

Barriers to establishing outpatient cardiac rehabilitation in the western region of Saudi Arabia : A cross sectional study

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1 **Barriers to establishing outpatient cardiac rehabilitation in the western region of Saudi**
2 **Arabia: A cross sectional study**

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12 **ABSTRACT**

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14 **Background:** The core of cardiac rehabilitation is structured exercise training. CR reduces
15 28-56% hospital readmission rate, and around 25 % increases cardiorespiratory fitness, thus
16 there is a need to establish outpatient CR (Phase III) in Saudi Arabia (SA). Furthermore, the
17 awareness of outpatient CR in SA is unknown. **Aims:** To determine the main barriers to
18 establishing an outpatient CR program (Phase III) in the western region of SA, as well as
19 assess the awareness of outpatient CR (Phase III) in the western region of SA.

20 **Methods:** A cross-sectional study survey was conducted among physiotherapists,
21 cardiologists and the cardiac surgeon using a questionnaire distributed electronically to
22 determine the awareness level of outpatient CR and barriers to establishing outpatient CR
23 (Phase III) in the western region of SA.

24 **Results:** Of the 141 participants who completed the survey, our findings showed that 131
25 were aware of CR with 112 participants were not aware of the four phases of CR. There were
26 three main barriers to establishing CR: no appropriate CR (96%), lack of awareness among
27 healthcare professions of the comprehensive CR phases and its benefits (95%) and the lack of
28 healthcare providers trained in CR (94%).

29 **Conclusions:** To overcome the barriers to establishing CR outpatient centers in the western
30 region of SA, it is recommended to provide more CR outpatient training programs to
31 healthcare providers and raise the awareness of the CR phases, its benefits, and the risk
32 factors for developing cardiac diseases among healthcare providers.

33 **Keywords:** Cardiac rehabilitation, barriers, awareness.

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36 **INTRODUCTION**

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38 Annually, 17.9 million people die worldwide because of cardiovascular diseases (CVDs)¹. A
39 report released by the Ministry of Health in Saudi Arabia (SA) 2013 stated that 42% of non-
40 communicable diseases in SA are caused by CVDs including heart attacks,² with a 42%
41 death rate caused by CVDs alone³. It is predicted that by 2030, the number of people who
42 will die from CVDs worldwide will increase to around 23 million if no effective treatment or
43 prevention is implemented. Moreover, cardiovascular morbidity intends to increase among
44 children unless effective action is taken².

45 In the Gulf Region, there is a need for effective preventive strategies to reduce the risk of
46 CVDs in the coming years³. The prevalence of ischemic heart disease in SA is 23%, with an
47 acute coronary syndrome prevalence of 77% in males and 32% in females³. The most
48 common risk factors to develop cardiac disease in SA are being diabetic (56%), hypertensive
49 (48%), a smoker (39%), and having high cholesterol (31%)³. Physical inactivity, an
50 unhealthy diet, and smoking are the most important risk factors for the development of CVDs

51 ²; therefore, comprehensive cardiac rehabilitation (CR) is the optimal treatment for patients
52 with CVDs and prevention for those at risk ⁴⁻⁸.

53 Comprehensive CR has many facets, including psychological and dietary support and
54 exercise programming, with structured exercise training being the main component ⁴. CR is
55 effective in decreasing the total mortality rate (11) by approximately 13–26% and the cardiac
56 mortality rate by 26–36%, increasing the quality of life, reducing dyspnea ⁴ and around 28-
57 56% hospital readmission rates ^{4,7,9} around 25% increasing cardiorespiratory fitness of
58 cardiac patients ^{4,10,11} and reducing the risk of future cardiac events ^{12,13}.

59 There are four phases of CR. The first phase is inpatient and begins after cardiac surgery; the
60 second phase starts after the patients are discharged from hospital for three to six weeks; the
61 third phase is the outpatient phase and is more independent with training exercises; and the
62 fourth phase is the maintenance phase and provided in the community ⁹. To the best of our
63 knowledge, most cardiac centers in SA conduct phase 1, providing cardiac rehabilitation for
64 inpatients after cardiac surgery, but there are very few cardiac centers conducting phase III
65 CR for outpatients after cardiac surgery. Thus, there is a need to establish outpatient CR
66 (Phase III) centers in the western region of SA ¹⁰, so the objectives of this study are to
67 determine the level of awareness of CR in the western region of SA and to investigate the
68 barriers to establishing comprehensive CR centers in in the western region of SA.

