BEHAVIOR CHANGE COUNSELING TRAINING PROGRAMS FOR NURSES AND NURSING STUDENTS: A SYSTEMATIC DESCRIPTIVE REVIEW

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Made substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data	GF, SC, MAMC, TM
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None declared.

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ABSTRACT

Objectives: (1) To systematically review the literature on behavior change counseling (BCC) training programs targeting nurses and nursing students; (2) to characterize these training programs according to their content (i.e., targeted health behavior[s], BCC approaches taught, BCC techniques taught), structure, and modes of delivery.

Design: A systematic, descriptive literature review.

Data Sources: PubMed, CINAHL and Embase were searched with no time limitation in August 2018.

Review Methods: A systematic, descriptive literature review structured according to Paré et al.'s methodology and the PRISMA guidelines. Primary studies were included if they evaluated a BCC training program with nurses or nursing students. Review authors screened studies, extracted data, and assessed study quality using the MERSQI. Data was synthesized through narrative synthesis, descriptive statistics, and content analysis.

Results: From a pool of 267 articles, we included 25 articles published between 2003 and 2018. Two studies scored as low quality (8%), 18 as medium quality (72%), and 5 as high quality (20%). Physical activity (N=14; 56%) and smoking (N=11; 44%) were the most frequently targeted health behaviors. Eleven BCC approaches were cited (e.g., motivational interviewing), and 48 BCC techniques were identified (e.g., eliciting and scaling change talk). The median number of training sessions was 3 (interquartile range [IQR] 5), the median training program duration was 3 hours (IQR 6.25 hours), and median training period was 24.5 days (IQR 110 days). Programs were most often delivered as seminars and workshops.

Conclusions: High-quality studies reporting the assessment of BCC training programs with nurses and nursing students are scarce. There was significant heterogeneity in terms of the BCC approaches and techniques taught. Current evidence suggests nurses and nursing students learn BCC mainly through active, realistic practice. However, computer-based training programs are rapidly gaining ground. Further research emphasizing theory-based BCC training programs is warranted.

KEY WORDS

Counseling; training; nursing education; literature review; descriptive review; systematic review; motivational interviewing; clinical practice change.

1. INTRODUCTION

Behavioral risk factors, such as smoking, physical inactivity, excessive alcohol consumption, and poor nutrition, are the biggest contributors to non-communicable diseases (NCDs) (World Health Organization, 2017). The main types of NCDs are cardiovascular diseases, diabetes, neoplasia, chronic kidney disease, and chronic lung diseases (Després, Cartier, Côté, & Arsenault, 2008; Leiter et al., 2011). Thus, behavioral risk factors leading to NCDs must be targeted by behavior change interventions initiated by healthcare professionals.

1.1. Background

Nurses and nursing students are particularly well positioned across the continuum of care to provide behavior change counseling (BCC) to explore patients' beliefs, assess their level of motivation for change, and intervene to elicit behavior change (Marks & Allegrante, 2005; Sniehotta, Scholz, & Schwarzer, 2005). BCC relies on "theories and interventions to facilitate behaviour change and does so by identifying sequential steps that guide the provider to empower the individual to engage in and sustain health behaviors in the face of barriers (p. 71)" (Vallis et al., 2018). Thus, nurses are expected to try to understand how the individual feels about change, and what plan he might have to initiate and maintain a change in health behavior (Lane et al., 2005; Patnode, Evans, Senger, Redmond, & Lin, 2017). When applied in routine clinical practice, BCC typically has a duration of 5 to 15 minutes. Multiple *BCC approaches* (or frameworks) are currently taught to nurses, such as the 5 As (Fiore et al., 2000)—i.e., ask, advise, assess, assist, arrange—and motivational interviewing (W.R. Miller & Rollnick, 2012). These BCC approaches that range from simple to complex are often based on theories originating from the field of psychology and aim to provide a general structure for providing BCC. These BCC approaches

involve the integration of various *BCC techniques*, such as respect for patient choices, active listening and formulation of open-ended questions (Lane et al., 2005). Effectiveness studies of BCC report modest, but clinically significant effects of BCC for smoking cessation, physical activity, reduction of alcohol consumption, and adoption of a balanced diet (Artinian et al., 2010; Goldstein, Whitlock, & DePue, 2004; Rees, Dyakova, Ward, Thorogood, & Brunner, 2013). Moreover, these modest effects can add up and lead to substantial improvements in terms of morbidity and mortality (Spring et al., 2013).

Implementing BCC in nurses' and nursing students' clinical practice is feasible, but it requires adequate training to ensure competency (Hauer, Carney, Chang, & Satterfield, 2012; Lin et al., 2014). While nurses acquire foundational knowledge and develop relational skills during undergraduate training (e.g., active listening, reformulation), this training does not cover specific abilities to explore patients' motivation and ambivalence, and to intervene accordingly. Thus, BCC training programs should be designed to improve nurses' and nursing students' attitudes, knowledge and skills needed to effectively engage individuals in health behavior change (Barwick, Bennett, Johnson, McGowan, & Moore, 2012; Hebert, Caughy, & Shuval, 2012). In addition, close attention should be paid to the sustainability of training. Indeed, changing nurses' clinical practice is a complex and challenging endeavor due to the influence of numerous factors, including nurses' motivational predispositions to change, and the professional, social, organizational, and societal context (Scott et al., 2012; Wuchner, 2014).

Several studies have shown that nurses struggle with providing BCC, even after receiving seemingly adequate training (Hollis, Glaister, & Anne Lapsley, 2014; Jansink et al., 2013; Jansink, Braspenning, van der Weijden, Elwyn, & Grol, 2010). Whether the BCC approaches and BCC techniques taught are not appropriate, or that nurses have problems with the acquisition and

maintenance of BCC skills, is unclear. While BCC training programs cannot be standardized to account for different practice settings and time factors, it is suggested the field would benefit from the identification of a common approach to train nurses and nursing students effectively (Vallis et al., 2018). Thus, it appears important to characterize the content, structure, and modes of delivery of BCC training programs assessed with nurses and nursing students to examine the current state of affairs and suggest areas for improvement and research.

Currently, we have a paucity of data regarding: (1) the content of BCC training programs designed for nurses and nursing students, in terms of the BCC approaches and the BCC techniques that are taught; (2) the structure of these BCC training programs (i.e., number and duration of training sessions, training period); (3) the modes of delivery of these BCC training programs (e.g., workshop, e-learning). This limits our ability to make recommendations regarding characteristics likely to lead to successful BCC training programs targeting nurses and nursing students. Thus, the general purpose of this descriptive literature review was to characterize BCC training programs assessed with nurses and nursing students, as a first step towards further evidence synthesis.

