REPUBLIC OF TÜRKİYE
KIRŞEHİR AHİ EVRAN UNIVERSITY
INSTITUTE OF HEALTH SCIENCES
DEPARTMENT OF PHYSICAL THERAPY AND REHABILITATION

EARLY PHYSICAL ACTIVITY AND ITS EFFECTS ON FUNCTIONAL CAPACITY AND QUALITY OF LIFE IN POST-SURGERY CARDIAC PATIENTS

Husham Abdullateef Salman AL-JADDAH

MASTER'S THESIS

KIRŞEHİR / 2024

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Assist. Prof. Dr. İsmail CEYLAN

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ACCEPTANCE AND APPROVAL

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THESIS STATEMENT

I declare that all the information in the thesis is obtained and presented within the framework of ethical behavior and academic rules, and in this study, which is prepared in accordance with the thesis writing rules, all kinds of statements that do not belong to me are fully cited to the source of the information.

Husham Abdulateef Salman AL-JADDAH

According to Objects 9/2 and 22/2 of the Graduate Education and Training Regulation published in the Official Gazette dated 20.04.2016; A report in accordance with the criteria determined by the Institute of Health Sciences was obtained by using the plagiarism software program for this postgraduate thesis.

Husham Abdulateef Salman AL-JADDAH

PREFACE

First of all, I thank God, after patiently and diligently completing my study. In addition to being an example to me with the calm and patient attitudes he has shown since the day I started my master's degree and during my master's course, the one who supported me, facilitated my difficulties, his encouragement and his helping for me continuously, and taught me a lot, he was always supports me wherever I go, teaching the most valuable information of my professional and academic life. I would like to thank my esteemed professor, advisor Dr. İsmail CEYLAN. I also took the opportunity to express my thanks to My friend Raed AL-JANABI who did not hesitate to advise me on the correction of my work. I would like to thank all my teachers for their efforts in my education who helped, supported me with love, appreciation, advice, direction and guidance from my childhood to this stage. I dedicate my thesis to my family Especially my dear wife, who have never spared their sacrifice in every period of my life, whose prayers I always felt with me, for the trust and support they have shown in me likewise, I do not forget the invitations of my parents in my scientific career. Thank you from deep of my heart.

Husham Abdulateef Salman AL-JADDAH FEBRUARY 2024

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LIST OF SYMBOLS AND ABBREVIATIONS

CVD : Cardiovascular Disease

CAD : Coronary Artery Disease

CPB : Cardiopulmonary Bypass

CVA : Cerebrovascular Accident

CABG: Coronary Artery Bypass Graft

MI : Myocardial infarction

MR : Mitral Regurgitation

AVR : Aortic Valve Repair/Replacement

MVR : Mitral Valve Repair/Replacement

ECC : Extracorporeal Circulation

CRP : Cardiac Rehabilitation Program

6MWT: Six Minute Walk Test

PA : Physical Activity

QoL : Quality of Life

SF-IPAQ: Short-Form International Physical Activity Questionnaire

SF-36 : Short Form-36 health survey

HRQOL: Health-related quality of life

ABSTRACT

M.Sc. THESIS

EARLY PHYSICAL ACTIVITY AND ITS EFFECTS ON FUNCTIONAL CAPACITY AND QUALITY OF LIFE IN POST-SURGERY CARDIAC PATIENTS

Husham Abdulateef Salman AL-JADDAH

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Advisor: Assist. Prof. Dr. İsmail CEYLAN

The heart and blood arteries make up the cardiovascular system. Heart and blood vessel problems together referred to as cardiovascular diseases (CVD) include congenital heart disease, cerebrovascular illness, and coronary heart disease. It is expected that CVD will remain the leading cause of death and disability in the world going forward. Medication therapy, exercise, a balanced diet, and heart surgery are the main treatments for CVD. Cardiovascular surgery has decreased CVD mortality and tended to become less invasive with the rapid development in CVD treatment.

After cardiac surgery, exercise helps people heal, but not enough exercise can make recovery more difficult. Physical activity following heart surgery is crucial for minimizing unfavorable outcomes, although postoperative patient participation in physical activity has typically been insufficient. The purpose of this research is to assess the impact of early physical activity on patients undergoing heart surgery's quality of life and functional ability.

This study was carried out for heart surgery at the Ibin AL-Bitar Hospital in Baghdad, Iraq. In all, 100 individuals between the ages of 18 and 65 who had cardiac surgery (52 men and 48 women) willingly took part in the study. From the first postoperative day (POD) to the seventh POD, all patients took part in the early physical activity program in the surgical wards and intensive care unit (ICU). This program comprised the following: In the ICU, on the first or

second POD, shoulder and neck movements, breathing exercises, and postural drainage are performed. Breathing exercises, postural drainage, and supervised walking in increments of 2.5 minutes, as tolerated, up to 10 minutes in the morning, afternoon, and evening, as well as at night, are recommended for patients in the surgery ward from 3 to 7 POD. The six-minute walk test (6MWT), the short form-36 quality of life (SF-36), and the short form-international physical activity questionnaire (SF-IPAQ) were utilized as outcome measures. On the seventh postoperative day, every patient finished examinations and questionnaires.

According to statistical analysis, there was a statistically significant correlation between the SF-IPAQ score and the 6MWT and SF-36. The results of this study showed that patients who engaged in an early physical exercise program following heart surgery had improved functional capacity and overall quality of life.

26 February 2024, 86 Pages

Keywords: Cardiovascular diseases, cardiac surgery, physical activity, functional capacity, quality of life.

ÖZET

YÜKSEK LİSANS TEZİ

POST-OPERATİF KARDİYAK HASTALARDA ERKEN FİZİKSEL AKTİVİTENİN FONKSİYONEL KAPASİTE VE YAŞAM KALİTESI ÜZERİNE ETKİLERİ

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Kardiyovasküler sistem kalp ve kan damarlarından oluşur. Kardiyovasküler hastalıklar (KVH), koroner kalp hastalığı, serebrovasküler hastalık ve konjenital kalp hastalığını içerir. KVH, dünya çapında en sık mortalite ve morbidite nedenidir. KVH için ana terapötik prosedürler ilaç tedavisi, fiziksel aktivite, sağlıklı beslenme ve kalp cerrahisidir. Kalp cerrahisi sonrası fiziksel aktivite hastaların iyileşmesini kolaylaştırırken, yetersiz fiziksel aktivite ise komplikasyonları arttırabilir. Kardiyovasküler sistemde en sık görülen problemler arasında; endokardit, romatizmal kalp hastalığı ve iletim sistemindeki anormallikler sayılabilir. KVH için en yaygın kullanılan tedavi yöntemleri ilaç tedavisi, fiziksel aktivite, diyet ve kardiyak cerrahidir.

Dünya Sağlık Örgütü (WHO), kan basıncı, kolesterol, obezite ve sigara içiminin kontrolü ile KVH'lerin görülme sıklığının yarıya indirilebileceğini bildirmektedir. Günümüzde yıldan yıla artan KVH'ler mortalite ve morbiditenin başlıca sebeplerindendir. WHO'ya göre, KVH her yıl yaklaşık 17,9 milyon kişinin ölümüne sebebiyet vermekte ve dünyada ölüm nedenleri arasında birinci sırada yer almaktadır. KVH nedeniyle gerçekleşen beş ölümünün dördü kalp krizi ve serebrovasküler olaylardan kaynaklanmakta ve bu ölümlerin üçte biri 70 yaşın altındaki kişilerde gerçekleşmektedir.

Post-operatif dönemde aktif olan hastaların hastanede kalma sürelerinin daha kısa olduğu ve post-operatif komplikasyonlara daha az maruz kaldıkları bilinmektedir. Dünya Sağlık Örgütü'ne göre, tekrarlayan kardiyovasküler olayların %75'i önlenebilmekte ve ikincil koruma bu yükü hafifletebilmektedir. Kardiyak rehabilitasyon (KR), mortaliteyi azaltan ve KVH'li hastaların yaşam kalitesine olumlu etki eden, etkili bir ikincil korunma için tüm klavuz önerileri sunan kapsamlı bir bakım modelidir. Kardiyak rehabilitasyon programları ile KVH'li hastaların, değiştirilebilir risk faktörlerini önleyerek veya ortadan kaldırarak, hastalık öncesi durumlarını yeniden kazanmaları hedeflenmektedir. Kardiyak rehabilitasyon, hastanın değerlendirilmesi, diyet, kilo verilmesi, egzersiz eğitimi, kronik hastalıkların tedavisi, psikososyal destek, fiziksel aktivite danışmanlığı ve sigaranın bıraktırılması olmak üzere on bileşenden meydana gelmektedir. Kalp ameliyatı geçirmiş bireylerde de fiziksel aktivitenin hastanede yatış süresini ve komplikasyon görülme sıklığını azalttığı bildirilmektedir. Bu çalışmanın amacı kalp cerrahisi ameliyatı geçirmiş 18-65 yaş arası bireylerde erken mobilizasyon ve fonksiyonel egzersizin fiziksel aktivite, fonksiyonel durum ve denge üzerine etkisini değerlendirmektir.

Bu çalışma Bağdat/Irak'ta Ibn-i AL – Bitar Kalp Hastanesi'nde yapılmıştır. Bu çalışmaya, kardiyak cerrahi geçirmiş, yaş aralığı 18-65 olan (52 erkek, 48 kadın) toplam 100 hasta katılmıştır. Tüm hastalara post-operatif birinci günden itibaren 7 gün boyunca erken fiziksel aktivite programı uygulanmıştır. Programa öncelikle yoğun bakımda başlanmış, sonrasında cerrahi servislerde devam edilmiştir. Erken fiziksel aktivite kapsamında hastalara postoperatif ilk ve ikinci gün yoğun bakım ünitesinde omuz ve boyun mobilizasyonu, solunum egzersizleri ve postüral drenaj uygulanmıştır. Postoperatif üçüncü ve yedinci günler arasında ise hastalara cerrahi serviste solunum egzersizleri, postüral drenaj, gözetim altında yürüyüş (sabah, öğleden sonra, akşam ve gece tolerasyona göre 2.5 dakika-10 dakika) uygulandı. Sonuç ölçeği olarak Kısa form – uluslararası fiziksel aktivite anketi (SF-IPAQ), SF-36 yaşam kalitesi ölçeği, altı dakika yürüme testi (6MWT) kullanıldı. Çalışmaya alınan tüm hastalar yedi günlük programı tamamladılar. Hastaların demografik ve klinik bilgileri postoperatif ilk gün kaydedilmiştir. Değerlendirme ölçümleri ise postoperatif ilk gün ve yedinci gün yapılmıştır.

Elde edilen bulgulara göre kalp cerrahisi geçirmiş bireylerde uygulanan erken fiziksel aktivite programının fonksiyonel kapasite ve yaşam kalitesini arttırdığı gözlenmiştir. Bununla birlikte

fiziksel aktivitenin fonksiyonel kapasite ve yaşam kalitesi ile korelasyon gösterdiği bulunmuştur. Yine çalışma bulgularına göre SF-IPAQ skoru ile tüm yaşam kalitesi alt kategorileri güçlü bir istatistiksel anlamlılık tespit edilmiştir. Ayrıca SF-IPAQ skorunun; fiziksel fonksiyonellik, enerji/yorgunluk, emosyonel iyilik hali, sosyal fonksiyonellik, genel sağlık ile pozitif korelasyon gösterdiği bulunmuştur. Bunun aksine SF-IPAQ ile ağrı arasında negatif korelasyon bulunmuştur.

Çalışma sonuçlarına göre kalp cerrahisi geçirmiş bireylerde erken mobilizasyon ve fonksiyonel egzersiz, fiziksel aktivite ve fonksiyonellik üzerine iyileştirici etki göstermiştir. Kalp cerrahisi sonrası erken fiziksel aktivite çok önemlidir ve fonksiyonel kapasite ve yaşam kalitesi üzerinde olumlu etkileri vardır. Bu nedenle, kalp ameliyatı sonrası fonksiyonel kapasitelerinin ve yaşam kalitelerinin iyileştirilmesi için hastaların erken fiziksel aktiviteye teşvik edilmesi morbidite ve mortaliteyi azaltır. Bir limitasyon olarak, çalışmamızda postoperatif ilk yedi günlük veriler değerlendirilmiştir. Dolayısıyla bu konu ile ilgili yapılacak daha uzun takip süreli araştırmalar elde edilen çıkarımları güçlendirecektir.

26 Şubat 2024, 86 Sayfa

Anahtar Kelimeler: Kardiyovasküler hastalıklar, kalp cerrahisi, fiziksel aktivite, fonksiyonel kapasite, yaşam kalitesi.

1. INTRODUCTION

The cardiovascular system is composed of up of blood vessels and the heart (1). Heart and blood vessel disorders, such as congenital heart abnormalities, cerebrovascular illness, and cardiovascular disease, are all included in the category of cardiovascular diseases (CVD) (2). The world's leading cause of mortality and suffering is cardiovascular disease (CVD), and this trend is probably here to stay (3). Numerous issues can affect the cardiovascular system, such as irregularities in the conduction system, rheumatic heart disease, and endocarditis (4).

While there are many other causes of cardiovascular disease, such emboli that result in ischemic stroke in patients with atrial fibrillation or rheumatic fever that causes heart valve disease, it is important to concentrate on risk factors linked to the development of atherosclerosis. This is so because the pathophysiology of CVD is unified by atherosclerosis (5). Unhealthy eating habits, inactivity, smoking, excessive alcohol use, diabetes, hypertension, hyperlipidemia, socioeconomic difficulties, psychological stress, and genetic susceptibility are among the behavioral factors that raise the risk of CVD (2).

The main strategies for treating cardiovascular disease are medication, exercise, eating a healthy diet, and heart surgery (6). Heart surgery has grown more common as a result of the rapid advancements in CVD medication, and the death rate from the disease decreased (7). However, there are still a number of important risk factors for postoperative problems after cardiac surgery (8).

