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# *The Awareness of Physicians and Allied Health Professionals about Cardiopulmonary Rehabilitation: A Cross-Sectional Survey Study*

## *Kardiyopulmoner Rehabilitasyon Konusunda Hekimler ve Diğer Sağlık Çalışanlarının Farkındalık Düzeyi: Kesitsel Bir Anket Çalışması*

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**Abstract**

**Objective:** Cardiopulmonary (CPR) programs were developed to improve and stabilize the physical, psychological, social, mental, professional, and economic conditions of patients with cardiovascular and pulmonary diseases. Although it is known that CPR reduces mortality and morbidity, it is not widely implemented as it is in Turkey. In this study, we aimed to determine the level of CPR awareness among physicians and allied health professionals.

**Material and Methods:** This was a multi-center, cross-sectional survey study. The study included physicians, nurses, physiotherapists, and other allied health professionals who were informed about the survey and provided written consent to participate.

**Results:** A total of 727 volunteers from 12 different centers were included in the study. Of the participants, 59.5% were physicians, 31.4% were

**Özet**

**Amaç:** Kardiyopulmoner rehabilitasyon (KPR); kardiyovasküler ve pulmoner hastalığı olan hastalar için fiziksel, psikolojik, sosyal, ruhsal, mesleki ile ekonomik durumun korunması ve iyileştirilmesi amacı ile geliştirilmiş bir programdır. Kardiyopulmoner rehabilitasyonun morbidite ve mortaliteyi azalttığı bilinmekle birlikte, Türkiye'de yaygın olarak uygulanamamaktadır. Bu çalışma ile sağlık çalışanlarının bu konudaki farkındalık düzeyinin araştırılması amaçlanmıştır.

**Gereç ve Yöntemler:** Bu çalışma çok merkezli, kesitsel bir anket çalışmasıdır. Hekimler, hemşireler, fizyoterapistler ve diğer sağlık disiplinlerindeki sağlık çalışanları arasından; anketle ilgili bilgilendirilmiş imzalı onam verenler çalışmaya dahil edilmiştir.

**Bulgular:** Çalışmaya 12 merkezden toplam 727 gönüllü dahil edildi. Çalışmaya katılan sağlık personelinin %59,5'i hekim, %31,4'ü hemşire,

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nurses, 5.9% were physiotherapists, and 3.2% were other allied health professionals; 79.3% participants answered the question on if they have had any idea about CPR. Participants indicated that patients should be referred to cardiac pulmonary rehabilitation after a coronary artery bypass (83.8%), chronic obstructive pulmonary disease (83.2%), and cardiac valve surgery (38.9%). Only 40.1% of the survey participants provided information about CPR to patients, while 20.5% did not provide any information about CPR.

**Conclusion:** This survey study determined that in centers where CPR could be implemented, health professionals have knowledge about CPR. If the study were conducted nationwide, the level of awareness might be even lower. Although it is an idea of CPR, the level of knowledge for this issue is not adequate. As the number of the CPR centers will increase, the knowledge of doctors and allied health professionals will advance.

**Key Words:** Cardiac rehabilitation, pulmonary rehabilitation, awareness, knowledge, health professional

%5,9'u fizyoterapist ve %3,2'si diğer sağlık disiplinlerindendi. Ankete katılanlardan %79,3'ü KPR hakkında fikri olduğunu belirtti. Kardiyopulmoner rehabilitasyon uygulanabilecek hastalıkların başında koroner arter baypas sonrası (%83,8) ve kronik obstrüktif akciğer hastalığı (%83,2) gelirken; en az uygulanan hastalık ise kalp kapak cerrahisi (%38,9) olmuştur. Ankete katılanların çalıştığı birimde hastalarına KPR konusunda bilgi verme oranı %40,1, fikri olmayanların oranı ise %20,5 idi.