2. METHODS

2.1. Objectives

The objective of this systematic, descriptive literature review was twofold: (1) to systematically review the literature on BCC training programs targeting nurses and nursing students; (2) to characterize these BCC training programs according to their content, structure, and mode of delivery.

2.2. Questions

We sought to answer the following questions:

1) What is the **content** of BCC training programs assessed with nurses and nursing students?
    a. What are the targeted health behavior(s)?
    b. What are the BCC approach taught (e.g., motivational interviewing)?
    c. What are the BCC techniques taught (e.g., using reflective listening)?
2) What is the **structure** of BCC training programs assessed with nurses and nursing students (i.e., number and duration of training sessions, training period)?
3) What are the **modes of delivery** of BCC training programs assessed with nurses and nursing students?

2.3. Design

To provide an in-depth synthesis of the characteristics of BCC training programs assessed with nurses and nursing students, we conducted a systematic, descriptive literature review structured according to the Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009) and the methodology of Paré, Trudel, Jaana, and Kitsiou (2015).

Systematic descriptive reviews aim to identify interpretable patterns and gaps in the literature with respect to pre-existing propositions, theories, methodologies or findings (Paré et al., 2015). We conducted the review in six steps: 1) formulating the review questions and developing the search strategy; 2) conducting a systematic search of multiple databases to identify a representative number of empirical studies; 3) selecting studies systematically

according to pre-established criteria; 4) appraising the quality of included studies; 5) extracting data; 6) synthesizing data through narrative synthesis, descriptive statistics, and content analysis.

2.4. Eligibility Criteria

We included primary research articles reporting the evaluation of BCC training programs in nurses or nursing students, published in English and French. Studies that enrolled other health professionals in addition to nurses or nursing students were also eligible for inclusion. We defined BCC as any counseling aimed at increasing healthy behaviors (e.g., adopting a balanced diet, engaging in physical activity) or reducing unhealthy behaviors (e.g., smoking, excessive alcohol consumption).

2.5. Information Sources

We searched three electronic bibliographical databases with no time limitation on August 20, 2018, for eligible primary research articles:

- Cumulative Index to Nursing and Allied Health Literature (CINAHL), via EBSCOhost (1980 to August 20 2018);
- Embase, via Ovid SP (1947 to August 20 2018);
- PubMed (including MEDLINE), via NCBI (1946 to August 20 2018).

Moreover, we performed hand searching in relevant journals (e.g., *Patient Education and Counseling*), retrospective searching (e.g., through the reference list of included studies) and prospective searching (e.g., by looking at articles that cited the included studies).

2.6. Search

We designed a search strategy revolving around three key concepts: (1) nurses (population); (2) behavior change counseling (concept), and (3) training (intervention) (see Supplementary File 1). We first developed the search strategy for PubMed, then tailored it to each database to ensure specificity and sensibility.

2.7. Study Selection

One review author (GF) screened the titles and abstracts of identified articles using the EndNote software V8.0 (Clarivate Analytics). The same author then performed the full-text assessment and applied eligibility criteria.

2.8. Data Collection and Data Items

Data was collected from included articles using two data extraction forms developed specifically for this review. Data collection was conducted by one review author (GF) and validated by a second review author (MAMC or TM). The first form allowed to extract methodological information on included studies (i.e., objective, design, sample, participants' practice setting), and information on BCC training programs (i.e., target clinical behavior, training program goal, content, structure, mode of delivery, comparator[s]). Moreover, we extracted which types of outcomes were measured in each study according to a modified version of Kirkpatrick's hierarchy (Craig, Bittel, & Kirkpatrick, 1967). We added the classification 3a since theoretical constructs underlying behavior change (e.g., self-efficacy, perceived behavioral control, instrumental attitude, habit) were not clearly taken into account in the initial classification (Craig et al., 1967):

- Type 1—*Participation* (covers learners' views on the learning experience);
- Type 2a—*Modification of attitudes/perceptions* (changes in the reciprocal attitudes or perceptions between participant groups toward intervention/curriculum);
- Type 2b—*Modification of knowledge/skills* (for *knowledge*, the acquisition of concepts, and principles; for *skills*, the acquisition of thinking/problem-solving, psychomotor, and social skills);
- Type 3a—*Theoretical constructs underlying behavioral change* (i.e., nurses' self-efficacy);
- Type 3b—*Behavioral change* (documents the transfer of learning to the workplace or willingness of learners to apply new knowledge and skills);
- Type 4a—*Change in organizational practice* (wider changes in the organizational delivery of care, attributable to an educational program);
- Type 4b—*Benefits to patients* (any improvement in the health and well-being of patients as a direct result of an educational program) (Hauer et al., 2012).

The second form focused on the BCC techniques reportedly taught to nurses and nursing students in the training programs. A BCC technique was defined as any strategy that can be used by nurses and nursing students to help the patient initiate or maintain health behavior change. To be coded as "present", a BCC technique had to be implicitly or explicitly mentioned in reviewed studies (i.e., "by the end of this training program, the trainee will be able to…" (Dragomir, Julien, Bacon, Boucher, & Lavoie, 2018). A second review author (MAMC or TM) coded studies for BCC techniques independently.

2.9. Quality Appraisal

One review author (GF) assessed study quality using the Medical Education Research Study Quality Instrument (MERSQI) (Reed et al., 2007). Quality assessment was then validated by a second author (MAMC or TM). The MERSQI includes 10 items, reflecting 6 domains of study quality: study design, sampling, type of data, validity, data analysis, and outcomes. The maximum score for each domain is 3, which produces a maximum possible MERSQI score of 18, and potential range of 5 to 18 (Cook & Reed, 2015). Studies with scores of ≤ 10 were considered as low quality, those with scores ranging from >10 to <15 as medium quality, and those with scores of ≥ 15 as high quality.

2.10. Data Synthesis

We synthesized data narratively, and using descriptive statistics (i.e., frequency and percentages, mean and standard deviation, median and interquartile range), and content analysis methods. Study characteristics and BCC training program characteristics were summarized narratively, in table format and through descriptive statistics. To synthesize the BCC techniques taught to nurses in nursing students extracted in included studies, we used a qualitative and inductive method of content analysis, with a constant comparison approach (Glaser, 1965). BCC techniques coded by review authors (GF, MAMC) were listed in the Excel software version 16.17 (Microsoft Corp.), examined individually to remove duplicates, and linked to an established theory or taxonomy in a similar way to what has been done recently in published literature (Dragomir et al., 2018). At any time during the review process, disagreements were resolved through discussion and consensus.

