

# Perceived Health Behaviors and Learning Needs of Patients with Myocardial Infarction

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## Abstract: -

**Introduction:** - Myocardial infarction is one of the foremost cardiovascular disease causes of mortality and morbidity worldwide. The prevention of this disease requires continuous monitoring and rehabilitative management. It can be achieved by the health promotion of patients using effective, planned educational programs and lifestyle modification by the patient. Patients perceived that their learning needs were unmet and that the information provided was too general. Hence, assessing the healthy heart habits performed by the patient and the patient's preference regarding learning needs is crucial. The descriptive study is intended to identify the perceived health behaviors and learning needs of patients with myocardial infarction for the first time.

**Methodology:** A quantitative descriptive design was used in this present study. The study included 102 newly diagnosed patients with MI carefully chosen by the non-probability convenience selection method. Information was collected using a patient profile (socio-demographic data, clinical data, and clinical parameters), a Modified cardiac health behavior scale (MCHBS), and a Cardiac patient's learning needs inventory (CPLNI).

**Results:** -The present study result showed that subjects with MI for the first time had a high level of perceived learning needs of  $164.11 \pm 22.28$ , with symptoms management was  $27.61 \pm 3.763$ , medication information was  $23.15 \pm 3.010$ , diet information was  $23.12 \pm 3.148$  were the areas perceived as high learning need information among the subjects. Only 11 (10.8%) subjects had a high perception of cardiac health behavior, among which were controlling risk habits and was  $14.53 \pm 3.16$ . Medication adherence was only  $6.76 \pm 1.89$ , perception of the subjects regarding dietary management was  $19.47 \pm 4.15$ , and blood pressure control was  $5.09 \pm 2.13$  as considered essential in maintaining a healthy heart. Interestingly, the findings show that subjects with the perception of higher learning needs showed a negatively weak correlation with a lesser perception of health behavior, which is not a statistically significant level at  $p > 0.05$ . The study highlighted that exercise, habits, and RBS had a statistically significant association with perceived health behavior ( $\chi^2 = 18.52$ ,  $p < 0.001$ ), ( $\chi^2 = 20.133$ ,  $p = 0.013$ ), ( $\chi^2 = 9.067$ ,  $p = 0.037$ ) respectively. Also, the exposure of subjects to mass media ( $\chi^2 = 15.01$ ,  $p < 0.05$ ), diversional activities

practiced ( $\chi^2 = 19.08$ ,  $p < 0.01$ ), perception about the prognosis ( $\chi^2 = 7.22$ ,  $p < 0.02$ ), habits ( $\chi^2 = 13.68$ ,  $p < 0.03$ ) level had a statistically significant association with the perceived learning needs.

**Conclusion:** - Patients' health behaviors practices and learning needs will change according to their perceptions. Determining the learning needs will help to guide the patient to achieve good cardiac health behaviors practice, subsequently reducing the reoccurrence of myocardial infarction.

**Keywords:** Myocardial infarction, perceived health behaviors, learning needs, cardiovascular disease.

Abbreviations: CVD: Cardiovascular disease, NCD: Non-communicable disease, MI: Myocardial Infarction

## 1. Introduction

Globally cardiovascular disease (CVD) is the foremost health concern. Approximately 423 million people are affected by cardiovascular disease, resulting in 8 million deaths in year<sup>1</sup>. Cardiovascular disease is a leading reason of mortality in India. A global burden of disease study shows that the age-standardized cardiovascular disease in India is high. Globally, it is 235 in 1,00,000 population, whereas in India, it is about 272 in 1,00,000 population. Compared with Western countries, 23% of India's CVD deaths occur before age 70, which is about 52%<sup>2</sup>. In Kerala, over 33 million people are affected by coronary artery disease and have the uppermost prevalence of risk elements<sup>3</sup>.

