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Original Article

Effects of targeted community healthcare on the prevention of thrombotic adverse events in patients with coronary heart disease under the guidance of behavior change theory

Peipei Yu*, Xunying He*, Juan Chang

*Department of Cardiovascular Medicine, The Central Hospital of Wuhan, Tongji Medical College, Huazhong University of Science and Technology, Wuhan, Hubei Province, China. *Equal contributors and co-first authors.*

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Abstract: Objective: To explore the effects of targeted community healthcare on the prevention of thrombotic adverse events in patients with coronary heart disease under the guidance of behavior change theory. Methods: A total of 89 patients with coronary heart disease who were admitted to our hospital were selected prospectively as subjects and divided into a research group (n=45, receiving targeted community healthcare under the guidance of behavior change theory) and a control group (n=44, receiving regular community healthcare) using a random number table method. The treatment period was 6 months. Then, patient's knowledge and attitude towards coronary heart disease as well as their personal habits, glucose and lipid metabolism indicators, compliance behaviors, quality of life and the incidence of thrombotic adverse events after 1-year of follow-up were compared between the two groups. Results: The scores of patient's knowledge, attitude and personal habits, compliance behaviors and quality of life were all higher in the research group than those in the control group after intervention (all P<0.05); and the glucose and lipid metabolism indicators including fasting insulin (INS), insulin resistance index (HOMA-IR), total cholesterol (TC), triacylglycerol (TG), low-density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C) in the research group were significantly better than those in the control group after intervention (all P<0.05); after follow-up for 1 year, the total incidence of cerebral infarction, systemic embolism and myocardial infarction was significantly lower in the research group (6.67%) than that in the control group (25.00%) (P<0.05). Conclusion: Targeted community healthcare under the guidance of the behavior change theory can effectively improve patient's compliance behaviors, change their knowledge, attitudes as well as their personal habits, keep their glucose and lipid metabolism indicators under control and reduce the risks of cardiovascular disease. Therefore, it is worth being applied in clinical settings.

Keywords: Behavior change theory, targeted community healthcare, coronary heart disease, compliance, thrombosis

Introduction

Coronary heart disease (CHD) is a common critical circulatory system disease in aged patients caused by coronary atherosclerosis, which presents symptoms such as chest pain, fatigue, palpitations and even sudden death due to vascular stenosis and occlusion [1]. Risks of CHD include uncontrollable factors such as age and heredity, as well as controllable factors such as dyslipidemia, smoking and alcohol, being overweight and insufficient physical activities [2]. It is reported that positive prevention of the controllable risk factors listed above is helpful for reducing the occurrence of thrombotic adverse events in CHD patients [3]. Normally, most CHD patients do not require long-term hospitalization for treatment and healthcare in the early stage of the disease, so community healthcare is a major option for them and it has important clinical significance [4].

Regular community healthcare usually relieves symptoms and improves quality of life of CHD patients through regular healthcare intervention and effective follow-up, with intervention measures majorly focusing on assistance with

developing healthy personal habits or behaviors and delivering healthcare-care-related education at the same time to help patients maintain these habits or behaviors [5]. However, it is also reported that regular community healthcare for the development of healthy personal habits is extremely transient and about 40% to 80% of elderly patients forget about the content of health education very soon. Moreover, since behavior change is a lasting and complex process, less than half of the patients can fully comprehend this concept or stick to their healthy personal habits [6]. So, based on regular community healthcare, targeted community healthcare applies scientific healthcare measures in accordance with the different characteristics and current conditions of patients so as to help them maintain their new personal habits [7]. It is also found that according to behavior change theory, CHD patients in different phases have different needs, so that different health education should be delivered for the purpose of realizing the best behavior change results [8]. Behavior change theory was firstly proposed by an American psychologist Prochaska in 1984, who suggested that the process of human behavior change was gradual and dynamic, with different targeted behaviors presented during each change, owing to the fact that the needs or motivations of behavior change for each patient were different. The change process was divided into five periods: pre-intention period, intention period, preparation period, action period and maintenance period [9]. It was reported that this theory was effective in getting rid of poor personal behaviors and improving the self-care capacity of patients with chronic disease [10]. At present, there are only a few reports on this theory for improving the self-care capacity of patients with diabetes, and there are no reports on the prevention of thrombotic adverse events in CHD patients [11]. Therefore, in this manuscript, targeted community healthcare guided by behavior change theory was applied to CHD patients to explore the results of such care in developing healthy personal habits and preventing the occurrence of thrombotic adverse events, which is reported as follows.