3. RESULTS

3.1. Study Selection

From a pool of 267 potentially relevant articles, we included 25 primary research articles reporting the evaluation of a BCC training program with nurses and nursing students. Reasons for exclusion are documented in Figure 1.

[Insert Figure 1]

3.2. Characteristics of included studies

Included studies were published between 2003 and 2018 and originated primarily from the USA (see Table 1). Sample sizes ranged from 6 to 269 participants, with a mean sample size of 62.88 (standard deviation [SD] 62.07). Studies generally aimed to increase nurses' or nursing students' BCC-related knowledge and skills, as well as its clinical application. Twelve out of 25 studies (46.1%) were single-group pretest posttest studies, 8 were randomized controlled trials (30.7%), 3 were cluster randomized controlled trials (11.5%), and 2 were non-randomized controlled trials (7.7%). A vast majority of studies targeted nurses and nurse practitioners (23 studies; 92%), while only a few studies aimed to train nursing students (2 studies; 8%). The most frequent practice setting of nurses was general practices (i.e., family medicine clinics).

[Insert Table 1]

In terms of outcomes, 5 studies had level 1 outcomes (1 = participation), 17 studies had level 2a/2b outcomes (2a = modification of attitudes/perceptions toward intervention/curriculum, 2b = modification of knowledge/skills), 19 studies had level 3a/3b outcomes (3a = theoretical

constructs underlying behavior change, 3b = behavior change), and only 3 studies had level 4a/4b outcomes (4a = change in organizational practice, 4b = patient outcomes).

Finally, in terms of quality, included studies were deemed mostly of medium quality according to the MERSQI; two studies were scored as low quality (8%), 18 studies were scored as medium quality (72%), and 5 studies were scored as high quality (20%).

3.3. Characteristics of included training programs

3.3.1. Content of training programs

3.3.1.1. Targeted health behaviors

In terms of the health behaviors targeted by the 25 training programs reviewed, counseling for physical activity was the most frequent (14 training programs; 56%), followed by counseling for smoking cessation (11; 44%), diet (11; 44%), alcohol consumption (6; 24%), medication adherence (4; 16%), glycemic control (2; 8%), binge-eating (1; 4%), low mood (1; 4%), obesity (1; 4%), and stress (1; 4%) (see Table 2).

[Insert Table 2]

3.3.1.2. Behavior change counseling approaches

We identified a total 11 different BCC approaches in examined studies (see Table 3). Importantly, 5 BCC training programs were based on multiple BCC approaches.

[Insert Table 3]

The most commonly used BCC approach was motivational interviewing, in 11 training programs (44%) (Beach et al., 2018; Butler et al., 2013; Chisholm et al., 2017; Edwards, Stapleton, Williams, & Ball, 2015; Fontaine et al., 2016; Karvinen et al., 2017; Magill et al.,

2018; Malan, Mash, & Everett-Murphy, 2016; Noordman, van der Weijden, & van Dulmen, 2014; Vermunt et al., 2012; Welch, 2014). Motivational interviewing, developed by Miller and Rollnick (2012), is a "client-centered, yet goal-directed counseling method for helping people to resolve ambivalence about health behavior change by building intrinsic motivation and strengthening commitment" (W. R. Miller & Moyers, 2006, p. 3). The second most used BCC approach was the 5 As, in 5 training programs (20%) (Barta & Stacy, 2005; Borrelli, Lee, & Novak, 2008; Gonzalez, de Tantillo, Snowden, Gattamorta, & Ortega, 2018; Malan et al., 2016; Verwey et al., 2016). The 5 As is a counseling approach developed by the American Agency for Healthcare Research and Quality (Fiore et al., 2000), involving 5 steps: ask, advise, assess, assist, arrange. The Transtheoretical Model of Change was used as a framework for BCC in 3 training programs (12%) (Drevenhorn, Bengtson, Allen, Saljo, & Kjellgren, 2007; Gotwals, 2017; Wilcox, Parra-Medina, Felton, Poston, & McClain, 2010). The model, developed by Prochaska and DiClemente (1982), is the one of the best-known behavior change theories, and one of the most commonly used (Michie, West, Campbell, Brown, & Gainforth, 2014). It is postulated that individuals are, at any given moment, at one of five stages of change, from pre-contemplation to maintenance, and move from one stage to another through different processes. The BCC approach developed by Rollnick et al. (2002) was used in 2 studies (8%) (Lane, Johnson, Rollnick, Edwards, & Lyons, 2003; Pfister-Minogue & Salveson, 2010). It involves elements of the patient-centered method and the use of a set of consulting strategies, derived from motivational interviewing.

Various other approaches were also used; the STIMEDIC Guideline (de Ruijter, Candel, Smit, de Vries, & Hoving, 2018), the social cognitive theory (self-efficacy) (Bandura, 1986), the 3-minute empowerment approach (Fontaine et al., 2016), the INOVA checklist (Fontaine et al.,

2016), the engage for change protocol (Hayes-Roth, Saker, & Amano, 2010), and the perspective-taking approach (Lobchuk et al., 2018).

3.3.1.3. Behavior change counseling techniques

Content analysis revealed a total of 48 different BCC techniques taught to nurses and nursing students in the 25 training programs examined (see Table 4). Six articles did not report any BCC technique. Thus, the following frequencies and percentages are based on a total of 19 studies. Overall, in the articles that reported BCC techniques, the BCC techniques most frequently taught to nurses and nursing students were "Eliciting and scaling change talk / readiness for change" (9 training programs; 47.37%), "Exchanging information (e.g., ask-tell-ask, elicit-provide-elicit)" (9 training programs; 47.37%), "Using reflective listening" (8 training programs; 42.11%), "Problem solving (i.e., analyze behavioral factors/barriers, select strategies)" (8 training programs; 42.11%), "Asking the patient about his habits regarding a specific health behavior" (8 training programs; 42.11%), "Advising the patient to change a behavior in a clear, strong, personalized manner" (7 training programs; 36.84%), and "Asking open-ended questions" (7 training programs; 36.84%). About a third of the 48 BCC techniques were linked to motivational interviewing and its four core processes (i.e., engaging, focusing, evoking, planning). The mean number of BCC techniques reportedly taught to nurses and nursing students per training program ranged from 3 (Florindo et al., 2018) to 20 (Borrelli et al., 2008).

[Insert Table 4]

3.3.2. Structure of training programs

The structure of BCC training programs varied considerably. Indeed, the median number of training sessions was 3 (interquartile range [IQR] 5), the median training program duration was 3 hours (IQR 6.25 hours), and median training period was 24.5 days (IQR 110 days).