The experts predict the global burden of cardiovascular disease will rise exponentially over the following few years as the long-term effects of the COVID-19 pandemic. The critical issues will be the cardiovascular health risks worsened by poor lifestyle behaviours<sup>4</sup>. The incidence and case-fatality of myocardial infarction exponentially increased with age in both men and women<sup>5</sup>. In India, the myocardial infarction rate is 64.37/1000 people.<sup>6</sup> In the year 2022, there was a 12% rise in fatalities attributed to heart attacks. After a decline from 28,579 in 2020 to 28,413 in 2021, the count of heart attack-related deaths subsequently surged to 32,457 in 2022.<sup>7</sup> The inter-study showed nine modifiable risk factors associated with more than 90% of acute myocardial infarctions. It is emphasized that modifiable risk factors and behavior related to unhealthy lifestyles are the major determinants of CVD mortality and morbidity<sup>8</sup>. The declining CVD mortality is primarily attributed to reducing behavioral risk factors<sup>9</sup>. Subsequently, it developed a target of avoidance and management of non-communicable disease in 2013, which comprised a 25% relative decrease in prevalence of high BP, halting the growth in diabetes and obesity, and guaranteeing 50% of patients with CVD have access to appropriate drug and medical counseling by 2025. The sustainable advance goals also include reducing premature deaths due to NCD to a third of total early deaths by 2030<sup>10</sup>.

Health behaviors are essential for avoiding cardiac disease and preserving the well-being of MI patients. Health behaviors and clinical outcomes are important components for enhancing medical treatment and assessing the possibility of cardiac disease. According to American Heart Association (AHA), health behaviors include medication management, exercise, diet management, stress control, and smoking cessation. Health behaviors are vital aspects for preventing hospital readmission and declining the mortality rate among patients who survived MI. Educational programs providing ordinary information rather than considering patients' preference fails to achieve behavioral changes and clinical goals. Hence, evaluating data associated with lifestyle practices and learning needs among MI patients is significant for effective primary and secondary prevention of MI<sup>11</sup>.

## Research Methods and Materials

This research employed a quantitative, descriptive design utilizing convenience sampling to gather data from 102 subjects who experienced myocardial infarction (MI). The study was conducted among patients attending the outpatient department and those admitted to the Coronary Care Unit (CCU) and cardiology ward at a tertiary healthcare setting, in Kochi, Kerala.

Data collection involved the strategic use of convenience sampling techniques, maintaining a connection with patients throughout the process. The investigator explained the research study's objectives to subjects, secured their consent, and administered questionnaires. Comprehensive socio-demographic and clinical data were collected, including information on perceived health behaviors and learning needs, employing the modified Cardiac Health Behavior Scale (MCHBS) and Cardiac Patient's Learning Needs Inventory (CPLNI) questionnaires.

The research instruments encompassed a patient profile for demographic and clinical parameters, the MCHBS to assess perceived health behaviors, and the CPLNI to identify learning needs. The MCHBS, revised by the investigator, comprised 25 items covering dimensions such as physical activity, stress management, diet management, smoking cessation, blood pressure control, and medication adherence. The CPLNI, originally established by Gerard and revised by Turton, included 43 items clustered into eight subdivisions related to cardiac care.

Ethical considerations were diligently addressed, with approval obtained from the Research Committee, the Institutional Review Board of AIMS, and the Head of the Departments of Cardiology. Participants were informed of the voluntary nature of participation, and written consent was obtained while ensuring confidentiality and anonymity.

Statistical analysis involved coding and summarization of collected data on a master data page, employing descriptive and inferential statistics. The correlation between perceived health behaviors and learning needs was assessed using Spearman's coefficient correlation. The association between perceived health behaviors, selected demographic variables, and learning needs, as well as carefully chosen demographic variables, was investigated using the chi-square test. Overall, these methodological procedures aimed to comprehensively explore the perceived health behaviors and learning needs of patients with myocardial infarction while adhering to ethical standards.

## Results

### 1.1. Socio-demographic data

The data shown in Table 1 showed that the significant subjects, 43 (42.2%), were in the age group of 51-65 years. Most subjects were male, 69 (67.6%), and 33 (32.4%) were females. Most of the subjects were married 84 (82.4%) and hailing a nuclear family 98 (96.1%). The data illustrates that most of the subjects were unemployed 31(30.3%) and 50 (49.0%) subjects had a monthly income  $\leq$  Rs.9000.

#### **Figure 1: Bar diagram presenting the distribution of subjects based on educational status.**

In Figure 1 the bar diagram depicted that most of the subjects, 42 (41.1%) had completed high school education, and 19 (18.6%) subjects had completed middle school education. 15 (14.7%) of the subjects were graduates, diploma 10 (9.8%), postgraduation 4 (3.9%), and professional degree 6 (5.8%), respectively. Furthermore, the data illustrated that the 5 (4.9%) subjects only had primary education, and only 1 (0.9%) were illiterate.

