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Original article

The suitability of motivational interviewing versus cognitive behavioural interventions on improving self-care in patients with heart failure: A literature review and discussion paper

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ABSTRACT

Background: Chronic heart failure remains a major public health concern due to its high prevalence and disease burden. Although self-care has been advocated as the sustainable solution, it remains inadequate. Recent studies have shown the potential of integrating structured counselling elements into traditional educational programs to enhance self-care but the optimal counselling method remains unclear.

Aim: To compare the applicability of cognitive behavioural interventions and motivational interviewing on improving self-care behaviours in patients with chronic heart failure.

Method: A systematic three-step search strategy was used to identify studies that incorporated cognitive behavioural interventions and/or motivational interviewing to improve heart failure self-care. Quantitative and qualitative trial studies that met the inclusion criteria were appraised using the Joanna Brigg's Institute criteria.

Results: Motivational interviewing showed higher potential in improving HF self-care behaviours, but sustainability remains unclear. Cognitive behavioural interventions only showed effectiveness when applied to patients with comorbid depressive symptoms. Statistically significant results were only elucidated upon statistical adjustments and examination of behaviours individually. Potential effective components of CBI include setting up environmental reminders, addressing misconceptions and skills-training while that of MI was the communication style.

Conclusion: MI and CBI could be used synergistically by extracting their key effective components to strengthen the intention-behaviour link in improving HF self-care behaviours. MI could be used to enhance the intention to change by evoking ambivalence and change talk. CBI could be used to enhance problem-solving skills and set environmental reminders to strengthen the translation of intention to behaviour.

1. Background

Globally, chronic heart failure (HF) affects approximately 1–2% of adults in developed countries, predicts a 50% 5-year survival rate and costs approximately US$108 billion each year (Cook, Cole, Asaria, Jabbour, & Francis, 2014; Tung et al., 2016). While HF mortality rates have improved by 33% and 24% in men and women respectively, readmission rates remain high with an estimated prevalence of 25% in the United States and 3% to 15% in Asia (Feltner et al., 2014; Reyes et al., 2016). As the risk of HF increases with age, a global ageing population is bound to increase the healthcare burden for beds, manpower, subsidies and insurance coverage (Cook et al., 2014; Tung et al., 2016). Various guidelines have since promoted the adoption of HF self-care to reduce symptoms due to cardiac decompensation, thereby reducing the risk of rehospitalisation by about 35% but HF-related readmissions remain high due to poor self-care (Ziaein & Fonarow, 2016; Moser et al., 2012).

1.1. HF self-care

HF self-care refers to a set of protective behaviours including medication adherence, dietary and fluid restrictions, physical activity, symptom monitoring, flu vaccination and symptom management (Riegel, Lee, Dickson, & Carlson, 2009). Although studies have showed that improving knowledge (Yehle & Plake, 2010) and skills (Dickson, Melkus, Katz, et al., 2014) are effective in improving self-care