3.3.3. Modes of delivery of training programs

In terms of mode of delivery, 13 out of 25 of training programs (52%) were delivered face-to-face, either as seminars or workshops (Barta & Stacy, 2005; Beach et al., 2018; Borrelli et al., 2008; Chisholm et al., 2017; Drevenhorn et al., 2007; Gonzalez et al., 2018; Hardy, Hinks, & Gray, 2014; Lane et al., 2003; Lobchuk et al., 2018; Magill et al., 2018; Malan et al., 2016; Pfister-Minogue & Salveson, 2010; Vermunt et al., 2012). These were often complemented by role-play exercises, written material, personalized feedback, or telephone/email follow-up. Eight out of 25 training programs (32%) were entirely computer-based (de Ruijter et al., 2018; Florindo et al., 2018; Fontaine et al., 2016; Hayes-Roth et al., 2010; Karvinen et al., 2017; Noordman et al., 2014; Welch, 2014; Wilcox et al., 2010), seven of these being available online. Two of the computer-based training programs were adaptive (de Ruijter et al., 2018; Hayes-Roth et al., 2010), i.e., they were designed to collect data to build the learner's profile (e.g., navigation behavior, knowledge, preferences), interpret these data through algorithms, and adapt in real time the training (i.e., content, navigation, presentation, multimedia, learning strategies), providing a dynamic and evolutionary learning path for each learner (Fontaine et al., 2017). Finally, 4 out of 25 training programs (16%) used a blended learning approach, one part of the training being delivered face-to-face and the other being delivered online (Butler et al., 2013; Edwards et al., 2015; Gotwals, 2017; Verwey et al., 2016).

4. DISCUSSION

4.1. General discussion and future research directions

This systematic, descriptive literature review identified 25 primary research articles that reported the assessment of a BCC training program in nurses and nursing students. These training programs were characterized according to their content, structure, and mode of delivery. Overall, the results suggest that BCC training programs focus mostly on physical activity and smoking cessation and integrate a wide range of BCC approaches and BCC techniques. A significant proportion of identified BCC approaches and techniques appear to be based directly on, inspired by or closely related to motivational interviewing and its four core processes (i.e., engaging, focusing, evoking, planning). Most training programs were delivered through workshops and seminars.

About half of reviewed BCC training programs focused on multiple health behaviors (e.g., counseling for physical activity, smoking cessation, glycemic control). This raises an interesting topic for discussion since it is unclear if teaching nurses BCC techniques tailored to a specific health behavior is more beneficial than teaching more general BCC techniques. For example, the BCC technique "Discussing habit formation" may be more beneficial for integrating physical activity in someone's lifestyle than for smoking cessation. In this sense, since it is known that the factors influencing behavioral change are different for each health behavior, the BCC techniques taught to nurses in training programs should also be specific to each targeted health behavior (Michie et al., 2014). Further research should put greater focus on specifying which BCC techniques target which health behaviors in the training program, and which BCC techniques are applicable to all health behaviors.

The content of reviewed BCC training programs varied widely depending on the BCC approach used. Motivational interviewing and the 5 A's approach were the most frequently identified BCC approaches in examined studies. While motivational interviewing was used as a basis for several training programs, few of these integrated all of the key BCC techniques relating to the four core processes of MI (i.e., engaging, focusing, evoking and planning). Indeed, several training programs focused on two or three of these processes, and failed to report clearly how these were operationalized. This problem is also present when training programs used other BCC approaches, with an exception: the 5 A's approach was reported and operationalized more clearly than the others. This may be due to its simplicity and ease of use (Vallis, Piccinini–Vallis, Sharma, & Freedhoff, 2013).

Few studies reported clearly the links between the BCC approach taught and relevant behavior change theories. A scoping review identified 83 behavior change theories (Michie et al., 2014). The underuse of theory in BCC training programs reviewed is problematic. Indeed, theory allows us to understand and address the mechanisms of action of health behavior change in patients. These mechanisms of action "can be intrapersonal psychological processes of the individual (e.g., motivation, skills, attitudes) and/or characteristics of the social and physical environment (e.g., social support)" (Carey et al., 2018). Michie and colleagues have identified 26 mechanisms of action in theories of behaviour and behaviour change that may be targeted by interventions (Carey et al., 2018; Connell et al., 2018; Johnston et al., 2018). Describing the mechanisms of action targeted by BCC could provide insight into the causal pathways leading to health behaviour change in patients. Thus, more rigorous, explicit links between BCC approaches and behavior change theories are needed in training programs targeting nurses and nursing students.

Overall, the significant heterogeneity in the use of BCC approaches underlines the importance of describing the BCC techniques included in the training program, rather than simply reporting which BCC approach is taught. Indeed, the analysis of the BCC techniques taught to nurses and nursing students in reviewed articles provides key insights into the content of these training programs. For instance, while BCC approaches such as motivational interviewing and the 5 A's provide a general structure for nurses to provide BCC, current evidence suggests that BCC techniques should be included in a training program on the basis of their effectiveness for health behavior change, not on the basis of a particular BCC approach (Michie et al., 2013). Thus, designing a training program integrating BCC techniques from the Behavior Change Technique Taxonomy integrated into a general BCC approach, such as the 5 A's, may be a promising direction for further research.

About a third of BCC training programs reviewed were entirely computer-based. Moreover, 6 of the articles reporting the evaluation of these programs were published in the last 4 years. Motives for this increase of e-learning programs may be related to increased training accessibility and satisfaction among nurses and nursing students (Button, Harrington, & Belan, 2014; Clark & Mayer, 2016; Lahti, Hatonen, & Valimaki, 2014). More specifically, we notice the emergence of adaptive e-learning for training nurses in BCC, which allows the adaptation of curriculum content, structure and presentation to individual nurses and nursing students (de Ruijter et al., 2018; Hayes-Roth et al., 2010). Current evidence shows adaptive e-learning may be particularly beneficial for developing competencies, such as BCC, in health professionals and students. Indeed, the adaptation process within adaptive e-learning allows for real time, tailored guidance and coaching for each nurse (Fontaine et al., 2017).

4.2. Strengths and limitations of this review

This review has several strengths, including the systematic literature search, the absence of a time limitation during the search, the evaluation of study quality using the MERSQI, and the validation of key steps in the review by a second author.

This review also has limitations. First, only 3 bibliographical databases were searched. It cannot be ruled out that additional references could have been identified in other bibliographical databases. However, the three databases selected are usually those utilized in the field examined in this review. Second, as a first step towards evidence synthesis in the field, this review was focused on the characteristics of BCC training programs in terms of content, structure, and modes of delivery. The next step would be to undertake a systematic review and meta-analysis to assess the effectiveness of BCC training programs on learning and clinical outcomes in nurses. Finally, our search was limited to English and French literature.