**Sonuç:** Kardiyopulmoner rehabilitasyon uygulamalarının yapılabildiği merkezlerde yürütülen bu anket çalışmasında, sağlık çalışanlarının KPR hakkında bilgi sahibi oldukları saptandı. Tüm ülke çapında yapılması durumunda bu düzeyin daha düşük olacağı kanısına varılmıştır. Kardiyopulmoner rehabilitasyon hakkında fikir sahibi olunmasına karşın, detaylı bilgi düzeyinin yetersiz olduğu görülmüştür. Ancak, kardiyopulmoner rehabilitasyon uygulamasının yapıldığı merkez sayısı arttıkça hekimler ve diğer sağlık çalışanlarının da bu alanda bilgileneceğini düşünmekteyiz.

**Anahtar Kelimeler:** Kardiyak rehabilitasyon, pulmoner rehabilitasyon, farkındalık, bilgi, sağlık çalışanı

## Introduction

Many developed countries have national health care policies and projects to provide physical, psychological, and social recovery programs for cardiopulmonary rehabilitation (CPR) patients (1-4). Studies have shown that cardiac rehabilitation is as effective as aspirin, statins, and β-blockers in decreasing mortality and morbidity rates among patients who have acute coronary syndrome (5,6). Therefore, cardiac rehabilitation has been recommended in many countries; however, it is reported that in practice, 70%-80% of patients are not able to take advantage of a cardiac rehabilitation program (7,8). Atherosclerotic cardiac disease and chronic respiratory diseases (asthma and chronic obstructive pulmonary disease) are among the top 10 most prevalent diseases in Turkey (9,10). Less than 2% of chronic obstructive pulmonary disease (COPD) patients are estimated to undergo pulmonary rehabilitation programs (11). Although the benefits of pulmonary rehabilitation have been proven for all stages of COPD, only advanced stage COPD patients are commonly referred to rehabilitation programs (12). The reasons of this low rate of taking part in CPR are multifactorial. Some of these factors are health systems, providers, programs, and patients (13). Among these factors, referral failure and lack of provider encouragement are the most common reasons. There are currently not enough data from our country regarding rehabilitation program referral rates (12). Lately, there has been an increased interest in understanding and preventing cardiac diseases in Turkey (10,14). In order to increase the amount of patients that can benefit from CPR services, it is crucial to educate and inform allied health professionals (3,4,12,15). There are not enough data about awareness of CPR in Turkey or in the world. The development of CPR may be possible with increasing knowledge about this issue.

In this study, we aimed to determine the degree of CPR awareness among physicians and allied health professionals.

## Material and Methods

This was a multi-center, cross-sectional survey study that was carried out in seven university hospitals and five training and research hospitals in which cardiopulmonary rehabilitation services were available at the departments of physical therapy and rehabilitation. Sample size analysis was performed to determine the volunteer number. The sample size for 0.1 effect size and 0.85 power was calculated as 721. For each hospital, physicians of different specialties (including physical medicine and rehabilitation, internal medicine, cardiology, cardiovascular surgery, pulmonary medicine, thoracic surgery, pediatrics, medical practitioner, and family medicine), nurses, physiotherapists, and other allied health professionals were informed about the study. They signed written consent forms and were asked to fill out the survey. The survey was devised by the members of the CPSG who participated in this study. These semi-structured questionnaires consisted of three parts. The first part included demographic information: age, gender, occupation, and organization of employment. The second part, filled out only by physicians, asked for information about each physician's field of specialization: specialization type, educational institution where the degree was obtained, time since the degree was obtained, patient groups treated, and treatments applied. Other allied health professionals were asked to skip the second part and referred to part three, which was filled in by all. The third part of the survey consisted of questions related to CPR: CPR training received importance of CPR, indications, types of specialists responsible for CPR, components and goals of CPR, and knowledge of CPR centers. This study was approved by the ethics committee of Ankara University, Faculty of Medicine (No:152-4791), and each participating center acquired approval from its local committee. Informed consent for this study was obtained fromall of the participants.

### Statistical Analysis

Statistical analysis was performed using SPSS version 16.0 software. Descriptive statistical methods were used to analyze demographical data. Participants' answers were evaluated using frequency analysis. Incomplete responses were considered missing values during analysis. Results are shown by valid percentages (percentage of the collated answers without accounting for the whole population) unless stated otherwise.

