

# Effect of Education Program on Nurses' Knowledge, Attitudes, and Intentions Towards Myocardial Infarction Prevention and Treatment

Ahmed Abdalla Jaralnabi<sup>1, \*</sup>, Sami Atawi<sup>1</sup>, Waleed Idris Sagiron<sup>2</sup>,  
Nader Alasmari<sup>3</sup>, Hussain Alasmari<sup>3</sup>

<sup>1</sup>AL-Ghad International College for Applied Medical Sciences, Nursing Department, Jeddah, Saudi Arabia

<sup>2</sup>College of Applied Medical Sciences, Nursing Department, Shaqra University, Shaqra, Saudi Arabia

<sup>3</sup>Department of European Languages, King Abdul-Aziz University, Jeddah, Saudi Arabia

## Abstract

**BACKGROUND:** This is triangulation method including experimental approach was done to evaluate the effectiveness of education program on nurses' knowledge, attitudes and intentions towards Myocardial infarction prevention and treatment. The study was conducted in three governmental hospitals **OBJECTIVE:** This study assessed and examined the Effect of education program on nurses' knowledge, attitudes and intentions towards Myocardial infarction (MI) prevention and treatment. **METHODS:** Triangulation method including experimental approach using before-after test design and focus group were used. A total of 194 nurses were recruited from three hospitals, Nurses' knowledge about myocardial infarction was measured by MI knowledge test, while attitudes and intentions were measured by MI survey. Repeated measures, t-test and ANOVA were used to assess and examine the influence of an educational program and the relationship of a set of independent variables on nurses' knowledge, to obtain more in depth information about the topic, focus group method was used, The thematic analysis guided by Krueger steps was used in analysing the qualitative data produced through the focus group. **RESULTS:** The study results showed that an educational program improves nurses' knowledge, attitudes and intentions towards MI prevention and treatment. The mean scores of nurses' knowledge for the experimental group improved significantly ( $P < .001$ ) from (10.5) at pre-test to (15.26) at post-test. There were statistically significant improvements in the mean intentions scores from baseline ( $M = 12.5$ ,  $SD = 3.8$ ) to post-education ( $M = 15.1$ ,  $SD = 2.5$ ). Paired t test showed statistically significant difference between pre and post intention scores of the experimental group ( $t = -6.7$ ,  $P = <0.001$ ). Finding from the focus group revealed the following four themes: lack of accurate information about myocardial infarction among nurses, positive nurse values toward MI prevention and treatment, experiences and tradition guiding nursing care, and barriers, short staff, lack of time and materials prevented nurses from implementing MI prevention and treatment. **CONCLUSIONS:** The educational program conduction improved nurses' knowledge, attitudes and intentions towards MI prevention and treatment which can lead to improve the nursing quality care and decrease cost and human suffering. The study results indicated that there is a need for conducting updated- programs for all nurses to keep the nurses' knowledge on MI built on evidence and routinely assess to improve patient outcome, also, findings guide hospitals and health care agencies to develop institutional protocols and national guidelines that can improve nurses' care practices.

## Keywords

Myocardial Infarction (MI), Knowledge, Attitudes, Intentions, Prevention and Treatment

Received: March 3, 2017 / Accepted: April 19, 2017 / Published online: August 1, 2017

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\* Corresponding author

E-mail address: [ahmed3636@live.com](mailto:ahmed3636@live.com) (A. A. Jaralnabi)