5. CONCLUSION

Training nurses and nursing students is crucial to lead to changes in health behaviors, and to reduce morbidity and mortality related to NCDs such cardiovascular diseases, diabetes, and neoplasia. This systematic descriptive review provides a synthesis of literature regarding the characteristics of BCC training programs assessed with nurses and nursing students. This review provides key insights for the design and development of BCC training programs for researchers, faculty members and clinical leaders. Reviewed BCC training programs vary widely in terms of structure, are most often based on motivational interviewing and the 5 A's approach, do not report the BCC techniques taught clearly, and are delivered mostly through seminars and workshops. Heterogeneity across the reporting of BCC training program content, structure, and

modes of delivery is large, suggesting the need for consensus and standardization in the field to allow for further evidence synthesis.

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Table 1. Characteristics of included studies.

First author (year) Country	Study objective [a]	Study design	Study participants [b]	Practice setting [b]	Expected outcomes [c]	MERQSI score
Barta (2005) USA	To explore the effectiveness of educating nurses to facilitate bedside smoking cessation interventions with patients who smoke.	Single-group pretest and posttest	Nurses, N = 20	Multiple settings	3a, 3b	10.5
Beach (2018) USA	To compare the effect of two different levels of MI training on clinician communication behaviors and patient experiences.	Randomized controlled trial	Nurse practitioners, physicians, physician assistants, N = 12	Primary HIV care	1, 2a, 3a, 3b	15
Borrelli (2008) USA	To examine whether training nurses is associated with changes in attitudes about providing smoking BCC, and an increase in BCC 6 months post-training.	Single-group pretest and posttest	Nurses, N = 98	Home health care	3a, 3b	10
Butler (2013) United Kingdom	To evaluate the effect of training primary care health professionals in BCC on the proportion of patients self-reporting change in four risk behaviors.	Cluster randomized controlled trial	Nurses, general practitioners, N = 53	General practices	2b, 3b, 4b	17
Chisholm (2017) United Kingdom	To investigate whether the Pso Well training improves clinicians' MI skills and knowledge; to explore the acceptability and feasibility of the Pso Well training.	Single-group pretest and posttest	Nurses, dermatologists, N = 61	Multiple settings	1, 2b, 3b	14.5
de Ruijter (2018) Netherlands	To assess the effects of a novel computer-tailored electronic learning (e-learning) program on practice nurses' smoking cessation guideline adherence.	Randomized controlled trial	Nurses, N = 269	General practices	3a, 3b	15
Drevenhorn (2007) Sweden	To analyze the effects of nurses' training on the use of the stages of change model when counselling hypertensive patients to perform lifestyle changes.	Randomized controlled trial	Nurses, N = 33	Nurse-led hypertension clinics	3b	12
Edwards (2015) Australia	To examine the effectiveness of training healthcare providers in brief MI targeting eating and exercise behavior change.	Non-randomized controlled trial	Nurses, multiple other health professionals, N = 163	NR	2b, 3a	12.5
Florindo (2018) Brazil	To report an evaluation of health professionals' participation in a distance-learning physical activity training course developed in a low socio-economic region of São Paulo city, Brazil.	Single-group cross-sectional	Nurses, multiple other health professionals, N = 170	Multiple settings	2a, 3a	6
XXX (2016) Canada	To examine the feasibility and acceptability of a Web-based e-learning platform for brief MI, and its' preliminary on nurses' perceived skill in and self-reported clinical use of brief MI.	Single-group pretest and posttest	Nurses, N = 31	Coronary care unit	1, 2a, 2b, 3b	10.5
Gonzalez (2018) USA	To evaluate the impact of an educational program on nurse screenings for tobacco and smoking cessation interventions for eligible patients and assess the feasibility of the program.	Single-group pretest and posttest	Nurses, N = 52	Emergency department	3b	10.5

Gotwals (2017) USA	To examine faith community nurses' self-efficacy perceptions following a nutrition educational intervention.	Randomized controlled trial	Nurses, N = 110	Faith community	2b, 3a	14
Hardy (2014) United Kingdom	To examine if training practice nurses increases the proportion of patients with severe mental illness who are screened for CVD risk factors and given lifestyle advice in primary care.	Single-group pretest and posttest	Nurses, NR	General practices	4a, 4b	13
Hayes-Roth (2010) USA	This study evaluated STAR Workshop, a web-based training system that automates efficacious techniques for individualized coaching and authentic role-play practice.	Randomized controlled trial	Nursing and medical students, N = 30	Multiple settings	1, 2a, 2b, 3a	13.5
Karvinen (2017) Canada	To examine the effectiveness of online learning modules for improving physical activity BCC practices among oncology nurses.	Randomized controlled trial	Nurses, N = 54	Oncology care	2b, 3a, 3b	14
Lane (2003) United Kingdom	To explore whether context-bound training would be beneficial for diabetes specialist nurses.	Single-group pretest and posttest	Nurses, N = 6	Diabetes care	2b, 3b	11.5
Lobchuk (2018) Canada	To develop and test a perspective taking intervention on nursing students' clinical empathy, perceptual understanding, and client readiness to alter health risk behaviors.	Randomized controlled trial	Nursing students, N = 42	Multiple settings	2b, 3a	15.5
Magill (2018) United Kingdom	The primary aim was to assess whether nurses achieved competencies in psychological therapy delivery at the end of the training period.	Cluster randomized controlled trial	Nurses, N = 23	Diabetes care	2b	15.5
Malan (2016) South Africa	To evaluate the effect of training primary care providers in an approach to brief BCC integrating the 5As with a guiding style derived from MI.	Single-group pretest and posttest	Nurse practitioners, general practitioners, N = 41	General practices	3b	14.5
Noordman (2014) Netherlands	To examine the effects of individual video-feedback on the generic communication skills, clinical competence and MI skills of experienced practice nurses working in primary care.	Non-randomized controlled trial	Nurses, N = 20	General practices	2b	14.5
Pfister-Minogue (2010) USA	To evaluate the effectiveness, feasibility, and usefulness of a BCC training program for public health nurses to facilitate behavior change in patients.	Single-group pretest and posttest	Nurses, N = 12	Public health clinics	2b	13
Vermunt (2012) Netherlands	To evaluate the implementation of the APHRODITE lifestyle intervention for the prevention of type 2 diabetes in Dutch primary care.	Randomized controlled trisinal	Nurse practitioners, general practitioners, N = 72	General practices	2b, 3a	13
Verwey (2016) Netherlands	To examine the reach, implementation and satisfaction with the BCC protocol and the tool.	Cluster randomized controlled trial	Nurses, N = 20	General practices	4a, 4b	13.5