## Results

In total, 727 volunteers from 12 centers were included in the study. The distributions of volunteers according to centers are shown in Table 1. The mean age of the participants was 33.8 years, and 68.8% was women. Among the participants, 59.5% were physicians, 31.4% were nurses, 5.9% were physiotherapists, and 3.2% were other allied health professionals. Participants were primarily employed at university hospitals (57.1%) or at training and research hospitals (34%). The physicians specialized in physical medicine and rehabilitation (38.4%), thoracic diseases (8.8%), internal medicine (12.4%), cardiology (8.6%), cardiovascular surgery (6.6%), or other specialties (25.2%). Of the physicians, 94% administered medical treatment, 11% administered surgical treatment, 48% administered interventional treatment, and 38% administered rehabilitation. Table 2 summarizes the survey results organized by participant specialty.

Responses from the third section of the survey revealed that 79.3% of the participants were familiar with CPR. The majority of participants either received CPR training in medical school/college (39.6%) or received specialized CPR training (33.6%). Table 3 shows the answers to the question of the necessity of CPR in the treatment of cardiac and pulmonary disease. The ratios of answers to the question of "Who can do CPR" were as follows: physicians (92%), nurses (59%), and physiotherapists (78%). Participants indicated that patients should be referred for cardiac pulmonary rehabilitation after a coronary artery bypass (83.8%), chronic obstructive pulmonary disease (83.2%), and cardiac valve surgery (38.9%). Of the survey participants, 48.2% had CPR programs or consulting services at their workplace; 20.5% did not know. The goals of CPR, as defined by survey participants, were to decrease physiological and psychological effects (90%), to ameliorate symptoms (86%), and to stop or reverse the atherosclerotic process (46%) in patients with the most common cardiopulmonary diseases. Cardiopulmonary rehabilitation team specialties were identified by participants as: cardiology (86.7%), thoracic diseases (81.6%), and physical medicine and rehabilitation (87%). However, only 41.5% of the survey participants marked psychiatry as a CPR specialty.

**Table 1. The distribution of volunteers according to center**

| Center number | Volunteer percentages (n) |
|---|---|
| 1 | 26.1 (190) |
| 2 | 20.2 (147) |
| 3 | 9.6 (70) |
| 4 | 9.6 (70) |
| 5 | 8.4 (61) |
| 6 | 7.7 (56) |
| 7 | 6.9 (50) |
| 8 | 4.4 (32) |
| 9 | 3.2 (23) |
| 10 | 2.1 (15) |
| 11 | 1.0 (7) |
| 12 | 0.8 (6) |

**Table 2. Survey responses of participating physicians organized by specialty**

| Specialty (n) | I am aware of CPR | CPR information is provided to patients at the institution where I work | At my institute, patients are referred to CPR related departments | I know a CPR center to which I can refer my patients |
|---|---|---|---|---|
| | (%) | (%) | (%) | (%) |
| Internal medicine (56) | 76.8 | 19.6 | 26.8 | 33.9 |
| (CI) | (64.3-87.5) | (10.7-30.4) | (14.3-39.3) | (21.4-46.4) |
| Cardiology (39) | 76.9 | 20.5 | 15.8 | 30.8 |
| (CI) | (64.1-89.7) | (7.7-33.3) | (5.3-28.9) | (17.9-46.2) |
| Cardiovascular surgery (30) | 93.3 | 75.0 | 67.9 | 63.3 |
| (CI) | (83.3-100.0) | (60.7-89.3) | (50.0-85.7) | (46.7-80.0) |
| Thoracic diseases (40) | 97.5 | 53.8 | 70 | 71.8 |
| (CI) | (92.5-100.0) | (38.5-69.2) | (55.0-85.0) | (56.4-84.6) |
| Pediatrics (14) | 71.4 | 28.6 | 42.9 | 42.9 |
| (CI) | (43.0-92.9) | (7.1-50.0) | (14.5-64.3) | (14.3-71.4) |
| Family medicine (19) | 89.5 | 26.3 | 42.1 | 52.6 |
| (CI) | (73.7-100.0) | (10.5-47.4) | (21.1-63.2) | (31.6-73.7) |
| Physical medicine and rehabilitation (174) | 91.9 | 66.3 | 74.7 | 75.9 |
| (CI) | (87.3-95.4) | (58.7-72.7) | (67.8-81.6) | (69.5-82.2) |
| Medical practitioner (43) | 63.4 | 12.5 | 17.5 | 23.8 |
| (CI) | (48.8-78.0) | (2.5-25.0) | (7.5-30.0) | (11.9-38.1) |

