CLINICAL & BASIC RESEARCH

Patients' and Nurses' Perceptions of Post-Coronary Artery Bypass Graft Learning Needs in Two Omani Hospitals

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إدراك المرضى والممرضين عن الحاجة لتثقيف المرضى بعد إجراء عملية طعم مجازة الشريان التاجي في اثنين من مستشفيات سلطنة عمان

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ABSTRACT: *Objectives:* Little is known about nurses' and patients' perceptions of learning needs following coronary artery bypass graft (CABG) surgery in Oman. This study aimed to identify patients' and nurses' perceptions of post-CABG learning needs. *Methods:* This cross-sectional study was conducted in two cardiac units in Oman between February and April 2018. Participants were from step-down units and perceptions of post-CABG learning needs were collected using a modified version of the Cardiac Patients Learning Need Inventory (MCPLNI) questionnaire. Data were analysed using descriptive and inferential statistics. *Results:* A total of 90 patients and 90 nurses were included in this study (response rate: 100%). Nurses perceived information about chest and leg wound care, medications and complications as patients' most important learning needs (4.89 ± 0.31, 4.84 ± 0.33 and 4.78 ± 0.45, respectively). Similarly, patients perceived a need for post-CABG learning related to chest and leg wound care, complications and medication, while learning related to physical activity received a moderate priority (4.92 ± 0.20, 4.80 ± 0.45, 4.85 ± 0.26 and 3.50 ± 1.34, respectively). *Conclusion:* Before discharging patients, they should be provided with specific information related to post-CABG care. It is essential to assess patients' learning needs and incorporate those learning needs into discharge plans.

Keywords: Learning; Perception; Coronary Artery Bypass; Education; Patients; Nurses; Oman.

الملخص: **الهدف:** لا تتوفر معرفة كافية بخصوص إدراك الممرضات والمرضى عن الحاجة لتثقيف المرضى بإجراءات العناية بعد إجراء عملية طعم مجازة الشريان التاجي في عُمان. تهدف هذه الدراسة إلى تحديد إدراك المرضى والممرضين عن احتياج تثقيف المرضى بعد عملية طعم مجازة الشريان التاجي. **الطريقة:** تم إجراء هذه الدراسة المستعرضة في قسمين لأمراض القلب بين فبراير وأبريل من عام 2018 في سلطنة عمان. كان المشاركون من أقسام العناية التدريجية. تم جمع المعلومات عن إدراك الممرضات والمرضى باستخدام نسخة معدلة من قائمة احتياجات تثقيف مرضى القلب. وقد تم تحليل البيانات باستخدام إحصاءات وصفية واستدلالية. **النتائج:** إشترك 90 مريضا و 90 ممرضا و ممرضة في هذه الدراسة (معدل الاستجابة: 100%). أظهرت النتائج أن الممرضين يعتبرون أن تثقيف المرضى عن عناية جروح الصدر والساق، الأدوية والمضاعفات هي الأكثر أهمية بعد إجراء العملية (4.89 ± 0.31، 4.84 ± 0.33 و 4.78 ± 0.45، على التوالي). وأظهرت النتائج أن المرضى كذلك يدركون الحاجة إلى تعلم العناية بجروح الصدر والساق والمضاعفات والأدوية، بينما تلقى التثقيف المتعلق بالنشاط البدني أولوية متوسطة (4.92 ± 0.20، 4.80 ± 0.45، 4.85 ± 0.26 و 3.50 ± 1.34، على التوالي). **الخلاصة:** قبل ترخيص المرضى من المستشفى، يجب تزويدهم بمعلومات محددة متعلقة برعاية ما بعد جراحة طعم مجازة الشريان التاجي. ومن الضروري تقييم احتياجات التعلم لدى المرضى وضم هذه الإحتياجات في خطط الترخيص.

الكلمات المفتاحية: التعلم؛ الإدراك؛ مجازة الشريان التاجي؛ تثقيف؛ المرضى؛ الممرضات؛ عمان.