Welch (2014) USA	To increase nurses' knowledge and foster positive attitudes regarding the use of MI as a communication style to promote health behavior change.	Single-group pretest and posttest	Nurses, N = 84	Medicine, surgery and telemetry units	2b, 3a	11.5
Wilcox (2010) USA	To report the training, adoption process, and implementation of an intervention to promote physical activity and dietary BCC in community health centers.	Single-group pretest and posttest	Nurses, general practitioners, N = 33	General practices	1, 2a, 2b	12

[a] BCC indicates behavior change counseling; MI indicates motivational interviewing.
[b] NR indicates not reported.
[c] 1 indicates ***Participation*** (covers learners' views on the learning experience, its organization, presentation, content, teaching methods, and aspects of the instructional organization, materials, quality of instruction); 2a indicates ***Modification of attitudes/perceptions*** (changes in the reciprocal attitudes or perceptions between participant groups toward intervention/curriculum); 2b indicates ***Modification of knowledge/skills*** (for *knowledge*, the acquisition of concepts, procedures, and principles; for *skills*, the acquisition of thinking/problem-solving, psychomotor, and social skills); 3a indicates ***Theoretical constructs underlying behavioral change*** (i.e., nurses self-efficacy); 3b indicates ***Behavioral change*** (documents the transfer of learning to the workplace or willingness of learners to apply new knowledge and skills); 4a indicates ***Change in organizational practice*** (wider changes in the organizational delivery of care, attributable to an educational program); 4b indicates ***Benefits to patient*** (any improvement in the health and well-being of patients as a direct result of an educational program).

Table 2. Characteristics of behavior change counseling training programs [a].

First author (year) Country	Training program goal	Targeted health behaviors	Behavior change counseling approach(es) taught	Structure *No. of sessions; training duration; training period*	Mode(s) of delivery	Comparator(s)
Barta (2005) USA	To improve nurses' self-efficacy and behavior for smoking cessation counseling with their patients.	Smoking cessation	5 A's	1 session; 2 hours; 1 day	Seminar	NA
Beach (2018) USA	To increase communication behavior changes and induce better patient experience.	Medication adherence	MI	4–6 sessions; 10+ hours; 4 months	Workshop	Workshop; 1 session; 8 hours; 1 day
Borrelli (2008) USA	To increase BCC-related positive attitudes organizational support, and BCC application in clinical practice.	Smoking cessation	5 A's	6 sessions; NR; 6 months	Seminar + booster sessions	NA
Butler (2013) United Kingdom	To introduce nurses to a set of skills that they could improve as they refined their efforts in everyday practice.	Diet, smoking cessation, physical activity, and alcohol	MI	9 sessions; 7.5 hours; NR	Seminar + web-based e-learning	NA
Chisholm (2017) United Kingdom	To enable the clinicians to adopt a patient-centered consultation approach and applied MI skills.	Medication adherence, obesity, smoking cessation, physical activity, low mood, and alcohol	MI	1 session; 8 hours; 1 day	Seminar	NA
de Ruijter (2018) Netherlands	To increase practice nurses' smoking cessation guideline adherence.	Smoking cessation	STIMEDIC Guideline	8 seCssions; NR; 6 months	Tailored, web-based e-learning	NA
Drevenhorn (2007) Sweden	To increase the use of the stages of change model when counselling hypertensive patients to perform lifestyle changes.	Physical activity, smoking cessation, alcohol, diet, and stress	Transtheoretical Model of Change	3 sessions; 21 hours; 3 days	Seminar + written material	No training
Edwards (2015) Australia	To improve healthcare professionals' knowledge, skills and confidence relative to brief MI for diet and physical activity.	Diet, physical activity	MI	3 sessions; 6 hours; 6 months	Seminar + web-based peer support	No training

Florindo (2018) Brazil	NR	Physical activity	Social Cognitive Theory	5 sessions; 3 hours; 3 weeks	Web-based e-learning	NA
Fontaine (2016) Canada	To train nurses regarding the spirit of MI, basic skills in brief MI, the change discourse, rolling with resistance, and initiating change.	Physical activity, diet, medication adherence and smoking cessation	MI + 3-Minute Empowerment Approach + INOVA Checklist	2 sessions; 50 minutes; 2 weeks	Web-based e-learning	NA
Gonzalez (2018) USA	To educate participants to identify patients who smoke, assess their readiness to quit, and refer for appropriate interventions.	Smoking cessation	5 A's	1 session; 2 hours; 1 day	Seminar + PowerPoint	NA
Gotwals (2017) USA	To increase nurses' perceived knowledge and counseling self-efficacy in dietary health promotion and prevention.	Diet	Transtheoretical Model of Change	1 session; 3 hours; 1 day	Seminar + Web-based resources	NA
Hardy (2014) United Kingdom	To increase understanding of severe mental illness and the risk of CVD, and confidence in carrying out physical health checks.	Diet, smoking cessation, physical activity	NR	1 session; 2 hours; 1 day	Seminar + demonstration	NA
Hayes-Roth (2010) USA	To train nursing and medical students in brief intervention for excessive alcohol consumption.	Alcohol	Engage for Change Protocol	E-book: 1 session; 20 min.; 1 day Adaptive e-learning: NR; 2.3 h.; NR	E-book or Adaptive e-learning (	No training
Karvinen (2017) Canada	To increase the knowledge and self-efficacy for BCC, increase BCC, and reduce perceived barriers/increase benefits.	Physical activity	MI	6 sessions; 3 hours; 12 weeks	Web-based e-learning	Publicly available websites
Lane (2003) United Kingdom	To increase nurses' skill in, and accurate use of, BCC.	Glycaemic control	BCC [MI]	8 sessions; 3 hours; 6 weeks.	Seminar	NA
Lobchuk (2018) Canada	The instructional session focused on training students in imagine-other perspective-taking.	Smoking cessation, binge-eating, diet, alcohol, and physical activity	Perspective-Taking Approach	4 sessions; 2 to 2.33 hours; 4 weeks	Seminar	No instructional and practice sessions
Magill (2018)	To train nurses active listening, managing resistance, directing change, self-efficacy, addressing beliefs, and shaping behaviors.	Glycaemic control, medication adherence, physical activity and	MI + Cognitive Behavioral Therapy	12 sessions; 36 hours; NR	Seminar + Email/telephone follow-up	Attention control