For a patient with cardiac disease, physical activity is essential as a basic health behavior (4). Regular and sufficient physical activity improves quality of life and reduces the risk of further cardiac problems (9). Any movement of the body that uses energy and is produced by the skeletal muscles is considered physical activity (10). Physical activity during the postoperative recovery period after cardiac surgery has been linked to shorter hospital stays and fewer postoperative complications (11).

Additionally, there is data that links differences in physical activity levels to differences in life quality: higher levels of physical activity are associated with better life quality, while lower levels are associated with worse life quality (12). Post-cardiac surgery, physical exercise improves recovery; however, inadequate exercise can hinder recovery (13). According to various studies on postoperative physical activity, patients who underwent cardiac rehabilitation (CR) or physical exercise under a physiotherapist's supervision following heart surgery reported higher functional capacities, shorter lengths of stay (14), and lower readmission rates than their non-participating peers (15). Although physical activity is important for minimizing negative outcomes after cardiac surgery, patients' engagement in physical activity after surgery has often been inadequate (16).

Van Laar et al. (13), reported that forty percent of individuals who had heart surgery were not exercising, and Brocks et al. (17) reported that over fifty percent of the study's female participants were not exercising sufficiently. Therefore, it's critical to understand the advantages of early physical exercise for patients recovering after cardiac surgery in terms of their functional capacities and overall quality of life, in order to motivate them to engage in physical activity. While several review studies have looked at heart disease patients' physical activity levels (18). However, the majority of these studies have primarily examined individuals with coronary heart disease or myocardial infarction, or have included patients with various cardiac conditions who took part in cardiac rehabilitation programs (19).

Review studies that have primarily examined the effects of early physical activity on functional ability and quality of life after cardiac surgery are generally unknown. Determining the impact of early physical activity on functional ability and quality of life in patients who had recently undergone cardiac surgery was the goal of this study in order to close this research gap. This study aims to investigate if early physical activity was effective in improving patients' quality of life and functional capacity after acute cardiac surgery. The following are the hypotheses that this study will test:

1-H1: Patients who underwent cardiac surgery have a correlation between their quality of life and physical activity.

1-H0: Patients who underwent cardiac surgery have not a correlation between their quality of life and physical activity.

2-H1: There is a correlation between an individual's functional capacity and physical activity after cardiac surgery.

2- H0: There is no correlation between an individual's functional capacity and physical activity after cardiac surgery.

3-H1: There is a correlation between functional capacity or quality of life and early physical exercise in patients recovering from cardiac surgery.

3- H0: There is no correlation between functional capacity or quality of life and early physical exercise in patients recovering from cardiac surgery.

2. GENERAL INFORMATION

2.1. Anatomy and Physiology of Heart

The heart is a muscle-based organ that collect blood that has lost oxygen from all regions of the body, sends it to the lungs, where it is oxygenated, and releases carbon dioxide. The blood that is rich in oxygen is then transferred from the lungs and distributed throughout the entire body (20). The heart is positioned in the middle of the chest with a slight leftward tilt (21). The right and left sides of the heart are divided into two separate sections by septa. A constriction also divides each half of the organ into two chambers. The bottom cavity is called the ventricle, while the upper cavity is called the atrium. The heart is composed of four cavities: the right atrium, left atrium, right ventricle, and left ventricle (22), as demonstrated in (Figure:2.1).

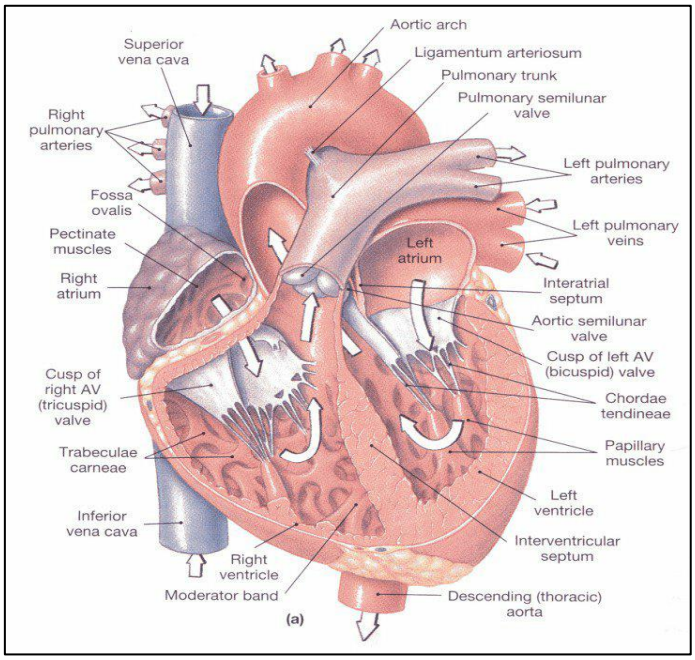

Figure 2.1: Heart Anatomy (22)

Blood flows through four valves as it moves through the heart's four chambers. Via the superior and inferior vena cava, blood enters the right atrium and passes via the tricuspid valve into the right ventricle. It then enters the pulmonary circulation after passing through the pulmonary valve. Blood is collected by the four pulmonary veins and subsequently reaches the

left atrium. Following that, the blood passes via the left ventricle, the mitral valve, and the aortic valve before entering the systemic circulation (23).

There are four valves in the heart. The main purpose of the heart's four valves is to allow blood to flow in one direction while blocking backflow (24). The annulus surrounding each heart valve is a challenge in terms of designing prosthetic grafts that don't leak. Two instances of the importance of anatomy and physiology are the negative outcome of left ventricular outflow tract occlusion and the mitral valve replacement operation. The aortic valve annulus is circular, whereas the mitral valve annulus is more crescent-shaped, necessitating a more sophisticated prosthesis and implantation procedure. Numerous artificial valve models, each with unique benefits and drawbacks related to anatomical, physiological, technological, and procedural features, demonstrate this.

The autonomic nervous system can control the heart's natural rhythmicity, which is characterized by a rise in heart rate upon sympathetic activation and a reduction in heart rate upon parasympathetic stimulation. The sinus node is the starting point for the hierarchical structure of cardiac electrical conduction, which travels via the right atrium to the atrioventricular node, the His bundle, and ultimately the ventricles via the Purkinje fibers. Understanding the anatomy and physiology of the heart is necessary to comprehend the clinical consequences of cardiac electrical activity (25).

A common condition following heart surgery is atrial fibrillation. By employing anatomical knowledge to halt uncontrollably high atrial activity, the Maze approach treats atrial fibrillation. The presence of mechanical heart valves in close proximity to the valve location during implantation may cause atrioventricular obstruction. The quality of vascular grafts has a major impact on the result of coronary artery bypass graft (CABG) surgery. A wide variety of blood arteries can be removed by surgeons. Compared to veins, arteries are more resilient (25, 26).

2.2. Cardiovascular Diseases

The blood artery network and the cardiac muscle forms the cardiovascular system (1). A variety of disorders involving the heart and arteries are included in the category of

cardiovascular diseases, including congenital cardiac defects, cerebrovascular illnesses, and coronary heart disease. Cardiovascular diseases are the main cause of death worldwide. Behavioral risk factors, including poor diet, inactivity, tobacco use, and excessive alcohol intake, are linked to cardiovascular disease. Additional risks include genetic susceptibility, high blood pressure, elevated blood cholesterol, socioeconomic disadvantage, psychological distress, and diabetes (2). Currently, the fourth leading cause of death globally is inadequate physical activity, which is defined as less than five 30-minute bouts of moderate activity or less than three 20-minute bouts of intensive activity each week (28).

Participating in 150 minutes a week (or an equivalent quantity) of moderate physical activity reduces adult risk factors for both diabetes mellitus and ischemic heart disease by almost one-third (29). Moreover, exercise contributes to weight loss and improves blood pressure, lipid profile, insulin sensitivity, and blood glucose management.Its benefits for the cardiovascular system may be partially explained by these actions (28). Population-level interventions that could reduce the prevalence of cardiovascular disease include tobacco use restrictions laws, health-harming food intake levies, improvements to public infrastructure that encourage physical activity (such as bike lanes and walkways), and the provision of wholesome school meals for children. Individualized health care interventions should be offered to people who are at a high danger of cardiovascular disorder (2).

Even if advances in science and cardiovascular surgery have improved patient quality of life, social harm follows the rising morbidity and disability rate from adult heart disease. However, other research indicates that patients' quality of life increased very little following surgery (30) and those who have arterial inlless generally notice changes in their morals and ethics in comparison to their prior states. People who are diagnosed with coronary artery disease experience negative health outcomes due to limitations on their daily activities and circumstances (31).

2.3. Etiology For Cardiovascular Diseases

Heart rheumatic illnesses, endocardial infections, and anomalies in the conducting mechanism are only a few of the numerous possible problems that can affect the cardiovascular system (4). While there are many different causes of cardiovascular disease, including emboli that

result in ischemic stroke in patients with atrial fibrillation or rheumatic fever that causes valvular heart disease, it is crucial to address risk factors linked to the development of atherosclerosis. This is because the pathophysiology of CVD has atherosclerosis as a common denominator. Physical inactivities, consumption of a high-calorie diet, saturated fats, and carbohydrates have been known as danger factors for the development of atherosclerosis and other metabolic disorders, including hypertension, diabetes mellitus, and metabolic syndrome, which are significantly more prevalent among individuals with cardiovascular disease (5).

Cardiovascular diseases are common and have significant death rates. Several diseases have originated in inactivity, which is a major contributing component (32). Nine modifiable risk variables were found to contribute to 90% of the chance of suffering a first myocardial infarction in the inter heart study, which included individuals from 52 nations and a range of financial levels. Frequent cigarette smokers, abnormal blood lipid levels, high blood pressure, elevated blood sugar, abdominal fat, psychological and social consequences, alcoholism, and sedentary lifestyles are some of these variables. It is significant to mention that in this study, 36% of the population's risk of myocardial infarction was attributed to frequent cigarette usage (33).

Similar strong correlations and prognostic importance have been found for dyslipidemia, hypertension, tobacco use, and reduced glucose tolerance in other extensive research. Sixty to ninety percent of cases of coronary heart disease were found in those with at least one risk factor. These results have been integrated by the American Heart Association into health promotion initiatives, with a focus on seven recommendations to lower the risk of cardiovascular disease: quitting smoking, exercising frequently, eating a healthy diet, and keeping blood pressure, body weight, glucose, and cholesterol at optimal levels (34, 35). Conversely, immutable characteristics like age, sexual orientation, and family history have different outcomes (36).

2.4. Epidemiology for Cardiovascular Diseases

Globally, CVD are the primary cause of death and morbidity, and this trend is anticipated to continue over the coming years (3). Over the course of each decade of life, the prevalence of heart disease increases significantly (38). Significant obstacles to global health are posed by

cardiovascular illnesses persons from low- and middle-income countries (LMICs) have an approximately 80% higher prevalence of cardiovascular disease, and South Asians are three to five times more likely than persons from other ethnic groups to acquire coronary artery disease (39). Since 1974, heart disease has consistently been one of the top two causes of death in the US. Cardiovascular diseases were the leading cause of mortality in 2014, accounting for 643,841 deaths, or 25% of all deaths. There were 595,930 documented instances of fatalities attributable to cancer (40).

The WHO estimates that CVD is the world's largest cause of death, accounting for 18.7 million deaths globally in 2014. Not only is cardiovascular disease a serious health problem, but it also costs a lot of money. Actually, it's regarded as This is the most expensive disease, even more expensive than Alzheimer's disease and diabetes mellitus. The estimated $237 billion (billion) in non-direct expenditures associated with cardiovascular illnesses are expected to increase to $368 billion by 2035 (41). 23,048 people in Croatia died from cardiovascular diseases in 2018, which represents 43.7% of all deaths—nearly half—of all deaths. Coronary heart disease (CHD) is the prevailing cardiovascular ailment characterized by the constriction or blockage of the arteries supplying the cardiac due to atherosclerosis (42).

Inadequate physical exercise is estimated to be the cause of over 3.2 million deaths each year, according to data from the WHO (43). Furthermore, Australia does around 20,000 heart surgeries per year (44). Turkey does almost 66,000 cardiac surgeries annually (45). and more than 60,000 individuals in Japan get heart surgery each year (46). Likewise, coronary artery bypass grafting (CABG) was performed on 70% of patients with coronary artery disease in the US, Canada, and Europe; 12% of patients also underwent valve surgery in addition to CABG (47).

2.5. Pathophysiology For Cardiovascular Diseases

Atherosclerotic disease is a pathologic process characterized by blood vessel stenosis, which causes decreased or absent blood flow in the arteries and aorta (48). The disorder involves a number of factors, including inflammation, immunological responses, dyslipidemia, and

endothelial dysfunction. These factors are believed to start producing greasy stripes, a characteristic that appears as atherosclerotic plaques form (49).

The thickening of the endothelium, or innermost layer of the blood arteries, is the first step in this process. Next comes the formation of connective tissue and macrophages, or foam cells, which carry fat. Following that, the development of atherosclerotic plaques is facilitated by the clustering in the spread of soft muscle cells (50). For instance, if these lesions keep growing, the deep layers would experience apoptosis, which would draw in more macrophages that might calcify and develop into atherosclerotic plaques (51).

2.6. Clinical History and Physical Examination For Cardiovascular Disorders

Clinical presentations of cardiovascular disorders can range from the absence of symptoms to more traditional ones, such as patients with a steady angina pain associated with myocardial infarction or those who have had a severe cerebrovascular accident and present with suddenly focused neurological impairments (52, 53). Historically, angina, or pain beneath the sternum, has been a common symptom of coronary artery disease. Moreover, symptoms including nausea, vomiting, irregular rhythms, profuse perspiration, unconsciousness, or even abrupt death may accompany it (54). The presence of additional chest pain characteristics that indicate a possible cause related to reduced blood flow to the heart include an increase in pain during physical exertion or movement, and a decrease in pain with rest or the use of nitroglycerin medication (55).

