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Effect of Quality of Life in Rehabilitation Patients Following Cardiac Surgery at Sudan Heart Center, Khartoum, Sudan

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ABSTRACT

Caring for a patient following Cardiac surgery improves the healing process and prevents postoperative complications. Cardiac rehabilitation is a standardized protocol for caring for patients undergoing cardiac surgery. The present study evaluated the effect of quality of life in rehabilitation patients following cardiac surgery on patients' outcomes. It employed a quasi-experimental design, which was conducted in Sudan Heart Center. From (128) patients, data were collected by an interviewing questionnaire. The program was implemented and the data were collected in three phases. The data analysed by software program of (SPSS). Results revealed that there was significant increase in patients' knowledge (p=0.000). A quality of life in rehabilitation patients educational program improves the patient's outcome as indicated by the absence of postoperative complications, and improve the satisfaction of the patients. This study concluded that the educational program has a positive effect on patients' knowledge. Quality of life in rehabilitation patients' educational program an improve patient's health status as indicated by an improve patient's outcome, and satisfaction.

Key words: Cardiac Surgery, Quality of Life, Rehabilitation Patients, Heart Center.

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INTRODUCTION

The cardiovascular disease is the leading cause of noncommunicable disease deaths; it was responsible for more than seventeen million deaths that account for about 46% of total noncommunicable diseases deaths (WHO, 2014). Cardiovascular disease (CVD) is now the leading cause of death globally (Tilin et al., 2013). In addition, it causes high rates of morbidity and mortality worldwide. As is known, by 2020, the global mortality rate of cardiovascular disease will increase to approximately 31.5%. However, risk factors and causes are not well understood (Anakwue & Anakwue, 2014). Cardiovascular disease remains the leading and most serious cause of death among European and world populations. The Global Burden Disease Survey predicted that nearly 30% of all deaths worldwide were due to cardiovascular disease in 2010, meaning that they accounted for more than the total deaths from communicable, maternal, neonatal and nutritional disorders. In addition, they were twice as many as deaths from cancer [4]. Cardiovascular disease is the leading cause of death in the world, as it killed nearly 7.5 million people in 2008, or about 12.7% of all deaths worldwide (Fineglod, Asaria, & Francis, 2013).

OBJECTIVES OF THE STUDY

This study generally investigated on the quality of life in rehabilitation patient following cardiac surgery. Specifically, it aims to: (1) identify the basic knowledge of patients regarding quality of life in rehabilitation patient following cardiac surgery; (2) implement the quality of life in rehabilitation patient following cardiac surgery educational program; and (3) evaluate the effect of quality of life in rehabilitation patient following cardiac surgery educational program on patient knowledge and outcome.

Hypotheses

This study aims to effect of quality of life in rehabilitation patients following cardiac surgery at Sudan Heart Center, Khartoum Town, Sudan: (1) Patients' knowledge regarding the quality of life in rehabilitation patient following cardiac surgery will be improved after attending of the educational program; (2) There is a positive relationship between pre-post educational programs on patients' knowledge and outcome.

MATERIALS AND METHODS

Research Design

A quasi-experimental (pre-post) design hospital and community-based have been used. The study was conducted from August 2018 to March 2019. The research has been done in Khartoum city at Sudan cardiac center. Sudan cardiac center was established in 2000, and until now, Sudan cardiac center has strived to provide stat of the art patient care and treatment. In addition to training of doctors, nurses, and technologists. Sudan heart center, which provides medical and surgical care to heart patients with the cardiac disease from all over the country. Have different departments: - ER, CCU, ICU, CATH lab, CATH ward, and general ward. Cardiac surgical ICU consists of eight beds. The word consists of 34 beds, is divided into 7 beds for surgical cases and 27 beds for medical cases. About 4-6 surgical cases operated per week. The postoperative cardiac patient is admitted to ICU and transferred to the surgical word when they are stable.

Respondents Sampling Criteria and Ethical Consideration

The study population consists of all patients for cardiac surgery in Sudan cardiac center during the time of data collection. The following inclusion and exclusion criteria were used in the selection of samples. The following were the inclusion criteria: (1) Adult patients (18 years and

above); (2) Patient underwent cardiac surgery (coronary artery bypass graft CABG and valve replacement while the following exclusion criteria: (1) Patient who not agree to participate in the study; (2) Patient who admitted for emergency/urgent condition; (3) Patients who have not attended all seasons of the program or not complete the tests (pre and post).