CPR: cardiopulmonary rehabilitation; CI: confidence interval

The percentage of specialists who informed their patients about CPR programs in participating centers was 40.1%, while 20.5% did not provide any information. Of the specialists, 47.1% referred patients to the relevant CPR department, and 20.5% did not know about CPR referrals. Fifty-four percent of the survey participants knew a CPR center to which they could refer their patients.

Only 43.4% of the nurses attended courses related to CPR during their education. Of the nurses, 42% answered "yes" to the question, "Are there any CPR programs or consulting services at the institution in which you work?", while 30% did not know. Moreover, 35% of the nurses stated that their institution regularly informed patients about CPR, and 31.9% of the nurses indicated that they knew a CPR center to which they could refer their patients. Table 4 summarizes survey questions based on participants' health care occupations.

## Discussion

The list of cardiopulmonary rehabilitation indications has been increasing. Currently, the general opinion is that all patients with these indications should be provided an opportunity for CPR (4,16,17). However, even in the United States, where CPR is most commonly practiced, only 20%-30% of patients currently benefit from CPR (3,4,16,17). Patients who are female, elderly, unemployed, from the countryside, or high-risk or have minimal education or lack of transportation are less likely to have access to these programs (3,4,18,19). Survey studies of European countries showed that only 1/3 of eligible patients undergo any form of cardiac rehabilitation. In some European countries, this percentage is as low as 3% (20,21). The lack of cardiac rehabilitation can be attributed to physician indifference, lack of instruction about referral of the patients to specialized centers, and lack of motivation (3,4,8,15). In the United States, Australia, and Great Britain, in order to improve referral rates, medical personnel are attempting to implement automated patient referral mechanisms (8,17,19,22,23). Physician awareness of CPR in our study was similar to the results obtained in the USA and Europe.

In 2007, the American Heart Association stated that cardiac rehabilitation programs should be multidirectional and multidisciplinary and defined basic components to optimally decrease cardiovascular risks, support healthy behavior, reduce disability, and provide active lifestyles for patients with cardiovascular diseases (17). The Turkish National Cardiac Health Policy plan, released in 2006, aims to reduce the incidence rate of cardiac disease within 10 years (14). The Turkish Cardiac and Vascular Diseases Prevention (2009) and Control Program and strategy plan preparatory workshop, intended for secondary and tertiary protection (2010-2014), arranged by the Ministry of Health, addressed cardiac rehabilitation at the government level for the first time in Turkey. In our country, the concept of cardiac rehabilitation is not well recognized in either public or private sector national health platforms.

The TEKHARF study, which examined risk factors for coronary artery diseases in Turkey, determined that more than half of our society engages in only low levels of physical activity (10). When the study was repeated in 2000, the results indicated that physical activity levels among women, particularly those between 30-59 years of age, had decreased by 8% in 10 years (10). Initiatives to increase physical activity, the most important part of cardiac rehabilitation, should be implemented at once. In addition, the overall decrease in physical activity in

**Table 3. Responses concerning the necessity of the cardiopulmonary rehabilitation in management of cardiac and pulmonary disease**

| Is CPR necessary in the management of cardiac and pulmonary diseases? | | |
|---|---|---|
| | n | % |
| It is mandatory | 461 | 68 |
| (CI) | | (65.0-71.8) |
| Have made it better | 161 | 24 |
| (CI) | | (20.9-27.0) |
| It is not necessary | 13 | 2 |
| (CI) | | (1.0-3.2) |
| Is unnecessary | 1 | 0.1 |
| (CI) | | (0-0.4) |
| I have no idea | 40 | 6 |
| (CI) | | (3.8-7.1) |