Materials and methods

General materials

This study was approved by the Medical Ethics Committee of our hospital. A total of 89 CHD patients who were admitted to our hospital were selected prospectively as subjects and divided into the research group (n=45, receiving targeted community healthcare under the guidance of behavior change theory) and the control group (n=44, receiving regular community healthcare) using a random number table method. Informed consent was obtained from all patients.

Patients were eligible if they were diagnosed with CHD meeting the diagnosis and treatment criteria set by WHO in 2007; they had grade I cardiac function by Killip grading; and they were available for follow-up [12]. Patients were excluded if they were diagnosed with extensive multi-site myocardial infarction, severe arrhythmia or cardiogenic shock; had severe liver, lung, kidney and other important organ dysfunction; had tumors; had thyroid disease; had (a history of) mental illness; had dysfunctional limbs or disturbance of consciousness and communication.

Methods

Routine treatments for CHD were given to patients in the two groups, which included anticoagulant treatment with oral administration of aspirin (Harbin Glory Pharmaceutical Co., Ltd, H10970098, 50 mg), 100 mg once a day, and treatment with oral administration of rosuvastatin calcium (Jinda Pharmaceutical Chemistry Co., Ltd, H20090155, 10 mg), 10 mg once a day. Patients in the two groups were treated continuously for 6 months. If angina pectoris presented during the treatment, nitroglycerin tablets (Jingyi) (Beijing Yimin Pharmaceutical Co., Ltd., H11021022, 0.5 mg*100 s) of 0.25 to 0.5 mg each were given sublingually every 5 minutes until the symptoms were relieved. Medical assistance was sought if the symptoms still persisted after taking 3 tablets within 15 minutes.

Control group: Patients in this group were given routine community healthcare such as diet management, health education, psychological consultation and instruction on drug administration [13]. Health education includes disclosing CHD triggers, progression, treatment protocols and discussing high daily risks. In addition, patients were told to strictly follow the drug dosage and administer drugs on time, and were also instructed to follow the suggestions such as selecting food with low fat and calories, high

in vitamins and protein; ensuring sufficient sleep by a normal work and rest schedule; keeping appropriate exercise if physical conditions permit. Moreover, patients were followed up through regular home visits and telephone calls to make sure they maintained a positive attitude towards life as well as the disease. Also, there was a hotline or consultation counter prepared to deal with the problems of patients during treatment and a person specially designated for providing online or offline consultation services.

Research group: Apart from the suggestions listed above, patients in this group received targeted community care under the guidance of behavior change theory [14]. Firstly, a medical team with 1 specialist, 1 head nurse (group leader), 4 N2 nurses and 1 psychiatrist, who were all qualified for the job by training, was established to provide targeted community healthcare; secondly, with the goal of reducing the occurrence of thrombotic adverse events and improving the quality of life of CHD patients, we checked the medical records of each patient to learn about their actual conditions, evaluated their personal habits and carried out intervention measures of 5 phases (pre-intention phase, intention phase, preparation phase, action phase and maintenance phase) for 6 months according to their general data, financial situation etc.

Pre-intention phase: during this phase, most patients lacked knowledge about the occurrence, progression and treatment of the disease, and did not know of the influences of daily lifestyle on the disease. In view of this, we made pamphlets, videos, PPT and so on, to offer both online and offline health education for patients so that they had a comprehensive understanding on the disease. We disclosed the harm of poor personal behaviors and the pain the disease caused so as to let them become aware of the importance of healthy habits such as regular administration of the drugs, healthy diet and keeping up on their exercises, in an attempt to stimulate their consciousness to initiatively change their behaviors.