Although most individuals with a thoracic aortic aneurysm do not experience any symptoms at first, as the problem increases, symptoms may become apparent. These symptoms can vary in severity, ranging from moderate symptoms like coughing or dysphonia brought on by the compression of surrounding tissues to severe symptoms like sudden, intense back or chest pain brought on by an acute rupture (56). Similarly, it can take a long time to diagnose abdominal aortic aneurysms (AAA) before they unexpectedly burst, resulting in excruciating stomach discomfort or even fainting (57).

To diagnose cardiovascular disease, a thorough physical examination is necessary. Starting with a thorough examination to find warning signs, such as those seen in patients with

degenerative cardiomyopathy or chest pain. A carotid examination must be done with the patient's back raised to a 30-degree angle and while they are in a laying position. This makes it possible to evaluate jugular venous pulsations in the neck, check carotid pulses, and find bruits. An essential part of evaluating cardiovascular disease is evaluating peripheral pulses by bilateral inspection and, when appropriate, comparison (58).

2.7. Evaluation For Cardiovascular Diseases

Diagnosing cardiovascular illness requires a complete medical history and physical examination, with special attention to the cardiovascular system. A more thorough history and physical examination must be performed by the physician if the patient has a history consistent with obesity, a heart attack, decreased functional capacity, dyspnea, intermittent dyspnea at night, fainting or near-fainting, and pain or cramping in the legs. In addition to making a diagnosis based on clinical hypotheses, the primary goal should be to stop the illness from developing by identifying people who have risk factors and taking all appropriate steps to address modifiable risk variables. It is recommended that all patients, beginning at the age of 20, should participate in discussions regarding cardiovascular disease risk factors and undergo lipid analysis (35).

2.8. Treatment for Cardiovascular Diseases

The way that heart disease is managed varies greatly and is contingent upon the specific clinical situation. As an illustration, peripheral vascular disease is treated with angiography, acute ischemic stroke is treated with catheter-directed blood clots, and coronary heart disease patients can have coronary stenting or surgery. Nonetheless, it's critical that people with established CVD receive comprehensive education regarding the importance of secondary protection through altering risk indicators and embracing a healthy lifestyle (35). The primary forms of treatment for cardiovascular problems are medication, exercise, a healthy diet, and heart surgery (6).

2.8.1. Medical Treatment of Cardiovascular Diseases

The use of cardiac medications, such as beta-blockers, statins, aspirin, and angiotensin-converting enzyme (ACE) inhibitors, is part of the treatment for secondary prevention of cardiovascular disease (7).

2.8.2. Surgical Procedures For Cardiovascular Diseases

Furthermore, it can be required to perform surgical treatments such as balloon angioplasty, cardiac transplantation, and artificial cardiac surgeries. In addition, medical equipment such as pacemakers, prosthetic valves, and patches for cardiac defect sealing may also be used (2). Significant progress in the field of cardiovascular disease medicine has led to a growing adoption of minimally invasive procedures in operative cardiac operations, which has decreased the death rates related to CVD (7).

However, there are still a number of significant risk factors for postoperative problems after cardiac surgery (8). On the other hand, heart valve issues may be hereditary, develop over time, or result from an infection. The two types of disease symptoms are regurgitation/insufficiency and stenosis. More heart valves are impacted by severe aorta stenosis in older adults in the West than by any other illness. It is associated with a lower quality of life and a higher chance of death. Heart valves can be replaced with biologic or mechanical prostheses (60).

Myocardial revascularization surgery (MRS) and valve replacement or repair are major surgeries that call for immediate postoperatively urgent care. Extracorporeal circulation (ECC) is a widely utilized technique in several types of cardiac surgery. It has the potential to trigger a systemic inflammatory response and release substances that impair coagulation and the immune system. Therefore, patients with long ECC durations are more likely to experience neurological problems (61,62). The brain damage brought on by ECC can have serious consequences, such as decreased self-reliance and a deterioration in general wellbeing. After being released from the hospital, these issues make it difficult to perform daily duties like food and personal hygiene (63).

2.9. Cardiac Surgery

The medical specialty of cardiovascular surgery is devoted to the surgical management of cardiac and thoracic aortic disorders. One way to understand the scope of modern heart surgery is to go back to the late 1800s (64, 65). Heart ischemia-related problems are frequently treated with cardiovascular surgery, including coronary artery bypass grafting. Additionally, it is used to treat valvular heart disease that arises from a variety of causes, including arterial hardening, rheumatism, and inflammation of the heart. Furthermore, it includes heart transplants (64). Heart surgery differs from other types of therapy because advances in techniques and equipment have reduced risks during the healing process and made surgeries safer (66).

Sternotomy is the primary method used in cardiovascular surgery, as seen in Figure: 2.2. Nonetheless, the use of minimally invasive procedures is becoming more and more popular. Following surgery, a sternotomy may affect the lungs (67). The patient is often scheduled for cardiopulmonary bypass surgery, which affects the lungs at the same time (68). After having cardiac surgery, patients frequently spend their first post-operative days in the ICU before being moved to the cardio-thoracic division. Research indicates that the length of hospital stay following a heart procedure is approximately 10 days (69). Following an open heart surgery, the patient is kept under close observation for approximately 48 hours in an ICU as their blood pressure, heart rate, and oxygen saturation levels are continuously tracked. In order to drain blood from the area surrounding the heart and lungs, chest tubes are placed (70). When it comes to relieving ischaemic cardiovascular disease that is accompanied by complex cardiovascular disease, cardiac surgery is one of the options (71).

There is a considerable danger associated with cardiac surgery, both during and after the procedure. It requires a highly qualified group of specialists as well as contemporary medical gear. Apart from the conditions that require cardiac surgery, the post-operative period brings with it a variety of unique pathologies: myocardium, shock, poor heartbeat symptoms, irregular heartbeats, systemic inflammation following cardiopulmonary bypass, and multi-organ involvement leading to kidney damage, stroke, and dyspnea. Cardiology and cardiac surgery have had to adapt as interventional and minimally invasive approaches for treating heart problems have grown in popularity (72).

Figure 2.2: Cardiac surgery room (73).

2.9.1. Indications For Cardiac Surgery

The international classes of statistics of diseases and related health problems provides medical classifications that include codes to describe diseases, taking into account both cardiac surgery and interventional cardiovascular procedures. It is significant to remember that for numerous diseases, heart surgery remains the main course of treatment. When managing valvular heart disease, stenotic lesions and regurgitation can be distinguished. Unlike the four-step angiographic grading used in the catheterization laboratory, valvulopathies are typically classified into three stages: mild, moderate, and severe. Medical intervention is necessary when there is substantial regurgitation of the valves, or stenosis. Surgeons can choose to rebuild the affected valve or replace it, depending on its condition (74).

Surgical is necessary for patients experiencing symptoms caused by severe aortic regurgitation. Patients who do not show symptoms but have a reduced the fraction of left-ventricular ejection, or higher leftward ventricle leftover quantities must too receiving surgery. Mitral stenosis mostly arises from rheumatic heart disease, a condition that is seldom in developed nations. The treatment of mitral regurgitate (MR) varies based on its underlying cause (75).

By implanting pacemakers, heart surgery treats a variety of heart rhythm abnormalities. This includes double-chambered systems for atrioventricular blocks of defibrillators for arrhythmic ventricular arrhythmias and heart synchronization therapy for severe cardiac disease. There are two classifications for congenital heart failure: bluish lesion and non-bluish lesion. An effective treatment for anomalies of the ventricular and atrial septum is surgical closure. For the treatment of coronary artery disease, coronary bypass grafting may be a beneficial option (76).

2.9.2. Major Common Types of Cardiac Surgery

Coronary artery bypass grafting: One procedure that is frequently performed to treat ischemic heart disease is coronary artery bypass grafting (77). Revascularization, sometimes referred to as revascularization, is a common surgical procedure that tries to give the arteries and veins a different way to receive blood. Its main goal is to prevent blood clots from forming. This can be accomplished in a few different ways, and the arteries can be taken from different parts of the body (78).

When it comes to symptom relief and prognostication, CABG is a commonly performed major surgery that has proven beneficial for patients with numerous arteries and illness of the left main coronary artery. Even if people are getting older and more precarious, overall results have significantly improved over time, with significant drops in both surgical mortality and perioperative complications. The survival rates at five and ten years are approximately 85% to 95% and 75%, respectively (79).

Indicators or symptoms that point to the possibility of a specific illness or condition. When there are significant blockages in the major coronary artery and/or when percutaneous coronary intervention (PCI) has not been successful in clearing the blockages, coronary artery bypass grafting, or CABG, is frequently recommended (80).

Surgery for valve diseases: This is an important sign that you should have cardiac surgery. This procedure deals with a valve's dysfunction or deterioration brought on by inherited or acquired illnesses. Valves can be replaced or repaired using mechanical or bioprosthetic valves. Although mechanical valves are thought to survive longer, patients using them must take anticoagulant medication for the rest of their lives (81).

Patients who have significant aortic stenosis, regurgitate the valve, or have symptoms are patients for aorta valve replacement or repair (AVR). Furthermore, it is performed on patients undergoing coronary artery bypass grafting or cardiac valve surgery who have minor aortic constriction or regurgitation. If a patient has severe or moderate mitral narrowing heart valve regurgitation, the mitral valves are replaced or repaired. Patients with severe tricuspid failure or mild tricuspid dysfunction who are undergoing heart surgery for other reasons are candidates for tricuspid valve replacement or repair (82).

Congenital heart defects surgery: Congenital heart disorders (CHD) are birth-related structural cardiac defects. They might change the usual blood supply to the heart. Genetic cardiac abnormalities are the more common type of birth anomaly (84). While significant advancements have been made in the surgical and medicinal therapy of congestive heart failure (CHD), many treatments fall short of offering a full recovery. Because of this, some people who survive congestive heart failure (CHD) nevertheless have serious persistent problems with blood flow and electrical conduction, which can have long-term cardiac effects (85).

2.9.3. Complications After Cardiac Surgery

Coronary surgery risk factors and conditions, such as age, sex, length of heart pulmonary bypass, hyperglycemia, obesity, cardiac or renal disease, and abrupt myocardial infarctions, are the main causes of difficulties following heart surgery (86). Cardiac surgery can have a number of postoperative consequences, the most common of which are cardiovascular, neurological, and lung-related.

On the other hand, a stroke is a neurological condition that might appear during the first twenty-four hours following surgery. Asthma, atelectasis, abrupt dyspnea, acute respiratory distress syndrome, and pleural fluid are among the pulmonary consequences (66,67). Moreover, postoperative bleeding is one of the major problems (62). Atria arrhythmia (87), mesenteric ischemia (88), cardiogenic shock (89), kidney failure (87), and infected deep sternal wound (IDSW) (90).

Ten to twenty percent of the nation's hematological derivatives are utilized in heart operations due to bleeding during the procedure, hemorrhaging-related shock, and clotting abnormalities

such as heparin-induced thrombocytopenia. Up to 18% of patients who undergo heart surgery get immediate renal injury. Merely 2% of individuals require kidney replacement therapy. According to the international classification of myocardial infarction, a myocardial infarction that develops following cardiac surgery is classified as a type 5 myocardial infarction, which occurs in 5–10% of cases (91,92).

Patients in the postoperative department frequently exhibit fever, edema, and high levels of inflammatory markers. Therefore, it might be difficult to tell the difference between people who have a true illness and people who have sepsis (93). There could be additional information in the time progression. To ascertain whether an infection has occurred, any signs or symptoms that appear the second or third day following the procedure should be looked into very away (94).

2.9.4. Clinical Significance of Heart Operation.

The goals of cardiac surgery are to improve the long-term prognosis, reduce symptoms, prevent the consequences of ischemia, and improve functional abilities (83). Cardiac surgery improves the quality of life for those with heart problems. Improving the patient's functionality and decreasing the severity of their sickness are two aspects of improving their quality of life. However, the complexity of the surgery and the use of cardiac bypass can occasionally lead to complications that need a protracted stay in the intensive care unit and, consequently, a longer duration of bed rest (8,95).

One of the most important aspects of preserving cardiovascular health is cardiac surgery. Because of the epidemiologic shift, the incidence of cardiovascular diseases—which include high blood pressure, atherosclerosis, and associated behavioral risk indicators—is gradually increasing. Cardiovascular surgery costs roughly forty thousand dollars each patient, or one to two percent of US health care spending, for a total of twenty billion dollars. The demand for medical professionals with expertise in cardiology and cardiac surgery will rise (96).

2.10. Physical Activity

Any movement of the body that is produced by skeletal muscles and requires the expenditure of energy is referred to as physical activity (97). Participation in physical exercise is an

essential lifestyle practice that significantly influences the general cardiovascular well-being of a patient suffering from heart disease (4). A sufficient and regular physical activity regimen reduces the risk of having more cardiac episodes and the need to be hospitalized (18), as well as the symptoms (97, 98, 99), anxiety (99), and development of quality of life (9).

Decreased physical activity was a sign of potential surgical issues. Patients with cardiac problems who did not exercise enough were more likely to experience serious side effects, such as needing repeat surgery, renal failure, cerebrovascular accidents, and wound inflammation. Further studies on physical activity following surgery have demonstrated that people participating in cardiac rehabilitation or exercising under a physical therapist's supervision. Compared to individuals who do not engage, post-heart surgery patients have lower readmission rates, improved functional capacity, and shorter hospital stays (14).

According to the results of a 10-year study (100), people who exercised after surgery had fewer cardiovascular events over a longer length of time and lower death rates. Studies have demonstrated a lower rate of postoperative complications, hospital readmissions, and mortality among patients with heart problems who engage in a regular exercise program and get information on controlling cardiovascular disease risk factors (15). Despite the fact that exercise is crucial for reducing negative effects. Patients' participation in postoperative physical activity has historically decreased after heart surgery (16).