**1.2. Distribution of subjects based on experience with the illness.**

Regarding the health behaviors practiced by the subjects, the majority received health information from their health professionals, 66 (64.7%), whereas 23 (22.5%) responded that they did not receive any health information. The data illustrated that most patients had awareness about MI through television and radio, 30 (29.4%) however, 25 (24.5%) subjects had no awareness of MI through mass media. More than 30 (29.4%) subjects had previous heart attack experience among the family members. Most subjects, 61 (59.8%), reported no specific outcome due to the current illness. Nearly 80 (78.4%) subjects ventilated worries about their condition to their family. Nearly 2 (2%) subjects said they had no trust in the treatment strategies, and 75 (73.5%) subjects said they would go to the hospital if they experienced chest pain next time. More than half, 57 (55.9%) subjects are not performing any alternative therapy to reduce stress and anxiety; 33 (32.4%) subjects mentioned they had experienced all MI symptoms. Whereas 35 (34.3%) subjects were not aware of the cause of their illness, and 30 (29.4%) subjects couldn't recognize the symptoms of myocardial infarction. Almost all subjects 100 (98%) had perceived that MI would be cured soon. The majority 54 (52.9%) of them, were not practicing any diversional activity 21 (20.6%) responded that they were engaged in leisure activities, 17 (16.7%) subjects spent time with family and friends, 6 (5.9%) subjects responded that they were engaged in their hobbies. However, only 4 (3.9%) subjects responded that they practice breathing exercises to avoid thoughts related to the disease condition.

**1.3. Distribution of subjects based on clinical data.**

The data showed that most of the subjects, 93 (91.2%), consumed non-vegetarian dietary patterns 59 (57.8%) were not performing exercise, and 33 (32.4%) subjects had a history of more than one comorbid illness. Most of the subjects 71 (69.6%), did not have habits of smoking and alcoholism. 14 (13.7%) had smoked and consumed alcohol. Furthermore, the data illustrated that 7 (6.9%) had a habit of smoking, and 10 (9.8%) subjects had a habit of alcoholism. The data highlighted that nobody had a habit of tobacco use 0 (0.0%), and more than half of the subjects 57 (55.9%), had a family history of myocardial infarction. The data depicted that, among 102 subjects, 61 (59.8%) had normal body mass index, and 2 (2%) subjects were underweight, whereas 28 (27.5%), and 11 (10.8%) subjects were overweight and obese, respectively. Among 97 subjects, the majority of the subjects 73 (75.2%) had normal total cholesterol levels, whereas 14 (14.4%), and 10 (10.3%) subjects showed borderline and high total cholesterol levels, respectively. Moreover, among 94 subjects, only 10 (10.6%) had normal HbA1C levels, whereas 59 (62.8%) had high HbA1C levels. Among 100 subjects, 39 (39%) had normal RBS levels, whereas 36 (36%) subjects showed high RBS levels and 25 (25%) subjects fell under pre-diabetic level.

**Table 1: Distribution of Subjects based on socio- demographic variables ( n =102)**

<b>Demographic Variables</b>	<b>Frequency (f)</b>	<b>Percentage (%)</b>
<b>Age in years</b>		
Below 35	0	0
36 – 50	17	16.7
51 – 65	43	42.2
Above 65	42	41.2
<b>Gender</b>		
Male	69	67.6
Female	33	32.4

**Marital Status**

Married	84	82.4
Unmarried	1	1.0
Widow/widower	17	16.6
Divorced	0	0

**Type of family**

Nuclear family	98	96.1
Joint family	4	3.9

**Occupational status**

Professionals	1	0.9
Technicians	2	1.9
Private- Employee	26	25.4
Government-Employee	26	25.4
Other	16	15.6
Un-employed	31	30.3