## 1. Introduction

Myocardial infarction (MI) is multi-factorial, progressive, and complex disease, means that part of the heart muscle suddenly loses its blood supply [1]. Without prompt treatment, this can lead to damage to the affected part of the heart, it sometimes called a heart attack or coronary thrombosis [1]. If blood flow is not restored to the heart muscle within 20 to 40 minutes, irreversible death of the heart muscle will begin to occur. Muscle continues to die for six to eight hours at which time the heart attack usually is complete [2]. Myocardial infarction is a common presentation of ischemic heart disease, coronary artery disease. [2] The World Health Organization estimated in 2004, that 12.2% of worldwide deaths were from ischemic heart disease; with it being the leading cause of death in high or middle income countries and second only to lower respiratory infections in lower income countries [3, 4]. Worldwide, more than 3 million people have STEMIs and 4 million have NSTEMIs a year. [5] STEMIs occur about twice as often in men as women. [6]. Acute coronary syndrome (ACS) is an umbrella term for a range of clinical symptoms associated with myocardial hypo-perfusion as a consequence of pathological mechanisms [7]. Also in the Eastern Mediterranean region (Bahrain, Cyprus, Egypt, Iran, Iraq, Jordan, Kuwait, Oman, Qatar and the United Arab Emirates), myocardial infarction emerging as a major health problem [8]. Rates of death from cardiovascular disease have decreased almost a third between 2001 and 2011 in the United States [9]. The average incidence of myocardial infarction for Sudanese patients those aged between 30 and 69 years is about 600 per 100,000 for men, and 200 per 100,000 for women in Sudan. In 2008 high prevalence 10.2% per 1000 MI is immediate cause death in 14.4% of men and 12.9 in women. Incidence increases with age and elderly people also tend to have higher rates of morbidity and mortality from myocardial infarction [4]. Bradycardia and sudden cardiac death following acute myocardial infarction were significantly high in Sudanese patient in all age group [10]. On a population level, public health measures may be used to reduce unhealthy diets (excessive salt, saturated fat and trans fat) including food labeling and marketing requirements as well as requirements for catering and restaurants, and stimulating physical activity. This may be part of regional cardiovascular disease prevention programs, or through the health impact assessment of regional and local plans and policies [11]. Smoking appears to be the cause of about 36% and obesity the cause of 20% of coronary artery disease, lack of exercise has been linked to 7–12% of cases, less common causes include stress-related causes such as job stress, which accounts for about 3% of cases [12, 13]. In

study done on Knowledge and attitude of nurses towards sexual activity and training patients with myocardial infarction and their spouses found that nursing education centers should focus more on sex issues and emphasize more on their lessons so that the nurses' knowledge increases and they will be able to provide information for patients at the time of discharge [14]. Myocardial infarction is becoming a major health problem in Sudan. Its incidence is increasing year after year [15]

## 2. Materials and Methods

**Study design and set up:** This a Triangulation method (mixed method) study was conducted among nurses working in three hospitals located in Khartoum, the capital of Sudan, this hospital provides outpatient and inpatient services for peoples living in this area. This hospital open all the day and receive patient from different setting in Sudan.

The current study was conducted in two phases: the first was the quantitative experimental phase (core phase) while the second was the qualitative focus group method (complementary phase).

**Sample size and sampling procedure:** The accessible population consisted of all eligible RNs who worked in the selected three hospitals. Systemic random sampling was used, since it is a type of probability sampling needed in an experimental approach. The sample size was calculated using a freely-available statistical software package called the statistical software [16]. Estimated sample size for independent sample t- test was 82 participants for each group based on medium effect size of (0.5), power.80 and ( $\alpha = 0.01$ ), and for Analysis of Variance (ANOVA) test with a medium effect size of (0.15), power.80 and ( $\alpha = 0.01$ ) the total sample size was 192 participants. Medium effect size assumed based on literature. More numbers were included in the study (N = 220) to replace missing or withdrawn cases, and to provide better validity of results.

**Data collection tool and procedure:** For the experimental phase of this study five tools were used to collect the data about nurses' [demographic characteristics, knowledge participants were asked 26 items to assess their level of knowledge towards myocardial infarction prevention and treatment, attitudes, intentions, and perceived barriers of myocardial infarction]. Data quality was controlled by giving trainings and appropriate supervisions for data collectors. The appropriateness of the instrument was measured through a pre-testing exercise, and the constraining factors were rectified.

**Data processing and analysis:** The questionnaires filled by

the nurses were checked for completeness and statistical software and then exported to SPSS version 20 for further analysis. Descriptive statistics was used to describe the study population in relation to relevant variables. Odds Ratios and their 95% Confidence Intervals were computed and variables with p - value less than 0.05 were considered as significantly associated with the outcome variable.

