EXAMINATION OF SHOULDER PAIN, PHYSICAL ACTIVITY LEVEL, AND QUALITY OF LIFE IN MANUAL WHEELCHAIR USER ATHLETES DURING THE PANDEMIC PERIOD

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

HANDE GÜL PANPALLI

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
THE DEPARTMENT OF PHYSICAL EDUCATION AND SPORT

JUNE 2022

Approval of the thesis:

EXAMINATION OF SHOULDER PAIN, PHYSICAL ACTIVITY LEVEL, AND QUALITY OF LIFE IN MANUAL WHEELCHAIR USER ATHLETES DURING THE PANDEMIC PERIOD

submitted by **HANDE GÜL PANPALLI** in partial fulfillment of the requirements for the degree of **Master of Science in Physical Education and Sports, the Graduate School of Social Sciences of Middle East Technical University** by,

Prof. Dr. Yaşar KONDAKÇI
Dean
Graduate School of Social Sciences _____

Assoc. Prof. Dr. Sadettin KİRAZCI
Head of Department
Department of Physical Education and Sports _____

Assoc. Prof. Dr. Irmak HÜRMERİÇ ALTUNSÖZ
Supervisor
Department of Physical Education and Sports _____

Examining Committee Members:

Prof. Dr. Mustafa Levent İNCE (Head of the Examining Committee)
Middle East Technical University
Department of Physical education and Sports _____

Assoc. Prof. Dr. Irmak HÜRMERİÇ ALTUNSÖZ (Supervisor)
Middle East Technical University
Department of Physical Education and Sports _____

Assoc. Prof. Dr. Şükran Nazan KOŞAR
Hacettepe University
Faculty of Sports Sciences _____

I hereby declare that all information in this document has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

Name, Last Name: Hande Gül PANPALLI

Signature:

ABSTRACT

EXAMINATION OF SHOULDER PAIN, PHYSICAL ACTIVITY LEVEL, AND QUALITY OF LIFE IN MANUAL WHEELCHAIR USER ATHLETES DURING THE PANDEMIC PERIOD

PANPALLI, Hande Gül
M.S., The Department of Physical Education and Sports
Supervisor: Assoc. Prof. Dr. Irmak HÜRMERİÇ ALTUNSÖZ

June 2022, 106 pages

The purpose of this study was to examine the correlation between shoulder pain, physical activity level, and quality of life in manual wheelchair user athletes and also compare shoulder pain differences by dividing the sample into overhead and non-overhead sports, individual and team sports, and athletes with congenital and acquired disabilities. Lastly, the physical activity participation of manual wheelchair user athletes during the pandemic period was described. One hundred manual wheelchair user athletes participated in this study via online and face-to-face surveys. The purposive sample was selected. The instruments were the Turkish version of Wheelchair User's Shoulder Pain Index (WUSPI-Tr), Physical Activity Scale for Individuals with Physically Disabled (PASIPD), and Short Form-12 (SF-12). According to the Pearson correlation coefficient results, the WUSPI score was correlated to the PASIPD score significantly ($r(98) = .293$, $p<.01$), and there was a significant inverse correlation between the WUSPI score and the PCS score according ($r(98) = -.415$, $p<.01$). According to the Mann-Whitney U test results, no significant difference was found between overhead and non-overhead sports athletes and between

individual and team sports athletes in terms of shoulder pain (p>.05). It was determined that athletes with congenital disabilities suffered significantly less shoulder pain than athletes with acquired disabilities (U = 915.500, z = -2.263, p = .024, r=0.23). Hence, a strength and prevention program against shoulder pain development is recommended for wheelchair user athletes to support their physical activity level and quality of life.

Keywords: disabled sports, shoulder pain, quality of life, physical activity, manual wheelchair user

ÖZ

PANDEMİ DÖNEMİNDE MANUEL TEKERLEKLİ SANDALYE KULLANICISI SPORCULARIN OMUZ AĞRISI, FİZİKSEL AKTİVİTE DÜZEYİ VE YAŞAM KALİTESİ İNCELENMESİ

PANPALLI, Hande Gül
Yüksek Lisans, Beden Eğitimi ve Spor Bölümü
Tez Yöneticisi: Doç. Dr. Irmak HÜRMERİÇ ALTUNSÖZ

Haziran 2022, 106 sayfa

Bu çalışmanın amacı, manuel tekerlekli sandalye kullanan sporcularda omuz ağrısı, fiziksel aktivite düzeyi ve yaşam kalitesi arasındaki ilişkiyi incelemek ve ayrıca katılımcıları (N=100) kafa üstü ve kafa üstü olmayan sporlar, bireysel ve takım sporları ve doğuştan ve sonradan edinilmiş engelli sporcular olarak ayırarak omuz ağrısı farklılıklarını karşılaştırmaktır. Ek olarak manuel tekerlekli sandalye kullanan sporcuların pandemi dönemindeki fiziksel aktivite katılımlarını belirlemek hedeflenmiştir. Amaçlı örnekleme kullanılmıştır. 100 manuel tekerlekli sandalye kullanıcısı sporcu bu çalışmaya çevrimiçi ve yüz yüze anketler aracılığıyla katılmıştır. Çalışmada kullanılan ölçekler omuz ağrısı için Tekerlekli Sandalye Kullanıcısının Omuz Ağrı İndeksi (WUSPI-Tr), Fiziksel Engelli Bireyler için Fiziksel Aktivite Ölçeği (FEBFAS) ve Kısa Form-12'dir (KF-12). Pearson korelasyon katsayısı sonuçlarına göre omuz ağrısı ile fiziksel aktivite düzeyi arasında anlamlı korelasyon saptandı ($r(98) = .293$, $p<.01$). Ancak omuz ağrısı ve yaşam kalitesi arasında anlamlı bir ters korelasyon vardı ($r(98) = -.415$, $p<.01$). Mann-Whitney U testi sonuçlarına göre kafa üstü ve kafa üstü olmayan sporcular ile bireysel ve takım sporu sporcuları

arasında omuz ağrısı açısından anlamlı fark bulunmadı (p>.05). Doğuştan engelli sporcuların ise sonradan kazanılmış engelli sporculara göre anlamlı derecede daha az omuz ağrısı yaşadıkları belirlendi (U = 915.500, z = -2.263, p = .024, r=0.23). Bu nedenle tekerlekli sandalye kullanan sporcuların fiziksel aktivite düzeylerini ve yaşam kalitelerini desteklemek için omuz ağrısı gelişimine karşı güçlendirme ve önleme programı önerilmektedir.