**Monthly family income in rupees**

≥50,000	11	10.8
49,000- 25,000	10	9.8
24,000-10,000	31	30.4
≤9,000	50	49.0

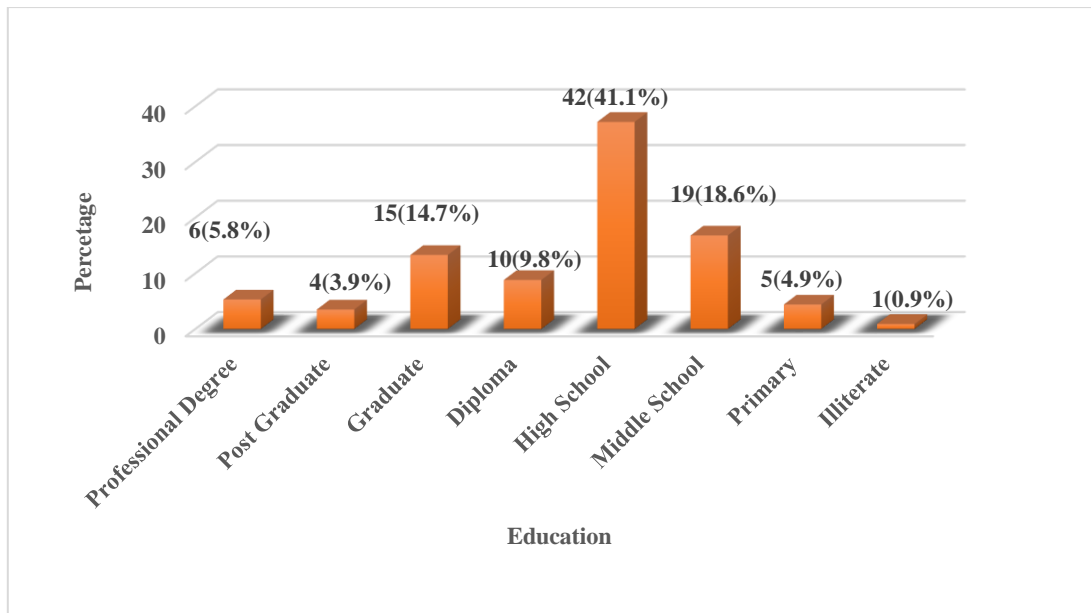


Figure 1: Bar diagram presenting the distribution of subjects based on educational status.

**1.4. Perceived health behaviors of subjects with myocardial infarction**

The data presented in Table 2 enumerated that, among 102 subjects, most of them, 76 (74.5%), had a moderate level of perception of cardiac health behavior practices, whereas 15 (14.7%) subjects perceived low cardiac health behavior practices. Only 11(10.8%) subjects perceived high cardiac health behavior practices.

**Table 2: Distribution of subjects based on perceived health behaviors.**

(n =102)

Perceived health behaviors	Frequency	Percentage
	(f)	(%)
High performance	11	10.8
Moderate performance	76	74.5
Low performance	15	14.7
Total	102	100

**1.5. Learning needs of subjects with myocardial infarction**

The data presented in Table 3 indicated that the categories ranked by the subjects were based on most important, as they perceived. The categories mentioned by the subjects as most important were symptoms management (Mean= 27.61, SD = 3.76) followed by medication information (Mean= 23.15, SD= 3.01), diet information (Mean= 23.12, SD= 3.14), structure and function of the heart (Mean= 22.00, SD=4.66), physical activity (Mean= 21.36, SD= 5.90), miscellaneous (Mean= 16.86, SD= 3.99), psychological factors (Mean=16.39, SD= 4.17) and lifestyle factors (Mean=13.62, SD=1.97) respectively.

**Table 3: Distribution of subjects based on learning needs.**

(n =102)

Sl. No	Category	Mean	SD
1	Structure and function of the heart (5)	22	4.66
2	Psychological factors (4)	16.39	4.17
3	Lifestyle factors (3)	13.62	1.97
4	Medication information (5)	23.15	3.01
5	Diet information (5)	23.12	3.14
6	Physical activity (6)	21.36	5.90
7	Symptom management (6)	27.61	3.76
8	Miscellaneous (4)	16.86	3.99

**1.6. Correlation of perceived health behaviors and learning needs of patients with myocardial infarction.**

The data from Table 4 indicated that the subjects perceived health behavior as less important, with a mean score of 61.8 however, their learning needs comparatively were high, with a mean score of 164.11 showing a weak negative correlation coefficient (r= -0.128) which is not statistically significant at (p>0.05) indicative of that the subjects had perceived importance in learning needs whereas their perception in health behavior practice is less.