Intention phase: patients had a basic understanding that their condition could be improved by changing their personal habits, which they had a strong intention to do so. However, recovery from CHD needs a long time and sometimes they couldn't promise to maintain their changed behavior that long. So, we communicated with them face-to-face during this phase and help them discover the difficulties in sticking to the changed behavior under the guidance of behavior change theory in order to let them believe that they were capable of changing their habits and help them stick to them eventually.

Preparation phase: during this phase, an intervention plan on behavior change was made by nurses from the medical team and patients together according to the patients' personal condition and symptoms, such as age, exercise capacity, family situation, complications, cardiopulmonary function and so on. The plan involved diet management, exercises, emotional changes, sleeping, counseling for quitting smoking and alcohol, as well as drug administration, glucose and lipid monitoring and so on. It required patients to list their daily goal and record the results upon finishing the goal so that they could self-monitor and manage themselves. The plan also assisted patients in identifying factors that may lead to unhealthy personal habits and problems that may present during intervention.

Action phase: during this phase, patients were encouraged and urged to maintain their changed personal habits. The planned or unexpected problems that might interfere with their action were resolved or lifted with the help of the medical staff. At the same time, patients felt the benefits from these behavior changes such as stabilized blood glucose levels and reduced angina pectoris so as to strength their belief in developing healthy habits [15].

Maintenance phase: patients were followed up through home visit or telephone calls to learn about the maintenance of their health habits. We also communicated with the family members, with whom we jointly encouraged the patients to stick to their changed personal healthy behaviors. Patients were also followed up irregularly during this phase.

Outcome measures and evaluation criteria

Primary outcome measures: Comparison of the scores of knowledge, attitude toward CHD and patients' personal behaviors: a self-designed scale (KAP scale) for evaluating the knowledge,

attitude and personal behaviors was applied, with the assessment reliability of 0.781 and validity of 0.836 [16]. There were three parts in the scale (evaluation of the knowledge, of the attitude and of the personal behaviors). In attitude the evaluation part, there were 10 questions, with 4 points for each question, 40 points in total; the knowledge and personal habit evaluation parts each had 20 questions, with 2 points for each question, 80 points in total. So, the total score of the scale was 120 points, with higher scores indicating better knowledge storage, attitude and personal behaviors. Questionnaires were given before and 6 months after intervention. During each questionnaire, the goal and significance of the survey were made clear to each patient, and each question was also explained clearly to ensure correct and objective answers from them.

Comparison of the improvement of glucose and lipid metabolism: the INS, HOMA-IR, TC, TG, LDL-C and HDL-C were all compared. A total of 5 mL fasting venous blood was collected from patients in the morning, and then, serum was collected by centrifugation and detected with the use of Hitachi 7600 automatic biochemical analyzer (Beijing Tailin Oriental Commerce and Trade Co., Ltd., CFDA (I) 20112401157) before and 6 months after intervention. The operating procedures of the analyzer were in accordance with its instructions.

Comparison of the incidence of thrombotic adverse events: the incidence of cerebral infarction, systemic embolism and myocardial infarction were all compared in the two groups. The total incidence equals the total number of patients with thrombotic adverse events/total number of patients*100%, which was evaluated 1 year after the intervention.

Secondary outcome measures: Comparison of compliance behaviors: the compliance behavior of patients was evaluated by compliance scale, which majorly includes whether they administered drugs accordingly, had a regular diet or sufficient exercise and whether they had mood swings, with 10 points for each item and higher scores indicating better performance [17].

Comparison of the score of quality of life: The Cardiovascular Questionnaire for the Quality of Life of Chinese (CQQC) was used to evaluate the quality of life of patients [18]. Cronbach's α was 0.93. There were 6 items in the questionnaire, which were divided into physical strength (2 questions), disease condition (6 questions), medical status (2 questions), general life (5 questions), psychosocial status (7 questions), and work status (2 questions). They were evaluated before and 6 months after intervention, respectively. The scores of the questionnaire ranged from 1 to 154, with higher score indicating better quality of life.