**Qualitative Approach** to enhance the rigor of the study results, to expand results, and to find out the unseen information pieces if only a quantitative approach had been used, a qualitative approach was conducted utilizing a focus group method. Triangulation method ruling out rival explanations and provide more valid evidence for results. Nurses who participated in the focus group were not included in the quantitative study.

**Qualitative Technique:** By the qualitative technique, the focus group method was undertaken with eight RNs with the aim of exploring their knowledge, views, beliefs and barriers around myocardial infarction prevention and treatment. Participants were recruited via phone, email, and contact person. Names, addresses, emails and phone numbers were taken from the nursing director.

**Sample Size and Characteristics:** The sample size for the focus group for the current study was eight nurses. The nurses selected purposively. Nurses who have experience in caring for patients with myocardial infarction and have interest in participating in the discussion on myocardial infarction prevention and treatment were selected.

**Data Collection Instrument and Procedure:** Semi-structured focus group guidelines were developed to assess participants' knowledge, views, beliefs, and perceived barriers related to myocardial infarction prevention and treatment. Semi-structured tape-recorded discussions were conducted. Before the interviews started, a list of sensitizing concepts was formulated. The participants were asked how they got informed about new nursing issues and knowledge and how

they were informed about myocardial infarction prevention and treatment. They were also asked how they view and deal with changes focusing on such nursing issues as myocardial infarction prevention and treatment. The focus group is typically recorded in two ways: by a tape recorder and with written notes.

**Ethical Consideration:** All participants were asked for their agreement to participate and give permission for the interview to be tape-recorded. The discussion took place in a quiet available room with only the researcher, note taker, and the participants.

**Data Analysis Plan:** Focus group analysis is a deliberate, purposeful process. It is systematic, uses verifiable procedures, is done in a sequential manner, and is a continuing process [22].

### 3. Results

Table 1. Shows demographic details of the sample. The majority of the sample were males (n = 114, 58.8%), while females nurses were 41.2% (n = 80). Their ages ranged from 22 to 40 years old. The mean age was 27.3 years (SD = 3.47, range = 22-40). The age of most nurses was between 26 and 30 years (n = 99, 51.0%). Also, the majority had bachelor degree (n = 171, 88.1%) while other nurses had master degree (n = 23, 11.9%). About 35.6% (n = 69) of the nurses reported that they had not received training or education about myocardial infarction prevention. One hundred eighty-two of the nurses (n = 182, 93.8%) who participated in this study had less than ten years of clinical nursing experience. Eighty-nine nurses (45.9%) had less than four years while 93 (47.9%) had five to ten years of clinical nursing experience. The majority of the nurses, one hundred sixty-three (84.0%), had not previously participated in myocardial infarction research.

**Table 1.** Demographic characteristics of nurses (N=194).

Variable		Total N=194 N	Group	
			Experimental (N=102) n (%)	Comparison (N=92) n (%)
Gender	Male	114	63 (61.8)	51 (55.4)
	Female	80	39 (38.2)	41 (44.6)
Age	20 - 25 years	67	45 (44.1)	22 (23.9)
	26 - 30 years	99	38 (37.3)	61 (66.3)
	31 - 35 years	25	17 (16.7)	8 (8.7)
	36 - 40 years	3	2 (2.0)	1 (1.1)
	Bachelor	171	89 (87.3)	82 (84.8)
Current Higher Degree	Master	23	9 (8.8)	14 (15.2)
	1 - 4 years	89	42 (41.2)	47 (51.1)
Nursing clinical Experience	5 - 10 years	93	50 (49.0)	43 (46.7)
	11 - 15 years	1	1 (1.1)	1 (1.1)
	16 - 20 years	1	9 (8.8)	1 (1.1)