Moreover, in a retrospective review of patients' participation in cardiac rehabilitation following heart surgery (101), 42% of patients did not finish exercise-based cardiac rehabilitation (CR), and 28% never took part in the course of treatment. Therefore, it is crucial to comprehend the factors that influence physical activities for individuals who have undergone heart surgery in order to provide incentives for them to engage in physical activity.

2.11. Life Quality Following Cardiac Surgery

The term of quality of life has gained importance in the fields of social sciences, healthcare, and medicine. It encompasses not only empirical, physiological, or clinical features, but also the patients' subjective accounts of the impact of their medical conditions on other facets of

their lives. This includes their capacity to engage in physical and social activities, find happiness in day-to-day activities, and maintain satisfying connections with others (102).

Increasing survival and quality of life is the main objective of heart surgery (103). It is critical to evaluate functioning both before and after surgery given the knowledge of potential post-operative complications. This aids in our understanding of how the treatment is going and allows us to step in when necessary to avoid functional restrictions (104). Recovery from a heart surgery has a direct impact on one's overall quality of life, particularly in terms of physical health (105).

A 2004 study conducted in Croatia found that, a year after surgery, patients' general health shown a significant increase in half of the psychological and physical aspects of quality of life when compared to their baseline status (106). Additional research revealed an improvement in general health and quality of life following a heart procedure and rehabilitation (107).

2.12. Functional Capacity After Cardiac Surgery

Patients functional capacity is observed to significantly decline following cardiac surgery (108). Weaker lung and peripheral muscles, difficulty breathing following an asternotomy, inactivity, pain at the wound site, fatigue, the impression that the work was done too much, and psychological variables like depression and worry are the causes of this (108,109). Capacity of function refers to the body's ability to consume oxygen. The device used to assess functional capacity is the six-minute walk test (109). The 6MWT is a useful and uncomplicated test that evaluates the overall impacts of numerous pathways through activity, including cardiovascular the respiratory, circulatory, neurological, and motor systems; also, the metabolisms of the muscles. It’s a submaximal test that allows individuals to pace their actions (110,111) .

It has been demonstrated through research by Daniel Da Costa Torres and colleagues (2016) and Claudia Fiorina and colleagues (2007) that people who had coronary artery bypass grafting surgery found the Six-Minute Walk Test to be both feasible and well-tolerated. This was observed on days 7 and 11 following the surgery. Following cardiac surgery, patient

outcomes are greatly impacted by prescribed supervised exercise and independent physical activity regimens (112,113).

Participating in self-directed physical activity following surgery and following prescribed exercise programs reduces the risk of post-operative complications, including pulmonary complications (PPCs) and venous thromboembolism (114). According to what has been said about the limitations and effects of early physical activity after cardiac surgery, physical exercise after heart surgery may be encouraged or inhibited depending on a person's individual characteristics.

Therefore, it is imperative to motivate those who have had cardiac surgery to engage in physical activity after the operation. While many review studies have examined the effects of physical activity on people with heart disease, the majority of these studies have concentrated on people who have undergone cardiac rehabilitation or who have coronary heart disease, myocardial infarction, or any other type of heart illness. As far as review studies go, none that have focused solely on the benefits of early physical activity following heart surgery exist (19).

3. METHOD

3.1 Patients and Study Design

Total of 100 participants (52 men and 48 women) were enrolled in the study. The current study was conducted at Al-Bitar Center for heart operation in Iraq's Baghdad and data were collected between December 2023 and January 2024.

The Clinical Research Ethics Committee of the Health Ministry of Iraq stated that this research was medically appropriate (decision No. 897 from 2023/12/12), (Appendix 1). In all, 110 patients voluntarily participated in this study as participants. The participants are selected during the course of the first seven days following their surgical operation from the operating rooms of the Ibin Al-Bitar center. Ten participants—seven men and three women—were removed from the study after samples were randomly collected because they were unable to pass the 6-MinuteWalk Test. In the final phase, the statistical analysis included 100 patients, 52 of whom were men and 48 of whom were women, whose ages ranged from 18 to 65.

3.1.1 Inclusion Criteria

This research includes patients who received sternotomy-assisted heart surgery. Men and women between the ages of 18 and 65 were involved in the study. Throughout the healing process, participants who were awake, alert, and able to communicate verbally as well as those who could comprehend and correctly complete tests and questions. Individuals who voluntarily agreed to share by filling out permission forms and patients who successfully passed the six-minute walk test.

3.1.2 Exclusion Criteria

Patients who were younger than 18 years old, older than sixty-five years old or incapable of completing surveys, scales, or the six-minute walk test were excluded from participation. Patients experienced complications after surgery, including atrial arrhythmia, contamination in a deep sternal hole, cerebrovascular accident, or extensive bleeding.

3.2. Physical Activity Program

Any movement of the body that requires the activation of skeletal muscle and consumes energy is referred to as physical activity (10). Moreover, any action that, whether done seated or supine, uses less than or equal to 1.5 metabolic equivalents (MET) of energy (42).

In accordance with earlier research, we created our treatment plan as follows: Postural drainage and breathing exercises are combined with shoulder and neck mobilization on the first and second postoperative day. Breathing exercises, postural drainage, and supervised walking at intervals of 2.5 minutes, as tolerated, up to 10 minutes in the morning, afternoon, and evening, as well as at night, are recommended from 3 to 7 post-operative days. A few representative images can be shown in (Figure 3.1).

Figure 3.1: Physical activity program.

3.3. Demographic and Clinical Information Collection

On the seventh day following the surgery, we recorded data for each patient: gender, age, marital status, height, weight, body mass index (BMI), history of alcohol and cigarette use, and chronic conditions such as diabetes mellitus, high blood pressure, hypothyroidism, bronchial allergies, high cholesterol, length of stay in the intensive care unit, kind of heart operation, and previous surgeries (Appendix 2).

3.4 Outcome Measurements

Following their heart surgery, all of the patients filled out questionnaires and other assessments designed to assess their degree of physical activity, overall well-being, and capacity for action. The following questionnaires, tests, and scores were administered to each patient who participated in the surgical seventh day. One tool used for assessing an individual's level of activity is the Short-Form International Physical Activity Questionnaire (SF-IPAQ). To assess quality of life, the Short Form-36 (SF-36) health survey is utilized. The test for measuring functional capacity is the 6-minute walking test (6MWT).

3.4.1 Short Form 36-Item Survey

We used the Arabic version of the "Medical Outcome Study Short Form-36 Items" (MOS SF-36), (117), to quantify HRQoL.With its succinct set of 36 questions, this health survey can accomplish several objectives. Body functioning (BF), role limitations due to physical problems (RP), physical pain (PP), general health (GH), energy, societal functioning (SF), role limitations due to emotional issues (RE), mental health (MH), and one item related to health transition are among the various dimensions of health that are included in the results (118,119). The 36 questions that make up the SF-36 are taken from 21 components. A score is given to each item, which is then totaled and transformed into a scale with 0 indicating poor health and 100 indicating excellent health (119), (Appendix 3).

3.4.2 International Physical Activity Questionnaire

One of the physical activities was providing the SF-IPAQ to participants. Participants in this questionnaire were asked to indicate how many days and how long they had spent walking or participating in moderate to active activities over the previous seven days (120). They were implemented to assign a suggested MET (metabolic equivalent of task) to each activity.(120). Based on their IPAQ scores, participants were divided into three physical activity stages: high, moderate, and low (121). If a participant did not meet the requirements for low PA stages—which include walking, moderate exercise, or vigorous activity for a certain number of minutes or days per week—they were classified as inactive. On the other hand, people who met the criteria for the moderate or high PA classifications were seen as active (120,121), (Appendix 4).

3.4.3 Six Minute Walking Test

A common, reliable, and safe test that may be utilized to assess a person's functional ability in a variety of medical settings is the 6-minute walking test (91). A 30-meter-wide, unblocked canal was used to achieve this goal. While the individual remained sitting, we monitored their vital signs, which included breathing rate, pulse, diastolic blood pressure, oxygen saturation, and a modified Borg scale for the subjective evaluation of dyspnea (91). For the purpose of the evaluation, participants are instructed to walk a maximum of six minutes. The longest distance walked serves as an indicator of a person's mobility (122). The supervisor may perform additional evaluations once the test is over, such as taking the test's arterial blood pressure, heart rate, and oxygen saturation. The Borg scale will then be used to record the results in order to assess fatigue and breathing problems. The 6MWT is calculated by keeping track of the total distance traveled and the number of completed laps (123). We measured the heart rate, blood pressure, and oxygen exhaustion both before and after the exam. Just as seen in (Figure: 3.2), (Appendix 5).

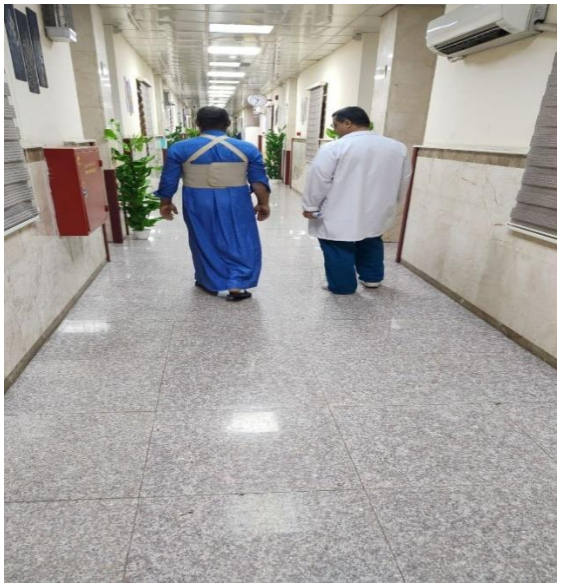

Figure 3.2: Six minute walk test.

3.4.4. Sample Size Calculation

Sample size was calculated using MedCalc Statistical Software version 20 (MedCalc Software, Ostend, Belgium). The minimum required sample size of is 91 patients. Calculation is guided by medium effect size (F2 = 0.2) with alpha of 0.05, power of 80% and with expected number of predictors of 10. Sample size was calculated based on F tests - Linear multiple regression: Fixed model, R^2 deviation from zero and was increased to 100 to compensate for any withdrawals or loss to follow up (124,125) .

3.5. Statistical Analysis

Statistical analysis was done by SPSS version 28 (IBM Co., Armonk, NY, USA). Numerical data were presented as the mean and standard deviation (SD), compared between two timepoints using Paired t-test. Categorical data were presented as the frequency and percentage. Pearson's correlation coefficient was calculated to estimate the degree of correlation between two quantitative variables. Linear regression analysis was performed to assess different independent factors associated with SF-IPAQ score. A two tailed p value <0.05 was considered statistically significant.

4. RESULTS

This study comprised 100 patients undergoing cardiac surgery, of whom 54%, 38%, and 9% received valve replacement, ASD repair, and CABG surgery, respectively. Among the patients under study, there was a little male majority (52%). BMI varied between 16 and 46.4 kg/m2 with a mean of 26.82 ± 5.58 kg/m2, while age ranged from 18 to 67 years with a mean of 53.15 ± 12.29 years, 92% of our patients were married, and 62% had only completed elementary school, 8% had completed secondary school, and 30% had completed university education. Moreover, 28% and 9% of the population, respectively, were smokers and drinkers. In addition, 58 individuals had hypertension, 41 had diabetes, 59 had hyperlipidemia, and 19 had other illnesses. Patients spent two or three days in the intensive care unit, with a mean stay of 2.04 ± 0.2 days. Remarkably, 54 patients had procedures done in the past. Sternotomies were used for all surgical procedures (Table 4.1), (Figures 4.1-6).

Table 4.1: Baseline characteristics of the studied patients.

		N	%
Gender	**Male**	52	52.0
	Female	48	48.0
Age (years)	**Mean ± SD**	53.15 ± 12.29	
	Range	18 – 67	
BMI (kg/m^2)	**Mean ± SD**	26.82 ± 5.58	
	Range	16 - 46.4	
Marital status	**Single**	8	8.0
	Married	92	92.0
Educational level	**Primary**	62	62.0
	Secondary	8	8.0
	College	30	30.0
Smoking		28	28.0
Drinking		9	9.0
HTN		58	58.0
DM		41	41.0
Hyperlipidemia		59	59.0
Other diseases		19	19.0
Type of cardiac surgery	**ASD**	9	9.0
	Valve replacement	38	38.0
	CABG	54	54.0
Stay period in ICU (days)	**Mean ± SD**	2.04 ± 0.2	
	Range	2 – 3	
Old surgery		54	54.0

BMI: Body mass index, HTN: Hypertension, DM: Diabetes mellitus, ASD: Atrial septal defect, CABG: Coronary artery bypass graft

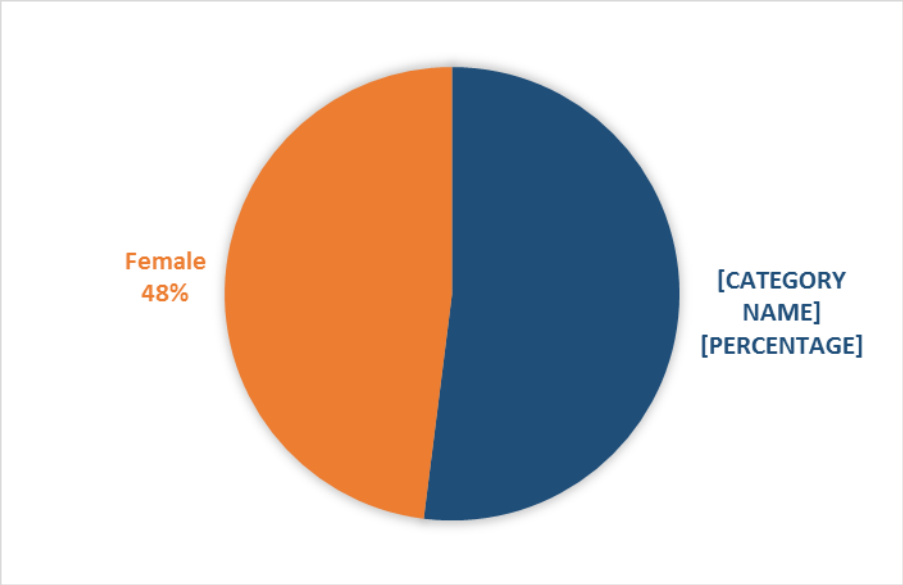

Figure 4.13: Sex distribution of the studied patients.