Anahtar Kelimeler: omuz ağrısı, tekerlekli sandalye sporcuları, engelli bireyler, yaşam kalitesi, fiziksel aktivite

To myself

ACKNOWLEDGMENTS

Firstly, I would like to express my thanks to my supervisor, Doç. Dr. Irmak Hürmeriç Altunsöz, for her support, remarks, and guidance throughout my academic career and thesis writing process. My master's thesis would not have been done without her guidance and support.

I would like to express my gratitude to Prof. Dr. Mustafa Levent İnce and Prof. Dr. Şükran Nazan Koşar, members of my committee, for their excellent remarks.

Then, I would like to thank all of the coaches and disabled athletes who took part in my research and assisted me in gathering data. This study gained me a great experience.

Lastly, I want to express my gratitude to my family and my friends for their unwavering support for my work.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

WUSPI	Wheelchair User's Shoulder Pain Index
PASIPD	Physical Activity Scale for Individuals with Disability
SF-12	Short Form-12
PCS	Physical Component Summary
MCS	Mental Component Summary
SPSS	Statistical Package for Social Sciences
WHO	World Health Organization
SCI	Spinal Cord Injury

CHAPTER 1

INTRODUCTION

The first chapter consists of five sub-categories. Firstly, the background of the study is described. Then, the purpose of the thesis is stated. After the research questions with a subsection for hypotheses are given, the significance of the study is explained. Lastly, the definitions of frequently used terms in the thesis are presented.

1.1. Background of the Study

Shoulder pain is a common and obscure problem that needs to be investigated widely in the wheelchair user population (Curtis, Roach, Applegate, Amar, Benbow, Genecco, & Gualano, 1995; Fullerton, Borckardt, & Alfano, 2003). Individuals with disabilities who have to use a manual wheelchair for a part of the day or the whole day put the workload on their upper extremities as they need a lot of effort to propel the wheelchair because they cannot do the work that they need with their lower extremity. This increases the workload on the shoulders. Heyward, Vegter, de Groot, and van der Woude (2017) define the increased workload as wheelchair propulsion, daily life activities, and the demands specific to different wheelchair sports. The increased workload leads to the overuse of the shoulder, which may cause shoulder pain (Yıldırım, Cömert, & Özengin, 2010).

Wheelchair user athletes also suffer from shoulder pain. Curtis and Black (1999) reported that 90% of 46 female wheelchair basketball players (M = 33.2, SD = 9.1 years) had both the upper extremity and shoulder pain due to overuse and repetitive stress on their shoulders. Therefore, it has become important to deal with shoulder pain in manual wheelchair user athletes, too. Subsequent studies focused on finding the underlying causes of shoulder pain. The problem was that it was not known whether shoulder pain was more common in non-athlete or athletic manual wheelchair users.

For the first time, Fullerton et al. (2003) compared shoulder pain between athletic and non-athletic manual wheelchair users. They found that non-athletic manual wheelchair users (66%) had significantly higher shoulder pain frequency than manual wheelchair athletes (39%). This outcome implies that sports participation has an inhibitor effect on shoulder pain.

The realization of the role of physical activity in shoulder pain led to the evaluation of physical activity level together with the evaluation of shoulder pain in subsequent studies. Not only physical activity but also age, gender, and shoulder range of motion (Tsunoda, Mutsuzaki, Hotta, Tachibana, Shimizu, Fukaya, Ikeda, & Wadano, 2016; Wessels, Brown, Ebersole, & Sosnoff, 2013), and muscle imbalances (Burnham, May, Nelson, Steadward, & Reid, 1993) have been found to be related to shoulder pain. Such personal factors confirm that there may be more than one underlying cause of shoulder pain. Therefore, a general solution, like encouraging participation in physical activity, to reduce or prevent shoulder pain for the wheelchair user population is required.

It is known that participation in physical activity has many benefits for every individual. The first benefit is that it triggers a physically active life. A sedentary lifestyle could contribute to an increase in body weight, leading to a more inactive lifestyle. An inactive lifestyle also causes weight gain, which becomes a vicious circle. Thus, a physically active lifestyle may help individuals with disabilities to break this vicious circle (Van den Akker, Holla, Dadema, Visser, Valent, de Groot, Dallinga, Deutekom, & WHEELS-study group, 2020).

One benefit is that physical activity promotes health. Warburton, Nicol, and Bredin (2006) argue that physical activity reduces the risk of premature death and the incidence of particular cancers such as colon and breast cancer and prevents type 2 diabetes and osteoporosis. Therefore, it is important to encourage the participation of individuals with disabilities in physical activity because participation in physical activity has a positive effect on the occurrence of other health problems, as well as reducing the incidence of shoulder pain in wheelchair users.

Another benefit is that participation in physical activity improves the quality of life (Pucci, Rech, Fermino, & Reis, 2012). Jenkins (2020) defines the quality of life as how

an individual is healthy, pleasant, and capable of joining in or enjoying life circumstances. Quality of life matters for every individual, whether a patient, a disabled, or an athlete. Encouraging sports participation is not enough to ensure that individuals with disabilities are happier when they do sports or when they have less pain. According to Gill, Hammond, Reifsteck, Jehu, Williams, Adams, Lange, Becofsky, Rodriguez, and Shang (2013), participation in physical activity enhances the quality of life, and the enhanced quality of life increases motivation for physical activity, and that loop creates a positive life cycle. Therefore, motivation for physical activity is affected by the quality of life. Since the quality of life is multidimensional, the effect of physical activity on the quality of life varies according to the dimensions. Giacobbi, Stancil, Hardin, and Bryant (2008) notice that psychological benefits and social opportunities are defined frequently as the benefits of physical activity among 26 wheelchair basketball players. Gill et al. (2013) report that the role of physical activity on quality of life is defined mainly as social well-being and physical health.