Variable		Total N=194 N	Group	
			Experimental (N=102) n (%)	Comparison (N=92) n (%)
Source of myocardial infarction Education	University	111	50 (49.0)	61 (66.3)
	In-service training	38	20 (19.6)	18 (19.6)
	Degree plus in-service	15	6 (5.9)	9 (9.8)
	Conference	11	5 (4.9)	6 (6.5)
Myocardial infarction research	Product promotion	11	7 (6.9)	4 (4.3)
	Yes	31	23 (22.5)	8 (8.7)
Last Attend Training on myocardial infarction	No	163	79 (77.5)	84 (91.3)
	Less than 1 year	78	49 (48.0)	29 (31.5)
	1-2 year	14	6 (5.9)	8 (8.7)
	More than 2 year	28	12 (11.8)	16 (17.4)
	Never attended	69	35 (34.3)	34 (37.0)

Table 2. Shows mean scores by experimental and comparison groups for the 3 time periods are presented total correct scores for experimental group on the 26-item of the myocardial infarction knowledge test ranged from 5 to 17 (19.2% - 65.3%) for the pre-test, from 8 to 21 (30.7% - 80.7%) for post- test 1, and from 7 to 18 (26.9% - 69.2) for post- test 2. Total correct scores for comparison group for the pre-test were between 5 to 17 (19.2%-65.3%), and were between 9 to 15 (34.6% - 57.6%) for post- test.

The mean nurses' myocardial infarction knowledge scores of pre- tests of experimental group was 10.8 (41.5%) and for comparison group was 11.4 (55.3%). Independent *t*-test revealed no statistical significant difference between the two

groups on the pre-test scores ( $t = 1.65, P= 0.10$ ). On the other hand, the experimental group mean nurses' myocardial infarction knowledge scores of post-test 1 ( $M = 15.3, SD= 3.17, \text{range} = 8-20$ ) was higher compared to the pre-test ( $M = 10.8, SD = 2.0, \text{range} = 7-16$ ) after the educational program. There was a statistically significant difference between the mean pre and post-test scores of nurses' myocardial infarction knowledge of the experimental group ( $t = -16.7, P < 0.001$ ) after the educational program (table 3). The mean nurses' myocardial infarction knowledge test scores dropped down after 3 months of conducting the educational program from ( $M = 15.2, SD = 3.17, \text{range} = 8-20$ ) in post-test 1 to ( $M = 13.2, SD = 2.5, \text{range} = 8-18$ ) in post-test 2.

**Table 2.** Experimental and comparison groups mean knowledge scores\* (N=194).

Myocardial Infarction knowledge test	Experimental (n=102)		Comparison (n=92)		<i>t</i>	<i>P</i> value
	N	Mean ± SD	n	Mean ± SD		
Pre-test	102	10.8 ± 2.05	92	11.4 ± 2.35	1.65	0.10
Post-test 1	102	15.3 ± 3.17				
Post-test 2	102	13.2 ± 2.50	92	11.6 ± 1.80	-4.95	<0.001**

\*Includes all participants completing questionnaires at each of the 3 times.

\*\* Significant at the 0.01 level (one tailed)

Table 3. Shows comparison was calculated to test the differences between the pair of means at an alpha level of 0.01 for post 1 and post 2 of experimental group scores. The results showed that scores, collapsed over the time, for the post-test 1 and post-test 2, were still significantly higher compared to scores for the pre-test ( $t = -5.47, P < 0.001$ ). However, scores of the experimental group decreased

significantly from post-test 1 ( $M = 15.3, SD = 3.17, \text{range} = 8-20$ ) to post-test 2 ( $M = 13.2, SD = 2.5, \text{range} = 8-18$ ) ( $t = 7.54, P < 0.001$ ) There was a statistically significant difference between the mean pre and post-test scores of nurses' myocardial infarction knowledge of the experimental group ( $t = -16.7, P < 0.001$ ) after the educational program.

**Table 3.** Differences between pre and post myocardial infarction knowledge test for experimental and comparison groups paired \* (N=194).

