

EFFECTIVENESS OF HEALTH EDUCATION INTERVENTION ON PREVENTION OF MYOCARDIAL INFARCTION AMONG PATIENTS WITH TYPE 2 DIABETES AND DYSLIPIDEMIA AT VIETNAM NATIONAL HOSPITAL OF ENDOCRINOLOGY

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ABSTRACT

Objectives: To describe the current status of knowledge and practice of myocardial infarction (MI) prevention and to evaluate the effectiveness of health education intervention on MI prevention among -patients with type 2 diabetes and dyslipidemia treated at the Vietnam National Hospital of Endocrinology in 2022. **Participants and methods:** An interventional study was conducted on 62 inpatients with type 2 diabetes and dyslipidemia treated at the Department of Cardiology and Metabolic Disorders of Vietnam National Hospital of Endocrinology from June to August 2022. The intervention was guided by the MOH guidelines with the sessions on knowledge and practice of myocardial infarction and infarction prevention. The knowledge and practice questionnaire were used to measure outcomes at three-point times, namely, baseline, post-intervention, and follow-up. **Results:** The average score of knowledge about myocardial infarction prevention of the participants was 35.61 ± 9.33 out of 57 points. In which, 17.74% had poor knowledge. The participants with poor practice accounted for 6.45%. There was a change in the mean score of knowledge and practice about myocardial infarction prevention after health education intervention with $p < 0,001$, however, the results rarely remained overtime with $p > 0,05$. **Conclusion:** Health education intervention was demonstrated to improve the participants' knowledge and practice of MI prevention. In nursing care practice, health education related to knowledge and practice of MI prevention for patients with type 2 diabetes and dyslipidemia should be maintained and strengthened.

Keywords: Knowledge, practice, myocardial infarction, type 2 diabetes, dyslipidemia, health education.

1. INTRODUCTION

Myocardial infarction (MI) is one of the leading causes of hospitalization and death today. More than 50% of patients with acute MI die within the first hour before being taken to the hospital. Recently this rate has decreased significantly but statistics show that there are still 105,843 deaths from

coronary heart disease in the UK, far more than from lung, breast or colorectal cancer. Vascular complications are the leading cause of death in the United States [1], [2], [3]. Epidemiological studies indicated that MI is not random, there are risk factors that precede it for many months or years. The known risk factors included Diabetes

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mellitus (DM), hypertension, dyslipidemia, smoking, obesity [4]. Prominent among the major risk factors is dyslipidemia. Many studies demonstrated that abnormal levels of HDL, LDL. The triglycerides are an independent predictor of cardiovascular disease [1], [3], [5].

According to the International Diabetes Federation (IDF), in 2017 there are 424.9 million people with diabetes around the world (aged 20 - 79), which means 1 in 11 people will have diabetes, in 2045 it will be 629 million, an increase of 48%, 1 in 10 people will have diabetes. With the increase in inappropriate food consumption and physical inactivity among children in many countries, type 2 diabetes is on the rise in children, becoming a serious public health problem [1].

In Vietnam, cardiovascular disease accounted for 31% of all deaths in 2016 or more than 170,000 cases. If in 1990 the prevalence of diabetes was less than 2.25%, the 2012 study by the National Hospital of Endocrinology showed that this rate was 5.42%, with 63.6% of people with undiagnosed diabetes. Vietnam is one of the countries with the highest growth rate of diabetes patients in the world [5]. In fact, 80% of heart attacks are preventable [4]. Therefore, having good knowledge and practice about MI prevention is extremely important and urgent to reduce the incidence and mortality of MI. The National Hospital of Endocrinology is a national specialized hospital, where thousands of patients are examined and treated every day at 2 campus of the hospital. In which, the majority of patients with type 2 diabetes and dyslipidemia are two of the very high risks leading to MI. Therefore, the research was conducted with objectives to evaluate effectiveness of health education

intervention on prevention of myocardial infarction in patients with type 2 diabetes and dyslipidemia at the Vietnam National Hospital of Endocrinology in 2022.

2. MATERIALS AND METHODS

2.1. Research participants

In-patients diagnosed type 2 diabetes with dyslipidemia treated at the National Hospital of Endocrinology.

