REVIEW ARTICLE

Best practice in cardiac rehabilitation for patients after heart valve repair or replacement surgery in Namibia: A literature review

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ABSTRACT

Heart valve repair and replacement is an invasive surgery which may compromise quality of life for the patients concerned. Therefore, patients who had heart valve surgery need rehabilitation interventions to prevent potential complications, and to promote quality of health. A rehabilitation programme is a medically supervised intervention which can assist patients coping with challenges related to heart surgeries and prevent potential complications. This review was undertaken to identify core components of a cardiac rehabilitation programme which can feasibly be adopted for the rehabilitation of patients who had heart valve surgeries locally. A literature review of articles on best practices regarding the core components of cardiac rehabilitation for patients who underwent heart valve repair or replacement surgery was undertaken. Published international guidelines of best practice for cardiac rehabilitation from 1993 to 2018, available in English language were identified through a search of electronic database and reviewed. A total of 20 articles with concepts on cardiac rehabilitation programme were retrieved. Out of the total, only 8 articles meet the criteria and the data were collected from the 8 articles. The findings indicated that patient assessment, exercise, physical counselling, diet/nutritional counselling, tobacco cessation, mental health, return to work, lipids, hypertension, cardio-protective therapies are essential components for the rehabilitation after heart valve surgeries, to support patients and their families to cope with challenges related to surgeries. These in return improve quality of life for the patients concerned. The core components for the cardiac rehabilitation programmes as highlighted by the international guidelines can be adapted to the cardiac rehabilitation programme in Namibia if tailored to the contextualized needs for the cardiac patients in Namibia.

Key Words: *Cardiac rehabilitation; Core components; Guidelines; Heart valve surgery; Heart valve replacement*

INTRODUCTION

Heart valve repair or replacement surgery is a medical procedure for treatment of moderate structural heart diseases such as septal defects and valvular heart diseases and is implemented when the valves becomes floppy and leaky. The diseased valve is replaced with either a mechanical (artificial) or biological tissues valve [1,2].

Although the mechanical and biological valve may improve patient's quality of life, these substitutes are associated with risks, including thrombo-embolism and bleeding during recovery. Therefore, the literature indicates that that thrombo-embolism and bleeding are the main cause of valve related complications after mechanical valve replacement [3,4].

Given the potential complications from heart valve repair and replacement surgeries, the literature suggests that patients who underwent heart valve repair or replacement surgeries should receive rehabilitation in order to prevent potential complications and thereby improve their quality of life [5].

A rehabilitation programme is a medically supervised intervention to assist patients coping with challenges related to heart surgeries to prevent potential complications. Interventions of the rehabilitation programme aims to reduce the risk of future cardiac complications after a heart surgery, therefore to improve patients' physical function and increase their quality of life [6-8].

International guidelines including the WHO publication on cardiac rehabilitation have been developed and recommended for all patients with cardiovascular conditions from different socio-economic contexts. The benefit of CR is well illustrated in literatures, and if locally available may reduce mortality, readmissions and improves quality of life [9-12].

GOALS AND OBJECTIVES

The goal of this study was to identify and review the guidelines on best practice of cardiac rehabilitation for patients after heart valve repair or replacement surgery with the purposes to make inferences for cardiac rehabilitation in Namibian context.

The objectives were to:

- Identify published international guidelines on best practices for patients who had heart valve repair or replacement surgery.
- Review published international guidelines on best practices of cardiac rehabilitation of patients who had heart valve repair or replacement surgery.

LITERATURE REVIEW

A literature review on best practices regarding the rehabilitation of patients who underwent heart valve repair or replacement surgery and those with cardiovascular diseases was undertaken. Online database such as Google Scholar, Medline and PubMed which contains scholarly published guidelines, position papers and consensus statements on cardiac rehabilitation were identified on the electronic database of the University of Namibia (UNAM) library. Peer reviewed publications and scholarly guidelines and position papers on cardiac rehabilitation were selected. The search terms were guided by the title of the study, goals and objectives mainly focused on cardiac rehabilitation of patients after heart valve surgery.