Paired <i>t</i> test						
Groups	Test	Mean ± SD	Test	Mean ± SD	<i>t</i>	<i>P</i> value
Experimental (n=102)	Pre-test	10.8 ± 2.05	Post-test 1	15.3 ± 3.17	-16.7	<0.001**
Experimental (n=102)	Post-test 1	15.3 ± 3.17	Post-test 2	13.2 ± 2.5	7.54	<0.001**
Experimental (n=102)	Pre-test	10.8 ± 2.05	Post-test 2	13.2 ± 2.5	-5.47	<0.001**
Comparison (n = 92)	Pre-test	11.4 ± 2.35	Post-test 2	11.6 ± 1.80	-65	0.51

\*Includes all participants completing questionnaires at each of the 3 times.

\*\* Significant at the 0.01 level (one tailed)

Table 4. Shows effects of the educational program on nurses' attitudes Nurses' as a whole (experimental and comparison group) demonstrated positive attitudes towards myocardial infarction prevention and treatment, irrespective to participants' characteristics of the experimental group ( $M = 34.2$ ,  $SD = 4.3$ , range = 26-46) and the comparison group ( $M = 34.7$ ,  $SD = 2.35$ , range = 25-41). The t-test was used to analyze if there were significant differences between the experimental and the comparison groups before conducting

the educational program. The level of significance was 0.01. There were no statistically significant differences between the two groups on the attitudes pre- scores ( $t = 0.78$ ,  $P = 0.44$ ). These results made the two groups comparable regarding the effect of the educational program on their attitudes towards myocardial infarction prevention and treatment. After conducting the educational program There is a significant difference ( $P = 0.01 < 0.05$ ).

**Table 4.** Attitudes scores between experimental and comparison groups (N=194).

Attitudes Toward Myocardial Infarction	Experimental (n=102)		Comparison (n=92)		t	P value
	N	Mean $\pm$ SD	n	Mean $\pm$ SD		
Pre-test	102	34.2 $\pm$ 4.28	92	34.7 $\pm$ 2.35	0.78	0.44
Post-test	102	35.8 $\pm$ 3.84	92	34.8 $\pm$ 2.74		0.01**

\*\* Significant at the 0.01 level (one tailed)

Table 5. Shows Repeated measure analysis of variance was used to examine the main effect of educational program on nurses' attitudes towards myocardial infarction prevention and treatment. The results showed that there were statistically significant differences in mean scores of attitudes towards myocardial infarction prevention and treatment between the experimental and comparison groups ( $F = 6.8$ ,  $P = .010$ )

Testing the interaction effect of educational program and groups, the repeated measures analysis showed that there was no significant effect by group interaction for the myocardial infarction attitudes scale ( $F = 5.2$ ,  $P = .023$ ). This indicated that the response of intervention group was different from that of the comparison group (Table 5).

**Table 5.** Analysis for the effect of an educational program on the nurses' attitudes towards myocardial infarction prevention and treatment (N=194).

Attitudes Toward Myocardial Infarction	Pre-test	Post-test	Repeated Measures Effect	F	p-value
	Mean $\pm$ SD	Mean $\pm$ SD			
Experimental	34.2 $\pm$ 4.28	35.8 $\pm$ 3.8	Education	6.8	0.010**
Comparison	35.8 $\pm$ 3.84	34.8 $\pm$ 2.7	Education* Group	5.2	0.023

\*\* Significant at the 0.01 level (one tailed)

\* Interaction

Tables 6, 7 and 8 shows Nurses' perceived barriers towards myocardial infarction prevention and treatment were measured using list of barriers related to assessment, documentation and carrying out myocardial infarction prevention and treatment practices. Participants were requested to rank the most important 3 barriers in each category of barriers. The most commonly cited possibilities were lack of time, short staff, the patients' condition and lack of resources or lack of equipment.

Potential barriers to carrying out myocardial infarction risk assessment, myocardial infarction documentation and myocardial infarction prevention and treatment are presented in (Tables 6, 7 and 8). 'The short staff and lack of time' was the most frequently cited barriers to carrying out myocardial infarction risk assessment (48.1%), along with documentation (56.3%) and prevention (39.2%). Barriers related to patient took the third rank, after staff and time. For example, the patient may be too ill to be assessed or may be uncooperative, making assessment difficult. Lack of training

and lack of aids were also perceived as important barriers. However, lack of knowledge was mentioned as least important barrier to carrying out myocardial infarction risk assessment, documentation and prevention.