CPR: cardiopulmonary rehabilitation; CI: confidence interval

**Table 4. Responses of survey participants based on occupation**

| | Physician (397) | Nurse (225) | Physiotherapist (43) | Other (21) |
|---|---|---|---|---|
| | % | % | % | % |
| I am aware of CPR | 85.5 | 70.7 | 81.4 | 46.7 |
| (CI) | (81.8-88.8) | (64.4-76.4) | (69.8-93.0) | (28.6-71.4) |
| CPR information is provided at the institution where I work | 42.5 | 35.0 | 53.5 | 19.0 |
| (CI) | (37.5-47.2) | (29.2-42.0) | (37.3-69.8) | (4.8-33.3) |
| At my institute, patients are referred to CPR-related departments | 49.2 | 42.0 | 58.1 | 33.3 |
| (CI) | (44.4-54.6) | (35.4-48.7) | (41.9-72.1) | (14.3-52.4) |
| I know a CPR center to which I can refer my patients | 57.1 | 31.9 | 58.1 | 61.9 |
| (CI) | (52.3-61.7) | (26.1-38.1) | (41.9-72.1) | (42.9-81.0) |

CPR: cardiopulmonary rehabilitation; CI: confidence interval

our society suggests that in the coming years, more people may need cardiac rehabilitation.

Turkey's physical medicine and rehabilitation physicians have begun to recognize cardiopulmonary rehabilitation as within the scope of the larger rehabilitation discipline only in the last 20 years or so. Exercise-based CPR programs and instructional studies have been started in physical medicine and rehabilitation clinics at university and education and teaching hospitals (24,25).

In our study, we determined that almost 90% of cardiovascular surgeons, thoracic disease specialists, primary care physicians, and physical medicine and rehabilitation specialists have some knowledge of CPR. However, only 70% of cardiovascular surgeons, thoracic disease specialists, and physical medicine and rehabilitation specialists regularly notified their patients about and referred their patients to CPR programs. The percentage was even lower for primary care physicians. Internal disease specialists, who are among those who most closely look after patients with cardiopulmonary diseases, also had low awareness of CPR. As part of the Ministry of Health's family medicine project, primary care physicians should also be made aware of CPR. Williams et al. (4) demonstrated that older individuals can benefit from CPR primarily by referral of their primary care physicians.

A nurse's rehabilitation team is an inseparable part of CPR. In some countries, nurses refer patients to CPR and may implement patient rehabilitation (22). In our study, 1/3 of the nurses had no knowledge of CPR, and 2/3 of did not know of a rehabilitation center to which they could refer their patients. Similar ratios were obtained by the physiotherapists' answers. Thus, CPR should be part of both physicians' and other allied health professionals' education.

When studies related to CPR are examined, the concept of "exercise-based CPR" is encountered frequently. A significant portion of studies related to CPR examine exercise rehabilitation only. In our study, in questions that evaluated awareness of CPR components, exercise recommendations were noted as a main component. The main goals of exercise-based CPR can be listed as follows: to stabilize present atherosclerotic plaques, improve endothelial function, regulate lipid/lipoprotein levels, regulate blood pressure, decrease arterial inflammation, increase functional capacity, ameliorate symptoms, decrease body weight and fat stores, improve the patient's psychosocial condition, and increase the probability that the patient will return to work (26). When we asked survey participants to define the goals of CPR, they mostly elaborated on ameliorating symptoms and decreasing physiological and psychological effects of cardiac/lung diseases. However, it is known that CPR is also effective against pathogenesis of the disease.

The major limitation of the present study is that the results can not be generalized to a wider population. This study was conducted in centers where CPR services were available to some extent; so, a higher level of awareness would be expected. Ratios of physicians in different specialties were not equal in our study.

## Conclusion

Our study, conducted at hospitals where CPR programs might be relevant, has shown that health professionals have knowledge about CPR. Furthermore, if this study were to be conducted nationwide, the level of awareness would likely be even lower. CPR is a long-term program that requires the patient's lifetime participation. In our country, as in the world at large, to increase the population's quality of life and overall health, not only physicians but also allied health professionals have to be aware about CPR.

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