Inclusion criteria

- Above 18 years old.
- Agreed and fully participated in the intervention program.

Exclusion criteria: Patients with severe physical illness (emergency, kidney failure during dialysis) or mental disorders.

2.2. Time and place of the study

From June to August 2022 at the National Hospital of Endocrinology.

2.3. Research Methods

Research design

Intervention research with before and after study design.

Sample size and sampling

Applying the formula to calculate sample size for 2 proportions in intervention studies [4].

$$n = \frac{(z_{\alpha/2}\sqrt{2\bar{p}(1-\bar{p})} + z_{\beta}\sqrt{p_1(1-p_1) + p_2(1-p_2)})^2}{\Delta^2}$$

Where: - n: Study sample size

- p_1 : Percentage of patients with adequate knowledge about MI. Choosing/taking $p_1 = 0,16$ based on the study conducted by [6].

- p_2 : This intervention hypothesis can increase the patient's knowledge by 50%. Consider $p_2 = 0.5$

p : average value of p_1 and p_2

$Z_{\alpha/2}$: Is the z-value of the normal distribution for probability $\alpha/2$. Chose $\alpha = 0,05$, then $Z_{\alpha/2} = 1.96$.

Z_{β} : the z-value of the normal distribution for the probability β . Chose $\beta = 0.1$, then $Z_{\beta} = 1.28$.

Substituting the number into the formula then $n = 56$, increasing the sample size by 10% of case drop out, then the final sample size was 62.

Convenient sampling was applied, participant meeting inclusion criteria was continuously selected the required sample size was reached.

2.4. Intervention Program

The intervention program was guided by MOH guidelines on MI prevention. There were sessions where the researcher provided the presentations, videos and materials to the participants. In the sessions, researcher presented knowledge of MI prevention, the patients may have knowledge and guide on prevention practices. At the intervention sessions, researcher provided opportunities for participants to have group discussions to come up with the best strategies. At the same time, at face-to-face nursing care sessions, the patients were guided by the research team and given feedback on their disease prevention methods. The educational intervention program was reviewed by 3 experts including an endocrinologist, a nursing instructor and an internal medicine nurse. Experts evaluated each item of the intervention as well as the entire intervention program. They evaluated whether individual pieces of content were relevant and structurally appropriate. Then, the research team revised the contents of the intervention program according to the

comments and suggestions of the experts.

The questionnaire of knowledge and practice was allowed to be translated and used by the author who developed original questionnaire. The WHO-recommended reversed translation method (WHO, 2015) was used to translate both instruments.

The knowledge and practice scale was tested for reliability internally with a total sample of 30 patients with the same characteristics as the study sample. Cronbach's Alpha of knowledge was 0.78. Cronbach's alpha of the practice scale was 0.82. There were 24 questions for general knowledge about MI (from B1 to B24), and 24 questions for knowledge of MI prevention (from C1 to C24). Each correct answer gained 1 point, wrong answer or "don't know" was 0 point, of which there were 12 questions (B1, B6, B13, C1, C4, C5, C6, C21, C23) considered as questions with key knowledge that gained 2 points (if answered correctly). The total score was 57 points (if every answer was correct).

The self-reported practice on MI prevention included 14 questions from D1 to D14. 1 point for each correct answer and , 0 point for wrong answer. Question D12, D13, and D14, accounting for 2 points. The total score for practice was 17 points.

The higher the score, the higher the participants' knowledge and practice of MI prevention. The classification was as follows: Poor knowledge if the total score was under 49% (≤ 28 points), average knowledge if score was from 50% to 69% (from 29 points to 39 points), good knowledge if score was above 70% (≥ 40 points). Poor practice if the total score was under 49% (≤ 8 points), average practice: from 50% to 69% (9 points to 12 points), good practice: above 70% (> 12 points)

2.5. Data collection

Step 1: Select 2 investigator who were nurses of the National Hospital of Endocrinology with more than 5 years of experience at the hospital. They were guided by the primary investigator on the content to be collected.

Step 2: Select right research participants into the research group by convenient sampling method.