**Table 6.** Barriers to carrying out myocardial infarction risk assessment (N=194).

Barriers to carrying out myocardial infarction risk assessment	Number (%)
Total number of respondents	194 (100)
Short staffed	33 (24.4)
Lack of time	32 (23.7)
Lack of training, resources, equipment, guidelines	26 (19.3)
Patient un-cooperative/too ill	20 (14.8)
Lack of equipment	18 (13.3)
Unstable patient	17 (12.6)
Lack of knowledge	13 (9.6)
Problems with assessment tool	9 (6.7)
Unable to assess	9 (6.7)

**Table 7.** Barriers to carrying out myocardial infarction documentation (N=194).

Barriers to carrying out myocardial infarction documentation	Number (%)
Total number of respondents	194 (100)
Lack of time	46 (34.1)
Short staffed	30 (22.2)
Problems with assessment tool	21 (15.6)
Unstable patient	16 (11.9)
Lack of aids	15 (11.1)
Lack of knowledge	14 (10.4)
Forget	13 (9.6)
Lack of equipment	10 (7.4)

**Table 8.** Barriers to carrying out myocardial infarction prevention and treatment (N=194).

Barriers to carrying out infarction prevention and treatment	Number (%)
Total number of respondents	194 (100)
Lack of time	33 (24.4)
Unstable patient	24 (17.8)
Lack of training, resources, equipment, guidelines	22 (16.3)
Short staffed	20 (14.8)
Lack of knowledge	19 (14.1)
Other aspects of care more important/lack of continuity	16 (11.9)
Lack of aids	14 (10.4)
Unable to assess	13 (9.6)

*Results of Qualitative Part*

*Findings and emerging themes.*

The focus group discussion data was analyzed by the author, starting immediately after the discussion.

Finally, a report was written based on the notes, the tape and written documents. It was sent to all participants in the focus group for validation of the content. Findings from the focus group discussion revealed the following four themes:

Lack of accurate information about myocardial infarction management among nurses.

Positive nurses values toward myocardial infarction management.

Experiences and tradition guide nursing care.

Barriers, short staff, lack time and equipment preventing nurses from implementing myocardial infarction management.

For example, one participant said:

"The patients will develop myocardial infarction if they are immobilized, this is the cause I think...."

Another participant said:

"Devices which used for myocardial infarction management are not available in our hospital such as monitoring devices and recovery devices etc....."

One participant said:

"Nurses do not suffer from outdated knowledge. I think that they have the idea that they know how to handle in a

way that their care is adequate. And on the whole they are right about it, I think."

Findings from the focus group discussion showed insufficient and inaccurate nurses' knowledge about myocardial infarction management. The emerging theme from the question on issues related to myocardial infarction nurses' knowledge and skills were, "Lack of accurate information about myocardial infarction management among nurses." Most of interviewed nurses did not mention pressure, friction and shear as causes of myocardial infarction, they considered the immobilization as the cause of myocardial infarction. Even, they could not differentiate the difference between friction and shear or between the causes and risk factors of myocardial infarction.

### 4. Discussion

This part presents a discussion of the study findings that support the influence of the myocardial infarction educational program. Barriers to improve patients' quality of life such as situational, contextual and knowledge related are evident. Employment of knowledge may prevent myocardial infarction occurrence. Regarding nurses' characteristics and their knowledge towards myocardial infarction the current study showed little differences in knowledge scores in regard with nursing education, years in practice, myocardial infarction training, age, or source of knowledge on myocardial infarction. The sample had only 23 (11.9%) having master degree compared with 167 (88.1%) having bachelor degree nurses. The age of majority of nurses was between 25 and 30 years. Additional impact of inadequate nurses' knowledge of myocardial infarction prevention and treatment may due to these unequal proportions in these variables might have contributed to the non-significant results. This finding is supported by several studies and one study compares chest pain-patients with community members, but only regarding the intention of calling the alarm number in case of cardiac event [17]. Fifty percent cut-off point (answering 13 out of 26 items of the myocardial infarction knowledge test correctly) was used to identify nurses' myocardial infarction knowledge, which could be regarded low compared to similar ones' [18]. In their study in 402 hypertensive nurses, also found 189 nurses (47.02%) did not have adequate knowledge about hypertension. Similar inadequacy of knowledge, awareness and practice of hypertension among Indian nurses has been reported by (Hemant Mahajan) [19]. Regarding nurses' attitudes towards myocardial infarction management the study revealed a significant correlation between knowledge gained through myocardial infarction educational program and attitudes towards myocardial infarction management. attitudes are