Pain has a wide spectrum that negatively affects their mental state and participation in physical and social activities, in addition to hurting individuals. The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience that may or may not be related to tissue damage (2020). Whether the degree of pain is low or high, it is an unpleasant condition that negatively affects the quality of life of individuals. Therefore, it is considered that not only physical activity could be related shoulder pain, but also shoulder pain could negatively affect the quality of life. Heyward et al. (2017) state that the proper function of the shoulder complex is crucial for the quality of life of manual wheelchair users as they benefit from the upper body and shoulder complex in nearly all tasks. Consequently, their quality of life also depends on the proper functioning of their upper extremities. Studies conducted with non-athletic wheelchair users found that lower physical activity levels and lower quality of life correlated with higher intensity of shoulder pain (Gutierrez, Thompson, Kemp, & Mulroy, 2007; Stirane, Kiukucane, Vetra, & Nulle, 2012).

The correlation between shoulder pain, physical activity level, and quality of life in manual wheelchair users, either athletes or non-athletes, have been studied previously (Feter, Calonego, Cavanhi, & del Vecchio, 2018; Gutierrez et al., 2007; Patel, Patel,

& Jadeja, 2015; Stirane et al., 2012). However, it is vital to examine the correlation between those three factors during the pandemic period. Strict regulations during the pandemic period forced individuals into a sedentary life. During the pandemic period, people with disabilities who struggle with various health problems, as well as those who suffer from diseases that physical activity reduces or prevents, were most affected by the regulations that restrict physical activity, such as the curfew. In a recent study, it has been found that the pandemic conditions decreased the well-being of elite and recreational athletes using manual wheelchairs and manual wheelchair users who are not athletes compared to their well-being before the pandemic period (Warner, Mason, Goosey-Tolfrey, & Webborn, 2022).

1.2. Purpose of the Study

The main aim of this study is to investigate the correlation between shoulder pain, physical activity, and quality of life in manual wheelchair user athletes during the pandemic period. The second aim is to compare the severity of shoulder pain between overhead and non-overhead sports athletes, between individual and team sports athletes, and between athletes with congenital and acquired disabilities using manual wheelchairs. Lastly, the third aim is to determine the physical activity participation of manual wheelchair user athletes during the pandemic period.

1.3. Research Questions

This study focuses on the correlation between shoulder pain, physical activity level, and quality of life in manual wheelchair user athletes participating in different sports. Therefore, this study aims to answer the following questions:

1. Is there a correlation between shoulder pain intensity, physical activity level, and the quality of life in manual wheelchair user athletes?
2. Does shoulder pain differ according to sports categories and type of physical disability in manual wheelchair user athletes?

2.1. Is there a significant difference in shoulder pain between overhead and non-overhead sports athletes using manual wheelchairs?

2.2. Is there a significant difference in shoulder pain between individual and team sports athletes using manual wheelchairs?

2.3. Is there a significant difference in shoulder pain between athletes with congenital and acquired disabilities using manual wheelchairs?

3. How has the duration of the pandemic affected the participation of athletes using manual wheelchairs in physical activity?

1.4. Hypothesis

This study is designed to test the following hypotheses.

1.4.1. Hypotheses for research question 1

H_0: There is a significant negative correlation between shoulder pain and physical activity level in manual wheelchair user athletes.

H_0: There is a significant negative correlation between shoulder pain and quality of life in manual wheelchair user athletes.

H_0: There is a significant positive correlation between physical activity level and quality of life in manual wheelchair user athletes.

H_0: There is a significant correlation between shoulder pain, physical activity level, and quality of life in manual wheelchair user athletes.

1.4.2. Hypotheses for research question 2

H_0: The sum of shoulder pain intensity rankings in the overhead and non-overhead sports athletes using manual wheelchairs groups differs.

H_0: The sum of shoulder pain intensity rankings in the individual and team sports athletes using manual wheelchairs groups differs.

H_0: The sum of shoulder pain intensity rankings in the athletes with congenital and acquired physical disabilities using manual wheelchairs groups differs.

1.5. Significance of the Study

In many studies, shoulder pain has been determined to be a common problem and a risk factor in the wheelchair user population (Curtis et al., 1995). The underlying causes and accompanying factors have been tried to be determined in many studies. It

has been observed that this situation includes not only sedentary individuals with disabilities using a wheelchair but also athletes with disabilities. For this reason, the studies were carried out to determine the factors that can be associated with shoulder pain in the wheelchair user population, such as sports participation, type of sports branches, trunk control, gender differences, and range of motion, but no study was conducted to evaluate shoulder pain, physical activity level and quality of life during the pandemic period.

Since all participants are athletes, physical activity assessment is not required. However, due to the pandemic that has been going on for about two years, many sports clubs have been closed or are not active at the moment. The ones who suffered the most from this situation were the disabled, who could not do many sports. For this reason, it is expected to increase the importance of the research by using a scale that will determine the physical activity levels instead of distinguishing between active and inactive athletes. Furthermore, of course, it should not be forgotten that every clinician should also evaluate the quality of life of individuals suffering from pain.

This study will determine whether there is a significant correlation between shoulder pain, physical activity level, and quality of life in manual wheelchair user athletes. At the same time, comparisons of shoulder pain would be made between overhead and non-overhead sports, individual and team sports, and athletes with congenital and acquired disabilities. Since voluntarism is required, the number of sports branches is variable. With this study, the correlation between shoulder pain, physical activity level, and the quality of life during the pandemic period will be determined, and prevention and treatment programs may be developed as a result of this study.

1.6. Definition of Terms

The following terminology is given in the context of this subject for a better understanding of it.

Adaptive sports: It refers to sports either adopted or created specifically for persons with a disability (Cambridge, n.d.; Greer, Balser, McKenzie, Nicholson, MacDonald, Rosebush, Senk, Tonkin, & Wilt, 2019). Also known as “parasports” or “disabled

sports" because many of them are adjusted versions of existing able-bodied sports to accommodate the requirements of persons with a disability (Disabled World, 2020).

Congenital: It means existing from birth, inherent (Merriam-Webster, n.d.).