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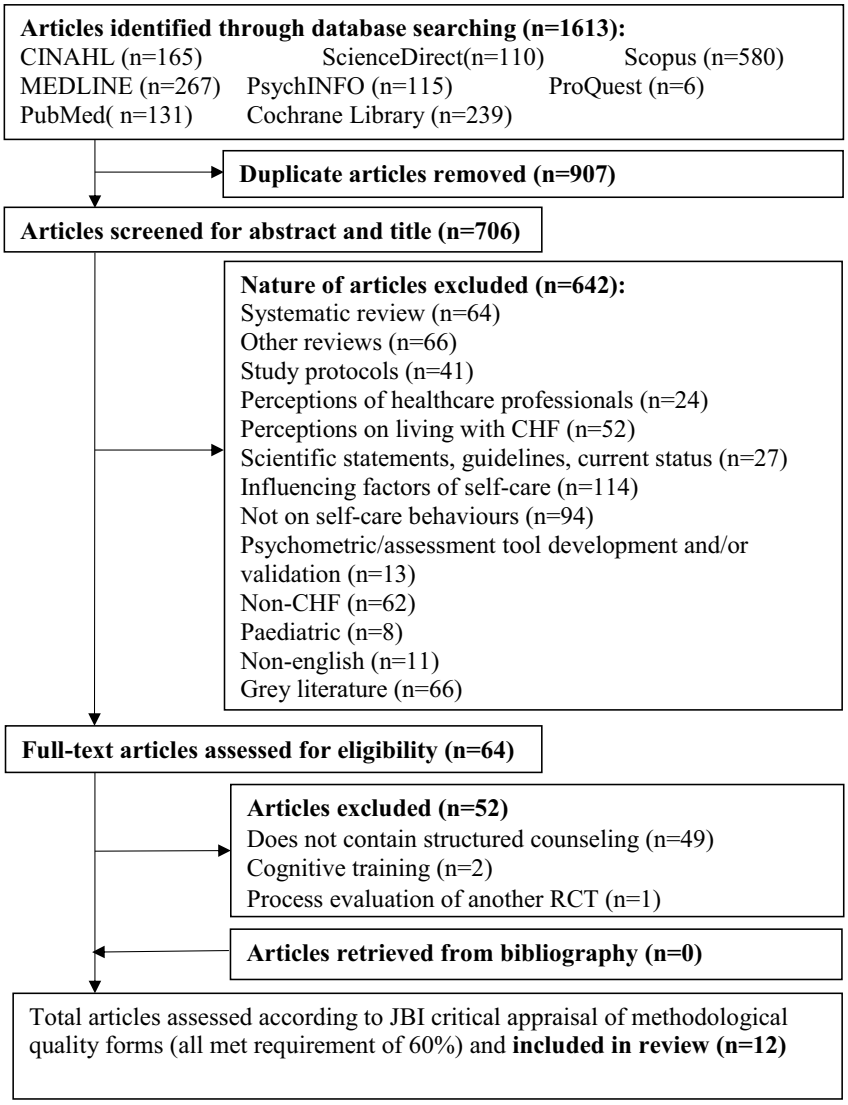

Fig. 1. Flow diagram of search process and outcome.

behaviours, others have shown that it is insufficient and the sustainability of post-intervention effects are rarely reported (Barnason, Zimmerman, & Young, 2012; Creber, Patey, Lee, et al., 2016). This suggests that initiating and sustaining health behaviour changes may not be as simple as imparting knowledge or skills.

According to systematic reviews, other influencing factors of self-care include: perceived heath beliefs (e.g. severity of illness and self-care effectiveness) (Oosterom-Calo, Van Ballegooijen, Terwee, et al., 2012); self-efficacy (confidence) (Chen et al., 2014; Peters-Klimm, Freund, Kunz, et al., 2013); motivation (Klompstra, Jaarsma, & Strömberg, 2015); and perceived control (empowerment) (Crundall-Goode, Goode, & Clark, 2016; Shearer, Fleury, Ward, & O'Brien, 2012). Qualitative findings have also reported patients' desire to feel normal but having to perform daily weighing, diet restriction and symptom monitoring are considered abnormal when compared to their lifestyle before being diagnosed with HF (Chew & Lopez, 2017; Mahoney, 2001). These factors are psychological in nature and could be addressed by using counselling methods. Therefore, a literature search was conducted to find out the common counselling methods used to improve HF self-care where cognitive behavioural interventions (CBI) and motivational interviewing (MI) were found to be most popularly used.

1.2. CBI versus MI: theoretical underpinning

Cognitive behavioural interventions (CBI) are mostly operationalized based on cognitive behaviour therapy (CBT), a structured goal-oriented process that assumes that problematic behaviours and emotions are caused by cognitive maladaptation (Hyland & Boduszek, 2012). Key components are cognitive restructuring (CR), a process of recognizing and resolving irrational thoughts through relearning rational interpretations of certain events (Lundgren, Andersson, & Johansson, 2015) and behaviour modification (BM), adapting behavioural responses towards specific needs and events. CBT often requires eight to twelve sessions, lasting for 60–90 mins per session (Bryant, Moulds, Guthrie, et al., 2008).