important because they give an expectation of individuals. positive attitudes towards an issue is an important influential factor that determines an individual's likelihood of carrying out a positive behavior. These changes in knowledge, attitudes and beliefs over time, are generally reflective of those reported internationally [20, 21]. Regarding influence of education on nurses' knowledge towards myocardial infarction prevention and treatment education is necessary to improve knowledge, in the current study, nurses' knowledge on myocardial infarction was heightened following conduction of myocardial infarction educational program. The results showed that myocardial infarction education program produced positive outcomes at global rates on myocardial infarction knowledge regarding different aspects of myocardial infarction preventive measures such as causes, nutrition, and risk assessment [20]. Attitude and belief scores were increased in both groups, but the increase was significantly faster and to a greater extent in the intervention group. These changes in knowledge, attitudes and beliefs over time, are generally reflective of those reported in worldwide [21].

## 5. Conclusion

In the current study, the majority of the nurses did not have sufficient knowledge to demonstrate competency of myocardial infarction prevention and treatment at the pre-test phase. In fact, few nurses achieved the minimum scores (50%; 13 out of 26 correct scores) to pass during the pre-test. The findings of the myocardial infarction educational program coincided and supported what was already known in the literature: that is, nurses are not equipped with enough education to appropriately prevent and treat myocardial infarction. On the other hand, having additional training, nurses improve their understanding of myocardial infarction and this positively affects their attitudes and intentions towards myocardial infarction prevention and treatment. Data revealed that upon post implementation of the myocardial infarction educational program, nurses' knowledge and awareness regarding myocardial infarction was increased, this supports the need to implement myocardial infarction educational program in Sudan health care settings to improve patients' outcomes.

In conclusion, Sudanese nurses' knowledge on myocardial infarction prevention and treatment was inadequate. Further, adequate dissemination of myocardial infarction prevention and treatment guidelines seems to be a prerequisite to improve the quality of myocardial infarction prevention and treatment. Improving practice requires a multi-faceted approach to assure adequate support to make changes reflected on patients' outcomes.

## Recommendations

The quality of care related to myocardial infarction is in need of improvement. Myocardial infarction has the propensity to affect an individual's overall health. Hence, efforts must be made to decrease myocardial infarction prevalence. Having the adequate knowledge on myocardial infarction prevention and treatment is crucial in preventing myocardial infarction development among hospitalized patients. It was apparent that nurses are in need to attend more training and education programs in order to properly assess, prevent and care for patients with myocardial infarction. Additionally, training allows the nurses to gain experience and confidence to use updates in their practice. The results of this study have the potential to significantly impact future studies related to myocardial infarction. Moreover, the results of this study can be considered as baseline to establishing national guidelines for myocardial infarction management. Also, findings can be platform for nurse educators, administrators, and researchers in regard to myocardial infarction prevention and treatment.

## Strength and Limitation

First, the current study used self-report questionnaires for data collection in the quantitative part. Tests about myocardial infarction knowledge were at baseline, with the second and third sessions were completed under direct observation since the non-observed tests often results in missing data and poor response rates, making interpretation of results challenging. In addition, using focus group discussion yielded an in-depth data about nurses' knowledge, attitudes and intentions towards myocardial infarction prevention and treatment. Second, this study was conducted on nurses working in hospitals in Khartoum state. However, these nurses are similar to those of other Sudanese nurses as there are no great regional differences in the education that nurses receive.

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