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70 **METHODS**

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72 **STUDY DESIGN AND PARTICIPANTS**

73 This cross-sectional study was approved by the Biomedical Research Ethics Committee of
74 Umm Al-Qura University, approval number HAPO-02-K—012-2021-03-591 and conducted
75 using an electronic questionnaire in English language, which was distributed in 20 Saudi
76 hospitals and two universities in the western region of SA. The target responders for this
77 questionnaire were cardiologists, cardiac surgeons and physiotherapists. The high quality of
78 the questionnaire can reflect on the following: each question in the questionnaire was based
79 on a previous report from the expertise review of barriers to CR in SA ¹⁰ and some elements
80 were derived from a previous study regarding barriers to establishing pulmonary
81 rehabilitation in SA ¹³. The validity and reliability of the questionnaire was tested by
82 physiotherapists (a total of 8) before it is used.

83 The questionnaire consisted of two parts, the first part was concerned about the awareness of
84 comprehensive CR (outpatient) in SA among cardiologists, cardiac surgeons, and
85 physiotherapists. If the participants were not aware of comprehensive CR and its phases, the
86 definition of CR (outpatient) and some details about CR were provided to increase the
87 participant awareness. The second part of the questionnaire was concerned about the barriers
88 to establishing comprehensive CR (outpatient) in SA.

89

90 **DATA ANALYSIS**

91 The descriptive data were statistically analyzed and reported as frequency and percentage
92 using SPSS (27 version) to address the objectives of this survey.

93

94 **RESULTS**

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96 The study participants were 67 physiotherapists and 73 cardiologists with 1 cardiac surgeon
97 aged 24 to 66 years old. About 83% of the responders were male, and about 17% were
98 female. There were 141 responses from the western region of SA (141 participants; Table 1).

99

100 **Table 1. Study participant demographics**

AWARNESS OF CR

About 93% of the responders were aware of CR but only 21% were aware of the phases of CR, with 97% of the responders aware of the benefits of CR and 99% considered it important to establish CR in SA (Table 2). Most responders (90%) prefer to establish hospital-based CR, with very few (10%) preferring home-based CR. Nearly all the responders (99%) believed that CR would be beneficial to the management of their cardiac patients and 94% thought that cardiac patients could not resume their normal daily activities without CR (Table 2). Additionally, 90% of the physiotherapists were aware of CR, but 33% of the physiotherapists were aware with CR phases. Further, 96% of the cardiologists and cardiac surgeons were aware of CR, but only 9% of the cardiologists and cardiac surgeons were aware with CR phases. The awareness of CR phases among physiotherapists (33%) was better than cardiologists (9%).

Table 2. The awareness of healthcare professionals of CR

BARRIERS TO ESTABLISHING COMPREHENSIVE OUTPATIENT CR IN THE WESTERN REGION OF SA

The three main barriers to establishing comprehensive outpatient CR in all participants, were the lack of appropriate comprehensive CR (96%), followed by a lack of awareness of patients and healthcare professionals of CR and its benefits (95%), and the lack of healthcare providers trained in CR (94%) (Table 3). Furthermore, 88% of the participants agreed that there is a lack of specific Arabic guidelines regarding cardiac diseases, which could be why CR does not exist, and 83% of the participants also agreed that there is a lack of funding to support cardiac CR, hence the lack of comprehensive CR in SA (Table 3). These three barriers were the same main barriers to establishing outpatient CR centers among the physiotherapist participants alone and cardiologist participants alone (Table 3).

The lowest-ranked barriers to CR in the western region of SA among all participants were the lack of hospital capacity in the cardiac wards (63%), referrals from cardiologists to CR (66%), and cooperation between applied medicine and the college of medicine (68%). Also, 70% agreed that the lack of cooperation between the physiotherapist and cardiologist could be a barrier to establishing CR in SA (Table 3). The lowest-ranked barriers to CR in the western region of SA among cardiologist participants only were the same as among all participants, but it is slightly different among the physiotherapist participants only, as lack of cooperation between the allied health care providers and physicians was 61%, followed by the cooperation between physiotherapist and cardiologists were at 67%, followed by the lack of hospital capacity in the cardiac wards were at 75% (Table 3).

Regarding the main barrier to not having CR in the western region of SA, almost half of the participants agreed that the lack of awareness among patients and healthcare professionals of

CR phase III and its benefits was the most important barrier for not having cardiac rehabilitation in SA, with about a quarter of the respondents agreeing that the lack of trained healthcare providers was the main barrier to not having CR in SA. Furthermore, a few participants agreed that the lack of appropriate CR and communication between therapists and cardiologists could be the main barrier to establishing CR in SA.