The purposive sample of patient, who meet inclusion criteria in the Sudan cardiac center. The sampling technique was chosen because it will be appropriate for the author's time. After returning to the Statistics Bureau of the Sudan Heart Center and knowing the number of surgeries (replacement of coronary arteries and valve repair) over the past year 2017.

Further, this study was guided by the following ethical considerations: (1) Approval from research and ethics committee at Bahri University; (2) Approval obtained from Institutional Review Board of Sudan cardiac center; (3) Research purpose and objectives explained to participants in clear, simple words; (4) Participants have a right to withdraw at any time without any deprivation; (5) Participant has a right to gain benefit from the author knowledge and skills; and (6) Consent obtained from each participant who accepts to be involved in the study after explanation of objectives and out –come.

Data Gathering Procedure

The study has been designed in three phases: assessment, implementation, and evaluation. Gathering information takes about 8 months. The author started by introducing himself to the health professional workers and give them a brief idea about the aim of the study.

Assessment Phase

This stage served to identify the baseline knowledge to the patient who agreed to participate in the study, and who has been informed about the nature and purpose of the study before implementation of the program. They has been intended to be used also after the intervention in order to measure the knowledge level of the patient about quality of life in cardiac rehabilitation patient following cardiac surgery and evaluate the improvement after the program. Filling the questionnaire has been done by the author and took from 15-20 minutes for each participant. The program will be implementing to cardiac surgical patients in terms of sessions and teaching on the spots during their staying in hospital to enhance knowledge about quality of life in cardiac rehabilitation patient following cardiac surgery and pretest has been conducted.

Implementation Phase

After preparation of the program, the author started its implementation in many sessions, the first sessions perform in preoperative period, and the others performed in pre discharge period. The program has been administered to the patients in short sessions of about 30 minutes and filling out the questionnaire to measure, the patient knowledge (pre & post) test consumed on average about 15-20 minutes. Permission to implement the program has been obtained from the directors of Sudan cardiac center. The program has been carried out through 10 sessions. The attendances at the beginning of the first session, the author introduced himself to the patients and explained the objectives of the program and the content; also, patients has been informed about the time of the next session.

Evaluation Phase

Post-test has been carried out immediate after complete of educational program (post 1), and then another test has been carried out 'after two to three months of educational program (post 2). Each subject will be evaluated using author administered structured questionnaire to determine the improvement of patient's knowledge.

Research Instruments

The tools have been collected and then the appropriate questions will be selected and adapted to form a rough of these tools. Interviewing close-ended structured questionnaires filled by the author has been used to collect data. It designed by author based on the related literature. The questionnaire consists of three parts: Part 1: consist of six questions about demographical data of the patients, (age, gender, general education, and type of surgery); Part 2: consist of 21 questions with five options related to patients' knowledge of quality of life in rehabilitation patients; Part 3: satisfaction of patients toward a quality of life in rehabilitation patients, which consist of 10 items.

To assure that the instruments were reliable, they were subjected to content validity by technical experts. During the process, translations of specific terms in Chinese was conducted to improve the questionnaire. The time of completion of the instrument was tested and 20 minutes was adopted. It has been established for face and content validity by a panel of seven expertise is who revised the tools for clarity, relevance, applicability, comprehensiveness, understanding, and ease for implementation and according to their opinion, minor modifications will be applied. Before the actual study, a pilot study has been done on 10% of the calculated patients to check the accuracy of the information included in questionnaire and to identify the validity and reliability of the items. It helped in making necessary changes in the tools to detect data collection problems or difficulties. The reliability of a test is indicated by the "reliability coefficient" is denoted by the litter "r" and is expressed as a number ranging between 0 and 1.00. If "r"= 0 that indicates no reliability, and when "r"=1.00 that indicates perfect reliability. Reliability value 0.90 and up are excellent, 0.80 to 0.89 are good, 0.70 to 0.79 are adequate, and below 0.70 may have limited applicability.

Data Analysis

The tools have been collected and then the appropriate questions will be selected and adapted to form a rough of these tools. Interviewing close-ended structured questionnaire filled by the author has been used to collect data. It designed by author based on the related literature. The questionnaire consists of three parts: Part 1: consist of six questions about demographical data of the patients, (age, gender, general education, and type of surgery); Part 2: consist of 21 questions with five options related to patients' knowledge of quality of life in rehabilitation patients; Part 3:

satisfaction of patients toward a quality of life in rehabilitation patients, which consist of 10 items.