International guidelines, position statements/papers and policy documents, consensus statement, frameworks for cardiac rehabilitation available in the English language published since 1993 to 2018 from high and low-income countries were identified through a search of electronic database of Google Scholar, Medline and PubMed. The World Health Organization (WHO) Expert Committee on rehabilitation after cardiovascular diseases prepared for guidelines with special emphasis for developing countries on cardiac rehabilitation for low-resource settings was also included in the review. The core components of cardiac rehabilitation guidelines of cardiovascular conditions were extracted and compared in order to identify components which are feasible and affordable to be delivered in Namibian context.

Given that there are limited empirical studies on heart valve surgeries, this review was based on the findings found on patients with cardiovascular diseases, heart failure, and Coronary Artery Bypass Graft (CABG).

STUDY POPULATION

Brink et al. [13] defines population "as entire group of persons or objects that is of interest to the researcher, that meets that the researcher is interested in studying". In this review, the target population were all published

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international guidelines, policy statements, position papers, peer reviewed publications including World Health Organization (WHO) guideline on best practice for cardiac rehabilitation from 1993 to 2019, available in English language on electronic database of Google Scholar, Medline and PubMed. The search terms used were "cardiac rehabilitation, core component, heart valve surgery, heart valve replacement, guidelines.

Sample and sampling technique

In the research context sample "is a part or fraction of a whole or a subset of a larger set selected by the researcher to participate in a research study" [13]. Sampling is the process of selecting the subset or portion of the population in order to represent the accessible population [14]. The sample in this review was a total of 20 articles with concepts on cardiac rehabilitation programme which were retrieved. Out of the total only 8 articles meets the criteria.

Data collection

Data collection is defined as a precise, systematic gathering of information related to the research purpose or the specific objectives of the study. In this study, the data on best practice regarding cardiac rehabilitation for patients after heart valve repair or replacement surgery were collected from the 8 articles. The core components of guidelines on cardiac rehabilitation were extracted and compared in order to identify components which are feasible and affordable to be delivered for patients after heart valve surgery in Namibian context.

Data analysis

Data analysis entails exploring and organising the raw data, analysing and interpreting the data in order to give them meaning [13]. In this study, qualitative data analysis was employed. Each article was read to identify the search terms. Components of the programme for cardiac rehabilitation and the advantages were identified from different articles/sources. The data from each article/source were organized under the categories of components of the rehabilitation programme for cardiac patients

FINDINGS

The findings indicated that the core component of cardiac rehabilitation after heart valve surgery includes patient assessment, modification or adjustment of physical activity counselling, exercise training, diet/nutritional counselling, smoking cessation and psychological management [4,8,14].

Moreover, the literature review suggests that delivery of the core components requires expertise from different range of professional namely: cardiologists, physician, nurse specialist, physiotherapist, dietician, psychologist, exercise specialist, occupational therapist and clerical services, as detailed on in the next sessions [8,14].

Patient assessment

All the international guidelines and WHO reports including the consensus statement from low-resource countries recommend that patient-centred assessment should be conducted before the commencement of the cardiac rehabilitation [14,15-23].

Patient assessment should include clinical history, physical examination, blood testing, ECG, physical activity level and peak exercise capacity to establish the patient's ability to endure the activities for the rehabilitation [4,16,18,21-23].

Physical activity counselling

The literature recommends counselling of clients on physical activities before the commencement of the exercise. activity level need to be assessed and for adjustment the activities of cardiac clients according to age, gender and daily life such as driving, sexual activity, sports, gardening household tasks [16,18,23]. As part of physical activities, exercises for cardiac patients are also adjusted.

Exercise training

Given the variation that exists in the intensity, duration and frequency of training sessions between international guidelines, both aerobic and resistance exercise training after a cardiac event or interventions are recommend [16,18,23]. In this regards, the WHO publication and Australian guidelines both recommend low to moderate aerobic exercise [18,20,23]. Aerobic exercises is recommendable after heart surgeries as it improves cardiovascular efficiency and subsequently increases the efficiency of respiration and efficient distribution and delivery of oxygen to muscles [24].

Diet/nutritional counselling

Given that unhealthy diet contributes to the conditions which precipitate development of cardiac diseases (vis-à-vis: obesity, diabetes, hypertension) the literatures recommend a healthy eating pattern which include reduction in intake of saturated fats, sugar and salt and recommends increased intake of fresh fruits and vegetables [5,16].