**Table 4. Correlation between perceived health behaviors and learning needs of patients.**

(n =102)

Perceived variables	Mean	SD	r	p-value
Health behaviours	61.18	±9.836	- 0.128	0.201 <sup>ns</sup>



Learning needs 164.11 ±22.283

*ns- not significant*

**1.7. Association of perceived health behaviours and selected demographic variables.**

The information shown in Table 5, most of the subjects, 59 (57.8%), were not performing the exercise, and among them, 46 (78.0%) showed moderate perceived health behaviour practices, only 1 (1.7%) had high health behaviour practices, and 12 (20.3%) showed low health behaviour practices, which is highly significant at ( $\chi^2 = 18.52, p < 0.001$ ). Moreover, most of the subjects 71 (69.6%), did not have habits of smoking and alcoholism among them, 58 (81.7%) subjects showed moderate health behaviour practices, 9 (12.7%) of them had high health behaviour practices, whereas 4 (5.6%) subjects had a low perception of health behaviour practices and were statistically significant at ( $\chi^2 = 20.133, p = 0.013$ ). At the same time, there was no statistically significant association between perceived health behaviours and BMI, total cholesterol level, and HbA1C level among subjects.

The data presented in Table 6 depicted that the exposure of subjects to mass media had a statistically significant association with the perceived learning needs of the subjects ( $\chi^2 = 15.01, p < 0.05$ ). The diversional activities practiced by the subjects and learning needs had a statistically significant association at ( $\chi^2 = 19.08, p < 0.01$ ) level. The subject's perception of the prognosis and learning needs also had a statistically significant association at ( $\chi^2 = 7.22, p < 0.02$ ) level; the subject's habits and perceived learning needs also had a statistically significant association at ( $\chi^2 = 13.68, p < 0.03$ ) level. In contrast, demographic variables such as gender, education, health information received from health professionals, and disease experience showed no statistically significant association with the perceived learning needs.

**Table 5. Association between perceived health behaviors and selected demographic variables. (n = 102)**

Demographic variable	Category	Perceived health behaviours						$\chi^2$	df	(p-value)
		Low		Moderate		High				
		f	%	f	%	f	%			
<b>Exercise (n =102)</b>	Regular	1	3.2	21	67.7	9	29.0	18.52	4	<0.001**
	Irregular	2	16.7	9	75.0	1	8.3			
	Nil	12	20.3	46	78.0	1	1.7			
<b>Habits (n =102)</b>	Smoking	4	57.1	3	42.9	0	0.0	20.13	6	0.013*
	Alcoholism	2	20.0	7	70	1	10.0			
	Smoking & Alcoholism	5	35.75	8	57.1	1	7.15			
	None	4	5.6	58	81.7	9	12.7			
<b>BMI</b>	Healthy	10	16.4	46	75.4	5	8.2			0.359 <sup>ns</sup>
	Underweight	1	50.0	1	50.0	0	0.0			

(n=102)	Overweight	2	7.1	20	71.4	6	21.4	7.99	6	
	Obese	2	18.2	9	81.8	0	0.0			
<b>Total cholesterol</b> (n = 97)	Normal	9	12.3	57	78.1	7	9.6	4.18	4	<b>0.495<sup>ns</sup></b>
	Borderline high	3	21.4	10	71.4	1	7.1			
	High	3	30.0	5	50.0	2	20			
<b>HbA1C</b> (n =94)	Normal	1	10.0	7	70.0	2	20.0	5.34	4	<b>0.321<sup>ns</sup></b>
	Pre-diabetes	7	28.0	17	68.0	1	4.0			
	High	7	11.9	46	78.0	6	10.2			
<b>RBS</b> (n =100)	Normal	10	25.6	28	71.8	1	2.6	9.06	4	<b>0.037*</b>
	Pre-diabetes	3	12.0	18	72.0	4	16.0			
	High	2	5.6	29	80.6	5	13.9			

\*\*Significant at 0.001 level; \* Significant at 0.05 level; ns – not significant at 0.05 level