Disability: It refers to "the interaction between individuals with a health condition (e.g., cerebral palsy, Down syndrome and depression) and personal and environmental factors (e.g., negative attitudes, inaccessible transportation, and public buildings, and limited social supports)" (World Health Organization [WHO], 2020).

Individuals with disabilities: It defines a person who has a physical or mental impairment or a background of such an impairment that significantly limits one or more daily life activities (Americans with Disabilities Act [ADA], 2020).

Manual wheelchair: It describes a wheelchair that is propelled by the user or pushed by another person (WHO, 2008).

Quality of life: It describes the extent to which an individual is healthy, pleasant, and capable of joining in or enjoying life circumstances (Jenkinson, 2020).

Pain: It refers to "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" (IASP, 2020).

Physical activity: It defines as "any bodily movement produced by skeletal muscles that require energy expenditure" (WHO, 2020).

Shoulder pain: Perceived pain in the shoulder caused by a disease, injury that includes anatomical structures like ligaments, tendons, or bursae around the shoulder joint, cartilage, menisci, or bones of the joint, or conditions that include the shoulder joint, the soft tissues, and bones around the shoulder, or the nerves that supply sensation to the shoulder area (Stöppler, 2021).

Wheelchair sports: It refers to a sort of sports that have been modified to allow wheelchair athletes using manual or electric wheelchairs to participate, also known as adapted sports. People with physical or intellectual limitations in wheelchairs can play these games (Disabled World, 2019).

Wheelchair athlete: It means a person with a disability who regularly competes in a wheelchair sport at the recreational or elite level (Heyward, Vegter, de Groot, and van der Woude, 2017).

Overhead sports: Any sport in which the athlete's upper arm and shoulder arc above his or her head to push a ball (Segen's Medical Dictionary, 2011).

Non-overhead sports: These sports in which the player’s upper extremity is not above his/her head to throw or push a ball.

Individual sports: It is defined as a sport that is performed independently (Definitions, n.d.).

Team sports: A type of sports that includes players competing together towards the same objective (Definitions, n.d.).

Physical component summary: One of the dimensions of the quality of life in SF-12. It consists of questions about physical illness, bodily pain, and general health (Preedy & Watson, 2010).

Mental component summary: One of the dimensions of the quality of life in SF-12. It includes questions about emotional problems, social functioning, vitality, and mental health (Preedy & Watson, 2010).

CHAPTER 2

LITERATURE REVIEW

This chapter includes four sub-categories. Firstly, shoulder pain and its related factors are given. Then, the importance of physical activity and quality of life in individuals with disabilities are explained. Next, studies about the correlation between those three factors in literature are stated. Finally, the recent studies about the participation of individuals with disabilities in physical activity during the pandemic are presented.

2.1. Shoulder Pain

Shoulder pain resulting from increased workload on the shoulder joint due to over wheelchair use is a common medical problem in manual wheelchair users, both athletes and non-athletes (Curtis et al., 1995; Curtis & Black, 1999; Fullerton et al., 2003; Tsunoda et al., 2016; Wessels et al., 2013; Yıldırım et al., 2010). Heyward et al. (2017) argue that many studies that tried to explain the underlying mechanism of shoulder pain could not explain the factors related to shoulder pain due to lack of organization and that the definition of overloading the shoulder joint could not be defined in terms of intensity, duration, and frequency. Still, Curtis, Tyner, Zachary, Lentell, Brink, Didyk, Gean, Hall, Hooper, Klos, Lesina, and Pacillas (1999) developed a standard exercise protocol by studying long-term wheelchair users and suggest that every clinician, physical therapist, coach, trainer, and athlete needs to know the prevention of shoulder pain.

The first considerable attempt to evaluate shoulder pain in the wheelchair user population comes from Curtis et al. (1995). They developed the Wheelchair User Shoulder Pain Index (WUSPI) in 1995 based on their studies investigating shoulder pain in individuals with SCI. This scale questions shoulder pain experienced throughout the daily life activities in manual wheelchair users without distinguishing

between athletes or non-athletes. Moreover, Perez-Tejero, Martinez-Sinovas, and Rossignoli (2006) developed a sport-specific shoulder pain questionnaire only for wheelchair basketball players, Shoulder Pain Index for Wheelchair Basketball (SPI-WB). However, its validity and reliability have not been proven until 2020 (Gómez, Pérez-Tejero, García, & Barakat). In other sense, Yıldırım, Büyüköztürk, Bayramlar, Özengin, Külünkoğlu, and Çoban (2019) established another shoulder pain scale only for wheelchair basketball players, which includes sport-specific items, too. Future studies using these two new instruments will provide more details about shoulder pain in wheelchair basketball players.

2.1.1. Factors related to shoulder pain

Since the underlying causes and correlates of shoulder pain in wheelchair users are unknown (Heyward et al., 2017), studies are conducted to compare parameters such as age, gender differences, shoulder range of motion (Tsunoda et al., 2016; Wessels et al., 2013), the duration of wheelchair usage time, wheelchair propulsion, sports participation (Fullerton et al., 2003; Üstünkaya, Edeer, Donat, & Yozbatıran, 2007; Soo Hoo, Kim, Fram, Lin, Page, Easthausen, & Jayabalan, 2021), type of disability, having trunk control (Yıldırım et al., 2010), functional capacity (Üstünkaya et al., 2007), pain hypersensitivity (Ortega-Santiago et al., 2020), and sports branches (Aytar, Zeybek, Pekyavas, Tigli, & Ergun, 2015; Mohseni-Bandpei, Keshavarz, Minoonejhad, Mohsenifar, & Shakeri, 2012, Soo Hoo et al., 2021). In this regard, studies have also investigated the prevalence and frequency of shoulder pain, as well as activities of daily living in which shoulder pain is felt most, and movements made with a wheelchair.

After developing WUSPI, Curtis and Black (1999) reported that 90% of 46 female wheelchair basketball players (M = 33.2, SD = 9.1 years) had both the upper extremity and shoulder pain due to overuse and repetitive stress on their shoulders. Their participants had various disabilities such as spinal cord injuries (39%), post-polio (13%), spina bifida (11%), and amputations (9%). The total performance corrected WUSPI score was 15.6 (SD = 20.5) out of 150 points. They noticed that shoulder pain was most common while doing housework (M = 1.7), pushing on hills or ramps (M = 1.6), overhead lifting (M = 1.6), and sleeping (M = 1.4). They recommend that

clinicians, coaches, and players need to know how to prevent shoulder pain become chronic.