Fresh fruits and vegetables are recommended after heart surgeries because they provide energy, help patient regain strength, boost immunity and as a results enhance.

Tobacco cessation

Cigarette smoking is associated with increased high risk of cardiovascular diseases. The carbon monoxide in tobacco replaces oxygen molecules on the haemoglobin, thereby lowering oxygen tension in the blood. As a result, the patient is at risk of hypoxia. This risk could intensify for a cardiac patient, whose cardiac output and delivery of oxygen to the tissues is at stake. Therefore the literature recommends smoking cessation for patients after cardiac surgery as the cornerstone for health. The European Association for Cardiovascular Prevention and Rehabilitation recommends that all smokers should be encouraged to stop smoking, and patients referred for special programmes.

Both international guidelines recommend application of structured approach of the 5 As (Ask, Advice, Assess, Assist and Arrange) as a smoking cessation strategy [5,16,20,21]. This is a psychological intervention for 30 minutes, conducted by physician, nurse or trained health personnel at the CR centre for patients of low-income countries. Furthermore, the services should include topic on advice on stop smoking, risks and consequences, benefit and advice on methods of quitting [18].

Psychological management

There is evidence that patients with cardiovascular diseases are prone to psychological problems due to cardiac conditions. Therefore, the Australia, United States and European Association guidelines as well as the consensus statement from low income countries all recommend screening of the use of patients after cardiac surgeries by a psychologist [5,14,16,19,20]. The use of a standardised interview tools is recommended in order to identify psychological distress which may be highlighted by depression, anxiety, anger, social isolation, marital or family distress, sexual dysfunction or adjustment, substance and alcohol abuse [5,14,16].

Furthermore, the United States and European guidelines recommend that the assessment should be conducted by a psychologist, while the Australian guidelines recommend that the screening assessment done by a social worker, psychologist or other trained counsellor [20]. In contrast, the low income consensus recommends that the screening can be performed by any health care professionals capable of undertaking diagnostic interview on depression [18]. The last provision may apply to the Namibian context. Psychological screening for patients after heart surgery may be conducted by a nurse because in Namibian context nurses are also at the fore front of providing counselling to patients. Counselling of patients for rehabilitation also helps the patient to adapt to life after cardiac surgery, including returning to work.

Return to work

The WHO reports that returning to work for patients with cardiovascular disease depends on the nature of the disease and the type of work an individual undertakes [23]. The international guidelines with regard to rehabilitation of patients after cardiac surgery recommend that education and support should be provided on resumption of physical activity, resumption of work or voluntary roles, driving, sexual activity and other daily living activities [22]. The European position paper further recommend that before discharge and return to work, resumptions of work related duties and any strenuous physical activities should be discussed with the patients and their partners before resumption of such activities. In this regards consensus from low income countries recommend that patients should undergo an assessment of occupational type, employment status and desired occupational status [18]. Moreover, consensus recommend that when available exercise testing of treadmill can be done before return to work and where resources are not available a 6 minute walk test should be performed [18].

DISCUSSION

A literature review was conducted on articles, international guidelines and statement papers from high-income and low-income countries regarding the best practices of cardiac rehabilitation of patients after a cardiac event

and interventions. Although there are differences in the mode of delivery and multidisciplinary team, all the resources conducted recommend the similar core components to be delivered to all patients after a cardiac event or interventions. The review shows that patient assessment, exercise, physical counselling, diet, mental health, return to work, tobacco cessation and education are essential for patients after a cardiac event [20].

The benefit of CR is well illustrated in the literatures, and if available may reduce mortality, hospital re-admissions and improves quality of life for the patients after cardiac surgery [9,10-12]. In this regard, the literature indicates that cardiac rehabilitation is associated with significant reduction of mortality of approximately 25% among patients who underwent combined heart valve and cardio artery bypass graft (CABG) surgery and participate in cardiac afterwards [10,25].

In addition, few studies have reported the impact of physical exercise training on patients following heart valve surgery. A Cochrane systematic review conducted in Denmark revealed that cardiac rehabilitation has beneficial impact on physical exercise capacity in patients who had isolated valve surgery [12]. A similar study conducted on cardiac rehabilitation after heart valve surgery comparing with patients who had cardio artery bypass graft found that the patients who underwent heart valve surgery obtained similar improvements in aerobic fitness training when compared to patients who underwent cardio artery bypass graft. The study further reported that both patients experienced improvements in strength, self-reported physical function and depression scores [26].