Statistical analysis

SPSS 21.0 software was used for statistical analysis. The measurement data were expressed as mean ± standard deviation. The t test was used for comparison among independent samples and between paired samples within or between the two groups. The enumeration data were expressed as cases or percentage (n, %). The χ^2 test was used, with $P<0.05$ considered statistically significant.

Results

Comparison of general data between the two groups

There were no statistically significant differences in the general data between the two groups (all $P>0.05$). See **Table 1**.

Comparison of KAP scores of patients in the two groups before intervention

There were no significant differences in KAP scores of CHD patients in the two groups before intervention (all $P>0.05$); however, the KAP scores were all increased in the two groups after intervention compared to those before intervention, respectively (all $P<0.05$), with a more significant increase observed in the research group than that in the control group (all $P<0.001$). See **Figure 1**.

Comparison of compliance scores of patients in the two groups after intervention

The score of each item in the scale for compliance was markedly higher in the research group than that in the control group (all $P<0.001$). See **Figure 2**.

Table 1. Comparison of the general data of patients in the two groups ($\bar{x} \pm sd$, n, %)

Item	Control group (n=44)	Research group (n=45)	χ^2/t	P
Sex (male/female, case)	27/17	25/20	0.309	0.578
Age (year)	61.5±9.7	61.3±10.5	0.093	0.926
Disease duration (month)	5.6±1.7	5.8±1.3	0.624	0.534
Smoking (cases, %)	32 (72.73)	31 (68.89)	0.159	0.691
BMI (kg/m^2)	23.95±3.27	24.07±3.22	0.174	0.862
Complications (cases, %)				
Hypertension	10 (22.73)	12 (26.67)	0.186	0.667
Diabetes	10 (22.73)	9 (20.00)	0.099	0.754
Hyperlipemia	14 (31.82)	16 (35.56)	0.139	0.709
Academic degree (cases, %)			0.336	0.845
Primary degree	18 (40.91)	21 (46.67)		
Junior degree	20 (45.45)	19 (42.22)		
Senior degree above	6 (13.64)	5 (11.11)		
Average monthly household income (yuan)			0.150	0.928
<2000	22 (50.00)	21 (46.67)		
2000~3999	18 (40.91)	19 (42.22)		
≥9 (4)	4 (9.09)	5 (11.11)		

Note: BMI: body mass index. BMI = the square of weight in kilograms/height in meters.

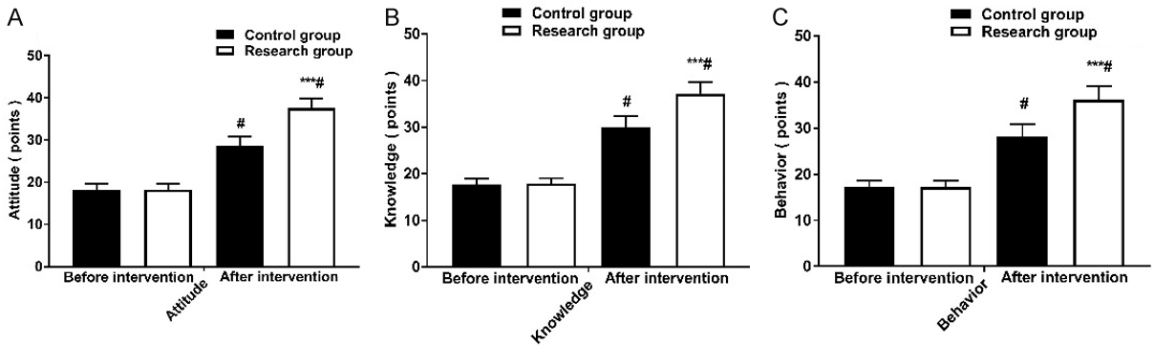

Figure 1. Comparison of coronary heart disease attitude (A), knowledge (B) and behavior (C) scores before and after intervention between the two groups. Compared with before intervention, #P<0.05; compared with the control group after intervention, ***P<0.001.

