions. It is informed by the behavioural sciences and emphasizes shared decision-making that is tailored to patients' preferences, goals and values."

Final mnemonic for the MC BCC program

Upon obtaining consensus on the communication competencies to be included in a definition of MC, the mnemonic LEARN THE BASICS was generated by considering the first letters of each competency (see Figure 3) to describe a new physician training program that would be developed to teach these competencies to physicians.

DISCUSSION

The purpose of this study was: (a) to determine the set of core communication competencies that validly represent MC as a BCC approach that can be used by physicians (and other health care providers) and (b) to achieve expert consensus on the definition of MC as an evidence-based approach for improving BCC in physicians working in the context of NCD management.

We sought feedback from an international sample of behavioral experts using a rigorous, structured methodology (which included a Delphi consensus process and several face-to-face meetings) to achieve consensus on a core set of communication competencies and a final definition of MC. We were able to confirm 11 communication competencies consistent with that definition. These competencies can be summarized by the simple mnemonic *LEARN THE BASICS*: *L*istening, *E*mpathy, *A*cceptance, tolerance, and respect, *R*esponding to resistance, (not) *N*egatively judging, (not) Expressing *H*ostility or impatience, *E*vocation of "change-talk," (not) *B*eing *a*rgumentative, *S*etting goals, *I*nformation, and *C*ollaboration. To our knowledge, this is the first study to use a systematic consensus approach incorporating the views of relevant multidisciplinary stakeholders (e.g., behavioral experts, physicians, nurses, and health administrators) to achieve

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Fig 3 | Mnemonic for the 11 motivational communication competencies.

consensus on what core BCC communication competencies physicians should acquire in the context of NCD management. While this set of competencies was developed to target the promotion of good health behaviors in the context of NCD, these communication skills may be valuable in the context of other medical settings and conditions where there are behavioral issues to address (e.g., vaccination, medication adherence, and practicing safe sexual practices).

Training in evidence-based BCC and interest in patient–provider communication has been gaining attention in recent years. In 2015, the *Royal College of Physicians and Surgeons of Canada* presented CanMEDS, a framework outlining the core competencies physicians need to acquire to effectively meet the health care needs of the people they serve [38] (http://www.royalcollege.ca/rcsite/canmeds/canmeds-framework-e). Consistent with this, we generated a definition of MC that represents the needs of relevant stakeholders, which emphasizes MC as a communication (rather than interview) strategy. MC and its core competencies align with that of the role of a "communicator" described by CanMEDS. This provides support for MC's pertinence and likely acceptability and suggests that physicians may be more likely to undergo BCC training if the terminology used to describe the approach is in line with national training frameworks. Finally, the competencies that make up MC can be used alone or in combination (depending on the therapeutic goals). This lends them to be seamlessly incorporated into practice without increasing consultation length, which was deemed important to physician stakeholders and may further increase their uptake in practice. Although stakeholder (physician) input does not guarantee widespread acceptance of the program by physicians, we believe that our stakeholder engagement approach was a critical first step to increasing the acceptance and uptake of the approach in practice.

Results from this study are being used to develop, in collaboration with key stakeholders, a MC-based BCC training program targeting physicians. This program will be developed to be delivered both in person and online to increase reach and impact. The first iteration of the program will undergo proof-of-concept testing to determine the minimum dose of training needed for physicians to achieve competency in these skills (followed by pilot testing and efficacy testing as per ORBIT [36]). Since this is a newly defined approach for BCC, we are also developing, in parallel, a competency assessment tool to objectively assess physician competencies in these core skills [47]. We are also developing this tool using an integrated knowledge translation approach that engages relevant stakeholders (i.e., physicians) in the development and testing process, which we believe will increase physician engagement and optimize the efficacy of these important training programs.

Study limitations and strengths

The Delphi process is an effective and valid technique to achieve the convergence of expert opinion on a specific question [33]. However, the results of this study should be interpreted within the context of certain limitations. First, the experts included in the initial Delphi round were selected from a small group of experts from a single Canadian network (Can-Change). While a limited number of experts generated the initial list, participants were from four Canadian provinces (Alberta, Ontario, Quebec, and Nova Scotia) and were both English (n = 6) and French (n = 2) speaking, which increases generalizability. The survey was then extended to international experts by leveraging the IBTN (343 members across 6 continents), which permitted an

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increase in participant heterogeneity in subsequent Delphi phases.