United Kingdom		diet				
Malan (2016) South Africa	To provide evidence of current deficiencies, to model the new approach and allow participants to practice new skills.	Diet, smoking cessation, physical activity, and alcohol use	5 A's + MI	4 sessions; 8 hours; NR	Workshop	NA
Noordman (2014) Netherlands	To increase nurses' generic communication skills, clinical competence and motivational interviewing skills.	Lifestyle	MI	2 sessions; NR; 8 weeks	Web-based video	No video feedback
Pfister-Minogue (2010) USA	To train nurses regarding the multiple skills relative to BCC.	Lifestyle	BCC [MI]	3 sessions; 9 hours; 8 weeks	Workshop + Telephone follow-up	NA
Vermunt (2012) Netherlands	NR	Physical activity and diet	MI	9 sessions; [15 hours; 2 years	Workshop	NA
Verwey (2016) Netherlands	NR	Physical activity	5 A's	2 sessions; 2 hours; NR	Web-based e-learning + Seminar	No use of the web-based application
Welch (2014) USA	To increase nurses' knowledge and foster positive attitudes regarding the use of MI to promote health behavior change.	Lifestyle	MI	1 session; 1 hour; 1 day	Web-based e-learning	NA
Wilcox (2010) USA	To train clinicians to acknowledge behavioral readiness, select stage-appropriate behavioral topics, and help patient set goals for change.	Physical activity and diet	Transtheoretical Model of Change	5 sessions; ≈7.5 hours; NR	Computer-based learning	NA

[a] BCC indicates behavior change counseling; MI indicates motivational interviewing; NR indicates not reported; NA indicates not applicable.

Table 3. Behavior change counseling approaches taught to nurses and nursing students.

Behavior change counseling approach	Definition	Citing article(s) included in this review
Motivational Interviewing	A client-centered, yet goal-directed counseling approach for helping people to resolve ambivalence about health behavior change by building intrinsic motivation and strengthening commitment. It revolves around four core processes: engaging, focusing, evoking, planning) (Miller and Rollnick, 2012).	Beach (2018); Butler (2013); Chisholm (2017); Edwards (2015); Fontaine (2016); Karvinen (2017); Magill (2018); Malan (2016); Noordman (2014); Vermunt (2012); Welch (2014)
5 As	A brief counseling approach rooted in behaviour change theory (e.g., self-management support, readiness assessment, self-efficacy enhancement). It comprises five steps: ask, advise, assess, assist, arrange. First developed for smoking cessation, it has now been adapted for a range of health behaviors (Fiore et al., 2000).	Barta (2005); Borrelli (2008); Gonzalez (2018); Malan (2016); Verwey (2016)
STIMEDIC Guideline	A counseling approach for smoking cessation comprising nine steps: (1) advising to quit smoking, (2) assessing smoking profile and smoking history, (3) assessing motivation to quit, (4) increasing motivation, (5) assessing barriers to quitting, (6) discussing barriers, (7) informing about cessation aids, (8) making a quit plan and setting a quit date, and (9) arranging follow-up after the quit date (Trimbos Institute, Dutch General Practitioners Association, 2016).	de Ruijter (2018)
Rollnick's Behavior Change Counseling Approach	A usually brief counseling approach derived from the patient-centered method that adopts the spirit of shared decision making, with some principles and skills linked to motivational interviewing. It is usually brief (5 to 30 minutes). It does not aim to develop discrepancy. It involves mostly the use of open questions and reflective listening statements to understand the client's views and feelings about the why, how, and when of behavior change (Rollnick et al., 2002).	Lane (2003) Pfister-Minogue (2010)
Transtheoretical Model of Change	A theory of human behavior change using a temporal dimension, the stages of change, to integrate processes and principles of change from different theories of intervention, hence the name transtheoretical. While not entirely a counseling approach *per se*, it has been used and operationalized to infer patients' readiness for change and to devise behavior change strategies in the context of counseling (Prochaska and Velicer, 1997).	Drevenhorn (2007) Gotwals (2017) Wilcox (2010)
Social Cognitive Theory	A theory of human behavior change whose main postulate is that behavior is directly related to observing others within the social context. One of the most well-known concepts is self-efficacy, i.e., the belief in one's capabilities to organize and execute the courses of action to manage situations. While not entirely a counseling approach *per se*, it has been used to devise behavior change strategies to address the psychological and social factors influencing self-efficacy (Bandura, 1989).	Florindo (2018)

3-Minute Empowerment Approach	A brief counseling approach inspired by Motivational Interviewing and the Transtheoretical Model of Change. It consists of two major steps: (1) Evaluation, with two components: a) determine the intervention goal, with the stages of change, b) determine the intervention target, i.e. conviction or confidence; (2) Intervention, with principles from motivational interviewing (Bédard, 2014).	Fontaine (2016)
INOVA Checklist	A list of counseling techniques targeting conviction and confidence towards health behavior change based on the Transtheoretical Model of Change. The list comprises 50 techniques that may be used for intervening at different stages of change (Paradis et al., 2010).	Fontaine (2016)
Engage for Change Protocol	A 10-minute protocol of 3 principal steps for brief intervention in alcohol abuse: A) Inform the patients of health risks; B) Acknowledge the patient's point of view; C) Encourage the patient of make a change (Hayes-Roth, Saker and Amaro, 2010).	Hayes-Roth (2010)
Perspective-Taking Approach	An approach sensitizing clinicians to: (a) be cognizant of their own thoughts and feelings about health risk behaviors, (b) control their thoughts and feelings to imagine the client's viewpoint of the health risk behavior and barriers for change, and (c) seek validation of his or her inferences of the client's viewpoint. It is hypothesized that perspective-taking can enhance empathic accuracy (Lobchuk et al., 2018).	Lobchuk (2018)
Cognitive Behavioral Therapy	An intervention aiming to improve self-management by helping people to identify and restructure unhelpful cognitive distortions (e.g. thoughts, beliefs, attitudes), teaching behavioral strategies, and supporting people to develop helpful coping strategies (Magill, 2018).	Magill (2018)

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Table 4. Behavior change counseling techniques taught to nurses and nursing students in training programs.