ADVANCES IN KNOWLEDGE
- *To the best of the authors' knowledge, this is the first study to assess patients' and nurses' post-coronary artery bypass graft (CABG) learning needs in Oman. When identifying post-CABG learning needs, both patients and their nurses prioritised information related to leg and chest wounds, medications and potential surgical complications.*

APPLICATION TO PATIENTS CARE
- *These findings provide clinicians with patients' and nurses' perceptions of post-CABG learning needs which can be used to plan educational approaches and avoid information overload.*

- *This study should be considered a platform for future studies to understand patients' post-CABG learning needs and develop a clear and effective educational plan to improve patients' outcomes and reduce post-CABG complications.*

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CORONARY HEART DISEASE (CHD) IS THE MAIN cause of mortality and morbidity worldwide.[1] In some Middle Eastern countries, CHD is the leading cause of death and disability.[2,3] In Jordan, the prevalence of CHD accounts for approximately 35% of overall coronary vascular disease (CVD) mortality.[3] In Oman, CHD accounts for 22.84% of all deaths and is a common non-communicable disease according to the Omani Ministry of Health.[4,5] Patients with CHD require appropriate management to prevent further complications such as heart failure and multi-organ dysfunction.

Despite the effectiveness of coronary artery bypass grafts (CABG) in managing CHD, post-CABG patients can develop severe complications such as infection and lung problems; these complications can be minimised with an appropriate discharge plan.[2] Recent studies have focused on the impact of health education (e.g. self-care, medication adherence and sleep quality) on patients' post-CABG outcomes.[6,7] Additionally, many patients with heart disease who have received CABG have expressed the importance of intensive education regarding post-discharge home-based self-care and management.[2,8] Specifically, patients reported a need to know about the physical and psychological aspects of medication, diet, physical education and wound care as well as potential complications of surgery.[2,8] Although one study in Oman found that intensive health education and close patient monitoring was key in managing CHD among Omani patients, no study has examined nurses' and patients' perceptions of post-CABG learning needs.[9] Therefore, this study aimed to identify patients' and nurses' perceptions of post-CABG learning needs.

Methods

This descriptive comparative cross-sectional study was carried out at Sultan Qaboos University Hospital's (SQUH) cardiac unit and the Royal Hospital's (RH) national cardiac unit in Muscat, Oman from February to April 2018. These cardiac units are considered the country's main units and are the largest in Oman. As such, these two tertiary institutions host all of the country's cardiac surgeries (130–200 CABG surgeries performed annually). The RH's cardiac unit opened in 2013 with a 139-bed capacity. The cardiac unit at SQUH consists of an operating room, four cardiac intensive care unit beds and an 18-bed cardiac surgery ward (step-down unit).

This study targeted patients who underwent CABG surgery and the nurses caring for them. The study used a non-probability convenience sampling technique to recruit participants. The sample size was determined by using G-power, Version 3.1 (Heinrich-Heine-Uni-

ersität Düsseldorf, Düsseldorf, Germany). Based on a chi-square comparative test, a medium effect size of 0.50, a two-tailed test ($P \leq 0.05$) and a power of 0.80, a sample size of 86 participants was determined for each group. To account for a 4% missing data rate that occurred in a prior study, it was decided to recruit 90 participants to each group.[10]

Patients were included if they were Omani, alert, aged ≥20 years old, had CABG for the first time, were currently admitted to a step-down unit and were 5–6 days post-CABG. Patients with cognitive impairments as identified by medical records or who refused to participate were excluded. Nurses of all nationalities were included if they were willing to participate and had been caring for post-CABG patients for at least one year. This time-frame was based on the assumption that nurses would be competent in the field of CABG care after a year. All participants completed the modified Cardiac Patients Learning Needs Inventory (MCPLNI) questionnaire and provided demographic information using a separate questionnaire.