The satisfaction was based on the level of agreement using a five points Likert' Scale. The satisfaction of the quality of life in rehabilitation patients was comprised of 10 items for patients rated on 5-points "Likert Scales" from 1 to 5 (strongly disagree=1, disagree=2, neutral=3, agree=4, and strongly agree=5). The total scores ranged between 10 and 50; the scores have been calculated in percent. Items in the satisfaction checklist have been rated on the "Likert Scale". In analyzing the satisfaction data, the scores have been categorized as satisfaction, neutral, and dissatisfaction. Finally, the total satisfaction scores have been rated: ≥31 has been labeled as satisfaction, 21 to 30 has been labeled neutral, and ≤20 will be considered as dissatisfaction.

RESULTS AND DISCUSSION

Table 1: Comparisons between, (pretest), (posttest1), and (posttest2) patients' knowledge regarding to Physiotherapy

Pre-post1		Pre-post2		Post1-post2	
t. test	*P. value*	*t. test*	*P. value*	*t. test*	*P. value*
38.966762	0.000**	22.491930	0.000**	13.336767	0.001**
Mean = 1.803922		Mean =1.147059		Mean = 0.656863	
± SD = 0.467545		± SD = 0.515061		± SD = 0.497421	

*=significant differences at p≤0.05.
**=highly significant differences at p=0.000.

Table 2: Comparisons between, (pretest), (posttest1), and (posttest2) patients' knowledge regarding to exercise

Pre-post1		Pre-post2		Post1-post2	
t. test	P. value	t. test	P. value	t. test	P. value
44.122413	0.000**	43.597852	0.000**	16.944448	0.001**
Mean =10.892157		Mean = 7.803922		Mean = 3.088235	
± SD =2.493186		± SD = 1.807790		± SD = 1.840700	

*=significant differences at p≤0.05.
**=highly significant differences at p=0.000.

Table 3: Comparisons between, (pretest), (posttest1), and (posttest2) patients' knowledge regarding to medications

Pre-post1		Pre-post2		Post1-post2	
t. test	P. value	t. test	P. value	t. test	P. value
49.112996	0.001**	39.567910	0.000**	26.249421	0.016*
Mean = 11.215686		Mean = 7.401961		Mean = 3.813725	
± SD = 2.306373		± SD = 1.889312		± SD = 1.467337	

*=significant differences at p≤0.05.
**=highly significant differences at p=0.000.

Table 4: Comparisons between, (pretest), (posttest1), and (posttest2) patients' knowledge regarding to sternal care

Pre-post1		Pre-post2		Post1-post2	
t. test	P. value	t. test	P. value	t. test	P. value
49.624931	0.000**	40.991352	0.000**	19.734733	0.015*
Mean = 9.568627		Mean = 5.960784		Mean = 3.607843	
± SD =1.947376		± SD = 1.468626		± SD = 1.846360	

*=significant differences at p≤0.05.
**=highly significant differences at p=0.000.

Table 5: Comparisons between, (pretest), (posttest1), and (posttest2) patients' knowledge regarding to nutrition

Pre-post1		Pre-post2		Post1-post2	
t. test	P. value	t. test	P. value	t. test	P. value
37.025503	0.000**	28.917145	0.000**	19.555887	0.009*
Mean = 8.147059		Mean = 5.0		Mean = 3.147059	
± SD =2.222286		± SD = 1.746283		± SD = 1.625277	

*=significant differences at p≤0.05.
**=highly significant differences at p=0.000.

DISCUSSION

Cardiac rehabilitation has become an accepted adjunct treatment for the majority of patients with cardiovascular disease, especially for those who have received cardiac surgery (Dala, Doherty & Taylor, 2015). Cardiac rehabilitation programs are safe and effective in improving the functional activities, lung function, nutritional habits, and incision healing of patients with cardiac surgery and cardiac diseases (Bansal, 2020).

The results of the current study were presented and discussed as follows: Demographics, patients' knowledge, patient's outcome, in addition to level of satisfaction. The demographic data produced by the current study showed a slight increase for women over men by 52%:48% and the mean age was 55.8±13.3, thus, the highest age group was (42-68) years. The illiteracy rate was the highest for the qualifications of the study sample, as it amounted to 61 patients (59.8%) of the total sample, while the lowest qualification was the secondary educational level of 9 patients (8.8%) of the total study sample, and 88 of them (86.3%) were married. Regarding the type of surgery, the results showed that the highest number of patients 55 patients (53.9%) underwent valve surgery and 36 patients (35.3%) they were suffering from hypertension. This indicates that a large percentage of patients were illiterate, they suffer from chronic diseases such as hypertension, and with old age, in addition to the fact that most of them are married (that is, they have other priorities). All of these factors inevitably affect negatively the level of patient's knowledge and daily activities regarding quality of life in the rehabilitation phase after heart surgery.