### 1.8. Association of perceived learning needs and selected demographic variables.

**Table 6. Association between perceived learning needs and selected demographic variables.**  
(n = 102)

Demographic variable	Category	Perceived learning needs						$\chi^2$	df	(p-value)
		Low		Moderate		High				
		f	%	f	%	f	%			
<b>Exposure to mass media</b>	Newspaper magazines	1	8.3	0	0.0	11	91.7	15.01	8	<b>0.059*</b>
	TV / Radio	0	0.0	3	10.0	27	90.0			
	Internet	0	0.0	1	6.3	15	93.8			
	All	3	15.8	4	21.1	12	63.2			
	None	2	8.0	0	0.0	23	92.0			
<b>Diversional activity practicing by subjects</b>	Engage in leisure activities	0	0.0	2	9.5	19	90.5	19.08	8	<b>0.014*</b>
	Spend time with family and friends	0	0.0	2	11.8	15	88.2			
	Practice relaxation exercise	1	25.0	2	50.0	1	25.0			



	Engage in a hobby	1	16.7	0	0.0	5	83.3			
	None	4	7.4	2	3.7	48	88.9			
<b>Perception of patient about the disease will cure</b>	Yes	5	50	8	8.0	87	87.0	7.22	2	<b>0.027*</b>
	No	1	50.0	0	0.0	1	50			
<b>Habits</b>	Smoking	0	0.0	0	0.0	7	100	13.68	6	<b>0.033*</b>
	Alcoholism	2	20.0	3	30.0	5	50			
	Smoking&Alcoholism	0	0.0	1	7.1	13	92.9			
	None	4	5.6	4	5.6	63	88.7			

\*\*Significant at 0.001 level; \* Significant at 0.05 level

**Table 6. Association between perceived learning needs and selected demographic variables. (n=102)**

Demographic variable	Category	Perceived learning needs						$\chi^2$	df	(p-value)
		Low		Moderate		High				
		f	%	f	%	f	%			
<b>Gender</b>	Male	4	5.8	6	8.7	59	85.4	0.21	2	<b>0.898<sup>ns</sup></b>
	Female	2	6.11	2	6.11	29	87.9			
<b>Education</b>	Up to high school	2	3.0	3	4.5	61	92.4	9.79	6	<b>0.134<sup>ns</sup></b>
	Degree/Diploma	3	12.0	4	16.0	18	72.0			
	P. G	0	0.0	1	25.0	3	75.0			
	Professional degree	1	16.7	0	0.0	5	83.3			
	Illiterate	0	0.0	0	0.0	1	0.9			
	Doctor/Nurse	4	6.1	5	7.6	57	86.4			

<b>Health information received</b>	Dietician/Social worker Physiotherapist	0	0.0	0	0.0	13	100	3.35	4	<b>0.501<sup>ns</sup></b>
	None	2	8.7	3	13.0	18	78.3			
<b>Experience of a significant person with a heart attack</b>	Family/partner	3	10.0	2	6.7	25	83.3	7.07	6	<b>0.314<sup>ns</sup></b>
	Relatives	2	12.5	0	0.0	14	87.5			
	Friends/colleagues	0	0.0	2	20	8	80			
	None	1	2.2	4	8.7	41	89.1			

*ns – not significant at 0.05 level*

## 2. Discussion

Many patients are diagnosed with myocardial infarction yearly and are unaware that it requires health behavior changes, especially in diet modification and physical activity. Patients with myocardial infarction vary in their comprehensive learning needs. Since the learning needs are intensive on preventing complications of cardiac events, this study was carried out to find out the perceived health behaviors and learning needs of the patient with myocardial infarction to prevent the secondary occurrence of myocardial infarction.

The investigator has tried to discuss the outcomes of the present study with the existing literature based on the objectives. From the study group, 43 (42.2%) subjects were included in the age group of 51-65 years. Most subjects were male, 69 (68%), and 33 (32.4%) were females. regarding educational status, in most subjects, 42 (41.1%) had completed high school education, and 19 (18.6%) subjects had completed middle school education. 15 (14.7%) subjects were graduates, 5 (4.9%) subjects only had primary education, and illiterate was 1 (0.9%). Most subjects were married 84 (82.4%) and are hailing a nuclear family 98 (96.1%). In addition, most of the subjects were unemployed, 31(30.3%) and 50 (49.0%) subjects had a monthly income  $\leq$  Rs.9000.