The Cardiac Patients Learning Needs Inventory was originally developed by Gerard and Peterson in 1994 to measure patients' and staff nurses' learning needs.[11] The MCPLNI consists of 44 items distributed within eight domains—introduction to the coronary care unit (CCU), anatomy and physiology, diet information, psychological factors, risk factors for coronary conditions, beneficial physical activities, medication information and other pertinent information. The instrument is based on a five-point Likert scale ranging from one (not at all important) to five (extremely important). The total scores range from 44–220 with higher scores indicating higher learning needs.[2] The Cronbach's alpha for the MCPLNI is 0.95.[2] This study used the Arabic version of the MCPLNI, which had been validated with Arabic speakers undergoing CABGs.[2] In the current study, Cronbach's alpha of the domains ranged from 0.76–0.94 and the degree of learning needs' importance was categorised based on the total mean score into either low (1–2.33), moderate (2.34–3.66) or high (3.67–5.00) because the original scale has no cut-off point to categorise the importance of learning needs [Table 3].[12]

Prior to data collection, the authors visited the target cardiac unit and explained the study's purpose to the nurse-in-charge. A data collection schedule was then developed. A convenience sampling technique was used to recruit subjects from the step-down unit. Patients were asked to self-administer the MCPLNI in Arabic and the nurses were asked to complete the English-language version. The questionnaire took 20 minutes to complete. After completed the MCPLNI, participants returned the questionnaire to the authors

or nurse-in-charge. After collection, the data and the questionnaires were secured in a locker.

Data were entered, computed and analysed using Statistical Package for the Social Sciences (SPSS), Version 23 (IBM Corp, Armonk, New York, USA). Demographics and nurses' and patients' perceived learning needs were presented as descriptive statistics, frequencies, percentages and means ± standard deviation.

Ethical approval was obtained from the Ministry of Health's Ethics Committee (MoH/DGPS/CSR/PRO-POSAL_APPROVED/30/2017) and the Medical Research and Ethical Committee at Sultan Qaboos University (SQU-EC/185/17). Each participant received an explanatory letter with a consent form detailing all risks and benefits of participation. Participants were assured that there would be no harm in answering the survey and had the right to withdraw from the study at any time without consequences.

Table 1: Characteristics of post-coronary artery bypass graft patients who completed the modified Cardiac Patients Learning Need Inventory questionnaire (N = 90)

Characteristic	n (%)
Median age in years (mean ± SD, range)	64 (63.4 ± 10.8, 40–86)
Gender	
Female	34 (37.8)
Male	56 (62.2)
Educational level	
Formal school education	41 (45.6)
Diploma and higher education	10 (11.1)
Uneducated	39 (43.3)
Occupation	
Government	12 (13.3)
Private	10 (11.1)
Retired	28 (31.1)
Unemployed	40 (44.4)
Marital status	
Single	1 (1.1)
Married	66 (73.3)
Divorced	1 (1.1)
Widowed	22 (24.4)
Monthly income in OMR	
<300	53 (58.9)
300–700	25 (27.8)
>700	12 (13.3)

SD = standard deviation; OMR = Omani riyals.

Results

A total of 90 patients and 90 nurses were included in this study (response rate: 100%). Most patients were male (62.2%), married (73.3%), unemployed (44.4%), had formal school education (45.6%), and had a monthly income <300 Omani riyals (58.9%), which is below Oman's poverty line.[13] Patients' median age was 64 years old (range: 40–86 years old) [Table 1]. The median age for nurses was 35 years old (range: 23–57 years old). The majority of nurses were female (77.8%), married (76.7%) and had a Bachelor of Science in Nursing or a higher degree (54.4%) [Table 2].

Generally, patients and nurses perceived that all learning needs domains were highly important, except for the physical activity domain where patients reported it as moderately important (3.5 ± 1.3). Post-CABG patients and nurses ranked learning related to chest and leg wounds as most important (4.9 ± 0.2 and 4.9 ± 0.3), medication information as second most important (4.9 ± 0.3 and 4.8 ± 0.3), complications as third most important (4.8 ± 0.5 and 4.8 ± 0.5) and psychological factors as ninth most important (4.3 ± 0.8 and 4.5 ± 0.6). Both groups ranked the remaining domains differently; patients ranked the domain of physical activity as least important and introduction to the cardiac unit as the fourth most important learning need, whereas nurses

Table 2: Characteristics of nurses who completed the modified Cardiac Patients Learning Need Inventory questionnaire and care for post-coronary artery bypass graft patients (N = 90)

Characteristic	n (%)
Median age in years (mean ± SD, range)	35 (35.7 ± 6.8, 23–57)
Gender	
Female	70 (77.8)
Male	20 (22.2)
Educational level	
Diploma	41 (45.6)
BSN and Higher	49 (54.4)
Marital status	
Single	20 (22.2)
Married	69 (76.7)
Divorced	1 (1.1)
Median years of experience as staff nurse (mean ± SD, range)	11 (12.3 ± 6.5, 1–27)
Median years of experience caring for post-CABG patients (mean ± SD, range)	8 (5.8 ± 5.6, 1–24)

SD = standard deviation; BSN = bachelor of science; CABG = coronary artery bypass graft.