Comparison of glucose and lipid metabolism indicators between the two groups before and after intervention

There were no significant differences in glucose and lipid metabolism indicators in the two groups before intervention (all P>0.05); however, the glucose and lipid metabolism indicators were all increased or decreased more in the two groups after intervention than those before intervention (all P<0.05), with INS, HOMA-IR, TC, TG and LDL-C more substantially decreased and HDL-C more markedly increased in the research group than those in the control group (all P<0.05). See **Table 2**.

Comparison of the incidence of thrombotic adverse events during the 1-year follow-up in the two groups

The total incidence of thrombotic adverse events such as cerebral infarction, systemic embolism and myocardial infarction in the research group (6.67%) was significantly lower than that in the control group (25.00%) (P<0.05). See **Table 3**.

Comparison of the scores of CQQC in the two groups before and after intervention

There were no significant differences in CQQC scores in the two groups before intervention (all

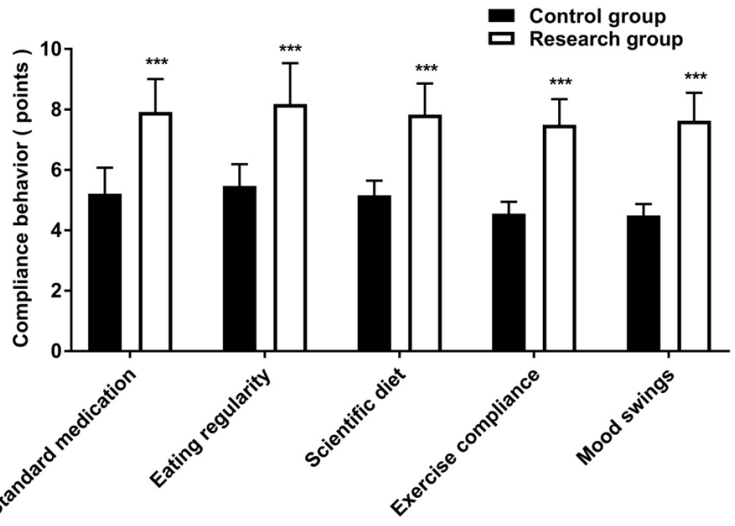

Figure 2. Comparison of the scores of compliance behaviors of patients between the two groups after intervention. Compared with the control group, ***P<0.001.

P>0.05); however, the CQQC scores were all markedly increased in the two groups after intervention than those before intervention (all P<0.05), among which the scores of physical strength, disease condition, medical status, general life, psychological status, work status as well as the total scores were all significantly higher in the research group than those in the control group (all P<0.05). See **Table 4**.

Discussion

The risks of myocardial infarction, heart failure and angina pectoris in CHD patients with higher serum cholesterol and more blood precipitation is 5 times higher than that in patients with common CHD [19]. It is reported that apart from treatment with drugs and surgeries, the control of CDH is closely associated with patient's personal lifestyle. A healthy lifestyle is more conducive to the disease recovery than an unhealthy one [20]. For CHD patients who receive treatment from home, their poor compliance behavior or personal habits can result in the worsening of CHD, thus scientific community healthcare is of great importance for controlling the disease progression and reducing thrombotic risks [21]. Recently, targeted community healthcare, as a new healthcare concept used in clinics, has been popularized in clinical practices. Its major function is to set a specific goal for patients who receive community healthcare [22]. Behavior change theory can help patients become aware of the harm of poor personal habits and provide CHD patients with healthy life guidance through organized and planned systematic healthcare services, therefore, realizing behavior changes in patients, which is of important value to ensure a secure and long-lasting life [23].

In our study, behavior change theory was applied to guide targeted community healthcare. The result showed that the scores of KAP, compliance behaviors and CQQC were all markedly higher in the research group than those in the control group, suggesting patients in both groups accepted the comprehensive healthy guidance on scientific diet, exercise compliance and other compliance behaviors. Moreover, targeted community healthcare under the guidance of behavior change theory let the patients become further aware of the importance of eliminating poor personal habits on the control of disease progression through popularizing CHD-associated knowledge in the previous two phases of targeted healthcare. Meanwhile, the possible difficulties during behavior change were listed in the intention phase and were resolved internally as well as externally in time. As a result, patients believed that they could change their poor habits or behaviors permanently with their potentials being stimulated, leading to initiative adjustment of their poor personal habits including their attitude, knowledge as well as behaviors, improvement of their self-care capacity and compliance behaviors, thus helping them recover from the disease and improving their quality of life. This result conforms to the report of Saffari M et al., which suggested healthcare intervention under the guidance of planned behavior theory could effectively improve the quality of life of patients [24].