Motivational interviewing (MI) refers to a goal-orientated process that assumes ambivalence as a normal part of the motivation to change (Miller & Rollnick, 2012). It is based on the spirit of collaboration; evocation and autonomy and the principles of expressing empathy; enhancing self-efficacy; rolling with resistance and evoking discrepancies (Miller & Rollnick, 2004). These guide the demonstration of four tenet skills: asking open-ended questions; providing affirmations; reflective listening and summaries (Martins & McNeil, 2009). Effectiveness of MI is best operationalized by “change talk”, which are statements that indicate the intention, motivation or commitment to

change (Apodaca & Longabaugh, 2009). MI is often used as a brief therapy or prelude of one to four average 60 min' sessions (Lundahl, Moleni, Burke, et al., 2013).

CBI has been used to treat depression (Karyotaki et al., 2017), stress and anxiety (Olatunji et al., 2014), eating disorders (Fairburn et al., 2015) and pain (Cherkin et al., 2016). MI has been used to manage substance abuse (Satre et al., 2016; Spohr, Taxman, Rodriguez, & Walters, 2016), promote health service utilization such as mental health services (Syzdek, Green, Lindgren, & Addis, 2016) and manage chronic diseases such as diabetes and heart failure (Creber et al., 2016; Pladevall, Divine, Wells, Resnicow, & Williams, 2015). Studies that compared the effectiveness of both methods separately and combined but were mostly in patients with mental health issues such as schizophrenia, alcohol dependence and depression (Barrowclough et al., 2001; Riper et al., 2014). To the authors' best knowledge, randomized controlled trials or papers comparing the effectiveness of both methods on improving self-care in patients with HF could not be found. Therefore, this paper aims to discuss the suitability of CBI and MI in improving self-care in patients with HF, which could inform future research in terms of intervention developments and understanding the underlying mechanism of behaviour change.

2. Method

A systematic three-step search strategy was used to identify research articles across eight electronic databases published between 2006 and 2016 that tested the effectiveness of CBI and MI on improving HF self-care (Aromataris & Riitano, 2014). The search generated 1613 articles: CINAHL (n = 165); MEDLINE (n = 267); PubMed (n = 131); Cochrane Library (n = 239); ScienceDirect (n = 110); PsycINFO (n = 115); Scopus (n = 580) ProQuest (n = 6). 907 duplicate articles were excluded, 642 articles were excluded following abstract and title screen, resulting in the assessment of 64 full-text articles where 52 were further excluded with reasons. Methodological quality appraisal was conducted using the Joanna Briggs Institute's (JBI) critical appraisal form (The Joanna Briggs Institute, 2016). Articles were included if they scored more than > 60% according to the aforementioned JBI criteria, resulting in twelve articles included in this literature review (Fig. 1). Data was first extracted using a data extraction form and organized into a table with headings: authors; theoretical framework; study design; counselling method; approach; sample characteristics, inclusion criteria, exclusion criteria, remarks and attrition. Data was further abstracted and synthesized.

3. Results

Twelve studies were included with nine randomized controlled trials (RCTs) (Agren, Evangelista, Hjelm, & Strömberg, 2012; Cockayne, Pattenden, Worthy, Richardson, & Lewin, 2014; Creber et al., 2016; Freedland, Carney, Rich, Steinmeyer, & Rubin, 2015; Otsu & Moriyama, 2011; Paradis, Cossette, Frasure-Smith, et al., 2010; Powell, Calvin, Richardson, et al., 2010; Smeulders, van Haastregt, Ambergen, et al., 2009, 2010), one quasi-experimental trial (McCarthy, Dickson, Katz, & Chyun, 2016) and two mixed-method studies (Riegel et al., 2006; Riegel, Dickson, Garcia, Masterson Creber, & Streur, 2017). The studies represented 1930 participants with mean ages ranging from 53.40 to 75.76 years, predominantly included males and were classified under New York Heart Association functional class (NYHAFC) II. Six studies employed CBI and six employed MI.