Table 3: Total mean scores and Cronbach's alpha for each domain of the modified Cardiac Patients Learning Need Inventory questionnaire and ranks ordered by levels of patients' and nurses' perceptions

MCPLNI domain	Cronbach's alpha	Patients' perceptions		Nurses' perceptions	
		Total mean score ± SD	Rank	Total mean score ± SD	Rank
Introduction to the cardiac unit	0.76	4.7 ± 0.6	4	4.2 ± 0.4	10
Anatomy and physiology	0.82	4.6 ± 0.7	6	4.6 ± 0.5	7
Psychological factors	0.88	4.3 ± 0.8	9	4.5 ± 0.6	9
Risk factors	0.92	4.4 ± 0.9	8	4.6 ± 0.5	6
Medication information	0.78	4.9 ± 0.3	2	4.8 ± 0.3	2
Diet information	0.83	4.7 ± 0.5	5	4.7 ± 0.5	4
Physical activity	0.92	3.5 ± 1.3	10	4.6 ± 0.5	5
Complications	0.76	4.8 ± 0.5	3	4.8 ± 0.5	3
Chest and leg wound care	0.81	4.9 ± 0.2	1	4.9 ± 0.3	1
Other information	0.94	4.5 ± 0.6	7	4.6 ± 0.5	8
Total learning needs score	0.91	4.4 ± 0.4	high	4.7 ± 0.4	high

MCPLNI = modified Cardiac Patients Learning Need Inventory; SD = standard deviation. Note: The degree of importance of the learning needs was based on the total mean score and categorised as either low (1–2.33), moderate (2.34–3.66) or high (3.67–5.00).

graded the same domains as fifth and least important, respectively [Table 3].

In the "introduction to the cardiac unit" domain (range: 4.5–4.8), patients reported that they most needed to learn about why they were in the unit and how to manage their post-operative pain (4.8 ± 0.6 and 4.8 ± 0.5). For the second domain "anatomy and physiology" (range: 4.1–4.7). The highest item scores were for why patients had chest pain (4.7 ± 0.6), why their heartbeat might be irregular (4.7 ± 0.7) and how to differentiate chest wound-related pain from angina-related pain (4.6 ± 0.8).

For the "psychological factors" domain (range: 4.0–4.4), patients reported a high need to learn about what to do to reduce stress when home (4.4 ± 0.9). Learning needs related to risk factors and medication and diet information were reported as having a high degree of importance (ranges: 4.2–4.4, 4.5–4.9 and 4.6–4.7, respectively). All items in the "complications" domain were rated as highly important (range: 4.7–4.8). Patients perceived a pressing need to learn about what post-operative complications might occur and how to prevent complications from occurring (4.8 ± 0.6 and 4.8 ± 0.5). Patients ranked information related to the "chest and leg wound care" domain highest of all (4.9 each). Patients highly valued the need to learn about when to get family involved (4.3 ± 1.0), when to call a doctor (4.7 ± 1.1) and whether any other tests would be performed after discharge (4.7 ± 0.1). The "physical activity" domain received the lowest scores (range: 3.2–3.8), indicating a moderate degree of perceived importance.

In general, nurses perceived all learning needs as highly important. Nurses also assigned the highest degree of learning needs to the "chest and leg wound care" domain (range: 4.8–4.9). This area was followed in perceived importance by information about medications and surgery complications (ranges: 4.5–4.8 and 4.7–4.8). The lowest mean score reported by nurses was for the "psychological factors" domain (range: 4.2–4.6), but still indicated a high degree of perceived importance [Table 4].