The first study that emphasizes the significance of sports participation in the management of shoulder pain in the wheelchair user population came from Fullerton et al. (2003). They compared shoulder pain in wheelchair user athletes (n = 172, M_{age} = 34.34, SD_{age} = 10.11 years $M_{wheelchairuse}$ = 15.79, $SD_{wheelchairuse}$ = 8.80) and non-athletes (n = 85, M_{age} = 46.06, SD_{age} = 12.54, $M_{wheelchairuse}$ = 14.56, $SD_{wheelchairuse}$ = 10.84) using a 20-item survey with visual analog scale (VAS), a 10-cm line giving points from 0 to 10. 48% of participants reported that they had shoulder pain during the study. 92% of the participants stated that they had shoulder pain during daily life activities. They found that non-athlete wheelchair users (66% of them) had shoulder pain twice (115%) as much as wheelchair athletes (39% of them). The sports branches of the participants were wheelchair basketball (51%), wheelchair tennis (26%), wheelchair rugby (23%), wheelchair racing (19%), adaptive skiing (5%), and adaptive hand-cycling (5%). For some reason, they did not compare adaptive sports with each other. Maybe it did not occur to them that there would be a difference between sports because it had not been studied until then, or that is because they did not have equal sizes for that comparison. The average for sports participation was about ten years for athletes, but there was no significant difference between participants with pain (M = 11.08, SD = 6.73) and without pain (M = 9.73, SD = 5.38) in this regard. They also added that shoulder pain development in non-athletic wheelchair users started four years earlier than in athletes. They determined that they could not specify why non-athletes had shoulder pain twice as often as athletes were, whether they were participating in sports or not, as a shortcoming of their study.

Üstünkaya et al. (2007) compared functional capacity, shoulder pain, and quality of life of 48 male wheelchair users who are wheelchair basketball players (n = 25) and non-athletic wheelchair users (n = 23). 44% of the athletes (M = 28.96, SD = 4.70 years) and 17% of the non-athletes (M = 35.00, SD = 11.37 years) had reported that they had had shoulder pain. They found that wheelchair basketball players had significantly higher functional capacity than non-athletic wheelchair users. However, there were no significant differences between wheelchair basketball players (M_{pain} = 21.59, SD_{pain} = 20.71, M_{life} = 21.12, SD_{life} = 6.02) and non-athletic wheelchair users

(M_{pain} = 20.84, SD_{pain} = 22.35, M_{life} = 21.34, SD_{life} = 6.87) in terms of shoulder pain and the quality of life. Hence, they found no link between shoulder pain and functional capacity in male wheelchair users.

The study with the highest number of participants was done by Mohseni-Bandpei et al. (2012) with 613 elite Iran wheelchair athletes who were interested in wheelchair volleyball (n = 103), wheelchair basketball (n = 88), handball (n = 138), para-swimming (n = 81), rowing (n = 113), and adaptive wrestling (n = 90) by using VAS in mm to evaluate shoulder pain intensity. Also, they used Disability of the Arm, Shoulder, and Hand Questionnaires (DASH-Q) to determine the functional disability. They found that shoulder pain was the most in rowing (M = 52.96, SD = 22.99 mm) and the least in para-swimming (M = 51.44, SD = 22.61 mm). The total mean VAS score was 53.8 mm (SD = 20.2). There was no significant relationship between shoulder pain and functional disability compared to all sports branches.

Wessels et al. (2013) investigated the relationship between sex, shoulder range of motion (ROM), and shoulder pain in manual wheelchair user athletes (N = 30; 18 males, 12 females) with a mean age of 21.93 (SD = 3.77). However, they did not explain in detail which branches of their participants. The average wheelchair use per day was 13.6 hours (SD = 4.14), and the average wheelchair use was 11.57 years (SD = 5.89). Based on VAS scores, they divided participations into two groups: pain group (n = 14; 9 males, 5 females; M = 4.23, SD = 2.66 cm) and no pain group (n = 16; 9 males, 7 females; M = 0.87, SD = 0.89 cm). 47% of the participants (n = 14) reported shoulder pain, more common in women (42%) than men (50%). Females with pain (M = 45.60°, SD = 5.80°) had significantly less extension than females with no pain (M = 69.41°, SD = 4.91°), but no difference between males with pain (M = 46.23°, SD = 4.10°) and males with no pain (M = 46.37°, SD = 4.33°). They concluded that shoulder pain affects females only in extension but not males.

A study that compared shoulder pain in wheelchair user athletes with shoulder pain in crutches user athletes came from Aytar et al. (2015). They compared scapular resting position, shoulder pain degree, and upper extremity function among 19 male amputee soccer players (M = 29.0, SD = 6.4 years), 22 male wheelchair basketball players (M = 25.2, SD = 9.1 years), and 22 disabled table tennis players (8 female, M = 20.0, SD

= 2.7 years, and 14 male, *M* = 20.4, *SD* = 2.5 years). They found that amputee soccer players (crutch-using sports) had better scapular resting position and upper extremity functionality than wheelchair basketball players and disabled table tennis players (wheelchair-using sports), possibly due to crutch usage. According the results, wheelchair basketball players (*M* = 3.86, *SD* = 3.21 cm) had slightly more shoulder pain than both amputee soccer (*M* = 1.52, *SD* = 2.31 cm) and disabled table tennis players (*M* = 1.89, *SD* = 1.85 cm).