Common self-care behaviours measured were daily weighing, medication adherence, sodium restriction, physical exercise, symptom monitoring and management. Fewer studies measured diet, cigarette smoking and alcohol consumption as an outcome. Five studies measured self-care using the Self-care in HF Index (SCHFI), which has three subscales – maintenance, management, and confidence; three studies employed the European Heart Failure Self-Care Behaviour Scale; and the rest used other self-report instruments. It is noteworthy all six studies that used SCHFI measured self-care behaviours using the SCHFI maintenance subscale besides the whole index as recommended by the original authors, considering that not all participants would have experienced events that require management.

3.1. CBI versus MI: effectiveness on improving self-care behaviours

Among the CBI studies, only Smeulders et al. (2009, 2010) reported significant improvements in physical activity (p = 0.006) and overall self-care scores upon 6 weeks follow-up (p = 0.008) in participants who received a cognitive-behavioural program compared to those who received usual care comprising regular follow-ups. Similarly, Powell et al. (2010) reported greater adherence to sodium restriction in the CBI self-management group (28%) (time effect: $p < 0.05$) than the education control group (18%). Interestingly, although CBI is theoretically supposed to alleviate depressive symptoms, this study also reported less decrease in depressive symptoms in the intervention (20%) than control group (22%) (time effect: p = 0.008). This is consistent with a study by Cockayne et al. (2014), that found a significantly higher depression score in the self-management group than the usual care group (p = 0.003) after adjusting for baseline scores. This was speculated to be due to an increase in anxiety and depression after being given disease-specific information. Suggestively, CBIs has to be designed carefully to avoid such counter-intuitive effects. Only one study reported significant improvement in depressive symptoms (p = 0.005) (Freedland et al., 2015) while the other studies reported otherwise: (p = 0.47) (Agren et al., 2012); (p = 0.786) (Cockayne et al., 2014); (p = 0.403) (Smeulders et al., 2010). This inconsistency could be due to the recruitment of only depressed patients with a “current major depressive episode” in the former study while the others included patients without clinical depression, which may have created a ceiling effect.

Two MI studies reported non-statistically significant improvement in self-care maintenance over 90 days (p = 0.08, Creber et al., 2016) and 30 days (p = 0.64, Paradis et al., 2010) from enrolment. However, Creber et al. (2016) reported statistically significant differences (p = 0.026) between the intervention and control group when adjusted for several factors including intervention group, sleep apnea, perceived general health and quality of social support. Others reported statistically significant improvement in self-care maintenance (p = 0.03), exercise (p = 0.03) (McCarthy et al., 2016), compliance with sodium restriction ($p < 0.001$), exercise ($p < 0.001$) and weight monitoring ($p < 0.001$) but not medication adherence (p = 0.098) (Otsu & Moriyama, 2011). However, it may be useful to note that in the study by Otsu and Moriyama (2011), focus was placed on education and skills acquisition by elderly and little was mentioned about how MI was conducted possible due to the word limit. This suggests that MI is effective in improving HF self-care behaviours especially exercise and sodium restriction. All the studies speculate that MI improves self-care through enhanced self-care confidence but only three studies measured self-care confidence with mixed results (p = 0.31; p = 0.93; p = 0.005) (Creber et al., 2016; McCarthy et al., 2016; Paradis et al., 2010). As HF self-care was measured using the same tool, the mixed results warrant more research on the role of confidence in the mechanism by which MI influences self-care.