Discussion

Nurses and other healthcare personnel play an important role in assessing and examining the learning needs of post-CABG patients, and encouraging patients to express their needs and feelings. This study's findings reveal that both nurses and patients perceived information related to leg and chest wounds, medication and complications as the top three learning needs of post-CABG patients. This finding was consistent with other studies done with similar populations.[14,15]

Post-CABG patients from Yemen and the USA also ranked information related to leg and chest wounds as the top priority for patient education.[2,14]

Nurses in the current study also ranked chest and leg wounds as the most important learning need followed by medication information and complications; introduction to the CCU was perceived as largely unnecessary. These results were consistent with Omari *et al.* and Yiu *et al.*'s studies, where nurses perceived

Table 4: Mean score for each item of the modified Cardiac Patients Learning Need Inventory questionnaire for patients (n = 90) and nurses (n = 90)

MCPLNI domain items	Mean score ± SD	
	Patients' perceptions	Nurses' perceptions
Introduction to the cardiac unit		
Why is the patient in this unit?	4.8 ± 0.6	4.8 ± 0.5
Why is the patient's activity limited?	4.5 ± 0.9	4.7 ± 0.5
How should the patient manage post-operative pain?	4.8 ± 0.5	4.8 ± 0.3
Anatomy and physiology		
How can the patient differentiate between pain from the chest wound and the pain resulting from angina?	4.6 ± 0.8	4.6 ± 0.5
What does the heart look like and how does it work?	4.1 ± 1.2	4.4 ± 0.7
How does the heart heal?	4.4 ± 1.2	4.5 ± 0.6
Why does the patient have chest pain?	4.7 ± 0.6	4.7 ± 0.5
Why is the heartbeat irregular or skip beats?	4.7 ± 0.7	4.5 ± 0.8
Psychological factors		
What is the normal psychological response to a serious illness?	4.2 ± 1	4.2 ± 1
What is the importance of talking to someone about fears, feelings and thoughts?	4.0 ± 1	4.4 ± 1
What effect does stress have?	4.2 ± 0.9	4.5 ± 1
What can be done to reduce stress while in hospital?	4.3 ± 0.9	4.6 ± 0.6
What can be done to reduce stress when at home?	4.4 ± 0.9	4.6 ± 0.6
Risk factors		
What does the term "risk factor" mean?	4.2 ± 1	4.5 ± 0.7
Which risk factors may have contributed to delaying recovery from surgery?	4.3 ± 0.9	4.6 ± 0.5
What can be done to decrease the chances of having another heart attack or of having a heart attack?	4.3 ± 0.9	4.7 ± 0.5
How do these risk factors affect the heart?	4.4 ± 0.9	4.6 ± 0.5
Medication information		
When should the patient take each medication?	4.9 ± 0.2	4.8 ± 0.3
How should each medication be taken?	4.9 ± 0.3	4.8 ± 0.4
Why is the patient taking each medication?	4.8 ± 0.5	4.8 ± 0.4
What is the side-effect of each medication?	4.8 ± 0.4	4.7 ± 0.5
What should be done if the patient has problems with their medication?	4.5 ± 0.4	4.8 ± 0.3
When should the patient stop taking medication?	4.8 ± 0.4	4.8 ± 0.4
How does each medication work?	4.6 ± 0.8	4.5 ± 0.8
Diet information		
How does diet affect the operation?	4.7 ± 0.6	4.6 ± 0.6
What do the words "cholesterol" and "triglycerides" mean?	4.6 ± 0.8	4.4 ± 0.8
What foods contain cholesterol and triglycerides?	4.6 ± 0.9	4.6 ± 0.6
Which food can and cannot be eaten?	4.6 ± 0.9	4.7 ± 0.5
How can the patient adapt the recommended diet to their lifestyle?	4.7 ± 0.8	4.7 ± 0.5

MCPLNI = modified version of the cardiac patients learning need inventory; SD = standard deviation. Note: The degree of importance of the learning needs was based on the total mean score and categorised as either low (1–2.33), moderate (2.34–3.66) or high (3.67–5.00).