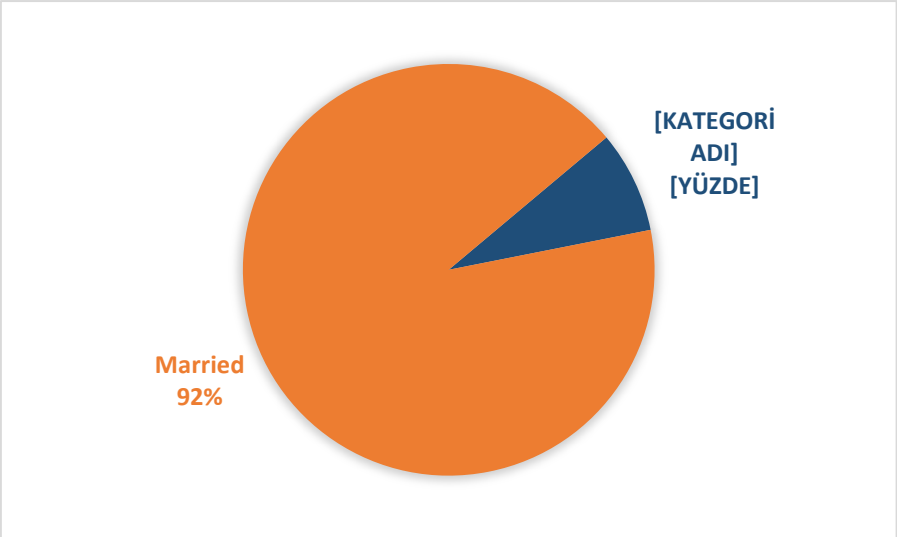

Figure 4.14: Marital status of the studied patients.

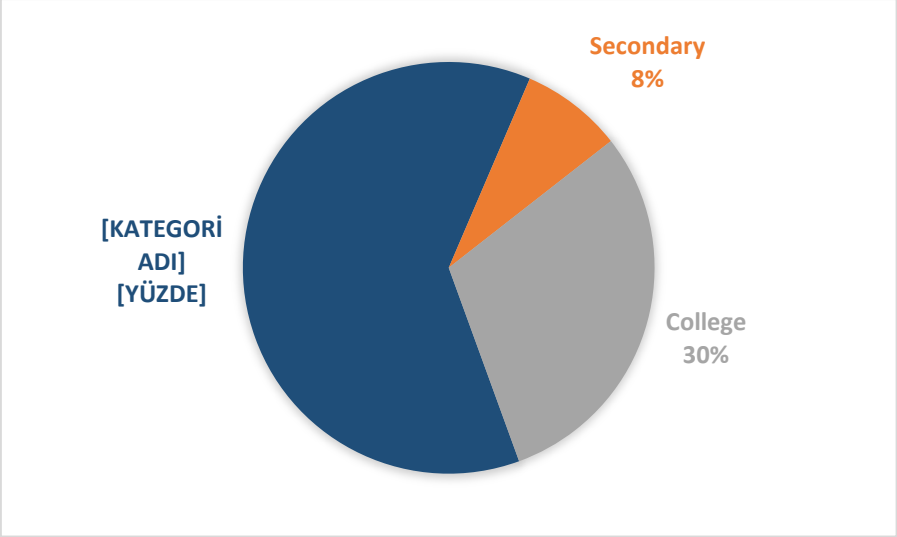

Figure 4.15: Educational level of the studied patients.

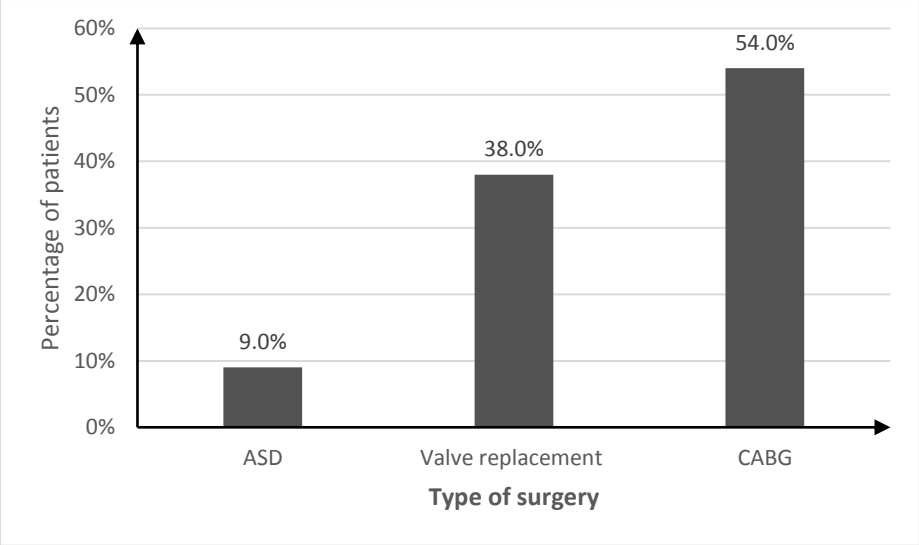

Figure 4.16: Type of surgery performed on the studied patients.

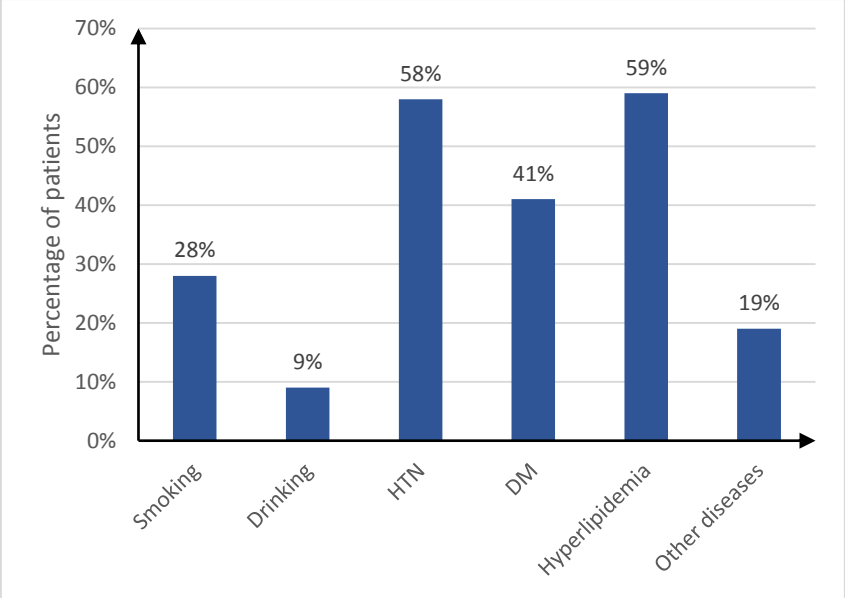

Figure 4.17: Risk factors of the studied patients.

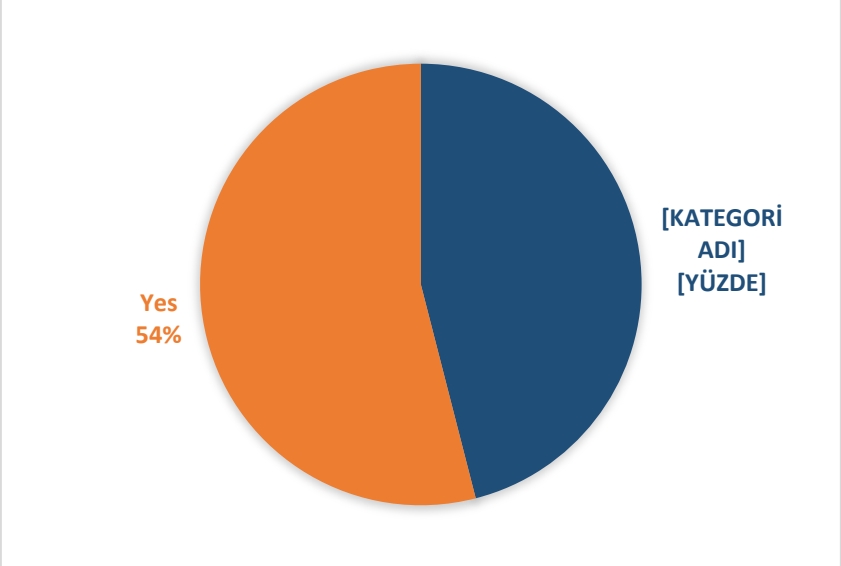

Figure 4.18: The prevalence of old surgeries performed on the studied patients.

As shown in Table 4.10 , the mean SpO2 was 96.92 ± 1.57% before 6MWT which was slightly increased after the test to 97.25 ± 2.04%. However, the mean PR was significantly increased from 87.15 ± 10.39 bpm before the test to 92.16 ± 12.54 bpm after test ($p<0.001$) and MAP was significantly increased from 91.86 ± 9.4 mmHg to 94.29 ± 10.82 mmHg ($p=0.001$). As for distance walked in 6 min, it ranged from 150 to 420 m with a mean of 270.05 ±.

Table 4.10: Six-minute walk test for functional capacity assessment of the studied patients.

		Total patients (n=100)		**P value**
		Before	**After**	
SpO_2 (%)	**Mean ± SD**	**96.92 ± 1.57**	**97.25 ± 2.04**	**0.079**
	Range	**92 - 99**	**90 – 100**	
PR (bpm)	**Mean ± SD**	**87.15 ± 10.39**	**92.16 ± 12.54**	**<0.001**
	Range	**63 - 126**	**50 – 130**	
MAP (mmHg)	**Mean ± SD**	**91.86 ± 9.4**	**94.29 ± 10.83**	**0.001**
	Range	**66 - 119**	**68 – 128**	
Distance Walked in 6 min (m)	**Mean ± SD**	**270.05 ± 63.72**		
	Range	**150 – 420**		

PR: Pulse rate, MAP: Mean arterial pressure, Statistical significance at p value<0.05

For quality of life, 7 categories were evaluated in SF-36 survey as physical functioning with a mean of 32.5 ± 9.25%, energy/fatigue with a mean of 42.88 ± 15.05%, emotional well-being with a mean of 48.11 ± 11.56%, social functioning with a mean of 38.49 ± 15.56%, pain with a mean of 37.92 ± 20.84%, general health with a mean of 52.9 ± 10.52% and health change with a mean of 65.95 ± 12.03%.

Table 4.11: 36-Item Short Form Survey for quality of life assessment of the patients.

		Total patients (n=100)
Physical functioning (%)	**Mean ± SD**	32.5 ± 9.25
	Range	10 – 45
Energy/fatigue (%)	**Mean ± SD**	42.88 ± 15.05
	Range	15 – 78
Emotional well-being (%)	**Mean ± SD**	48.11 ± 11.56
	Range	28 – 76
Social functioning (%)	**Mean ± SD**	38.49 ± 15.56
	Range	13 – 75
Pain (%)	**Mean ± SD**	37.92 ± 20.84
	Range	10 – 78
General health (%)	**Mean ± SD**	52.9 ± 10.52
	Range	35 – 80
Health change (%)	**Mean ± SD**	65.95 ± 12.03
	Range	50 – 75

As shown in (Table 4.4), (Figure 4.7) patients had a mean walking days a week of 4.92 ± 0.27 with a mean time of 28.85 ± 6.15 minutes. Most patients (63%) evidenced moderate level of physical activity and the remainder had low activity. Moreover, MET amount ranged from 247 to 1000 with a mean of 541.89 ± 159.35.

Table 4.12: Summary of physical activity level among the studied patients.

		Total patients (n=100)
Walking days a week	**Mean ± SD**	4.92 ± 0.27
	Range	4 – 5
Walking time (min)	**Mean ± SD**	28.85 ± 6.15
	Range	15 – 50
Type of physical activity	**Low**	37 (37%)
	Moderate	63 (63%)
SF-IPAQ (MET amount)	**Mean ± SD**	541.89 ± 159.35
	Range	247 – 1000

MET: Metabolic equivalent

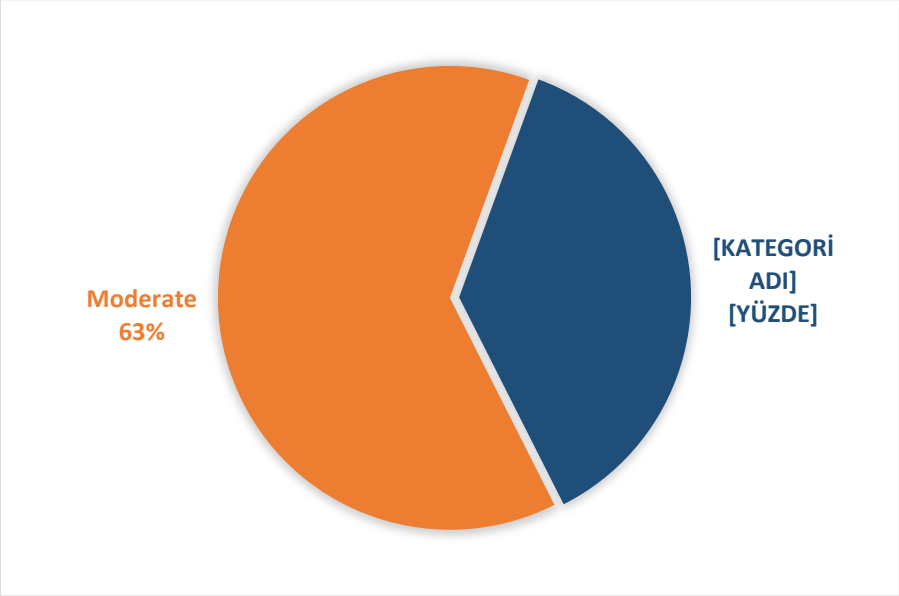

Figure 4.19: Type of physical activity among the studied patients.