Tsunoda et al. (2016) revealed correlations of shoulder pain in players of the Japanese national wheelchair basketball team (*N* = 40) using WUSPI. There were no significant differences between age (19 males, *M* = 29.7, *SD* = 5.2 years, and 21 females, *M* = 29.0, *SD* = 8.2 years), type of disability, daily wheelchair use (hours), ability class, practice time per week, and sports involvement (years) in terms of gender differences. They found that the total WUSPI score of males (*M* = 16.18, *SD* = 17.39) was significantly higher than that of females (*M* = 8.62, *SD* = 15.70). In males, greater age was more likely to shoulder pain experienced during pushing the chair for 10 minutes or more and pushing up ramps or inclines outdoors, but in females, longer practice time was linked to mild shoulder pain. Also, more experience was significantly correlated with more shoulder pain experienced during loading a wheelchair into a car, pushing the chair for 10 minutes or more, and pushing up ramps or inclines outdoors for males, too. On the other hand, longer practice time was significantly correlated with less shoulder pain experienced during transferring from bed to wheelchair, transferring from wheelchair to car, performing usual daily activities at work or school, and sleeping for females. Therefore, this study supports the outcomes of Fullerton et al. (2003), but it is not clear whether participating in sports is the reason for less shoulder pain. They recommend regular checkups to maintain shoulder pain, especially in older male players.

Gómez and Pérez-Tejero (2017) investigated the effect of shoulder pain on wheelchair basketball sport-specific skills with 51 wheelchair basketball players (21 females, *M* = 23.86, *SD* = 1.38 years, and 30 males, *M* = 23.90, *SD* = 1.46 years). They used SPI-WB instead of WUSPI. 27.5% of the sample reported that they had shoulder pain during the study. According to the outcomes of the study, shoulder pain during the shooting was more common in players under the age of 20. Furthermore, players under

the age of 20 and between the ages of 20 and 30 felt shoulder pain during rebounding and one-handed long passes.

The study, which found that overhead sports pose a risk for shoulder pain, belongs to Soo Hoo et al. (2021). They compared the prevalence of shoulder pain and their ultrasound findings of 34 wheelchair athletes (M_{age} = 35.8, $M_{wheelchairuse}$ = 15.3,), who were interested in hand-cycling (n = 8), sled hockey (n = 9), quad rugby (n = 9), and wheelchair basketball (n = 8), 6 non-athletic wheelchair users (M_{age} = 43, $M_{wheelchairuse}$ = 21.2), and 12 nonwheelchair users (M_{age} = 30.4). They found that wheelchair users had more rate of shoulder pain (32.5%) than nonwheelchair users (0%), and non-athletic wheelchair users (50%) had more rate of shoulder pain than wheelchair athletes (29.4%) despite a non-significant difference. According to mean scores of WUSPI, wheelchair basketball players (M = 17.2, SD = 21.8) had more shoulder pain than hand-cycling (M = 4.91, SD = 8.32), sled hockey (M = 7.76, SD = 13.1), and quad rugby (M = 4.29, SD = 7.75) players. Therefore, they concluded that wheelchair athletes, particularly those involved in overhead sports like wheelchair basketball, are at greater risk than in other wheelchair sports.

2.2. Importance of Physical Activity for Individuals with Disabilities

The studies conducted on shoulder pain in the wheelchair user population are not also for wheelchair user athletes but for non-athletic wheelchair users, too. Leading a sedentary life causes them to cope with the health problems brought about by inactivity as well as suffering from shoulder pain. A sedentary lifestyle is associated with physiological and psychological health risks for individuals with disabilities (Cooper, Quatrano, Axelson, Harlan, Stineman, Franklin, Krause, Bach, Chambers, Chao, Alexander, & Painter, 1999). That is because it is vital to encourage sedentary individuals to participate in sports.

WHO (2020) recommends that individuals with disabilities do moderate aerobic physical activity of more than 300 minutes or more than 75 minutes of vigorous aerobic physical activity. Moreover, the U.S. Department of Health and Human Services prepared Physical Activity Guidelines for Americans to inform about physical activity for children, adults, individuals with disabilities, individuals with chronic diseases, and the elderly. However, it is hard to keep up physical activity or

sports participation, especially binding to a wheelchair. Also, using a wheelchair creates new upper extremity positions, such as the manual wheelchair propulsion technique. Therefore, every manual wheelchair user needs to adjust themselves according to the wheelchair propulsion technique in order to keep themselves physically active.

Some researchers considered that the wheelchair propulsion technique might be affected by other factors. For the effect of physical activity level and shoulder pain on wheelchair propulsion technique, Dysterheft, Rice, Learmonth, Kinnett-Hopkins, and Motl (2017) examined the differences in wheelchair propulsion techniques with adults with SCI (N = 14, M = 30.64, SD = 11.08). They used both WUSPI and PASIPD and also measured propulsion metrics for analysis. Firstly, they found a significant correlation between WUSPI, PASIPD, and BMI scores. On the other hand, they found that the PASIPD score was significantly correlated to contact angle and stroke frequency, meaning that higher physical activity level causes using a more dangerous stroke technique at high speed. It could be a reason for the higher risk for an injury. Moreover, the WUSPI score was only correlated to peak propulsion forces significantly. Therefore, they recommend that healthcare professionals warn manual wheelchair users to learn a protective stroke technique against injuries.

In the literature, it has been determined that physical activity is related to both physical and mental component summary (MCS) of the quality of life (Pucci, Reis, Rech, & Hallal, 2012; Salguero, Martínez-García, Molinero, & Márquez, 2011). For the effect of physical activity on the quality of life, Giacobbi, Stancil, Hardin, and Bryant (2008) studied 26 wheelchair basketball players (M = 31.12, SD = 10.75) who reported spina bifida, cerebral palsy, paraplegia, and amputation. Unlike the previous qualitative studies, they used mixed-method research using PASIPD for physical activity and conducting interviews for the quality of life. Participants described psychological benefits (n = 25), social opportunities (n = 23), physical health (n = 13), social influences (n = 11), and increased overall quality of life (n = 6) as the benefits of physical activity.

2.3. Quality of Life in Individuals with Physical Disabilities

Quality of life is described in mainstream psychology as a conscious cognitive appraisal of one's pleasure with one's life (Rejeski & Mihalko, 2001). Felce and Perry (1995) define the domains of quality of life as physical, material, social, and emotional well-being and development and activity. Later on, they were reduced to two titles on Short-Form-36: Physical and mental component summary. The subscales related to PCS are determined as general health, physical function, physical role difficulties, and bodily pain. Moreover, subscales related to MCS emotional role difficulties, mental health, vitality, and social functioning.