3.2. CBI versus MI: approach in HF self-care research

Two studies described challenging patients' automatic thoughts (CR) (e.g. exaggerated stress from self-care) and helping them to set environmental reminders such as placing pill bottles at visible places to perform certain self-care behaviours (Freedland et al., 2015; Powell et al., 2010). They preserved the nature of CBT by employing both CR and BM processes but two other trials seemed only to have incorporated the CR aspect, focusing on cognitive symptom reinterpretation and thoughts alteration (Agren et al., 2012; Smeulders et al., 2010). The rest

lacked detail on how CBI was exemplified, where the remotely relevant component was the dispelling of cardiac misconceptions, but this could be too general to indicate whether maladaptive thoughts, feelings or beliefs were addressed.

All except Otsu and Moriyama (2011) reported the aim of resolving ambivalence to change. Only McCarthy et al. (2016) described the MI process according to the MI manual while the rest briefly reported participants selecting HF self-care behaviours change goals, undergoing MI and action planning on how to overcome challenges. It is essential to report the counselling process so that key elements for MI's effectiveness can be identified, mechanism by which it works to improve self-care can be elucidated and future interventions can be streamlined. Only two studies identified key elements of MI that participants appreciated: (1) reflective listening; (2) empathy; (3) individualized problem solving; and (4) provision of knowledge, skills and resources activation (Riegel et al., 2006; Riegel et al., 2017). This would be useful in future development of HF self-care promotion interventions. However, generalizability of results is limited due to the nature of a western qualitative study with a small sample size ($N = 15$) (Riegel et al., 2006) ($N = 8$) (Riegel et al., 2017) (Kukull & Ganguli, 2012). Future studies may include other objective measures of HF self-care behaviours instead of just measuring the aggregate self-care behaviour score according to a validated tool, which may conceal certain significant results.

It is noteworthy that McCarthy et al. (2016) and Riegel et al. (2006) reportedly evaluated the effectiveness of MI on ambivalence using “change talk”, which according to the MI manual, represents one's intention to change (Miller & Rollnick, 2012). Additionally, Paradis et al. (2010) used the “evALuate the stagEs of chanGe and the cOnviction and cOnfidence level” (ALEGrO) algorithm to evaluate each patient's confidence, conviction and stage of change according to the transtheoretical model. Further studies could contribute by including measurement of other MI tenets such as motivation to uncover the underlying mechanism by which MI improve HF self-care. However, most CBI studies did not do so except one that measured CBI effect on cognitive change using the Coping with Symptoms Scale (Smeulders et al., 2010).

3.3. CBI versus MI: intervention structures

3.3.1. Components

All interventions incorporated components of education, goal-setting, action-planning and problem-solving. Common contents of education included the definition of HF and the recommended HF self-care behaviours. Few studies included information on stress management, relaxation, dealing with emotions, immunization, relationships and sexual activity. (Agren et al., 2012; Otsu & Moriyama, 2011; Powell et al., 2010; Smeulders et al., 2009, 2010) Education on coping with stress especially from the inability to perform self-care and skills on how to perform constant evaluation of behaviour change may be useful in sustaining interventional effect on improving self-care behaviours. Description of the action planning and problem solving processes were also lacking possibly due to the restriction of word count, making comparison difficult.

3.3.2. Mode of delivery

CBI ranged from 60 to 150 min/session over 6 to 52 weeks, whereas studies that used MI ranged from 5 to 60 min/session over 24 weeks. While two of the studies that used CBI included educational CD or DVD, none of the MI studies did. Interventions were commonly delivered individually face-to-face in a heart failure clinic. All studies targeted solely HF patients but one included a partner living in the same household as the patient (Agren et al., 2012). Two studies were conducted in groups of 5–10 participants per group to enhance social support and vicarious learning according to Bandura's self-efficacy theory (Powell et al., 2010; Smeulders et al., 2010). Three MI studies and one of the CBI studies conducted home visits, which were speculated to enhance the intervention effectiveness by tailoring self-care interventions to the patients' living conditions (Creber et al., 2016; Riegel et al., 2017; Riegel et al., 2006).