Dahal P and Karki R conducted a descriptive cross-sectional study among patients with myocardial infarction. The study findings highlighted that most (53.4%) subjects were more than 30 years of age, and the majority (52.5%) were male. Most of the subjects were literate (93.1%); out of them, the highest number (78.2%) had above-secondary level education. Interestingly, the demographical characteristics of the subjects of the supportive study are congruent with the present study group. This indicates that the male gender is more prone to MI, and the age group greater than 50 years is another risk factor for developing MI<sup>12</sup>.

### 2.1. Perceived health behaviors and learning needs of subjects with MI.

This descriptive study aimed to investigate the perceived health behavior practice and learning needs of patients with MI and identify the relationship between perceived health behaviors and learning needs. The

effective practice of health behaviors may change an individual perception, which can induce changes in practicing health behaviors, which can bring about a change in attitude toward practicing effective health behaviors.

The present study result showed that subjects with myocardial infarction for the first time, 102 subjects, 76 (74.5%) had a moderate level of perceived health behavior practice with a score of (Mean 61.18, SD=9.83), out of which controlling risk habits was (M=14.53, SD =3.16) and medication adherence was (M=6.76, SD=1.89) were perceived among the subjects as high importance in maintaining healthy heart. Perception of the subjects' regarding diet was (M=19.47, SD= 4.15), blood pressure control was (M=5.09, SD=2.13), physical activity was (M=7.59, SD=3.02) and stress control was (M=8.23, SD=2.59) respectively. The present findings coincided with this study conducted by Gauro P, Thaniwattananon P, Kritpracha C and noted that the cardiovascular health behaviours score was high (M=92.14, SD=10.72). The patient with IHD reported high medication adherence (M=11.60, SD=0.72) and BP control (M=15.73, SD=3.71). On the other hand, the dimensions of cardiovascular health behaviours that the patients stated that they performed moderate level were diet management (M=25.04, SD=4.12). physical activity (M= 13.72, SD= 2.65), smoking cessation (M= 11.61, SD= 3.52), and stress control (M= 11.04, SD= 2.24). The results exhibited that disease perception can be a forecaster of cardiac health behaviours<sup>13</sup>.

Yaacob S, Zaini NH, Abdullah KL, Ahmad NZ, Ramoo V, Azahar NM, Aziz AF, et al. conducted a study among coronary artery disease patients. The findings show that around two-thirds (60.7%) of the subjects perceived to have high learning needs. Gender and highest educational level were significantly associated with perceived learning needs. The most important perceived learning needs were medication information, risk factors for CAD, diet information, physical activity, structure, heart function, and other associated information<sup>14</sup>.

## **2.2. Correlation between perceived health behaviours and learning needs of patients with MI.**

The current study findings showed that among 102 subjects, most of the subjects 76 (74.5%) had a moderate health behavior practice score (mean 61.18, SD=9.83), and 88 (86.3%) subjects had a high level of learning needs score (mean 164.11, SD=22.28). The study result indicated that the higher the perceived learning needs of the subjects, the lower was their perceived health behaviour practice, showing a negative, weak correlation between the perceived health behaviors and learning needs ( $r = -0.128$ ,  $p = 0.201$ ), which not statistically significant at ( $p > 0.05$ ) indicative of that the subjects had perceived importance in learning needs. In contrast, they perceived health behaviour practice was low. The findings confirmed that knowledge through cardiac rehabilitation and informative programs should be designed according to the patient's preference rather than providing general information that will help influence health behavior practices perceived by the patients with MI.

In a descriptive study done by Jung HG, and Yang YK, the researchers noted a positive relationship between cardiac rehabilitation knowledge and cardiac health behavior practice ( $r = 0.17$ ,  $p = 0.02$ ). When the correlation between cardiac rehabilitation knowledge, educational demand, and cardiac health behavior practice of the subjects was analyzed, cardiac rehabilitation knowledge had a significantly positive correlation with cardiac health behavior practice ( $r = 0.37$ ,  $p < 0.01$ ), educational demand also had a significantly positive correlation with health behavior practice ( $r = 0.17$ ,  $p = 0.02$ ). In this study as the knowledge demands were increasing their cardiac health behaviour increased. In contrast, in the current study results presented that, as the subjects had a high perception of learning needs and their

perceived cardiac health behaviour practice was low, this difference might be due to differences in nationality and ethnicity and the variance in the domains in which they perceived important<sup>15</sup>.

