Family Medicine and Community Health
REVIEW

Motivational interviewing and its application in the management of coronary heart disease

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Abstract

Objective: This review paper explores the concept, spirit, principles, and core skills of motivational interviewing (MI) as a psychological approach applied to CHD patients.

Methods: Literature reviews based on English and Chinese articles.

Results: The English and Chinese literature provided strong evidence for the effectiveness of MI in terms of behavior changes, blood pressure control, hyperglycemia and hyperlipidemia control, compliance improvement, and improving quality of life amongst chronic heart failure patients. The Happy Life Club (HLC) is the only randomized controlled trial (RCT) that examined the effects of MI on behavior changes and self-management improvements in Chinese patients with type 2 diabetes mellitus. The HLC pilot revealed positive outcomes, and RCTs will provide further evidence.

Conclusion: MI has been expanded in its application to a wider range of lifestyle-related chronic diseases, including CHD. At the time of this review, MI represents a new concept and approach in China for improving physical and mental health (body and mind) in patients with CHD. In order to integrate MI into medical practice, the authors suggest improving the medical education curriculum and strengthening vocational training, while conducting further research initiatives to assess the innovation and inform practice management.

Keywords: Motivational interviewing, Coronary heart disease, Psychological approach, Behavior change, Self-management

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Introduction

Cardiovascular disease (CVD) is one of the leading causes of death among men and women worldwide, and is currently increasing in prevalence. Vascular/metabolic risk factors, such as hypertension, dyslipidemia, and diabetes, contribute to the burden of disease, together with the increased risk of an aging population, sedentary behavior, overweight or obesity, and unhealthy dietary habits.

Lifestyle changes and improved medication adherence are crucial steps in the prevention and treatment of cardiovascular disease. A statement from the American Heart Association recommended detailed interventions to promote physical activity and dietary

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lifestyle changes for cardiovascular risk factor reduction in adults, as follows [1]: use of cognitive-behavioral strategies to assist adults to adopt and maintain healthy dietary and physical activity targets; making decisions about behavior change intervention processes and delivery strategies; and modifying interventions to address culture and social context variables that influence behavior change. Motivational interviewing (MI) is recommended as an efficient approach in this process. Clinicians help patients adhere to self-efficacy and reinforce their own self-motivation, thus enabling them to use their own potential to control and manage the disease and achieve better health, from heart to mental state, through these specific measures.

This paper reviews the English and Chinese literature to demonstrate the effectiveness of MI in CVD management.

Definition of MI

Thirty years ago, William R. Miller, an American psychologist, initially described MI based on his experience in the treatment of alcohol abuse. MI is defined as a directive, individual-centered counseling style for eliciting behavioral change with the central purpose of helping individuals to explore and resolve their ambivalence [2, 3].

The spirit of MI is based on the following four key elements: collaboration, evocation, autonomy, and compassion. Collaboration refers to a partnership between the therapist and client, grounded in the point of view and experience of the client. On the basis of mutual respect, the therapist draws out the patient's own thoughts and ideas, rather than imposing the therapist's opinions, as motivation and commitment to change. The therapist maintains compassion during the whole counselling process. Even if MI technology is not employed completely, the spirit of MI should be adhered to.

MI involves a special type of conversation that differs from the ordinary doctor-patient communication. The principle of MI is to listen, express understanding of the patient's point of view and motivation, avoid arguments and strong persuasion, and draw out the patient's own motivation.

The practice of MI involves certain techniques for bringing out the 'MI spirit' demonstrating MI principles, and guiding the process towards eliciting patient change and commitment for change. Open-ended questions, affirmations, reflections, and summaries (OARS) are core skills the counselor employs to move the process forward by establishing a therapeutic alliance and eliciting discussion about change.

The application of MI technology requires two basic conditions. First, the therapist should have the spirit of MI (or quality), and second, specific training is required. The Motivational Interviewing Network of Trainers (MINT) is a resource for MI training services. The majority of MINT trainers are located in North America and western Europe, as well as in Australia, New Zealand, and Japan, while few are found in other parts of Asia, South America, and Africa [http://www.motivationalinterviewing.org/].