Second, the format of the Delphi can be a lengthy process for participants, who are contacted multiple times to verify the data collected and offer their input to further the process. This feature could impact the retention rate of participants from one phase to the next (though we only lost seven participants from Survey 1 to 2). Lastly, there is no standardized definition of what 'consensus' is and when it is reached. This indicates that there may be some measure of bias in decision-making as the consensus moderator must decide when a sufficient level of consensus has been reached. However, if the moderator is independent of the study and the clinical question is defined prior to the start of the project and the criteria for consensus are determined prior to examining the data, this can minimize bias [34].

Despite some limitations, this study also has a number of notable strengths. First, the Delphi process is a highly structured method providing rigorous guidelines for achieving consensus. It offers a convenient alternative to other qualitative research methods, such as focus groups and in-person interviews, which can be highly burdensome [48]. Second, the stakeholder involvement in the development process represents a major strength guaranteeing successful translation of BCC strategies into clinical practice. Moreover, the sampling of views from multiple stakeholders from around the world and chosen to respond to rigorous expertise criteria increases both the validity and representativeness of the views expressed. Finally, the Delphi surveys protect the participant's anonymity within the group and eliminate the possibility of bias that can occur in in-person group conversations [34].

CONCLUSION

The burden of NCDs and the role of poor health behaviors in their development and progression is well documented as is the role of patient–health care provider communication. This study responds to the need for the development of an evidence-based, stakeholder-driven, and time-efficient communication style that may be used to improve BCC in the context of NCD management. We used an international iterative Delphi process to achieve consensus on the core communication competencies that physicians should acquire to improve BCC with NCD patients that were informed by physicians and deemed physician relevant and practice specific. These competencies were summarized to define "Motivational Communication." Results from this study indicate that there are 11 communication competencies that represent the basic elements to master in order to achieve competency in BCC and represent, by extension, the core content of a training program for physicians. Maintaining longitudinal physician engagement will be critical for the future success of the "LEARN THE BASICS" program, and eventual implementation of this training within Continuing medical education-accredited programs is expected to improve patient care and reduce morbidity and mortality related to poor health behaviors in NCD patients.

SUPPLEMENTARY MATERIAL

Supplementary material is available at *Translational Behavioral Medicine* online.

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Compliance with Ethical Standards

Conflicts of Interest: A.I.D., V.G.B., S.L.B., C.G., G.S., G.G., C.R., D.R., J.G.D., and W.G. declare that they have no conflict of interest. M.T.V. has received research grants from Bausch Health and Novo Nordisk. M.T.V. is a consultant to Lifescan, Novo Nordisk, Abbvie, and Bausch Health. M.T.V. has received a speaker honorarium from Nov Nordisk, Abbvie, Lifescan, Baush Health, and Merck. S.K.L. is a consultant for Janssen, Astellas, Astra-Zeneca, Novartis, and Boehringer Ingelheim. K.L.L. has received honorarium from Janssen, Astellas, Astra-Zeneca, Novartis, Boehringer Ingelheim, Bayer, and Abbvie (all for presentations given in the area of motivational communication, behavior change for chronic disease prevention, or stress and chronic disease). K.C. has received a speaker honorarium from Novo Nordisk and Janssen.

Authors' Contributions

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

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APPENDICE I

LA COMMUNICATION AU SERVICE DE LA SANTE

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La communication au service de la santé

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Vincent est étudiant au doctorat en psychologie - approche cognitivo-comportementale. Sa thèse porte sur l'évaluation des compétences en communication des médecins spécialistes. Il aime les sports d'endurance comme la course à pied et le vélo. Par ailleurs, il est un passionné de la nature et entretient un intérêt pour la paléontologie.

BRIGITTE VOISARD

ÉTUDIANTE AU DOCTORAT EN PSYCHOLOGIE

Brigitte est étudiante de deuxième année au doctorat en psychologie. Elle s'intéresse à la communication entre les professionnels de la santé et leurs patients. En collaboration avec des acteurs du système de santé, elle travaille à l'élaboration d'un programme de formation en communication motivationnelle pour les médecins.

Quand un médecin doit amener un patient à changer des comportements liés à la santé, la manière de communiquer s'avère d'une grande importance. Cela peut faire la différence entre un patient motivé et un patient désengagé, entre une prévention réussie et une maladie chronique. Quoi dire, comment le faire, et surtout, qu'est-ce que ça change ? La science comportementale montre comment l'approche centrée sur le patient, bien connue des médecins, fournit un élément de la réponse.