Step 3: Explain the research purpose to the research participants. If the patient agreed to participate in the study, asked her/him to sign the consent form.

Step 4: Directly interview the research participants with the designed questionnaire. Time for each case was about 30 minutes. Immediately after the interview was completed, the researcher re-checked the questionnaire to ensure that all information was collected.

Step 5: Collect data (lab results) from the medical record and consult more necessary information from the patient.

3. RESULTS

3.1. Knowledge and practice on prevention of myocardial infarction of participants before intervention

Table 1. Distribution of Knowledge and practice level on prevention of myocardial infarction of participants before intervention

Content	Poor		Medium		Good	
	Frequency (n)	Rate (%)	Frequency (n)	Rate (%)	Frequency (n)	Rate (%)
Knowledge	11	17.74	26	41.94	25	40.32
Practice	4	6.45	12	19.35	46	74.19

41.94% and 17.74 % of participants had average and poor knowledge of MI prevention, respectively.

Regarding the practice of MI prevention, 74.19% participants had good practice. Poor and medium level of practice accounted for 6.45% and 19.35%, respectively.

2.6. Research Ethics:

Research participants consented to participate, the information was only for scientific research purposes and was kept confidential. The study was approved and authorized by the Scientific Council of the National Hospital of Endocrinology by the decision 553/GCN-HDDD.

2.7. Data analysis

The collected data were cleaned, coded, entered and then analyzed by SPSS 20.0 software.

Data of continuous variables were checked for normal distribution before analysis.

Descriptive statistics was used to analyzed quantitative variables as frequencies and percentages, mean, standard deviation.

Using paired t-test to compare 2 mean values before and after intervention; Kruskal Wallis to compare more than 2 means with a non-normal distribution.

3.2. Status of knowledge and practice on prevention of myocardial infarction of participants before intervention

Table 2. Mean score of knowledge and practice on prevention of myocardial infarction of participants before intervention

STT	Content	Medium	Classification
1.	General knowledge of MI prevention	35.61 ± 9.33	Medium
1.1	Basic knowledge of MI	5.77 ± 1.61	Medium
1.2	Symptoms of MI	3.34 ± 7.55	Poor
1.3	Diagnostic test for MI	2.69 ± 1.17	Medium
1.4	Treatment of MI	1.24 ± 1.24	Poor
1.5	Complications of MI	1.45 ± 1.08	Poor
1.6	After treatment of MI, discharge from hospital	3.18 ± 0.90	Good
1.7	MI risk factors	8.31 ± 2.16	Good
1.8	Diet and exercise to prevent MI	7.06 ± 1.84	Good
1.9	Actions to take when a MI is suspected	4.79 ± 1.15	Good
2.	Self-report practice of MI prevention	12.40 ± 2.72	Good

The average score of knowledge about MI prevention of the study participants was 35.61 ± 9.33 out of 57 points. In which, knowledge of MI symptoms, treatment and complications were the contents with the average score lower than 50% of the maximum score. The study participants had a fairly high average practice score, reaching 12.40 ± 2.72 points out of a total of 17 points.

Table 3. Status of MI prevention practice

Practicing MI prevention	Right answer	
	n	%
Limiting intake of foods high in sugar or fat	62	100
Supplementing with green vegetables, fresh fruits and less sweet.	62	100
Taking the pill or inject insulin at the right dose and at the right time	52	83.97
Changing injection sites to avoid fat atrophy	31	50
Self-monitoring blood sugar, blood pressure at home every day/week	55	88.71
Self-checking for injection site infection regularly every day/week	45	72.58
Remembering to bring “quick sugar” (e.g. juice, glucose) when being away	53	85.48
Engaging in some form of regular physical activity every day	57	91.94

Practicing MI prevention	Right answer	
	n	%
Adjusting food intake based on exercise level, blood sugar levels., or when being sick	57	91.94
Adjusting insulin based on exercise, blood sugar, or when being sick	18	29.03
Paying attention, detecting and managing the early signs of low blood sugar	53	85.48
Interested in detecting and managing the early signs of high blood sugar*	26	41.94
Going to hospital every month by appointment *	57	91.94
Recording blood sugar and blood pressure in diabetes diary *	29	46.77

Most of the performance indicators were above 80%. Only 5 indicators achieved less than 50%. In which the lowest practice was “adjusting insulin levels based on exercise level, blood sugar level or when sick”, only 29.03%. 100% of study participants “Limit the amount of food containing a lot of sugar or fat” and “addition to enhance green vegetables, low-sweet fresh fruits”.