There was a statistically significant positive correlation between SF-IPAQ score and each of walking days a week (r=0.405, p<0.001) and walking time in minutes (r=0.969, p<0.001). On the other hand, SF-IPAQ score was significantly negatively correlated with age (r=-0.336, p=0.001) and BMI (r=-0.248, p=0.013).

Table 4.12: Correlation between SF-IPAQ score and different characteristics of the studied patients.

	SF-IPAQ score	
	r	**p value**
Age (years)	-0.336	**0.001**
BMI (kg/m^2)	-0.248	**0.013**
Stay period in ICU (days)	0.014	0.888
Walking days a week	0.405	**<0.001**
Walking time (min)	0.969	**<0.001**

r: Pearson's correlation coefficient, Statistical significance at p value<0.05

In univariate regression analysis, age, BMI, marital status and HTN were independent predictors of SF-IPAQ score as: Increased age and BMI were significantly associated with decreased SF-IPAQ score, with coefficients (95%CI) of, -4.35 (-6.8 to -1.91) and -7.09 (-12.63 to -1.54) respectively and p values <0.001 and 0.013. In comparison to single patients, the married ones showed significantly lower SF-IPAQ score (coefficient=-127.84, 95%CI: -242.16 to -13.52, p=0.029). Hypertensive patients had significantly lower SF-IPAQ score than the non-hypertensive ones (coefficient=-74.5, 95%CI: -137.14 to -11.86, p=0.02). In multiple regression analysis, increased age and BMI were significantly associated with decreased SF-IPAQ score, with coefficients (95%CI) of, -5.88 (-9.29 to -2.47) and -6.16 (-12.17 to -0.15) respectively and p values of 0.001 and 0.045.

Table 4.13: Linear regression analysis for factors associated with SF-IPAQ score among the studied patients.

	Univariate			Multivariable		
	Coefficient	**95%CI**	**p value**	**Coefficient**	**95%CI**	**p value**
Gender						
Male	Ref			Ref		
Female	-44.21	-107.21 to 18.79	0.167	-59.99	-144.5 to 24.52	0.162
Age (years)	-4.35	-6.8 to -1.91	**0.001**	-5.88	-9.29 to -2.47	**0.001**
BMI (kg/m^2)	-7.09	-12.63 to -1.54	**0.013**	-6.16	-12.17 to -0.15	**0.045**
Marital status						
Single	Ref			Ref		
Married	-127.84	-242.16 to -13.52	**0.029**	-63.97	-184.74 to 56.81	0.295
Educational level						
Primary	Ref			Ref		
Secondary	94.84	-23.29 to 212.97	0.114	-11.47	-151.09 to 128.15	0.871
College	37.96	-31.98 to 107.89	0.284	25.75	-51.31 to 102.81	0.508
Smoking	6.78	-63.99 to 77.56	0.85	-12.09	-100.21 to 76.02	0.786
Drinking	10.08	-100.97 to 121.12	0.857	32.4	-90.68 to 155.49	0.602
HTN	-74.5	-137.14 to -11.86	**0.02**	-43.13	-120.91 to 34.65	0.273
DM	-19.11	-83.62 to 45.4	0.558	18.18	-67.6 to 103.97	0.674
Hyperlipidemia	-21.82	-86.29 to 42.66	0.504	8.06	-129.99 to 146.11	0.908
Other diseases	-5.48	-86.49 to 75.53	0.894	49.6	-44.45 to 143.65	0.297
Type of cardiac surgery						
ASD	71.07	-39.08 to 181.21	0.203	-55.26	-414.23 to 303.72	0.76
CABG	-27.95	-91.48 to 35.58	0.385	3.69	-335.93 to 343.3	0.983
Valve replacement	7.23	-58.23 to 72.7	0.827	-12.76	-336.85 to 311.32	0.938
ICU stay (days)	11.58	-150.6 to 173.76	0.888	9.14	-151.93 to 170.2	0.91
Old surgery	-33.63	-97.04 to 29.79	0.295	4.64	-69.15 to 78.44	0.901

CI: Confidence Interval, Statistical significance at p value<0.05

As shown in Table 4.14, there was a statistically significant correlation between SF-IPAQ score and all the categories of SF-36 score, positive with physical functioning (r=0.803, p<0.001), energy/fatigue (r=0.772, p<0.001), emotional well-being (r=0.647, p<0.001), social functioning (r=0.491, p<0.001), general health (r=0.657, p<0.001) and health change (r=0.782, p<0.001) while negative with pain score (r=-0.798, p<0.001).

Table 4.15: Correlation between SF-IPAQ score and categories of SF-36 score.

	SF-IPAQ score	
	r	**p value**
Physical functioning (%)	0.803	**<0.001**
Energy/fatigue (%)	0.772	**<0.001**
Emotional well-being (%)	0.647	**<0.001**
Social functioning (%)	0.491	**<0.001**
Pain (%)	-0.798	**<0.001**
General health (%)	0.657	**<0.001**
Health change (%)	0.782	**<0.001**

r: Pearson's correlation coefficient, Statistical significance at p value<0.05

Our univariate regression analysis revealed that all the categories of SF-36 score were significantly associated with SF-IPAQ score as:

Each 1 unit increase in physical functioning, energy/fatigue, emotional well-being, social functioning , general health and health change scores resulted in increasing SF-IPAQ score, respectively by, 1383.76 (95%CI: 1178.2 to 1589.32), 817.63 (95%CI: 682.69 to 952.56), 892.2 (95%CI: 681.56 to 1102.85), 503.35 (95%CI: 324.54 to 682.15), 995.79 (95%CI: 767.02 to 1224.56) and 1036.25 (95%CI: 870.95 to 1201.55) with P<0.001. Conversely, each 1 unit increase in pain score resulted in decreasing SF-IPAQ score by -610.13 (95%CI: -702.56 to -517.7) with p<0.001.

Based on multiple regression analysis, social functioning, pain and health change scores were the only ones significantly associated with SF-IPAQ score; with every 1 unit increase in social functioning and health change scores, SF-IPAQ score increased by 157.62 (95%CI: 42.58 to

272.67) and 266.45 (95%CI: 51.08 to 481.82) respectively, with p values of 0.008 and 0.016. On the other hand, each 1 unit increase in pain score resulted in decreasing SF-IPAQ score by 269.43 (95%CI: -384.9 to -153.97) with p<0.001.

Table 4.16: Linear regression analysis for the association of SF-IPAQ score with categories of SF-36 score.

	Univariate			Multivariable		
	Coefficient	95%CI	P value	Coefficient	95%CI	P value
Physical functioning (%)	1383.76	1178.2 to 1589.32	<0.001	329.22	-15.65 to 674.08	0.061
Energy/fatigue (%)	817.63	682.69 to 952.56	<0.001	168.84	-24.7 to 362.38	0.087
Emotional well-being (%)	892.2	681.56 to 1102.85	<0.001	111.35	-81.59 to 304.29	0.255
Social functioning (%)	503.35	324.54 to 682.15	<0.001	157.62	42.58 to 272.67	0.008
Pain (%)	-610.13	-702.56 to -517.7	<0.001	-269.43	-384.9 to -153.97	<0.001
General health (%)	995.79	767.02 to 1224.56	<0.001	-100.97	-329.12 to 127.18	0.382
Health change (%)	1036.25	870.95 to 1201.55	<0.001	266.45	51.08 to 481.82	0.016

CI: Confidence Interval, Statistical significance at p value<0.05

Before 6MWT, SF-IPAQ score was significantly positively correlated with SpO2 (r=0.247, p=0.013) and negatively correlated with MAP (r=-0.236, p=0.018). Moreover, there was a significant positive correlation between SF-IPAQ score and distance walked in 6 minutes (r=0.839, p<0.001).

Table 4.17: Correlation between SF-IPAQ score and 6MWT score.

	SF-IPAQ score	
	r	**p value**
Before 6MWT		
SpO_2 (%)	0.247	**0.013**
PR (bpm)	0.082	0.42
MAP (mmHg)	-0.236	**0.018**
After 6MWT		
SpO_2 (%)	0.167	0.097
PR (bpm)	0.007	0.946
MAP (mmHg)	-0.161	0.109
Distance Walked in 6 min (m)	0.839	**<0.001**

r: Pearson's correlation coefficient, Statistical significance at p value<0.05

In simple regression analysis, distance walked in 6 minutes was significantly associated with SF-IPAQ score ($p<0.001$) as it increased by 2.1 (95%CI: 1.82 to 2.37) with every 1 unit increase in the distance.

Likewise in multiple regression analysis, distance walked in 6 minutes was significantly associated with SF-IPAQ score ($p<0.001$) as it increased by 2.12 (95%CI: 1.83 to 2.4) with every 1 unit increase in the distance (Table 4.10), (Figures 4.8-12).

Table 4.18: Linear regression analysis for the association of SF-IPAQ score with 6MWT score.

	Univariate			Multivariable		
	Coefficient	**95%CI**	**P value**	**Coefficient**	**95%CI**	**P value**
After 6MWT						
SpO_2 (%)	13.04	-2.42 to 28.51	0.097	1.76	-7.28 to 10.79	0.7
PR (bpm)	0.09	-2.46 to 2.64	0.946	-0.52	-1.98 to 0.94	0.484
MAP (mmHg)	-2.37	-5.28 to 0.54	0.109	0.65	-1.11 to 2.41	0.466
Distance Walked in 6 min (m)	2.1	1.82 to 2.37	**<0.001**	2.12	1.83 to 2.4	**<0.001**

CI: Confidence Interval, Statistical significance at p value<0.05

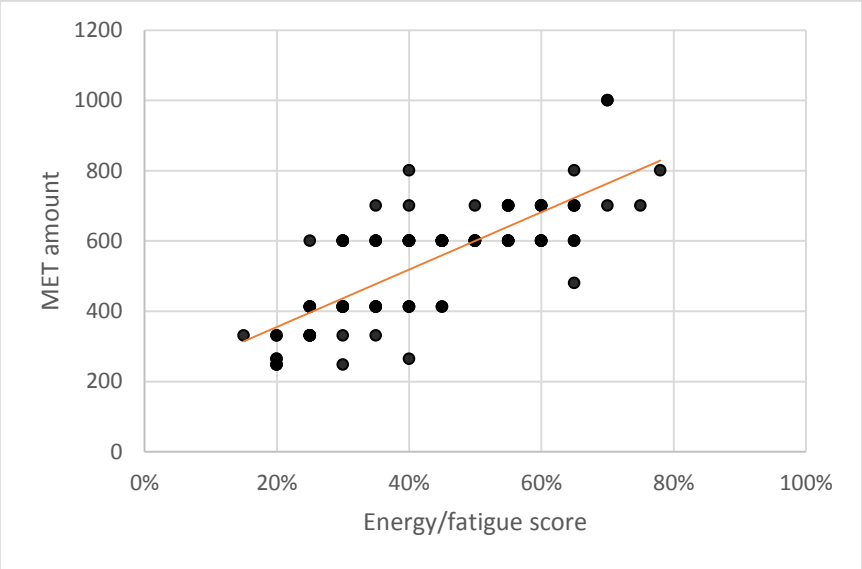

Figure 4.20: Scatter plot demonstrating the correlation between energy/fatigue score and MET amount.

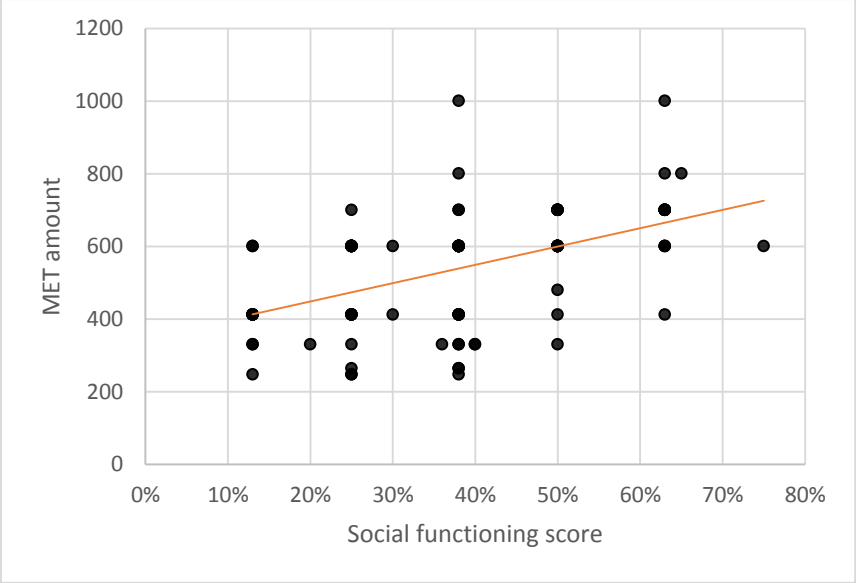

Figure 4.21: Scatter plot demonstrating the correlation between social functioning score and MET amount.