The application of MI has far exceeded that of behavioral change in relation to alcohol and drug abuse and it has been introduced to the field of chronic disease management, such as heart disease, diabetes, obesity, and other diseases that are closely associated with lifestyle behaviors. There are >500 articles and 200 research about MI [4]. These studies found that MI had a significant positive effect, particularly on treatment compliance and intention to change behavior. Compared with other 'formal psychological approaches' to behavioral change, MI was given less time and was less applicable in primary health care settings and busy clinical environments. It was also found that the effects of MI cannot be achieved through simple training and/or isolated intervention. Apart from training, the effects rely significantly upon the quality of the therapist (MI spirit), the practice settings, and the method of evaluation.

Application of MI in coronary heart disease patients

In recent years, many ransdomized, controlled trials (RCT) have focused on the application of MI in coronary heart disease (CHD) to observe its effects in lifestyle change and to treatment compliance, and evaluate whether or not MI is an effective intervention approach.

Lifestyle change

Healthy diet, regular exercise, and weight loss are important measures for prevention and treatment of CHD. A statement from the American Heart Association recommended MI as an intervention to promote physical activity and dietary

lifestyle changes for cardiovascular risk factor reduction in adults [1]. This recommendation was based on a number of clinical-based MI studies in the US and UK [5–7]. Danish researchers reviewed eight RCT studies [8] and the meta-analysis showed significant effects of MI intervention on body mass index (BMI), total cholesterol, and systolic blood pressure (SBP).

Most of the previous studies illustrated a short-term effect of MI intervention, while a few studies aimed to evaluate the long-term effectiveness of MI-based intervention on health-related outcomes associated with CVD risk. Hardcastle and her colleagues [9] evaluated the effectiveness of a 6-month, low-intensity MI intervention in a UK primary care setting on maintaining reductions in CVD risk factors at the 12-month post-intervention follow-up. Participants were 18–65 years of age and exhibited at least one of the following CVD risk factors: excess weight (BMI ≥28 kg/m^2 based on a value used in the recruiting general practice); hypertension (SBP/diastolic blood pressure (DBP) ≥150/90 mmHg); or hypercholesterolemia ≥5.2 mmol/L). The participants in the MI group only received five face-to-face MI sessions over a 6-month period, while the control group received the standard information. The study showed that a low-intensity MI counseling intervention was effective in bringing about long-term changes in some, but not all, health-related outcomes (walking and cholesterol levels) associated with CVD risk.

Smoking, which is an important risk factor for CHD, also exhibits physiological and psychological dependency. The smoking cessation rate in the general population ranges between 5% and 29% [10, 11], and only increases by 2.5% after brief and traditional advice given by physicians [12]. Bredie and colleagues [13] explored the feasibility and effectiveness of MI for smoking cessation. The study recruited 112 patients with established cardio-cerebral vascular diseases (myocardial infarction, stroke, and peripheral vascular disease) or at high cardiovascular risk (hypertension, hyperlipidemia, and diabetes), and randomly allocated them to a routine lifestyle intervention group and a lifestyle intervention plus MI group. After 3 months of follow-up, the cessation rates were 7% and 26% in the control and intervention groups, respectively, and the rates of smoking reduction were 15% and 31% in the corresponding groups.

Blood pressure control

Many clinical studies have investigated the effects of MI on blood pressure control in recent years. In the study by Hardcastle et al. [7], blood pressure was one of the outcome measurements for MI intervention. One of the inclusion criteria was patients with blood pressures >150/90 mmHg. The data from the subgroup with hypertension revealed that, after five face-to-face MIs over 6 months, the SBPs of the MI and control groups were 141.82 mmHg and 152.19 mmHg, and DBPs were 90.72 mmHg and 94.44 mmHg, compared with the baseline SBPs for the two groups of, 150.49 mmHg and 153.71 mmHg, and baseline DBPs of 96.57 mmHg and 96.52 mmHg. This effect could be maintained for 18 months. After 12 months of follow-up, the SBPs and DBPs of the MI and control groups were 138.23 mmHg and 90.99 mmHg vs. 144.74 mmHg and 91.62 mmHg, respectively.