The result of our study also suggested that the glucose and lipid metabolism indicators were all substantially better in the research group than those in the control group, which is consistent with the report of Winter SJ et al., which

Table 2. Comparison of glucose and lipid metabolism indicators between the two groups before and after intervention ($\bar{x}$ ± sd, control group: n=44; research group: n=45)

Group	INS (mU/L)	HOMA-IR index	TC (mmol/L)	TG (mmol/L)	HDL-C (mmol/L)	LDL-C (mmol/L)
Before intervention						
Control group	99.67±8.23	3.53±1.14	5.36±1.37	2.45±0.38	1.23±0.25	3.83±0.57
Research group	98.71±8.51	3.66±1.05	5.29±1.45	2.43±0.46	1.28±0.43	3.82±0.51
P	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05
After intervention						
Control group	77.55±6.03②	3.03±0.86②	5.11±0.84②	1.65±0.32②	1.49±0.53②	3.14±0.41②
Research group	61.74±5.83②	1.99±0.81②	4.53±0.46②	1.36±0.28②	1.85±0.75②	2.75±0.33②
T	12.576	5.874	4.028	4.553	2.620	4.949
P	0.000	0.000	0.000	0.000	0.011	0.000

Note: Compared within the group before intervention, ②P<0.05. INS: insulin; HOMA-IR: insulin resistance index; TC: total cholesterol; TG: triacylglycerol; HDL-C: high-density lipoprotein cholesterol; LDL-C: low-density lipoprotein cholesterol.

Table 3. Comparison of the incidence of thrombotic adverse events in the two groups during the 1-year follow up (n, %)

Group	Cerebral infarction	Systemic embolism	myocardial infarction	Total incidence rate (%)
Control group (n=44)	2 (4.55)	5 (11.36)	4 (9.09)	11 (25.00)
Research group (n=45)	0 (0.00)	2 (4.44)	1 (2.27)	3 (6.67)
t	2.093	1.470	1.980	5.641
P	0.148	0.225	0.159	0.018

Table 4. Comparison of CQQC scores of CHD patients between the two groups before and after intervention ($\bar{x}$ ± sd, control group: n=44; research group: n=45)

Group	Physical strength	Disease condition	Medical status	General life	Social psychological status	Work status	Total score
Before intervention							
Control group	11.07±2.68	13.86±3.73	2.44±0.65	4.80±0.27	13.15±2.23	1.47±0.33	46.47±8.22
Research group	11.04±3.56	13.65±3.27	2.41±0.48	4.82±0.34	13.19±2.49	1.46±0.38	45.92±9.03
P	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05	>0.05
After intervention							
Control group	12.66±3.13②	16.24±3.46②	3.56±0.45②	6.19±1.83②	15.75±3.28②	2.63±0.52②	57.72±10.16②
Research group	17.79±3.67②	21.57±4.18②	5.93±0.74②	10.82±2.72②	20.41±4.25②	4.26±1.01②	79.62±15.47②
T	7.088	6.545	18.301	9.441	5.782	9.603	7.911
P	0.000	0.000	0.000	0.000	0.011	0.000	0.000

Note: Compared within the group before intervention, ②P<0.05. CQQC: Quality of Life of Chinese; CHD: Coronary heart disease.

indicated healthy behavior changes under the guidance of behavior change theory were effective in controlling the blood glucose and lipid levels in patients with cardiovascular diseases [25]. Another result of this study showed that the incidence of thrombotic adverse events was significantly lower in the research group than that in the control group, which resulted from our focuses on increasing patients' knowledge as well as cultivating their awareness toward the disease, and making them realize the importance of good personal habits on the control of disease development. Patients were also encouraged to enhance their belief through the whole preparation phase until changes in their behaviors were made in the action phase, during which, they were told to repeat these changed behaviors to enhance them. During the maintenance phase, follow-ups were carried out by nurses through home visits and telephone calls for the self-management of patients' health, and support was gathered

from all parties to help them maintain their changed behaviors. At the same time, the glucose and lipid metabolism levels were stabilized, which hepled reduced the occurrence of thrombotic adverse events and facilitated their recovery.