Contrairement aux siècles passés, et malgré la situation exceptionnelle de la COVID-19, les maladies infectieuses ne représentent plus la principale menace pour la santé. Ce sont maintenant les maladies chroniques telles que les maladies cardiovasculaires, pulmonaires, le diabète et le cancer qui causent 71% des décès dans le monde[1]. La gestion de ces maladies demande généralement au patient de modifier certains éléments de son style de vie, ici nommés *les comportements liés à la santé*. Il revient souvent aux médecins, omnipraticiens et spécialistes, d'aborder la question avec leurs patients[2]. Toutefois, les stratégies couramment utilisées par les professionnels de la santé mènent seulement à des changements de comportements chez leurs patients de 5 à 10% du temps[3,4]. Plusieurs études et méta-analyses ont maintenant fait la démonstration que la *manière* d'aborder le changement de comportement à apporter aura un impact non négligeable sur son succès[5,6].

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L'approche centrée sur le patient et le rôle de l'expert

La tradition médicale incite les professionnels de la santé à agir en tant qu'experts auprès du patient, incluant au moment de faire des recommandations sur les comportements liés à la santé[7]. Ainsi, le principal outil utilisé par les médecins à cet effet reste l'éducation. Par exemple, on usera de statistiques sur les risques du tabagisme, on décrira les recommandations en matière d'activité physique, ou encore on prescrira un régime riche en fruits et en légumes. Toutefois, ces conseils sont souvent donnés de manière unilatérale. En effet, alors que 96% des patients souhaiteraient participer aux décisions thérapeutiques, seulement 9% y prennent réellement part[8]. De plus, près de la moitié des patients quittent une consultation médicale confus par les informations reçues et la marche à suivre[8]. En considérant ce statu quo, il est possible d'identifier certains facteurs expliquant la difficulté de voir des changements sur le plan des comportements liés à la santé.

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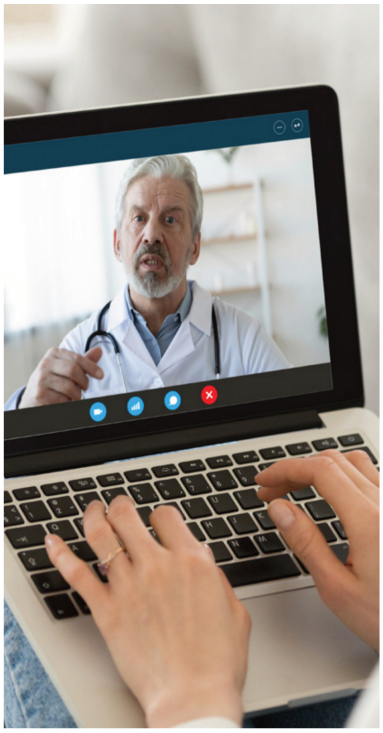

Il est nécessaire de connaitre la situation du patient pour s'assurer que le changement ne représente pas seulement pour lui une prescription à suivre, mais une solution bien accordée à ses besoins.

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Pourtant, depuis maintenant plusieurs années, *l'approche centrée sur le patient* est entérinée par le Collège royal des médecins et chirurgiens du Canada[9,10]. Cette approche se définit par un respect des besoins, des valeurs et des préférences du patient dans la planification et l'octroi d'un traitement. Cela passe entre autres par une attention particulière à la relation entre le traitant et le patient et par une *dynamique de collaboration* entre eux[11]. Si cette approche est officiellement mise de l'avant, les médecins restent souvent mal outillés pour l'appliquer concrètement dans le contexte des changements comportementaux[12], entre autres parce qu'elle peut être perçue comme étant moins efficace que l'approche par les conseils. Toutefois, les principes guidant l'approche centrée sur le client ne sont pas contraires aux notions d'efficience et d'efficacité. La science comportementale nous informe à ce sujet.