When referring to previous studies and comparing them to the current study, there is a clear consensus that the aging

and the lower educational level are considered risk factors for morbidity and the patient's low level of knowledge as the highest age group was (42-68) years old with a mean age is 55.8±13.3. Many studies had pointed out that most cases were male, and average age group was (50-60). Clerkin, et al, (2020) reported that most of the patients were males (86.7%) and the mean group was 63.07±7.93. El Bardissi.(2012) the study was conducted during the year 2009 and it was compared to a study conducted during the year 2000, and it was concluded that the mean age was equal in both studies where it was 65±8. Males were (72.9%) in 2009 compared to (70.6) in 2000, diabetes mellitus (33%) in 2009 compared to (40%) in 2000, and hypertension (71%) in 2009 compared to (85%) in 2000.

In the current study, before educational program, patients' level of knowledge on quality of life in the rehabilitation phase after cardiac surgery was almost nonexistent, although there are slight differences regarding some aspects such as nutrition, drug use, daily activities etc., but they remain below the required level. Despite the low level of patient knowledge, however, after the implementation of the educational program, a significant change was observed in the level of patient knowledge, as the statistical significant deference were $p < 0.05 = 0.000$. On the other hand, it was found that there are also statistical significant between the tests after implementing the educational program (posttest1 and posttest2) as the statistical significant deference were $p < 0.05 = 0.001$. This means that patients benefit greatly from educational programs; this reflects positively on their level of knowledge, but at the same time, and with no continuous follow-up, they lose what they have gained information after 90 days of educational program. For this reason, they need to implement fruitful educational programs on quality of life in the rehabilitation phase.

In addition, there were no patients who had adequate knowledge with a percentage of (0%), while after the educational program, the percentage rose to (61.5%) in the posttest1, but it returned to decrease in the posttest2 (90 days after the educational program) to record (19.6%). All this proves the validity of the hypotheses that were formulated and accepted, where the hypothesis assumed that the patients' level of knowledge would improve significantly after attending the educational program, and there was a statistical significant deference between the pretest and posttest of the educational program.

Returning to previous studies, it was found that most of them prove that patients acquire knowledge about their diseases and everything related to this through educational programs, the percentage of knowledge among patients varies from one study to another and from one country to another according to several factors, the most important of which is the educational level of patients, the availability of optimal medical facilities, in addition to availability of awareness and rehabilitation centers. There are some studies that patient information changes positively and improves after attending educational programs, especially when confirmed by the evidence base when the statistical significance deference is $p<0.05$.

(Abdo & Mohamed, 2010; Ryhänen et al, 2010). The results of the current study are similar to the results of other studies conducted to know the level of patients' knowledge before and after the implementation of educational programs.

In the midst of the current study and its details, and during the educational program, the researcher discussed with the patients the most important aspects of the rehabilitation process such as chest physiotherapy, nutrition, medicine, sternal care and daily activities. Through the results, there was no more difference from the overall level of knowledge grad of the patients, as the patients' knowledge before the implementation of the educational program about physiotherapy was inadequate and recorded at (91.2%), and the mean was 0.3±0.8, but it rose after the program as the percentage of patients with adequate knowledge reached (89.2%) and the mean was 6.8± 1.1 where statistical Significance deference of showed it was $p<0.05 = 0.000$. The patient needs to be instructed and awareness of the things he must do, in addition to training the patient to use a spirometer and the correct method of deep breathing would improve his level of knowledge and make him maintain the optimal function of the lungs after heart surgery.

Numerous studies have shown similar results for current study regarding chest physiotherapy (i Figuls, et al, 2016; Newstead, Seaton, & Johnston, 2017; Topal, et al, 2019) they demonstrated that the patient's knowledge on physiotherapy improves after educational programs, especially those that use concrete objects such as a spirometer and training the patient in breathing exercises. This leads to improved lung function and improvement in the level of oxygen in the blood and preventing the accumulation of mucous secretions in the respiratory tract.