However, this is a single center study with limited sample size and short follow-up period. Therefore, further studies with longer follow-up period and correlation analysis among the glucose and lipid metabolism control, health management and thrombotic adverse events should be designed to provide comprehensive guidance on behavior changes and the control of disease in CHD patients.

In summary, targeted community healthcare under the guidance of behavior change theory can effectively increase patient's compliance behavior, change their knowledge, attitude as well as behavior towards CHD, keep their glucose and lipid metabolism indicators under control and reduce the risks of cardiovascular disease. Therefore, it is worth being applied in clinical settings.

Disclosure of conflict of interest

None.

Address correspondence to: Juan Chang, Department of Cardiovascular Medicine, The Central Hospital of Wuhan, Tongji Medical College, Huazhong University of Science and Technology, No. 26 Shengli Street, Jiang'an District, Wuhan 430010, Hubei Province, China. Tel: +86-13871369018; E-mail: changjuan7ue3@163.com

References

[1] Menotti A, Puddu PE, Kromhout D, Kafatos A and Tolonen H. Coronary heart disease mortality trends during 50 years as explained by risk factor changes: the European cohorts of the seven countries study. Eur J Prev Cardiol 2020; 27: 988-998.

[2] Shakiba M, Mansournia MA, Salari A, Soori H, Mansournia N and Kaufman JS. Accounting for time-varying confounding in the relationship between obesity and coronary heart disease: analysis with G-estimation: the ARIC study. Am J Epidemiol 2018; 187: 1319-1326.

[3] Zhang N, Zhang Y, Guo X and Sun Y. Self-reported snoring, snoring intensity and incident coronary heart disease events: insights from a large Chinese population-based cohort study. Geriatr Gerontol Int 2020; 20: 89-90.

[4] Thakkar J, Redfern J, Khan E, Atkins E, Ha J, Vo K, Thiagalingam A and Chow CK. Healthcare resource utilisation by patients with coronary heart disease receiving a lifestyle-focused text message support program: an analysis from the TEXT ME study. Aust J Prim Health 2018; 24: 256-262.

[5] Martinez C, Bacigalupe G, Cortada JM, Grandes G, Sanchez A, Pombo H and Bully P. The implementation of health promotion in primary and community care: a qualitative analysis of the 'Prescribe Vida Saludable' strategy. BMC Fam Pract 2017; 18: 23.

[6] Silver SA, Nadim MK, O'Donoghue DJ, Wilson FP, Kellum JA, Mehta RL, Ronco C, Kashani K, Rosner MH, Haase M and Lewington AJP. Community health care quality standards to prevent acute kidney injury and its consequences. Am J Med 2020; 133: 552-560.

[7] Chiang CY, Choi KC, Ho KM and Yu SF. Effectiveness of nurse-led patient-centered care behavioral risk modification on secondary prevention of coronary heart disease: a systematic review. Int J Nurs Stud 2018; 84: 28-39.

[8] Santarossa S, Kane D, Senn CY and Woodruff SJ. Exploring the role of in-person components for online health behavior change interventions: can a digital person-to-person component suffice? J Med Internet Res 2018; 20: e144.

[9] Elobaid YE, Jabari AL, Al Hamiz A, Al Kaddour AR, Bakir S, Barazi H, Kazim E, Sherman S and Ali R. "Stages of change, smoking behavior and acceptability of a textmessaging intervention for tobacco cessation among cigarette, dokha and shishasmokers: a qualitative research study". BMJ Open 2019; 9: e029144.

[10] Tusa N, Kautiainen H, Elfving P, Sinikallio S and Mäntyselkä P. Relationship between patient activation measurement and self-rated health in patients with chronic diseases. BMC Fam Pract 2020; 21: 225.