Rajati, Ashtarian, Salari, Ghanbari, Naghibifar, and Hosseini (2018) report that lower levels of depression and anxiety and higher levels of physical activity and self-efficacy are the predictors of both physical and mental component summary among 302 individuals with physical disabilities.

Campbell (1995) found that wheelchair athletes with acquired disabilities had a better overall mood, greater mastery and self-esteem, and lower trait anxiety than those with congenital disabilities. Confirming the previous study's findings, Scarpa (2021) found that athletes with acquired disabilities had a higher mean score of physical self-concept than those with congenital disabilities.

2.4. Correlation Between Shoulder Pain, Physical Activity, and Quality of Life

Like the current study, one study that examines shoulder pain, physical activity level, and the quality of life together belongs to Gutierrez, Thompson, Kemp, and Mulroy (2007). They found that individuals with paraplegia (n = 80, M_{age} = 44.7) who had lower physical activity levels (M = 14.4 MET) and lower quality of life experienced a higher intensity of shoulder pain significantly by using WUSPI, PASIPD, Subjective Quality of Life (SQOL), and CAC.

Another study was done by Stirane, Kiukucane, Vetra, and Nulle (2012). They studied 40 adults with SCI (9 females, 31 males, M_{age} = 30.8) and divided them into two groups, the pain group (n = 20) and the without pain group (n = 20). They used WUSPI, PASIPD, SF-36, Community Activities Checklist (CAC), Functional Independence Measure (FIM), and a goniometer. The average hours of wheelchair use per day were

found to be 11.8. There was no relationship between shoulder pain intensity and the duration of SCI. On the other hand, they found that shoulder pain was inversely related to both physical activity level and the quality of life but not related to community activities. However, community activities were associated with the quality of life significantly.

One study with 35 manual wheelchair users (10 females, 25 males) investigated the correlation between shoulder pain, the quality of life, and physical activity level (Patel et al., 2015). The average hours of wheelchair use per day in their study were 3.49. They divided the sample into two groups pain group and the no pain group. They used WUSPI, SF-36, and PASIPD for the pain group, respectively. For the no pain group, they used only SF-36 and PASIPD, not WUSPI. No pain group had a significantly better quality of life both physically and mentally than the pain group, but no significant differences between the groups for PASIPD scores. In total, the shoulder pain intensity was not correlated to the quality of life and physical activity level significantly. However, there was a medium positive correlation between shoulder pain and quality of life and a small positive correlation between shoulder pain and physical activity according to the r values.

A recent study included 59 manual wheelchair users (28 females, 31 males; M = 49.1, SD = 13.4 years) in order to determine whether the COVID-19 restrictions affected the severity of shoulder pain and the level of physical activity in manual wheelchair users (Warner, Mason, Goosey-Tolfrey, & Webborn, 2022). They used the Leisure Physical Activity Questionnaire to question daily wheelchair activities before and during the lockdown. According to the results, the average hours of wheelchair use per day and the number of transfers significantly decreased during the lockdown. 67% of the participants reported that they had shoulder pain, and 22% stated that their shoulder pain was worse than before the lockdown. Despite the worsened shoulder pain, no significant relationship was found between physical activity and shoulder pain before and during the lockdown.

2.5. The Participation of Physical Activity During The Pandemic Period

The COVID-19 pandemic period has changed individuals' exercise habits as well as their daily routines (Lim & Pranata, 2021). Also, strict regulations like curfew during

the pandemic period decreased the quality of life and physical activity motivation of individuals, either athlete or non-athlete manual wheelchair users (Sokić, Popov, Dinić, & Rastović, 2021; Warner et al., 2022). Therefore, it has become essential to stay physically active at home during the pandemic, as WHO recommends. Lim and Pranata (2021) emphasize the necessity of telehealth for every kind of lockdown. Telehealth refers to health treatment delivered to patients in a different place using video conferences via a mobile phone or a computer (Merriam-Webster. n.d.). Friedman and VanPuymbrouck (2021) found that individuals with physical disabilities were more likely to use telehealth in the second year of the pandemic than individuals with intellectual disabilities, visual impairments, and hearing impairments, respectively. Since it was not known what would happen when the pandemic started, telehealth, which became widespread in the second year of the pandemic, may be preferred to be used for the physical activities of physically disabled individuals who have difficulty leaving the house even if there is no pandemic.

As described above, studies examining shoulder pain in the literature should consider participants' quality of life together with physical activity and shoulder pain, either athletes or non-athletes. Several studies on shoulder pain in wheelchair user athletes did not evaluate the quality of life of athletes mostly (Curtis & Black, 1999; Fullerton et al., 2003; Gómez & Pérez-Tejero, 2017; Mohseni-Bandpei et al., 2012; Ortega-Santiago et al., 2020; Pérez-Tejero & García-Gómeza, 2019; Soo Hoo et al., 2021; Wessels et al., 2013; Yıldırım et al., 2010). Only Üstünkaya et al. (2007) evaluated the quality of life using SWLS. The other studies on shoulder pain in non-athletic wheelchair users assessed the quality of life, but they used SF-36 instead of SF-36E or SF-12 (Stirane et al., 2012). Moreover, there is no study in the literature about the comparison of shoulder pain in individual and team sports and athletes with congenital and acquired disabilities.

CHAPTER 3

METHODS

The study's main purpose is to determine whether there is a relationship between shoulder pain, physical activity level, and the quality of life in manual wheelchair user athletes during the pandemic. This study also examines whether there is a significant difference in shoulder pain between overhead and non-head sports, between individual and team sports, and between athletes with and without congenital disabilities. Finally, it aims to examine the physical activity participation of manual wheelchair user athletes during the curfew. This chapter explains the study design, sampling method and settings, instruments, procedure, data analysis, and limitations.

3.1. Design of the Study

This study is quantitative type research with a cross-sectional design.