Combler le fossé à l'aide de la science comportementale

Pour changer un comportement, trois ingrédients sont essentiels: 1) la *capacité*, incluant les compétences et les connaissances requises pour s'engager dans une activité; 2) l'*opportunité*, faisant référence à tous les facteurs externes à la personne ayant un impact sur le comportement (p.ex., contraintes de temps et de moyens, environnement, etc.); et 3) la *motivation*, incluant tous les processus cognitifs et émotionnels influençant et dirigeant nos comportements[13]. Seul le patient sait où il se situe par rapport à chacun de ces éléments. S'il ne conçoit pas qu'il puisse augmenter son niveau d'activité physique, quelle en est la raison? Est-ce en raison de sa méconnaissance des dangers liés à la sédentarité ou en raison de son horaire trop chargé? Est-ce que c'est parce qu'il ne sait pas par où commencer, ou plutôt puisqu'il est découragé par le chemin à parcourir?

Il est nécessaire de connaitre la situation du patient pour s'assurer que le changement ne représente pas seulement pour lui une *prescription à suivre*, mais une solution bien accordée à ses besoins. Voilà pourquoi la collaboration est de mise. Elle permet au patient d'illustrer lui-même sa réalité, et au médecin de faire des recommandations ajustées aux besoins du patient. Dès lors, il devient beaucoup plus simple d'élaborer un plan d'action empreint de sens pour le patient favorisant ainsi le maintien d'un changement comportemental dans le temps.

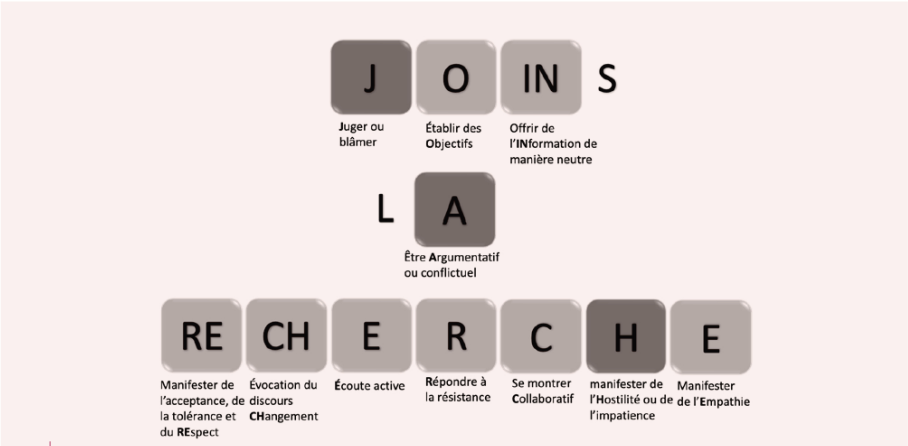

FIGURE 1. LES 11 COMPOSANTES DE LA COMMUNICATION MOTIVATIONNELLE SOUS FORME DE MNÉMONIQUE[14]

La communication motivationnelle

Il existe des stratégies de communication pouvant aider le professionnel de la santé à instaurer, au sein de ses consultations, des conditions propices aux changements comportementaux. Pour en offrir un cadre de référence, un groupe d'experts en sciences comportementales a récemment défini la notion de *communication motivationnelle*[14]. Ce style de communication est spécialement adapté au contexte médical et regroupe 11 composantes clés (voir la figure 1) réparties en trois catégories. Premièrement, on retrouve des *manières d'agir*, comme l'écoute active, la sélection d'objectifs clairs et réalisables, la réponse envers la résistance, l'évocation du discours de changement et la présentation neutre de l'information. Deuxièmement, on y présente des *manières d'être*, comprenant la manifestation de respect, de collaboration et d'empathie. Finalement, on y trouve des *contre-indications* concernant certaines attitudes pouvant *miner* le processus de changement telles que de juger ou de blâmer le patient, d'être hostile ou impatient à son égard, ou encore de glisser vers l'argumentation ou la conflictualité. Chacune de ces composantes est ancrée dans la littérature de la science comportementale et, avec les bons outils[15], peut être enseignée, peu importe le niveau d'expérience du professionnel de la santé[12].

Le défi à venir

L'adoption d'un style de communication intégrant les acquis de la science comportementale représente le morceau manquant au casse-tête des pratiques de changement comportemental efficaces et centrées sur le patient. Le prochain grand défi sera de disséminer ces connaissances, en plus de réellement changer les pratiques cliniques forgées par une formation d'expert et un système de santé aux ressources limitées.
Si la communication motivationnelle permet d'adresser ces réalités, les formations auront le défi de convaincre et d'outiller les professionnels de la santé. Pour ceux-ci, le comportement le plus difficile et le plus important à modifier pourrait bien être le leur.

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