By directing attention to the daily activities and actions through which the researcher wanted that the patient can distinguish the activities that he must practice and is important and beneficial to the body from those activities that are dangerous, especially during the rehabilitation period after cardiac surgery in addition to the gradual return to the usual daily activities and a smooth involvement in life. When analyzing the results of daily activities, it was noted that all patients were unaware of what activities should be practiced or even the way they were practiced, and the percentage of inadequate information was (100%) with mean of 0.5±0.9. However, this percentage changed positively after applying the educational program, to constitute (42.2%) of patients with adequate knowledge, while (47.1%) of patients had moderate knowledge, and the mean was 11.3± 2.9. Old age, low educational level, and fear of being affected by the surgical site are very important factors in not recording a high percentage with regard to daily activities despite clarifying all the pros and cons of daily activities, but one training program remains insufficient to reach impressive results. However, the results of the current study regarding activities remain excellent and have statistical significance deference as $p <0.05 = 0.000$. Exercise training is beneficial and most likely safe after cardiac surgery, resulting in improved exercise capacity and self-reported quality of life. Home exercise training programs are probably as effective as hospital programs. Home exercise training programs should be integrated in the follow-up care of patients undergoing cardiac surgery (Minnella, et al, 2018). The current study result line with

Shah et al, (2016), they mentioned that early mobilization and exercise seems to be important to prevent postoperative complications, improve functional capacity, and reduce length of hospital stay in patients after cardiac surgery.

As for the medications and methods of using it without the help of others, and the things that should be focused on when using, especially anticoagulants, it was found that (95.1%) of patients had inadequate knowledge, and the mean was 0.8±1.7, but the percentage increased after the educational program and the percentage of patients with adequate knowledge was (83.3%) and the mean was 12.0±2.5, and have statistical significance deference as $p<0.05 = 0.001$. After 90 on the day of the educational program, patient knowledge had decreased to (22.5%). These results are identical to the results of the O'Neal, Shaw, & Billings (2016) which indicated the importance of patient knowledge of each with regard to the medication that must be used after cardiac surgery and that must be improved through educational programs where it showed a statistical relationship between educational programs and improved patient knowledge. Where the statistical significance deference was $p<0.05 = 0.002$.

Sternal care is one of the most important things that should be taken care of after heart surgery, which the patient must realize that taking care of them means preventing infection and thus reducing the possibility of complications and improving the outcome. In the current study, patient knowledge regarding sternal care was inadequate by (100%), and with mean of 1.1±1.5, this percentage improved to be an adequate knowledge percentage of (85.3%) and mean of 10.696078±1.98404. Where the statistical significance deference was $p<0.05 = 0.000$. These results are identical to the results of the studies of Peirce & Grady (2019) and Katijjahbe et al, (2018).

When talking about nutrition and diet that patients must follow during the rehabilitation period after cardiac surgery, the current study showed that knowledge of patients before the start of the educational program was inadequate at (98%), but after implementing the educational program the results showed that (74.5%) of patients have adequate knowledge. In addition, through the results of the test after 90 days, the percentage was referring to (7.8%), which is the lowest rate recorded through posttest2. This is due to several factors, including the food habits in Sudan and the financial condition of patients, in addition to the fact that most patients live in rural areas through which it is difficult to obtain the required food diversity. On the other hand, we note that there is a strong statistical significance with regard to patient knowledge before and after applying the educational program where the statistical significance deference was $p<0.05 = 0.000$. Most previous studies that analyzed the nutritional program for patients undergoing cardiac surgery which done by Ratajska, et al (2019) discuss and demonstrate that healthy and adequate nutrition greatly helps in reduce surgical stress, maintain physiological functional capacity, and facilitate postoperative functional recovery. In addition to preventing complications and improving outputs.

Crosstab between gender and total knowledge of the current study showed that women had less knowledge than men before and after the educational program, as the rates between women and men during the pre-test (52%: 48%) and all of them were inadequate knowledge, while the proportion of women to males after the educational program (post-test1) was as follows (21.4%: 40 %) their knowledge was adequate, (16.8%: 6.9%) their knowledge was moderate, and (13.8%: 1%) was inadequate knowledge. These differences may be because men are more educated than females, especially in rural areas, in addition to the household responsibilities of females more than males, and there may be other factors that we cannot predict.