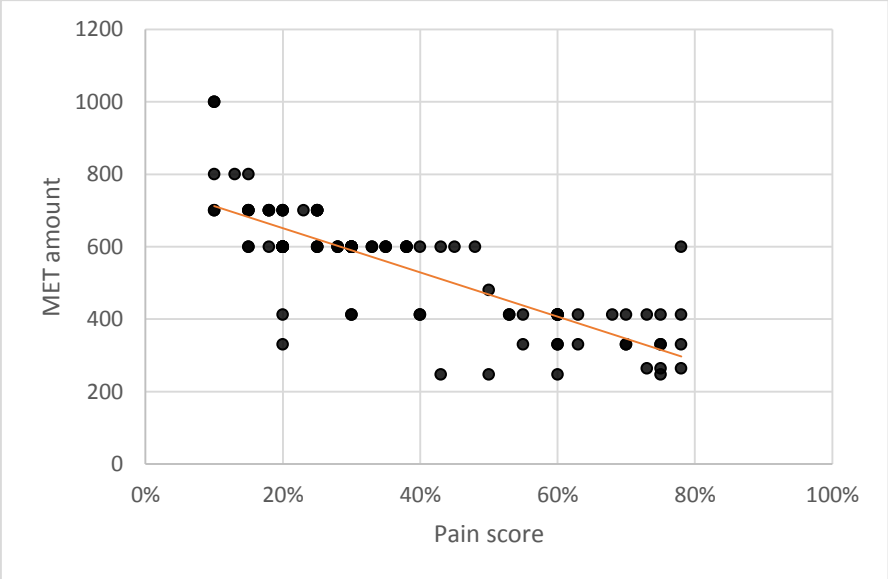

Figure 4.22: Scatter plot demonstrating the correlation between pain score and MET amount.

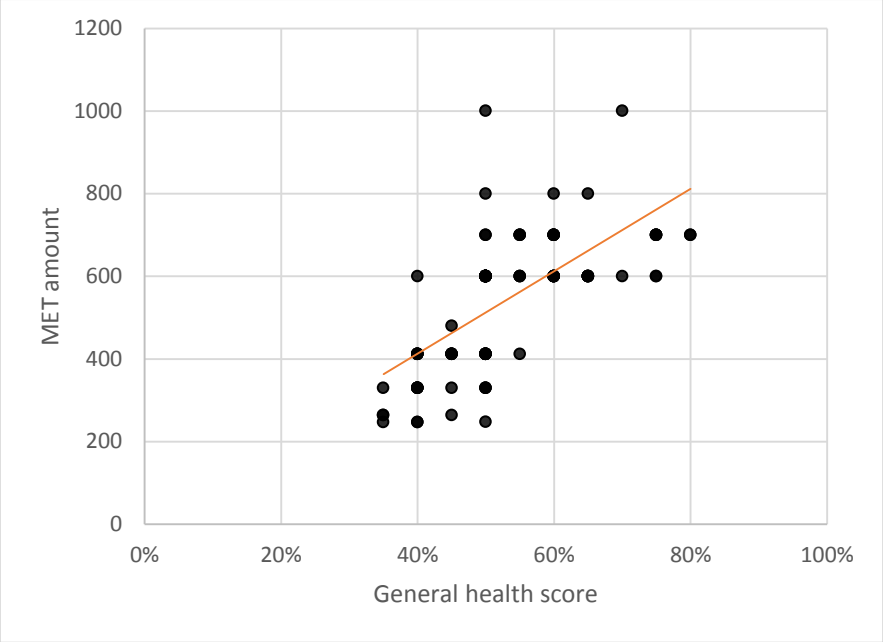

Figure 4.23: Scatter plot demonstrating the correlation between general health score and MET amount.

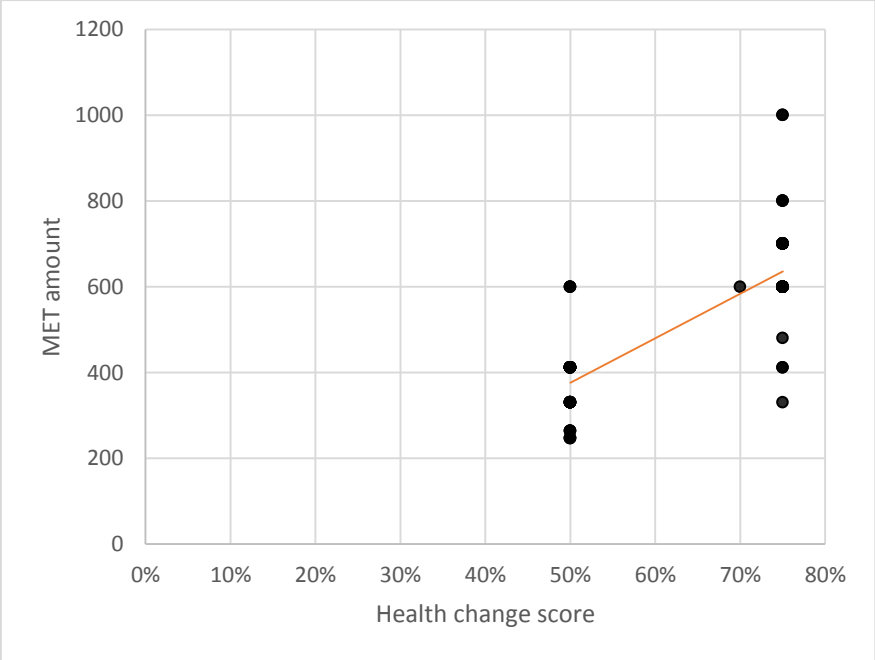

Figure 4.24: Scatter plot demonstrating the correlation between health change score and SF-IPAQ amount.

5. DISCUSSION

In the present study, we examined the association between functional capacity and quality of life in patients who had just undergone cardiac surgery, as well as physical activity, as assessed by the SF-IPAQ. The findings of this study have demonstrated that there is a statistically significant and associational correlation between functional capacity and physical activity, as well as between physical activity and quality of life.

Age, body mass index (BMI), marital status, and high blood pressure (HbP) were among the variables that were demonstrated to be independent predictors of SF-IPAQ score: Increased age and BMI were significantly correlated with a decline in SF-IPAQ score (p values less than 0.001 and 0.013, respectively). When comparing married participants to single participants, the married participants' SF-IPAQ scores were significantly lower. Compared to people without hypertension, those with hypertension scored significantly lower on the SF-IPAQ. Furthermore, our data show a correlation between increased physical activity and enhanced functional capacity and quality of life. This was the situation for the patients in this study who made up 37% of the total with low levels of physical activity and 63% with moderate levels. Our study's conclusions demonstrated a statistically significant relationship between the SF-IPAQ score and each of the quality of life subscale categories. The SF-IPAQ score had a negative correlation with pain and a positive correlation with energy/fatigue, social functioning, general health, emotional well-being, and physical functioning.

Conversely, the SF-IPAQ score increased in response to increases in the scores for energy/fatigue, social functioning, general health, physical functioning, emotional well-being, and health change. Conversely, an increase in the pain level was accompanied by a corresponding decrease in the SF-IPAQ score. Based on our search of the pertinent literature, we were unable to discover any studies that looked into the relationship between the post-heart operation score on the SF-IPAQ and the score on the SF-36 subscale. Taking this into consideration, we compare a number of our findings—such as the SF-36 subscale and SF-IPAQ scores—with those of earlier research conducted after heart surgery that employed alternative metrics to evaluate the connection between pain and physical activity. Bond et al. (126) found a strong and statistically significant correlation between the quality of

life and the return of physical activity within thirty days after cardiac surgery. It was found that there was a direct association between this correlation and life quality. Despite this, our study's subscale scores for the SF-36 and SF-IPAQ were evaluated on the seventh day after heart surgery.

On the other hand, their research assessed quality of life thirty days following surgical operations using the Quality of Life in Cardiovascular Surgery Questionnaire (QLCS). According to Markou et al. (127), there had been gains in every area for both physical activity and quality of life; however, the degree of these increases varied among the three research groups. Group C shows no discernible improvement in PA, while groups B and A both exhibit significant increases. While groups B and C each demonstrate improvement in two of the domains, group A exhibits significant improvement in all five quality of life dimensions.

This was consistent with the results of our experiment even though the scales they utilized in their study were different from ours. According to Firouzabadi MG et al. (128), all categories of the quality of life components demonstrated improvement after the intervention. The average scores of every quality of life component before and after physical activity in the intervention group showed a statistically significant difference. One and four months following their release from surgical procedure sessions, the control group's average scores for the seven quality of life components did not show any statistically significant differences.

Whenever it came to the assessment of physical activity and quality of life in one group on the seventh day following surgery, our results in sync with theirs. On the other hand, their study evaluated quality of life and physical activity in two groups in the first and fourth months following surgical procedure discharge.

Over the course of three years, Tessier S et al. (129) observed a correlation between higher levels of physical activity in leisure time and high scores in health-related quality of life aspects. These categories comprised social functioning for women only, vitality for both sexes, mental health, and physical functioning. Every one of these attributes was assessed independently. An hourly increase in the amount of time spent physically during leisure time each week is associated with a 0.17 and 0.39 point increase in the vitality component in men and women, respectively.

Women's mental component scores developed in parallel with their higher physical activity levels during leisure time. While their study examined leisure-time physical activity and quality of life over a three-year period after cardiac surgery, our investigation revealed a positive correlation between increased physical activity and better quality of life during the first week following the procedure. According to our study, there was a slight association between increased physical activity and a better quality of life.

According to Sjöland H et al. (130), there are important relationships between physical activity levels and life satisfaction. The majority of the quality of life subscales showed significant correlations with physical activity, however these correlations' amplitudes were either mild or moderate. It was discovered that the dimensions that represented physical capacity had the highest correlation coefficients.

Despite the fact that our surveys were different, these results agreed with ours. The quality of life of the individuals was evaluated using the physical activity score, the Nottingham health profile, and the psychological general well-being measure in this study. After implementing a home-based intervention physical activity program, Lie I et al. (131) found that there were significant improvements for most subscales of health-related quality of life in both groups of patients who had undergone heart surgery at the 6-week and 6-month follow-up. However, in terms of these improvements, there was no discernible difference between the groups.

This study's results were relatively similar to our own, which looked at patients the seventh day following surgery and discovered significant gains in physical activity and quality of life. According to Andrew D et al.'s study (132), there were no appreciable variations in the intervention groups' health-related quality of life at the time of hospital discharge. These results contrasted with those obtained for the SF-36 subscales score, which showed that patients who had heart surgery had higher SF-36 subscale scores in correlation with a higher SF-IPAQ score. This resulted from the fact that the two studies' therapeutic regimens were dissimilar.

Our research revealed a significant relationship between the increasing 6MWT scores and a significantly higher SF-IPAQ score for the patient after cardiac surgery. The 6MWT was used to assess the functional capacity. We decided to discuss the relationship between functional

capacity and physical activity using a variety of scales in a number of studies that were conducted after cardiac surgical procedures because we were unable to locate studies that were comparable to our own and that discussed the relationship between functional capacity and physical activity by combining the scores from the 6MWT and the SF-IPAQ.

According to Fiorina et al. (133), the 6MWT's distance traveled was a reliable indicator of a person's functional capacity. The subgroup of patients who had performed the 6MWT more than once was shown to have walked a significantly longer distance after completing the cardiac rehabilitation program after the cardiac operation. Our study's findings, which showed that participants' physical activity levels improved during the postoperative first week of heart surgery and had increased 6MWT marks, were in line with those of their study, which assessed patients who had participated in a heart rehabilitation program 15 days after surgery.

Furthermore, the results of this study demonstrated that higher oxygen saturation levels following six minutes of standing were associated with higher SF-IPAQ scores in patients who had recently undergone surgery. According to Giacchi et al. (134), increased physical function is thought to be associated with a higher oxygen saturation level that is maintained throughout the mobilization process. This was supported by the findings of our study, which showed that a higher degree of physical activity was linked to an increase in oxygen saturation measured by how far a patient could walk in six minutes.

This was consistent despite the fact our study used the SF-IPAQ to measure physical activity and the 6MWT to measure functional status, while their study used the SPPB test to assess physical function. According to Mungovan et al. (14), participating in physical exercise under a physiotherapist's supervision improves postoperative physiological functional ability and reduces hospital stay duration following heart surgery operations. Moreover, this was consistent with our study's conclusions.

After being discharged from the hospital, the walking and walking/breathing exercise groups had significantly greater six-minute walking distances than the standard intervention group, as shown by Hirschhorn A et al. (116). Walking at a modest pace under the supervision of a physiotherapist during the hospital stay following coronary artery bypass grafting (CABG)

may improve functional ability when the patient leaves the facility. This was consistent with the results that we discovered.

Mohamed et al. (135) demonstrated that patients who had heart surgery experienced a significant improvement in hemodynamic variables and the 6-minute walk distance when they participated in the nurse exercise program, which included early physical activity (such as deep breathing, incentive spirometer, coughing, and early walking). The study also found highly statistically significant differences between the two groups regarding the total distance walked after the 12-week mark following discharge, in addition to the results showing an increase in the study group's total distance walked compared to the control group.

This was consistent with the results of our study, which showed a relationship between increased physical activity and improved functional capacity. This was the case even though our study, which examined variables after the 12th week after discharge in two groups, indicated an association between functional ability and physical activity on the seventh day after surgical procedures in one group.

According to Andrew D et al. (132), once the patients were allowed to walk six minutes from the hospital, there were no discernible changes between the intervention groups. These results contrasted with those we found on the 6MWT score, which showed that patients who had cardiac surgery had higher 6MWT scores in relation to a higher SF-IPAQ score. The reason for this discrepancy was the distinct therapy program employed in the two experiments.

A possible limitation of our study is that we only evaluated data from the first seven days following surgery. Longer follow-up periods in studies on this subject will therefore strengthen the conclusions reached.

6. CONCLUSION

Based on the findings of this study, we determined the following conclusions:

1. Post-operative cardiac patients' quality of life improved with early physical activity.

2. Patients who engaged in early physical activity following heart surgery had improved functional ability.

3. Patients should be encouraged to engage in early physical activity following cardiac surgery in order to improve their functional abilities and quality of life. Early physical activity is crucial after cardiac surgery and has positive effects on both categories.