In a trial of MI in 190 hypertensive African Americans [14], the participants met the following criteria: age ≥18 years; diagnosis of hypertension; taking at least one anti-hypertensive medication; uncontrolled blood pressure before screening (BP≥140/90 mmHg or 130/80 mmHg for those with kidney disease or diabetes). The participants were randomly assigned to usual care, or MINT (usual care plus behavioral counseling using MI techniques). The 12-month intervention included four MI counseling sessions for the MINT group. Parameter estimates from mixed regression analysis indicated a significant overall drop in SBP of 5.1 mmHg for both groups, while the MINT group showed an additional drop of 6.1 mmHg. There was also a significant overall drop of 3.5 mmHg in DBP, but the MINT group did not show an additional drop.

Gabbay et al. [15] determined whether or not the addition of nurse case managers trained in MI for usual care would improve outcomes in high-risk type 2 diabetes patients. The results showed that SBP improved in the MI intervention group compared with the usual care group (131±15 vs. 135±18 mmHg, respectively, P<0.05). DBP improvements (from 78 to 74 mmHg and 80 to 74 mmHg, respectively) occurred in both groups.

Another pilot study [16], which investigated whether or not a combination of MI and physical activity on prescription would increase leisure time and subsequently improve health-related variables, showed significant improvements in SBP

(–14.5±8.3 mmHg) and DBP (–5.1±5.8 mmHg), heart rate (–4.9±8.7 beats/min), weight (–1.2±3.4 kg), BMI (–0.6±1.2 kg/m^2), waist circumference (–3.5±4.1 cm), and VO_2 max (2.94±3.8 mL/kg and 0.23±0.34 L/min) upon intervention compared with baseline.

Cholesterol management

The Dislip-EM study was launched in 2011 [17]. It is an open, two-arm parallel, multicenter, cluster, controlled, RCT. A total of 48–50 general practitioners from 35 public primary care centers in Spain will be randomized and 436 patients with dyslipidemia will be recruited. Interventions will be performed based on MI or usual brief advice. After an initial assessment, follow-ups will be performed at 2, 4, 8, and 12 months. The primary outcomes are lipid levels (total cholesterol, HDL cholesterol, LDL cholesterol, and triglycerides) and cardiovascular risk. The study will assess the degree of dietary and physical activity improvements, weight loss in overweight patients, and adherence to treatment guidelines. There are no results reported to date. However, the MILD-project [18], a cluster RCT, involving 70 general practices (35 practices in the intervention arm and 35 practices in the control arm), which commenced in March 2007, recruited 700 patients with type 2 diabetes. The patients in the intervention arm received care from the primary care nurse, who received training in an implementation strategy with MI as the core component. The control arm received usual care. The primary outcomes were metabolic parameters (glycosylated hemoglobin, blood pressure, and lipid profile), lifestyle (diet, physical activity, smoking, and alcohol), health-related quality of life, and patients' willingness to change behaviors. After 14 months of intervention, the LDL and total cholesterol in the MI and control groups were 2.8±1.0 mmol/L and 4.7±1.0 mmol/L vs. 2.5±0.8 mmol/L and 4.5±1.0 mmol/L, respectively, showing a minor difference [19].

Hyperglycemia control

Appropriate intervention for diabetes is as important as is for CHD, and hyperglycemia control is a crucial step in CHD management. However, the results of many studies involving MI on hyperglycemia control are not consistent. Jansink and colleagues [18, 19] evaluated the effects of a comprehensive diabetes program that integrated lifestyle counseling based on MI principles, and reported that the intervention had no effect on HbA1c or lifestyle related to diet and physical activity [18, 19]. The Hoom prevention study [20] was a parallel group RCT that assessed MI and problem-solving treatment on type 2 diabetes and CVD risks in real life. The intervention group received a theory-based lifestyle intervention based on an innovative combination of MI problem-solving treatments. The control group received existing health brochures. Intention-to-treat analysis showed no significant difference in outcomes between the two groups at 6 or 12 months of follow-up. A previous meta-analysis revealed that behavioral and educational interventions in diabetes produced modest short-term improvements in glycemic control [21]. There was a tendency towards non-significant improvements in HbA1c levels in the included studies, in which the mean HbA1c values were <8.5% at baseline [21–24]. MI might not improve glycemic control in patients who have a relatively lower HbA1c and longer duration of diabetes, especially when general practitioners or diabetologists evaluate them regularly [25]).