Behavior change counseling (BCC) approaches	BCC techniques	Number of times cited	Citing articles
5 A's (Fiore et al., 2000)	Asking the patient about his habits regarding a specific health behavior.	**8**	Barta (2005), Borrelli (2008), de Ruijter (2018), Fontaine (2016), Gonzalez (2018), Hayes-Roth (2010), Malan (2016), Verewy (2016)
	Advising the patient to change a behavior in a clear, strong, personalized manner.	**7**	Barta (2005), Borrelli (2008), de Ruijter (2018), Gonzalez (2018), Hayes-Roth (2010), Malan (2016), Verewy (2016)
	Assessing the patient's willingness to change a specific health behavior.	**6**	Barta (2005), Borrelli (2008), de Ruijter (2018), Gonzalez (2018), Malan (2016), Verewy (2016)
	Assisting the patient in health behavior change.	**5**	Barta (2005), Borrelli (2008), Gonzalez (2018), Malan (2016), Verewy (2016)
	Arranging for follow-up contacts.	**6**	Barta (2005), Borrelli (2008), de Ruijter (2018), Gonzalez (2018), Malan (2016), Verewy (2016)
Motivational interviewing (W.R. Miller & Rollnick, 2012)	Adopting the spirit of motivational interviewing	**6**	Beach (2008), Butler (2013), Fontaine (2016), Hayes-Roth (2010), Pfister-Minogue (2010), Welch (2014)
	Asking open-ended questions (Engaging)	**7**	Beach (2018), Chisholm (2017), Drevenhorn (2007), Fontaine (2016), Lane (2003), Lobchuk (2018), Welch (2014)
	Affirming the patient's strengths and efforts (Engaging)	**2**	Chisholm (2017), Welch (2014)
	Using reflective listening (Engaging)	**8**	Beach (2018), Butler (2013), Chisholm (2017), Drevenhorn (2007), Magill (2018), Pfister-Minogue (2010), Welch (2014), Wilcox (2010)
	Maintaining rapport (Engaging)	**3**	Beach (2018), Chisholm (2017), Drevenhorn (2007)
	Using summaries (Engaging)	**4**	Chisholm (2017), Drevenhorn (2007), Lane (2003), Welch (2014)
	Acknowledging autonomy and encouraging participation (Engaging)	**4**	Beach (2018), Chisholm (2017), Lane (2003), Malan (2016)
	Developing and maintaining a specific agenda (Focusing)	**5**	Beach (2018), Butler (2013), Chisholm (2017), Drevenhorn (2007), Lane (2003)
	Exchanging information (e.g., ask-tell-ask, elicit-provide-elicit) (Focusing)	**9**	Barta (2005), Beach (2018), Borrelli (2008), Chisholm (2017), de Ruijter (2018), Drevenhorn (2007), Fontaine (2016), Malan (2016), Pfister-Minogue (2010)
	Eliciting and scaling change talk / readiness for change (Evoking)	**9**	Beach (2008), Chisholm (2017), de Ruijter (2018), Fontaine (2016), Hayes-Roth (2010), Lane (2003), Lobchuk (2018), Pfister-Minogue (2010), Wilcox (2010)
	Recognizing ambivalence (Evoking)	**1**	Borrelli (2008)
	Exploring the patient's goals and values (Evoking)	**4**	Borrelli (2008), Drevenhorn (2007), Verwey (2016), Wilcox (2010)
	Developing discrepancy (Evoking)	**1**	Borrelli (2008)
	Rolling with resistance (Evoking)	**4**	Beach (2018), Fontaine (2016), Lane (2003), Magill (2018)
	Setting patient-determined goals (Planning)	**4**	Borrelli (2008), Chisholm (2017), Drevenhorn (2007), Fontaine (2016)
	Arriving at a plan (Planning)	**4**	Chisholm (2017), de Ruijter (2018), Fontaine (2016), Verwey (2016)
	Moving towards commitment (Planning)	**2**	Beach (2018), Hayes-Roth (2010)
Social Cognitive Theory (Bandura, 1986)	Increasing self-efficacy.	**4**	Borrelli (2008), Butler (2013), Florindo (2018), Magill (2018)
	Reframing attempts of behavior change as learning experiences instead of failures.	**2**	Borrelli (2008), Gonzalez (2018)
	Affirming small changes in behavior or attitude.	**1**	Borrelli (2008)
	Evoking patient stories of confidence-building experiences.	**1**	Borrelli (2008)

	Promoting vicarious experiences.	**1**	Borrelli (2008)
	Discussing feelings of loss and other ways of obtaining pleasure.	**1**	Borrelli (2008)
Core Communications Conditions (Rogers, 2007)	Demonstrating empathy.	**3**	Beach (2018), Lobchuk (2018), Wilcox (2010)
Behavior Change Technique Taxonomy (Michie et al., 2013)	Discussing habit formation (8.3)	**1**	Verwey (2016)
	Advising on, arranging or providing social support (3.1)	**6**	Barta (2005), Drevenhorn (2007), Florindo (2018), Fontaine (2016), Malan (2016), Wilcox (2010)
	Providing information about the health consequences of a unhealthy behavior (5.1)	**2**	Drevenhorn (2007), Fontaine (2016)
	Advise the person to identify the pros and cons of behavior change (9.2)	**4**	Borrelli (2008), Butler (2013), Drevenhorn (2007), Fontaine (2016)
	Arrange self-delivery of a reward if there is progress in behavior change (10.7)	**1**	Fontaine (2016)
	Recommending pharmacological support (11.1)	**1**	Barta (2005)
	Framing or reframing a behavior (13.2)	**2**	Drevenhorn (2007), Fontaine (2016)
	Problem solving (analyze behavioral factors/barriers, select strategies) (1.2)	**8**	Beach (2018), Borrelli (2008), de Ruijter (2018), Drevenhorn (2007), Florindo (2018), Fontaine (2016), Lobchuk (2018), Verwey (2016)
	Emphasizing the salience of consequences (5.2)	**4**	Borrelli (2008), Fontaine (2016), Hayes-Roth (2010), Magill (2018)
	Draw attention to incompatible beliefs (13.3)	**3**	Borrelli (2008), Fontaine (2016), Hayes-Roth (2010)
	Persuading verbally about capability (15.1)	**2**	Drevenhorn (2007), Fontaine (2016)
	Prompt behavior substitution (8.2)	**1**	Drevenhorn (2007)
3-minute Empowerment (Bédard, 2009)	Assessing conviction regarding behavior change.	**2**	Fonatine (2016), Pfister-Minogue (2010)
	Assessing confidence regarding behavior change.	**4**	Drevenhorn (2007), Fontaine (2016), Malan (2016), Pfister-Minogue (2010)
Transtheoretical M. (Prochaska & DiClemente, 1982)	Select stage-appropriate topics for discussion for each behavior.	**1**	Wilcox (2010)
Prismatic Model (Hedberg, 1999)	Using confrontation when necessary.	**1**	Drevenhorn (2007)
	Allowing pauses.	**1**	Drevenhorn (2007)
	Identifying perceived vulnerability to complications.	**1**	Drevenhorn (2007)
Other	Recognizing and adapting to intrinsic patient feedback.	**1**	Hayes-Roth (2010)