3.3.3. Dosage

Studies that used CBI were delivered over a longer period of time as compared to studies that used MI. CBI programs ranged from 3 to 36 sessions, 60–150 min per session over 6–52 weeks. MI programs ranged from 1 to 6 sessions, 5–60 min per session over 10 days to 24 weeks. We were unable to identify an optimal dosage, as there is insufficient evidence on whether CBI independently affected self-care or did so by mediating depression. Nevertheless, findings suggest that higher dosage of short intervention sessions instead of a long once-off session may be more effective in enhancing self-care behaviours. However, increasing the intervention dosage may increase attrition rates (Creber et al., 2016; Reigel et al., 2006).

4. Discussion

To our best knowledge, studies that compared the effectiveness between CBI and MI in a population with HF could not be found and this paper serves to fill this gap. However, the true causal effect of each method on HF self-care could not be measured as this study is not a randomized controlled trial. Nevertheless, findings could inform future research development in populations with different characteristics such as comorbid depression.

Overall, MI seemed to be more effective than CBI in improving HF self-care behaviours especially exercise and sodium restriction. This could be due to the difference in theoretical underpinning and approach. CBT was first designed to treat depression, a common comorbidity in patients with HF who are 2 to 3 times more likely to develop depression than the general population (Rustad, Stern, Hebert, & Musselman, 2013). Therefore, it seems intuitive to improve self-care by alleviating depression, but this discussion showed otherwise.

Both CBT and MI are structured psychological interventions with user manuals aimed at treating mental health conditions like depression and substance abuse respectively. Improving HF self-care behaviours is not a mental health issue and could be as normal as you and I trying to change a habit. This may explain the limited effect of CBI on improving HF self-care behaviours, especially when analysing a set of behaviours together.

Both CBI and MI start by exploring clients' perspectives on certain maladaptive behaviours, which in this case are inadequate HF self-care behaviours. While CBI focuses on the therapist identifying and challenging clients' irrational thoughts, MI focuses on the therapist's communication style that allows clients to hear their own ambivalence and challenge their own maladaptive thoughts. While CBI facilitates reinterpretation and replacement of thoughts, MI promotes the opposite by “rolling with resistance”. While CBI studies focused on restructuring thoughts and modifying behaviours by enacting environmental cues, MI studies focused on helping patients to recognize and resolve their own ambivalence through communication techniques – expressing empathy; reflective listening; developing discrepancy and supporting self-efficacy. This suggests that behaviour change may be more significant when clients themselves recognize their own ambivalence to change, identify the reasons to change and actively develop personalised action plans rather than the therapist doing it for them. Therefore, MI may be more applicable in promoting HF self-care especially when there is no irrational thoughts but rather maladaptive ones, where clients have yet to adapt to the self-care behaviours needed to cope with their diagnosis.

While CBI extends the talk therapy by setting up environmental cues to facilitate behavioural modifications, MI ends. This is coherent with the nature of MI as a prelude to education and skills training programs to increase the motivation to continue with the intended treatment (Westra & Dozois, 2006). Setting environmental reminders to take medications may be effective only if forgetfulness is the reason for

medication non-compliances. Taking medications is comparatively more convenient than going to the park to jog for 30 min and this may require more than an environmental cue to comply. This may explain why MI seems more effective in improving self-care behaviours by enhancing motivation rather than through setting environmental reminders, which would not be effective if one does not want to change in the first place. Nevertheless, our findings indicated that CBI might be effective in improving medication adherence through environmental modifications.

Employing MI as a prelude to CBI has been speculated to enhance response and decrease attrition from the therapy but more research is needed to establish its effectiveness especially in HF patients (Westra & Dozois, 2006). To the authors' knowledge, there are currently no studies exploring the use of such combined therapy on improving HF self-care. Further studies are needed to uncover the optimal intervention dosage and delivery to sustain significant changes.