3.3. Effectiveness of health education intervention on prevention of myocardial infarction

Table 4. Average score of knowledge and practice on prevention of myocardial infarction at the time points

STT	Content	Evaluation time	Mean ± SD
1	Knowledge of prevention of MI	T0	35.61 ± 9.33
		T1	52.21 ± 4.10
		T2	48.84 ± 5.57
1.1	Symptoms of MI	T0	3.92 ± 2.22
		T1	7.55 ± 0.88
		T2	6.76 ± 1.45
1.2	Treatment of MI	T0	1.24 ± 1.21
		T1	3.37 ± 0.98
		T2	2.79 ± 1.09
1.3	Complications of MI	T0	1.45 ± 1.08
		T1	2.68 ± 0.54
		T2	2.53 ± 0.69
2	Practicing MI prevention	T0	12,40 ± 2.72
		T1	15.56 ± 2,07
		T2	14.74 ± 2.30

The results indicated that immediately after the intervention, the average score of the patients' knowledge and practice on MI prevention increased substantially. However, after 1 month of intervention, the average score was reduced compared to immediately after the intervention.

Table 5. The paired sample t-test on knowledge and practice of MI prevention at time T1 and T2

STT	Content	Mean difference (T1-T2)	t	p
1	Knowledge of prevention of MI	3.37	6.90	< 0,001
1.1	Symptoms of MI	0.79	5.23	< 0,001
1.2	Treatment of MI	0.58	3.52	< 0,001
1.3	Complications of MI	0.15	1.76	< 0,05
2	Practicing MI prevention	0.82	3.02	< 0,01

According to the research results, patients had significantly improved their practice in the prevention of MI after the intervention. However, some performance indicators were reduced after one month of intervention. The paired T-test of T0 and T1 had an increase in the mean score of knowledge and practice on MI prevention after the intervention with $p < 0.001$. The paired T-test at the time of T0 and T2 had an increase in the mean score one month after the intervention with $p < 0.001$. The paired T-test at the time of T2 and T3 had a mean decrease in the knowledge and practice of MI prevention at the time immediately after the intervention with $p < 0.05$. The results indicated that knowledge and practice on MI prevention increased after the intervention, however, the effectiveness of intervention rarely remained overtime.

4. DISCUSSION

4.1. Status of knowledge and practice on prevention of myocardial infarction of participants before intervention

Status of participants' knowledge about MI prevention

The results showed that the participants had quite good knowledge about risk factors, nutrition and exercise for MI prevention, similar to the study of Cho-Ja Kim and colleagues with the highest score for knowledge about MI were preventive measures, while the lowest scores were symptoms and pain [7]. In our study, the proportion of participants who correctly

answered the symptoms of MI was lower than that of the systematic review study conducted by Benedikt Birnbach et al., who synthesized data from 16 other studies worldwide. The rate percentage of participants recognizing chest pain as a symptom of MI is high [8]. Our results are similar to the study of Cho-Ja Kim and colleagues performed on a Korean population with a high percentage of participants knowing that chest pain was a symptom of MI but not knowing that the pain could also radiate to the shoulder or arm [7]. In general, the study participants had some knowledge about the clinical symptoms of MI, the level of knowledge about the subclinical

symptoms was still low. It is important for the patient to recognize the warning signs of MI through clinical symptoms so that the correct treatment will not waste golden time. Treatments are only effective from the first 2-4 hours of the onset of a heart attack [2], [9]. Therefore, when performing health education interventions, it is necessary to prioritize the characteristics of chest pain in MI, then the patients can recognize early warning signs of MI, thereby properly managing and limiting the risk of death down to the lowest level.