Another study conducted by Pollman et al. [27] among 250 patients who underwent heart valve replacement between January 2009 and August 2013 reported that cardiac rehabilitation after heart valve surgery improves exercise capacity and was associated with decreased morbidity [27]. Therefore Cochrane systematic review and meta-analysis confirmed that exercise based cardiac rehabilitation reduces cardiovascular mortality, reduces hospital admissions and improves quality of life [9].

Furthermore, Lund et al. [12] reported that moderate to high levels of physical exercise and participation in cardiac rehabilitation among patients who underwent heart valve were highly associated with survival rates. Importantly, the WHO report with special emphasis on developing countries and other high income countries such as Australia, Scotland, Japan and Northern Ireland guidelines also recommend low-to-moderate intensity exercise for patients after cardiac surgery [23-28].

Moderate to high level physical exercise is regarded to be safe to patients following heart valve surgery, taking into consideration the sternotomy wound. In this regard, report of a randomized clinical trial of CopenHeart VR suggests that upper body strength training should start when the patient is free from pain and at least 6 weeks post-operative to avoid complications of unstable sternum [29].

Despite of well documented benefits of cardiac rehabilitation on patients with cardiovascular diseases and following cardiac surgeries, cardiac rehabilitation is generally underutilized even in most high income countries where best practice guidelines are available. Hence, the highest uptake rates of 52% among patients undergoing heart valve surgery were recorded in Denmark [24].

Numerous studies have indicated barriers for the use of cardiac rehabilitation. An integrative review done by the American College of Nurse practitioners on facilitators and barriers in cardiac rehabilitation reported various factors which inhibit participation in cardiac rehabilitation. These include: depression and anxiety, income status, age, health and cultural/ethnic status, gender, transportation and lack of knowledge [30].

Similarly, a review of best practices in cardiac rehabilitation for women reported that patient's behaviour/beliefs such as smoking; sedentary lifestyles; obesity; marital status; perceptions that exercise is painful; attitudes of health professionals (physicians, nurses, and physiotherapists) and contextual factors such as employment, self-esteem, family support, low socioeconomic status and lack of transportation and comorbidities such as depression and musculoskeletal limitations were the many barriers for women not attending cardiac rehabilitation programmes [6]. Given the complications related to heart surgeries and the benefits of cardiac rehabilitation when available, this review identified core components suitable for patients who had heart valve repair or replacement surgery, which may be applied to the local (Namibian) context.

LIMITATIONS OF THE STUDY

The information on best practice for cardiac rehabilitation was based on publications obtained mainly from high-income countries and limited to low-income countries. Therefore, it is possible that documented components for cardiac rehabilitation programme may not be applicable to the low-income countries including Namibia.

INNOVATION

Interventions such as patient assessment before the initiation of cardiac rehabilitation, physical activity counselling, exercise training, diet/nutritional counselling, smoking cessation, psychological management, and return to work can be introduced to patients who had heart valve repair or replacement surgery in Namibian context. Furthermore, cardiac rehabilitation programme for low-income countries as per the recommendations of the World Health Organization tailored to the contextualized needs for the cardiac patients be adopted locally (Namibia), for the rehabilitation of patients after heart valve surgery.

RECOMMENDATIONS

On the basic of the findings from the review on best practices regarding rehabilitation of patients after heart surgery the following recommendations are subsequently made.

It is recommended that for a contextualized evidence based intervention, the following recommendations are made:

- A study among patients and their caregivers to assess their knowledge regarding cardiac rehabilitation.
- A study among nurses who provide care to patients after cardiac surgery to assess nurses' knowledge and practice regarding cardiac rehabilitation for patients who has heart surgery.

CONCLUSION

This review on best practices highlighted core components of the programme regarding cardiac rehabilitation. The benefits of each components of a cardiac rehabilitation programme are outlined. These core components for cardiac rehabilitation programmes which are highlighted by WHO and the international guidelines can be adapted to the cardiac rehabilitation programme in Namibia as innovation if tailored to the contextualized needs for the cardiac patients in Namibia.

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