Table 3. Barriers to establishing CR in SA

DISCUSSION

This is the first study to examine the barriers to establishing outpatient cardiac rehabilitation in the western region of SA and the awareness of CR among cardiologists, physiotherapists, and cardiac surgeons in the western region of SA. The main barriers for not having outpatient CR in the western region of SA were the lack of awareness among healthcare professionals of cardiac rehabilitation phases and its benefits, as well as the lack of healthcare professionals trained in cardiac rehabilitation. There are few outpatients' CR centers in SA but they do not provide comprehensive cardiac rehabilitation. The novelty of this study is to determine the barriers for establishing outpatient CR in order to overcome these barriers and establishing more outpatient CR centers in SA.

In comparisons to other high-income countries such as Chanda, the United States, and Australia, lack of awareness of CR among healthcare professionals was also the same main barrier for referring patients to CR ¹⁵. Lack of training in health care and lack of programs cardiac rehabilitation centers were from the most important barriers in India and Brazil also the same main barriers existed in Saudi Arabia ^{16,17}. To overcome these barriers, there is a need to increase awareness regarding CR among healthcare providers worldwide by adding CR topics in both undergraduate and postgraduate levels ¹⁶. Moreover, there is a need to establish many cardiac rehabilitation services worldwide and to train the health care providers more about the CR ¹⁶. In additions, lack of funding was main barriers in counties with middle and low income, such as Brazil and India ^{16,17}. Lack of funds should not be the main issues because CR program can be implanted using local services in hospital resources with low-costs ¹⁷.

The present study's findings are in line with another study that state there are no specific Arabia cardiac rehabilitation guidelines, with limited cardiac rehabilitation centers in SA, hence the need to establish cardiac rehabilitation centers in SA ¹⁰. Furthermore, the expert opinion suggests that the lack of hospital capacity and healthcare providers for cardiac rehabilitation may be the obstacles for not having cardiac rehabilitation centers in SA, whereas our survey revealed that the lack of hospital capacity was not a major barrier to providing comprehensive cardiac rehabilitation in SA.

A narrative review of barriers that physicians face when referring patients to cardiac rehabilitation revealed that increased physician awareness of cardiac rehabilitation increases their referral rate ¹⁸. The present study's findings are in line with these results, that the awareness of physicians of the cardiac rehabilitation phases was a barrier to establishing cardiac rehabilitation in SA. The UK is also facing a lack of staff training and education in cardiac rehabilitation to achieve the recommended exercise intensity during cardiac rehabilitation, which is an obstacle to cardiac rehabilitation in the UK ¹⁹ as confirm in our study.

The present study findings also agree with a study that investigated the barriers to establishing pulmonary rehabilitation in SA in the eastern region, which reported that the barriers were a lack of hospital capacities, lack of healthcare professional training, and lack of funding to support pulmonary rehabilitation ¹³. Based on our results and the expert opinion ¹³, there is a need to establish comprehensive cardiac rehabilitation centers in different regions of SA.

To establish outpatient cardiac rehabilitation in SA, it is recommended that healthcare professionals are taught about the four phases of cardiac rehabilitation during their

undergraduate training in Saudi universities to raise awareness. Patients should also be educated about the benefits of cardiac rehabilitation, as well as the risk factors for CVDs. Furthermore, cooperation between physiotherapists and cardiologists, the development of cardiac rehabilitation guidelines in Arabic, and securing funding are vital to establishing cardiac rehabilitation centers in SA.

This study has some limitations. All respondents were from the western region; therefore, the findings may not be generalizable across SA. This study utilized a questionnaire but a structured interview could have gathered more detailed information regarding the barriers to outpatient cardiac rehabilitation in SA.

In conclusion, the awareness of cardiac rehabilitation among healthcare providers is high but most were unaware of the phases of cardiac rehabilitation. The barriers to establishing cardiac rehabilitation phase III-outpatient in practice were the lack of awareness among healthcare professionals of the cardiac rehabilitation phases, as well as the lack of trained healthcare providers; some cardiac rehabilitation is provided in SA, but it is not comprehensive.

Ethical approval and consent to participants

All methods were carried out in accordance with declaration of Helsinki²⁰. This study was approved by the Biomedical Research Ethics Committee of Umm Al-Qura University, approval number HAPO-02-K—012-2021-03-591 and written informed consent was obtained from all subjects.

Consent to publication

Each participant was obtained consent to publication in this study.

Data availability

All data generated or analyzed during this study are included in the supplement data document.

Author contribution

All authors contributed to conception, design, provision of study materials, collection and assembly of data, data analysis and interpretation, manuscript writing and final approval of manuscript.

Conflict of interest

All authors declare that they have no conflicts of interest.

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Supplementary Files

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- [Cardiacrehabilitationsurvey.xlsx](#)