The attrition rate for studies that used MI was higher than that of CBI, ranging from 16.6% to 49% versus 3.2% to 27.3%. Consideration of the paradoxically high rate of attrition in the MI studies poses scepticism regarding the essential motivational aspect of the intervention since the included participants should already be motivated to change since they agreed to participant in the studies (Creber et al., 2016, McCarthy et al., 2016). Moreover, CBI studies were generally conducted over a longer period of time, which should increase the attrition rate. Common reasons for attrition were consistent throughout MI and CBI studies - lost to follow-up, decline and discontinuation due to medical conditions and death. It may be useful for future studies to report details of the intervention process for readers to evaluate effective components.

In addition, most studies were heavily reliant on self-reports, risking respondent bias such as recall and social desirability bias that undermines the accuracy of results (Krumpal, 2013). It is noteworthy that Creber et al. (2016) tried to minimize response bias by comparing responses of those participants who have completed the program and those lost to follow-up (Fisher & Katz, 2008). Intervention validity was strengthened in three studies that assessed for difficulty in performing at least one SCB before recruitment (Creber et al., 2016; Riegel et al., 2017; Paradis et al., 2010). However, a 34% refusal rate in one study and another that excluded patients who expressed unwillingness to change their SCB may indicate a higher willingness to change in the included participants, which may have augmented results (Creber et al., 2016; Powell et al., 2010). Although randomization was conducted in the latter study, it was done after recruitment, which would have precluded most patients who are resistant to change. Therefore, assessment of self-care difficulty should have been done after random assignment of subjects to enhance the generalizability of the results. Also, results could have been limited by a ceiling effect on how much self-care behaviours can improve over time especially in samples with higher socioeconomic status, access to resources (Chen & Miller, 2013), advanced stages of HF, and proficiency in optimal self-care (Creber et al., 2016). The high willingness to change and ceiling effect defeats the purpose of conducting the interventions aimed at enhancing willingness to change.

5. Recommendations

As suggested by various theoretical frameworks such as the Theory of Reasoned Action (Sheppard, Hartwick & Warshaw, 1988) and Theory of Planned Behaviours (Armitage & Conner, 2001), a behaviour performance is based on the intention-behaviour link. A better understanding of this mechanism in patients with HF could shed light on the initiation and sustainability of self-care behaviour changes. Future research could measure intention to change in addition to behavioural change and follow-up for longer periods to evaluate the sustainability of the interventions. From this discussion, MI seems to be effective in enhancing clients' motivation/intention to change while practical skills taught during CBI could enhance the translation of intention to behaviour change, strengthening the initiation and sustainability self-care. In addition, it may be noteworthy to consider the cultural uniqueness of the population receiving MI and CBI due to different priorities and social practice norms (Dickson, McCarthy, Howe, Schipper, & Katz, 2013).

6. Conclusion

This paper discussed the suitability of CBI and MI on improving self-care in patients with HF in terms of theoretical underpinning, approach and effectiveness. While CBI may be useful in improving self-care behaviours such as medication adherence due to forgetfulness, MI shows more potential in improving exercise and sodium restriction. Future trials could consider measuring self-care behaviours individually to ascertain interventional effectiveness as different behaviours may require different intentions such as inhibitory self-control for sodium restriction and motivation to exercise. Key effective components of CBI was suggested to be setting environmental cues, enhancing knowledge and skills training while that of MI is the style of communication that evokes ambivalence and change talk. The brief nature of MI compared with the comprehensive nature of CBI suggests a possible synergistic effect of a combined therapy for further research. Future studies should develop methods to include patients unwilling to change, the true target population of these counselling methods despite the various constraints in doing so. Future studies should also at least report and measure the basic tenets of CBI and MI included in their interventions. This would serve to facilitate insightful understanding of the mechanism by which each element works in enhancing self-care in patients with HF streamline cost- and outcome-effective interventions.

Conflict of interest

No conflict of interest has been declared by the author(s).

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