### **2.3. Association between the perceived health behaviours of patients with MI and selected demographic variables.**

The current study presented that there is a statistically significant association between carefully chosen demographic variables such as exercise ( $\chi^2=18.52$ ,  $p < 0.001$ ), and habits ( $\chi^2=20.133$ ,  $p = 0.013$ ) and RBS ( $\chi^2=9.067$ ,  $p = 0.037$ ) and perceived health behaviour practices. The data illustrated that the association between perceived health behaviors and clinical variables such as BMI ( $\chi^2=7.99$ ,  $p=0.359$ ), Total cholesterol ( $\chi^2=4.18$ ,  $p=0.495$ ), HbA1C ( $\chi^2=5.34$ ,  $p=0.321$ ) was not to be found statistically significant at ( $p\text{-value} > 0.05$ ).

In an explorative study conducted by Nur KR, the researcher found that exercise and risk habits had a strong association with perceived health behaviour practice by the subjects.

( $\chi^2 18.52$ ,  $p < 0.001$ ), ( $\chi^2 20.13$ ,  $p < 0.013$ ) respectively, this may be due to the influence of family members, support groups, or the doctors and nurses inspire patients to modify poor lifestyle behaviour since the initial diagnosis. The other variables were not assessed in this study<sup>16</sup>.

### **2.4. Association between the perceived learning needs of patients with MI and selected demographic variables.**

The current study displayed that most of the subjects 88 (86.3%) had a high learning need score (Mean 164.11, SD=22.28). The perceived learning needs showed strong association with the exposure of subjects to mass media ( $\chi^2 = 15.01$ ,  $p < 0.05$ ), diversional activities practiced ( $\chi^2 = 19.08$ ,  $p < 0.01$ ), perception about the prognosis ( $\chi^2=7.22$ ,  $p < 0.02$ ), habits at ( $\chi^2=13.68$ ,  $p < 0.03$ ) level and perceived learning needs had statistically significant association at the ( $p\text{-value} < 0.05$ ). However, there is no association between perceived health learning needs and selected demographic variables such as gender ( $\chi^2=0.21$ ,  $p=0.89$ ), education ( $\chi^2=9.7$ ,  $p=0.13$ ), health information received by patient ( $\chi^2=3.35$ ,  $p=0.50$ ), the experience of a significant person with a heart attack ( $\chi^2=7.07$ ,  $p=0.31$ ).

A similar study done by Yaacob S, Zaini NH, Abdullah KL, Ahmad NZ, Ramoo V, Azahar NM, Aziz AF among coronary artery disease patients and researcher noted that gender and uppermost educational attainment were significantly associated with perceived learning needs following cardiovascular intervention ( $p=0.004$ ). The findings are in contrast with the present study findings; there is no association of education with the perceived learning needs of the subjects ( $\chi^2=9.79$ ,  $p=0.31$ ), and the educational background did not influence the learning needs of the subjects. This may be due to the individual variation and the uniqueness in the learning needs of the individuals<sup>17</sup>.

### **3. Limitations**

The study's limitations are that the data collection period was extended due to the lack of availability of subjects because of the COVID-19 pandemic, and the study was limited to only one set. Moreover, the study included only 102 subjects; hence, the generalization of the findings is limited. In this study, the investigator found it challenging to get all the blood values on the same day of data collection, and unanswered questions interfered with the data analysis such as RBS, HbA1C, and total cholesterol levels.

#### 4. Conclusion

The current study's findings highlighted the perceived health behaviours and learning needs of newly diagnosed patients with myocardial infarction. Based on the results, the investigator concluded that most subjects had a moderate health behavior practice. Subjects had a better perception of health behavior practice in controlling risk habits and medication adherence. On the other hand, poor perception of health practices in diet, BP control, physical exercise, and stress management, and almost most of the subjects had high learning needs with dominants of CPLNI such as structure and functions, lifestyle factors, medication, diet management, symptoms management and regarding CPR procedure.

Patients' health behavior practice and learning needs will change according to their perceptions. Determining the learning needs will help to guide the patient to achieve good cardiac health behaviour practice subsequently, it will reduce the reoccurrence of myocardial infarction with this intention, the researcher has developed a care guide based on the learning needs of the subjects.

#### Conflict of interest

Nil

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