Compliance improvement

Medication compliance is a significant problem in chronic disease treatment. A practice-based trial of MI and compliance in hypertensive African Americans [14] showed post-treatment compliance rates of 43% and 57% in the usual care and MI groups, respectively. MI counseling led to steady maintenance of medication compliance over time, compared with a significant decline in compliance for patients receiving usual care, based on the baseline compliance, which was similar in both groups (56.2% and 56.6% for MINT and usual care, respectively).

Improving quality of life

Heart failure is the end stage of CHD. In this stage, the patient's quality of life is significantly decreased, accompanied by decreased tolerance, and increased anxiety, and depression. The management target in this stage is to prevent readmission and improve the quality of life. A study of MI combined with other behavioral changes in heart failure patients indicated that MI was able to improve the patient's quality of life and exercise tolerance [26].

Application of MI in China

In 2010 Monash University and Peking University launched a project (HLC) in the Fengtai district of Beijing, China. The pilot results from 100 type 2 diabetes patients showed an increased frequency of self-managed blood pressure, more compliance with physician's advice, and higher high-density lipoprotein compared with the control group [27]. An RCT of the HLC was conducted [28]. This is the first MI trial in China that applies specific psychological skills at community health centers to help diabetes patients change behaviors and improve self-management of a chronic condition. Community physicians and nurses were trained by MINT trainers and integrated the new skills into their primary care practices.

The results of searching the Chinese academic periodical database (CNKI and Wanfang Data), show that MI is mainly applied to education and rarely applied to health care. There were <30 relevant articles in health care published in different levels of Chinese journals before 2012, and no RCT studies involving MI. Articles about CHD mainly focused on case studies of lifestyle interventions and medication compliance.

Challenges for MI application in China in the management of coronary heart disease

As a mature technology applied in the field of CHD, MI faces many challenges in China. Some of the challenges depend on methodologic characteristics; some challenges are specific to China.

(1) MI is a psychology technology routinely aimed at a single target of behavioral change in particular sessions, not a behavioral change "package solution plan" (i.e., do not simultaneously set up multiple risk behaviors as targets); however, in reality cardiovascular patients normally have multiple and interrelated behaviors in need of change. The current research on MI is aimed at single behavioral changes, because of the methodologic characteristics [29]. For a particular patient, he/she may have many behaviors related to CHD, which constrains the application of MI in CHD from a methodologic aspect.

(2) The effect of MI is closely related to the 'strength' of the intervention, i.e., frequency and length of follow-up. Researchers suggests that <3 months of follow-up interviews will increase the chance of failure [8]. However, long-time follow-up will undoubtedly increase the cost of health services. Within the context of a limited package and coverage of health insurance, or insufficient government funding, a long consultation that includes MI will be a significant financial burden on patients.

(3) The quality of the practitioner is critical. The spirit of MI is cooperation, evocation, autonomy, and empathy. It is consistent with 'healing-heart' at a spiritual level. William R. Miller, in his book *Motivational Interviewing*, indicated that education qualifications in psychology may not be a necessary condition for recruiting MI practitioners, and the most important qualification is 'empathy' [30]. However, compassion has not been considered in health/medical education enrolment. Therefore, expressing 'empathy' in the clinical process is one of the challenges for clinicians or health professionals in China.

(4) MI training is required. The practice of MI involves the skilful use of certain techniques for bringing the 'MI spirit' to life, demonstrating MI principles, and guiding the process towards eliciting patient change and commitment to change. All of these depend on good training; however, the difficulty for China is the lack of available MI trainers and underdeveloped training materials. Articles on MI published in high impact factor international journals on studies need a detailed description of the training process. Nothing currently exists amongst MI training experts in China, and within. In Asia there are only a few qualified training experts in Japan and South Korea. How to develop Chinese MI training experts should be a future consideration.

(5) MI technology application in China. Even after physicians have undergone strict formal training to master MI skills, it is difficult to implement them together with regular clinical care in busy clinical practices. MI use in China is thus currently limited.

Conclusion

The use of MI has expanded from the treatment of alcohol abuse to lifestyle changes affecting CHD; however, it is also a new concept and approach for improving the physical and mental health of CHD patients in China. Improving the medical education curriculum and strengthening vocational training are key considerations for integrating MI into medical practice.

Conflict of interest

The authors declare no conflict of interests.

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