[11] Tanash MI, Fitzsimons D, Coates V and Deaton C. An evaluation of the effectiveness of self-management interventions for people with type 2 diabetes after an acute coronary syndrome: a systematic review. J Clin Nurs 2017; 26: 1458-1472.

[12] Gibbons RJ. Comparison of ESC and ACC/AHA guidelines for the diagnosis and management of patients with stable coronary heart disease: are the differences clinically relevant? An American perspective. J Nucl Cardiol 2018; 25: 516-520.

[13] Bleys B, Defloor B, Van Ootegem L and Verhofstadt E. The environmental impact of individual behavior: self-assessment versus the eco-

logical footprint. Environ Behav 2018; 50: 187-212.
[14] Blow J, Torres IN and Cooper TV. Correlates of overweight and obesity in a Hispanic sample. J Behav Med 2019; 42: 256-264.
[15] Zweiker R, Aichinger J, Metzler B, Lang I, Wallner E and Delle-Karth G. Ranolazine: impact on quality of life in patients with stable angina pectoris, results from an observational study in Austria - the ARETHA AT study. Wien Klin Wochenschr 2019; 131: 165-173.
[16] Köhler AK, Jaarsma T, Tingström P and Nilsson S. The effect of problem-based learning after coronary heart disease - a randomised study in primary health care (COR-PRIM). BMC Cardiovasc Disord 2020; 20: 370.
[17] Zhu SJ, Zhang XL, Xie Q, Zhou YF and Wang KR. Comparison of the effects of deep and moderate neuromuscular block on respiratory system compliance and surgical space conditions during robot-assisted laparoscopic radical prostatectomy: a randomized clinical study. J Zhejiang Univ Sci B 2020; 21: 637-645.
[18] Yang G, Li W, Cao H, Klupp N, Liu J, Bensoussan A, Kiat H and Chang D. Does Tai Chi improve psychological well-being and quality of life in patients with cardiovascular disease and/or cardiovascular risk factors? A systematic review protocol. BMJ Open 2017; 7: e014507.
[19] Gragnano F and Calabrò P. Role of dual lipid-lowering therapy in coronary atherosclerosis regression: evidence from recent studies. Atherosclerosis 2018; 269: 219-228.
[20] Leskelä RL, Torvinen A, Rissanen TT, Virtanen V, Herse F, Nuutinen M, Mustonen J and Laatikainen T. Outcomes of lipid control in secondary prevention of coronary artery disease in Finland: a 24-month follow-up after acute coronary syndrome. Atherosclerosis 2020; 296: 4-10.
[21] Ruge T, Carlsson AC, Kjøller E, Hilden J, Kolmos HJ, Sajadieh A, Kastrup J, Jensen GB, Larsson A, Nowak C, Jakobsen JC, Winkel P, Gluud C and Ärnlöv J. Circulating endostatin as a risk factor for cardiovascular events in patients with stable coronary heart disease: a CLARICOR trial sub-study. Atherosclerosis 2019; 284: 202-208.
[22] Burton E, Lewin G, O'Connell H, Petrich M, Boyle E and Hill KD. Can community care workers deliver a falls prevention exercise program? A feasibility study. Clin Interv Aging 2018; 13: 485-495.
[23] Pindus DM, Mullis R, Lim L, Wellwood I, Rundell AV, Abd Aziz NA and Mant J. Stroke survivors' and informal caregivers' experiences of primary care and community healthcare services - a systematic review and meta-ethnography. PLoS One 2018; 13: e0192533.
[24] Saffari M, Emami Meybodi MK, Sanaeinasab H, Karami A, Pakpour AH and Koenig HG. A theory of planned behavior-based intervention to improve quality of life in patients with knee/hip osteoarthritis: a randomized controlled trial. Clin Rheumatol 2018; 37: 2505-2515.
[25] Winter SJ, Sheats JL and King AC. The use of behavior change techniques and theory in technologies for cardiovascular disease prevention and treatment in adults: a comprehensive review. Prog Cardiovasc Dis 2016; 58: 605-612.