Status of participants' practice in preventing MI

Regarding MI prevention practice, the participants achieved a fairly high average score. The research team developed a practice self-reported questionnaire related to control blood sugar levels of patients with type 2 diabetes. Since diabetes is a modifiable risk factor for MI, good glycemic control is also preventive practice against MI.

4.2. The effectiveness of health education intervention on prevention of myocardial infarction

Change in the study participants' knowledge of MI prevention

Immediately after the intervention, the participants' understanding of the contents of MI prevention increased, the average score of knowledge immediately after the intervention and 1 month after the intervention were higher than before the intervention; The results of the paired t-test indicated that this difference is statistically significant with $p < 0.001$. This result is similar with the study by Sharon McKinley and colleagues, when testing the effect of educational and health counseling interventions on knowledge, attitudes and

beliefs about acute coronary syndromes (in including MI), scores on knowledge, attitudes and beliefs increased significantly in the intervention group compared with the control group with $p = 0.005$ [10].

The average knowledge score increased immediately after the intervention. Because each participants only received health education intervention in one session with a duration of about 60 minutes, the communication message was not repeated many times, the average knowledge score was reduced after the 1-month intervention. In a trial by T Buckley et al of 200 participants, education and counseling improved knowledge of MI symptoms. In addition to a 40- to 50-minute face-to-face education and counseling session, there is also an increased follow-up within 4 weeks. Participants were given home a leaflet with prominent illustrations of common MI symptoms and appropriate actions to take in the event of these symptoms [11]. The participants are randomly selected in Sydney, Australia, where the economy and society are developed, the interest in disease prevention is quite high. The participants may search for diverse information, their knowledge and the practice of the study participants increased gradually over time. Objectively, our research has not done this.

Changing the practice of preventing MI of study participants

There was an increase in the mean score of practice after 1 month of intervention. It is noticeable when some practice contents had significant changes such as adjusting insulin, changing injection sites. Two important contents, which are weighted with 2 points, also have changes of recording blood sugar levels and blood pressure in a diary and knowing how to handle high blood sugar.

In order to prevent MI well and maintain it regularly, health education and communication must be continuous and long-term, with close monitoring and supervision combined with objective assessment of behavior changes for the sustainability of the intervention. Thereby showing the important role of nurses and health educators in improving the knowledge and practice of MI patients as well as partly reducing the burden on the family and society.

Strengths and limitations of the study

Strengths: This study is the first study in Vietnam National Hospital of Endocrinology to assess current status of knowledge and practice of MI prevention and their changes after health education intervention among inpatients with type 2 diabetes and dyslipidemia. The results from the study confirm that health education related knowledge and practice of MI prevention to such patients should be strengthened to improve their right behaviors for the prevention of MI.

Limitations of the study: There are some limitations of the study. The research was conducted in a short period with small sample size and convenient sampling technique, therefore it is not representative of the population.

Evaluation of practice in the study used a self-reported questionnaire. Moreover, the person performing the study is a nurse taking care of the patient. These factors may lead to a higher score in practice after the intervention, therefore we recommend that for future research the researcher team should not be nurses who provided the direct care of the patients.

The study has only evaluated the effectiveness of health education

interventions up to 1 month after the intervention, therefore, the maintenance of knowledge and practice of patients is still limited. We suggest that there is a need for another study to evaluate the change in knowledge and practice of MI prevention combined with maintenance monitoring and regular follow-up for a longer period after the health education intervention for patients with type 2 diabetes and dyslipidemia.

5. CONCLUSIONS

Knowledge of study patients with type 2 diabetes and dyslipidemia about MI prevention is at average level (mean score: 35.61 over 57) while their practice of MI prevention is at good level (mean score: 12.40 over 17). Health education intervention in the study was demonstrated to improve the participants' knowledge and practice of MI prevention. In nursing care practice, health education related to knowledge and practice of MI prevention for patients with type 2 diabetes and dyslipidemia should be maintained and strengthened.

Conflict of interest: The authors declare no conflict of interest.

Ethic approval: The study was approved by the leadership of the Vietnam National Hospital of Endocrinology. All personal information about the research participants was kept in secret, the collected data and information were only for research purposes.

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