With regard to the relationship between the patients' level of knowledge and their educational level, the current study showed a decrease in the knowledge level of illiterate patients, as (59.8%) of patients whose knowledge was inadequate were illiterate. In addition to that they are the most groups that lost information after the educational program, where the illiteracy rate was with sufficient information after test1 (27.5%), this percentage decreased to reach (1%) in test2 (after 90 days of the educational program). The high percentage of illiterate patients and their inability to take full advantage of the educational program sessions in addition to their inability to read the educational guide prepared by the researcher, which was given to the patients as it contained all the information included in the educational program, all of these factors contributed to the low level of knowledge in illiterate patients.

Through the current study, patients' level of satisfaction was measured for everything that was presented to them during the educational program in addition to the educational guide. The results showed that (94.1%) of the patients feel satisfied while (5.9%) were neutral. The level of satisfaction among patients has been reported by many studies, including the Talal et al (63), where his study showed that (82.3%) feel satisfied, while (17.6%) of patients do not feel satisfied, Chalise, Gita Dhakal, et al (2018), where their studies showed a relative level of satisfaction in patients after providing educational programs post cardiac surgery. The level of satisfaction among patients is directly related to the quality of the service provided to the patient, whether clinical services or educational programs, and this means that, whenever the patient's level of satisfaction is high the service provided is successful and thus this has a positive impact on the patient's outcomes.

Perhaps the patient's outcomes are the ones that reflect the success of the educational program, as good outcomes are the most important goals of services and programs that are provided to patients, and through the current study, results showed that (96.1%) of patients with good outcomes compared to (3.9%) with poor outcomes. The good outcomes came because of the success of the educational program and the appropriate methods used in implementation, in addition to the large response shown by patients at the level of knowledge and its projection on the quality of life and daily activities. Poor outputs may be due to the educational level of patients, habits and traditions of patients, in addition to the possibility of factors unknown to the current study that led to this ratio. All this proves the validity of the hypotheses that were formulated and

accepted, where the hypothesis assumed that is a positive relationship between pre-post educational programs on patients' outcome.

Complications after cardiac surgery would determine the patient's outcome, chest infection, inflammation of the surgical site, and non-healing of the wound during the first three months, all or one of which is a clear indication that the patient's output is poor. The implementation of such programs for the rehabilitation of patients after cardiac surgeries requires great coordination between nursing, internal medicine doctors, and surgeons, in addition to physiotherapist and the involvement of the patient and his family. Rehabilitation centers at the state level have a prominent role in implementing these programs, as it is easy for the patient to follow-up and obtain appropriate health services and advice. All this helps a lot in providing standardize care and improving performance to achieve excellent outcomes.

CONCLUSION

The current study showed that after implementation of educational program the patients' knowledge was improve significantly and the knowledge grade were adequate 61.5% and 19.6% compare to 0% before educational program. A Quality of life in cardiac rehabilitation patient following cardiac surgery educational program had a positive effect on patients' outcomes, 96.1% of patients had not complications after surgery, no chest infection, no inflammation of the surgical site, and healing of the wound during the first three months, this entire indicator led to good and perfect outcome. In relation to physiotherapy, daily exercise, medication use, sternal care, and nutration, were significant improved after educational program were (p=0.000 and p=0.001), (p=0.000 and p=0.001), (p=0.000 and p=0.016), (p=0.000 and p=0.015), and (p=0.000 and 0.009) respectively. The majority of patients were satisfied constituted 94.1% compared to 5.9% of patients are neutral and there is no patient is dissatisfied regarding educational program.

Practical Implication of the Study

Based on the finding of the current study, the following recommendations are suggested: (1) Carry out cardiac rehabilitation educational programs as one of the most important things associated with cardiac surgery; (2) Developing and establishing centers for cardiac rehabilitation inside Khartoum and at the states level so that patients can follow up' (3) In service training and continuous learning to activating the role of the nursing staff in the health education process related to quality of life in the rehabilitation stages for patients undergoing cardiac surgeries; (4) Carrying out more research in this regard and applying the educational guide and developing it continuously until good results are reached.

Strengths and Limitations of the Study

This study generally investigated on the quality of life in rehabilitation patient following cardiac surgery. Despite the use of quasi-experimental research design, a cross-sectional method is still encouraged for future studies to be conducted with larger number of samples using mixed method of research to obtain triangulation and validation of results. Likewise, there is also a needed for multilevel analyses to ascertain the real outcome of pre-post-operative cardiac pain management program and the satisfaction of the patients. Moreover, the study is only limited to selected number of participating hospitals due to the interest of time and funding.

CONFLICT OF INTEREST

None

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