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APPENDICES

Appx 1. Ethical Committee Approval

SAGLIK BAKANLIGI

BAGHDAD ALKARH SAĞLIK İDARESİ

INSAN VE EĞİTİM GELİŞİM DAİRESİ MERKEZİ

ARAŞTIRMA KURUL

KARAR NO: 897

KARAR TARIHI:12.12.2023

ARAŞTIRMA KURUL KARARI

BAGHDAD/ALKARH SAĞLIK IDARESI DEPARTMANI ARAŞTIRMA KOMITESINCE ARAŞTIRMA TARAFINDAN SUNULAN ARAŞTIRMA PROJESİ İNCELENDİ NUMARASI(321054).

"EARLY PHYSICAL ACTIVITY AND ITS EFFECTS ON FUNCTIONAL CAPACITY AND QUALITY OF LIFE IN POST-SURGERY CARDIAC PATIENTS" ARAŞTIRMACI TARAFINDAN SUNULAN (HUSHAM ABDULATEEF SALMAN) MERKEZ EĞİTİM VE İNSAN GELİŞİMİ DEPARTMANI,BİLGİ YÖNETİMİ VE ARAŞTIRMA DEPARTMANINA SUNULMUŞTUR.BAGHDAD ALKARH SAĞLIK İDARESİ TARİH:11.12.2023.

KURULUN KARARI:

BU ARAŞTIRMA TEZ PROJESİ KURULUMUZ TARAFINDAN KABUL GÖREREK SAĞLIK BAKANLIĞI TARAFINDAN ONAYLANDI. ÖZEL ÇEVRE TEZ UYGULAMA MERKEZİ BU KONUDA UYGULAMAYA ENGEL YOKTUR MERKEZİN ADI KALP CERRAHİ BRANŞ MERKEZİ. BU TEZİN ARAŞTIRMASINDA VE UYGULAMASINDA BİR ENGEL BULUNMAMAKTADIR.

ARAŞTIRMA KURUL MÜDÜRÜ

KURUL BAŞKANI

IMZA 12.12.2023

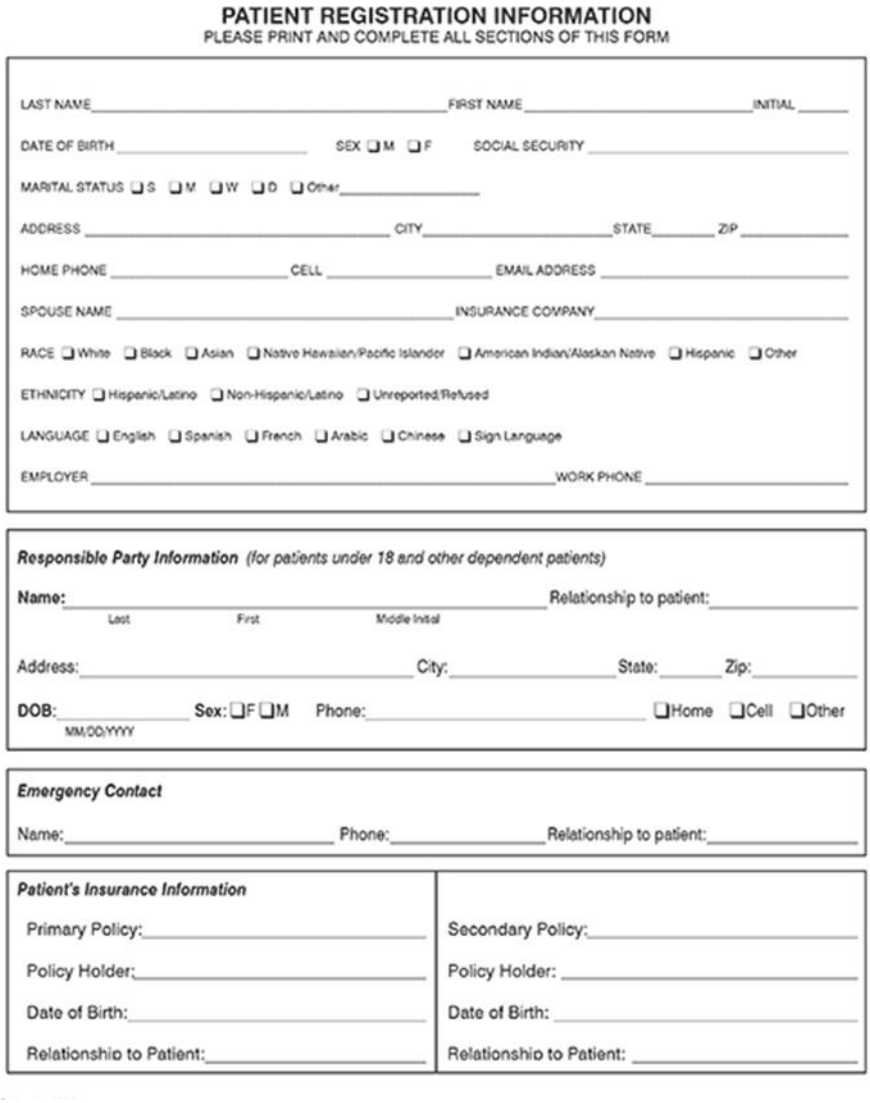
FAKÜLTE BRANŞ DOKTORU

SUAD KAMİL RAHEEM

IMZA

Ömer ASLAN
Arapça Yeminli Tercüman
Tel : 0533 [illegible]

Appx 2. Demographic and Clinical Information



PATIENT REGISTRATION INFORMATION
PLEASE PRINT AND COMPLETE ALL SECTIONS OF THIS FORM

LAST NAME _____ FIRST NAME _____ INITIAL _____

DATE OF BIRTH _____ SEX ❑ M ❑ F SOCIAL SECURITY _____

MARITAL STATUS ❑ S ❑ M ❑ W ❑ D ❑ Other _____

ADDRESS _____ CITY _____ STATE _____ ZIP _____

HOME PHONE _____ CELL _____ EMAIL ADDRESS _____

SPOUSE NAME _____ INSURANCE COMPANY _____

RACE ❑ White ❑ Black ❑ Asian ❑ Native Hawaiian/Pacific Islander ❑ American Indian/Alaskan Native ❑ Hispanic ❑ Other

ETHNICITY ❑ Hispanic/Latino ❑ Non-Hispanic/Latino ❑ Unreported/Refused

LANGUAGE ❑ English ❑ Spanish ❑ French ❑ Arabic ❑ Chinese ❑ Sign Language

EMPLOYER _____ WORK PHONE _____

Responsible Party Information *(for patients under 18 and other dependent patients)*

Name: _____ Relationship to patient: _____
Last First Middle Initial

Address: _____ City: _____ State: _____ Zip: _____

DOB: _____ Sex: ❑F ❑M Phone: _____ ❑Home ❑Cell ❑Other
MM/DD/YYYY

Emergency Contact

Name: _____ Phone: _____ Relationship to patient: _____

Patient's Insurance Information

Primary Policy: _____
Policy Holder: _____
Date of Birth: _____
Relationship to Patient: _____

Secondary Policy: _____
Policy Holder: _____
Date of Birth: _____
Relationship to Patient: _____

Appx 3. SF-36

SF-36 QUESTIONNAIRE

Name:_____ Ref. Dr:_____ Date: _____

ID#: _____ Age: _____ Gender: M / F

Please answer the 36 questions of the **Health Survey** completely, honestly, and without interruptions.

GENERAL HEALTH:
In general, would you say your health is:
◯ Excellent ◯ Very Good ◯ Good ◯ Fair ◯ Poor

Compared to one year ago, how would you rate your health in general now?
◯ Much better now than one year ago
◯ Somewhat better now than one year ago
◯ About the same
◯ Somewhat worse now than one year ago
◯ Much worse than one year ago

LIMITATIONS OF ACTIVITIES:
The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

Vigorous activities, such as running, lifting heavy objects, participating in strenuous sports.
◯ Yes, Limited a lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Lifting or carrying groceries
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Climbing several flights of stairs
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Climbing one flight of stairs
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Bending, kneeling, or stooping
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Walking more than a mile
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Walking several blocks
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Walking one block
◯ Yes, Limited a Lot ◯ Yes, Limited a Little ◯ No, Not Limited at all

Bathing or dressing yourself

◯Yes, Limited a Lot ◯Yes, Limited a Little ◯No, Not Limited at all

PHYSICAL HEALTH PROBLEMS:

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of your physical health?

Cut down the amount of time you spent on work or other activities

◯Yes ◯No

Accomplished less than you would like

◯Yes ◯No

Were limited in the kind of work or other activities

◯Yes ◯No

Had difficulty performing the work or other activities (for example, it took extra effort)

◯Yes ◯No

EMOTIONAL HEALTH PROBLEMS:

During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

Cut down the amount of time you spent on work or other activities

◯Yes ◯No

Accomplished less than you would like

◯Yes ◯No

Didn't do work or other activities as carefully as usual

◯Yes ◯No

SOCIAL ACTIVITIES:

Emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

◯Not at all ◯Slightly ◯Moderately ◯Severe ◯Very Severe

PAIN:

How much bodily pain have you had during the past 4 weeks?

◯None ◯Very Mild ◯Mild ◯Moderate ◯Severe ◯Very Severe

During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

◯Not at all ◯A little bit ◯Moderately ◯Quite a bit ◯Extremely

ENERGY AND EMOTIONS:
These questions are about how you feel and how things have been with you during the last 4 weeks. For each question, please give the answer that comes closest to the way you have been feeling.

Did you feel full of pep?
- ○ All of the time
- ○ Most of the time
- ○ A good Bit of the Time
- ○ Some of the time
- ○ A little bit of the time
- ○ None of the Time

Have you been a very nervous person?
- ○ All of the time
- ○ Most of the time
- ○ A good Bit of the Time
- ○ Some of the time
- ○ A little bit of the time
- ○ None of the Time

Have you felt so down in the dumps that nothing could cheer you up?
- ○ All of the time
- ○ Most of the time
- ○ A good Bit of the Time
- ○ Some of the time
- ○ A little bit of the time
- ○ None of the Time

Have you felt calm and peaceful?
- ○ All of the time
- ○ Most of the time
- ○ A good Bit of the Time
- ○ Some of the time
- ○ A little bit of the time
- ○ None of the Time

Did you have a lot of energy?
- ○ All of the time
- ○ Most of the time
- ○ A good Bit of the Time
- ○ Some of the time
- ○ A little bit of the time
- ○ None of the Time

Have you felt downhearted and blue?

- ◯ All of the time
- ◯ Most of the time
- ◯ A good Bit of the Time
- ◯ Some of the time
- ◯ A little bit of the time
- ◯ None of the Time

Did you feel worn out?

- ◯ All of the time
- ◯ Most of the time
- ◯ A good Bit of the Time
- ◯ Some of the time
- ◯ A little bit of the time
- ◯ None of the Time

Have you been a happy person?

- ◯ All of the time
- ◯ Most of the time
- ◯ A good Bit of the Time
- ◯ Some of the time
- ◯ A little bit of the time
- ◯ None of the Time

Did you feel tired?

- ◯ All of the time
- ◯ Most of the time
- ◯ A good Bit of the Time
- ◯ Some of the time
- ◯ A little bit of the time
- ◯ None of the Time

SOCIAL ACTIVITIES:

During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

- ◯ All of the time
- ◯ Most of the time
- ◯ Some of the time
- ◯ A little bit of the time
- ◯ None of the Time

Appx 4. Short Form International Physical Activity Questionnaire (SF-IPAQ)

IPAQ Scoring Protocol (Short Versions)

Categorical Score- three levels of physical activity are proposed

1. *Inactive*

   - No activity is reported **OR**
   - Some activity is reported but not enough to meet Categories 2 or 3.

2. *Minimally Active*

   Any one of the following 3 criteria

   - 3 or more days of vigorous activity of at least 20 minutes per day **OR**
   - 5 or more days of moderate-intensity activity or walking of at least 30 minutes per day **OR**
   - 5 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 600 MET-min/week.

3. *HEPA active*

   Any one of the following 2 criteria

   - Vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week **OR**
   - 7 or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum of at least 3000 MET-minutes/week

Continuous Score

Expressed as MET-min per week: MET level x minutes of activity x events per week

Sample Calculation

MET levels	**MET-min/week for 30 min episodes, 5 times/week**
Walking = 3.3 METs	3.3*30*5 = 495 MET-min/week
Moderate Intensity = 4.0 METs	4.0*30*5 = 600 MET-min/week
Vigorous Intensity = 8.0 METs	8.0*30*5 = 1,200 MET-min/week
	TOTAL = 2,295 MET-min/week

Total MET-min/week = (Walk METs*min*days) + (Mod METs*min*days) + Vig METs*min*days)

Please review the document "Guidelines for the data processing and analysis of the International Physical Activity Questionnaire (Short Form)" for more detailed description of IPAQ analysis and recommendations for data cleaning and processing [www.ipaq.ki.se].

Appx 5. Six Minute Walking Test

The following elements should be present on the 6MWT worksheet and report:

Lap counter: _____ _____ _____

Patient name: _____ Patient ID# _____

Walk # _____ Tech ID: _____ Date: _____

Gender: M F Age: ____ Race: ____ Height: ___ft ____in, ____ meters

Weight: _____ lbs, _____kg Blood pressure: _____ / _____

Medications taken before the test (dose and time): _____

Supplemental oxygen during the test: No Yes, flow _____ L/min, type _____

	Baseline	End of Test
Time	___:___	___:___
Heart Rate	_____	_____
Dyspnea	____	____ (Borg scale)
Fatigue	____	____ (Borg scale)
SpO_2	____ %	____%

Stopped or paused before 6 minutes? No Yes, reason: _____

Other symptoms at end of exercise: angina dizziness hip, leg, or calf pain

Number of laps: ____ (×60 meters) + final partial lap: _____ meters =

Total distance walked in 6 minutes: _____ meters

Predicted distance: _____ meters Percent predicted: _____%

Tech comments:

Interpretation (including comparison with a preintervention 6MWD):

CURRICULUM VITAE

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Name and surname	Husha Abdulateef Salman Al-Jaddah.
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Education information	
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