Table 4 (contd.): Mean score for each item of the modified Cardiac Patients Learning Need Inventory questionnaire for patients (n = 90) and nurses (n = 90)

MCPLNI domain items	Mean score ± SD	
	Patients' perceptions	Nurses' perceptions
Can the patient return to work?	3.2 ± 1.7	4.6 ± 0.6
When can the patient return to work?	3.3 ± 1.6	4.5 ± 0.6
What physical activities, if any, are restricted?	3.5 ± 1.6	4.6 ± 0.6
How can I tell if the patient can increase activity?	3.8 ± 1.5	4.5 ± 0.7
When can the patient engage in sexual activity?	3.4 ± 1.4	4.6 ± 0.7
Complications		
What complications might occur from the operation?	4.8 ± 0.6	4.7 ± 0.6
How can complications be recognised?	4.7 ± 0.7	4.7 ± 0.5
How can complications be prevented?	4.8 ± 0.5	4.8 ± 0.4
Chest and leg wound care		
How can chest and leg wounds be cared for appropriately?	4.9 ± 0.2	4.8 ± 0.4
What are the symptoms of wound infection in the chest or leg?	4.9 ± 0.3	4.9 ± 0.3
How can chest and leg wounds be protected from infection?	4.9 ± 0.2	4.9 ± 0.3
Other pertinent information		
When should the doctor be called?	4.7 ± 1.1	4.6 ± 0.6
Will any other tests be done after the patient leaves the hospital?	4.7 ± 0.1	4.5 ± 0.6
Will the patient need further testing after going home?	4.1 ± 1	4.5 ± 0.6
Where can family go to learn how to deal with the operation?	4.3 ± 1	4.5 (0.6)

MCPLNI = modified Cardiac Patients Learning Need Inventory; SD = standard deviation. Note: The degree of importance of the learning needs was based on the total mean score and categorised as either low (1–2.33), moderate (2.34–3.66) or high (3.67–5.00).

information regarding leg and chest wounds as top learning priority.[8,16]

Patients' and nurses' perceptions that leg and chest wounds, medications and complications were the most important learning needs in comparison to other domains can be explained by the severity of complications associated with CABG surgery. In addition, they may have had concerns around wound infection such as re-hospitalisation and have been more willing to adhere to treatment plans and medication regimens.[11,16] These findings are consistent with studies from Western, Eastern and Middle Eastern countries, which emphasise that nurses should pay more attention to educational plans regarding wound management, preventing surgery complications and wound infection.[16,17]

In the current study, patients perceived physical activity as the lowest educational priority. This finding was inconsistent with Omari *et al.* and Hamdan *et al.*'s studies that reported physical activity as the most important educational need post-CABG.[8,15] This inconsistency could be explained by the fact that the majority of the current sample were older (median = 63 years), unemployed (44.4%) and some were illiterate (43.3%).

Another reason for the perception of low educational need for physical activity may be related to the Omani climate. Oman is hot and humid with average temperatures ranging between 30–50°C, which makes the outdoor environment discouraging for physical activity. Despite the physical activity domain receiving the lowest priority in terms of learning needs, the individual items were perceived as having high-to-moderate importance, indicating that education on physical activities should be included when planning post-discharge educational plans.

A major limitation of this study is its cross-sectional descriptive design, where perceived learning needs cannot be determined over time. The convenience sampling technique may affect the study's generalisability. Data were collected from only two tertiary governmental hospitals and therefore excluded post-CABG patients and nurses from private hospitals. Future studies should focus on developing an educational programme upon discharge and testing its effectiveness on patients' post-CABG outcomes in a longitudinal study. Future studies should include CABG patients and nurses from private hospitals and compare their perceived

learning needs. In addition, future studies should aim to examine the influence of exposure to CABG via family or close friends on patients' learning needs.

Conclusion

This study highlights the need to assess patients' learning needs and establish a specific health education programme focusing on post-CABG learning needs after discharge. Nurses and healthcare providers should direct their efforts towards understanding patients' learning needs as guided by the findings of this study to plan a well-developed and personalised discharge education programme. Hospital management should consider making necessary adjustments to educational plans provided to post-CABG patients, keeping in mind the necessity to prioritise learning needs.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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