3.2. Sampling Method and Settings

This study was conducted in Turkey. Data were collected from wheelchair athletes registered with the Turkish Sports Federation of the Physically Disabled. Due to the pandemic conditions, the purposive sampling method was selected for this study. The purposive sample was described as researchers may utilize the personal judgment to pick a sample based on prior knowledge of a community and the specific objective of the study (Frankel, Wallen, & Hyun, 2012). Since lots of disabled sports clubs closed during the pandemic period and also disabled athletes could not go to the sports clubs due to the curfew, it was the only option. Therefore, the list of active disabled sports clubs was needed and obtained from the Turkey Physically Disabled Sports Federation to reach participants and send them a Google Form link. Manuel wheelchair user athletes who live in Ankara (n = 23) were surveyed face to face, and those who live outside Ankara (n = 77) were surveyed online by sending their coaches the instruments

through the Google Forms link. The link was also sent to the disabled athletes of the closed sports clubs.

Table 3.1

Descriptive Statistics of Disabled Sports Branches

	N	*%*
Wheelchair Basketball	54	54.0
Para-Archery	16	16.0
Disabled Table Tennis	16	16.0
Para-Badminton	4	4.0
Para-arm-wrestling	3	3.0
Sitting Volleyball	1	1.0
Para-Shooting	1	1.0
Para-Swimming	2	2.0
Boccia	3	3.0
Total	100	100.0

Frankel et al. (2012) define the disadvantages of a purposive sample as the researcher's judgment could cause the inability to get a representative sample of the population and the inability to generalize the information to be obtained as a result of the study. By calling each disabled sports club one by one, a total of 100 manual wheelchair user athletes participated in this study. Since participation was voluntary, nine disabled sports branches were included in line with the sports branches of the participants who agreed to take part in this study. These branches were wheelchair basketball (n = 54), disabled table tennis (n = 16), para-archery (n = 16), para-badminton (n = 4), para-arm-wrestling (n = 3), sitting volleyball (n = 1), para-shooting (n = 1), para-swimming (n = 2), and boccia (n = 3), as shown in table 3.1. All participants were manual wheelchair users as criteria. Hence, a representative sample (N = 100) was almost obtained.

Table 3.2

Demographic Information of Participants

		N	*%*
Residential	Village	3	3.0
	Small Town	2	2.0
	Large Town	25	25.0
	Metropolis	70	70.0
Education Status	Primary School	5	5.0
	Secondary School	6	6.0
	High School	44	44.0
	University	41	41.0
	Master	4	4.0
Occupation	Employed	31	31.0
	Student	32	32.0
	Volunteer	5	5.0
	Retired	12	12.0
	Other	20	20.0

In table 3.2, the demographic information of the participants is described. Regarding the residential, 70% of the participants stated that they live in a metropolis, and 25% live in large towns. While 3% live in the villages, the remaining 2% live in small towns. For the education status, 44% of the participants indicated that they graduated from high school. 41% of them pointed out that they graduated from university. 6% marked secondary school, 5% chose the primary school, and the remaining 4% circled master's degree as their education status. Considering the occupational knowledge of the participants, 32% of them were students, 31% were employed, 12% were retired, 5% were volunteers, and 20% chose others. Of the 20 participants who marked the

other option, 15 stated that they were national athletes, but the remaining five participants did not specify their profession.

Table 3.3

Descriptive Statistics of Mean Age According to Gender

	N	*%*	*M*	*SD*	Min	Max
Female	31	31.0	29.49	8.53	18.20	46.50
Male	69	69.0	33.33	11.03	18.00	62.10
Total	100	100.0	32.13	10.44	18.00	62.10

The average age of the participants according to their gender is given in table 3.3. According to this table, male participants consisted of 69.0% of the sample, and the ratio of female participants was 31.0%. In addition, male participants (n = 69, M = 33.33, SD = 11.03) were slightly older than females (n = 31, M = 29.49, SD = 8.53), and the age range for male participants (18-62.10) was wider than the age range for females (18.20-46.50).

Table 3.4

Descriptive Statistics of The Disability Status

		N	*%*
Type of disability	Congenital	46	46.0
	Acquired	54	54.0
Medical condition	Spinal cord injury	39	39.0
	Polio	11	11.0
	Amputation	4	4.0
	Spina Bifida	22	22.0
	Other	24	24.0

Table 3.4 gives the rest of the participants' demographic information regarding their disability status. Regarding whether their disability is congenital or not, 46% of the participants answered yes, while 54% answered no. Considering the medical conditions that caused the participants to use wheelchairs, 39% were SCI, 11% were polio, 4% were amputation, 22% were spina bifida, and 24% were the other option. For those with spina bifida, it was checked whether they answered yes to the question of whether their disability is congenital. Even though some space was provided for the other option in the online questionnaire, none of the participants indicated their medical condition in this option. If it had been administered face to face, more detailed results would have been obtained. Moreover, for those with spinal cord injuries, the question of which level the spinal cord injury was and its sub-question of whether it was a complete or semi-incision could not be answered for the same reason.

Table 3.5

Frequencies of Dominant Side and Type of Wheelchair

		N	*%*
Dominant side	Left	16	16.0
	Side	84	84.0
Type of Wheelchair	Manuel	87	87.0
	Electric	0	0.0
	Using both of them	13	13.0

Frequencies of the dominant side of the participants and the type of wheelchair that the participants used were given in table 3.5. For the knowledge of the dominant side, the term “dominant side” was explained to participants as “your writing hand”. While 16% of them had left-side dominance, 84% had right-side dominance. In addition, since the subject of the study was manual wheelchair users, there was no one marked electric wheelchair because they were not included at the beginning of the study. Whereas 87% of the participants used only a manual wheelchair, 13% used both manual and electric wheelchairs.

Table 3.6

Frequencies of Having or Not Having Had Covid-19

	N	*%*
Yes	17	17.0
No	80	80.0
Currently having the disease	3	3.0
Total	100	100.0

For the fifth research question, all participants were asked whether they had Covid-19 or not. 80% of them stated that they had never experienced Covid-19, but 17% had, as shown in table 3.6. The remaining 3% were suffering from Covid-19 when they participated in the study.

3.3. Instruments

As instruments, WUSPI, PASIPD, and SF-12 were used to investigate the correlation between shoulder pain intensity, physical activity level, and the quality of life in manual wheelchair user athletes during the pandemic period in this study. The first instrument, WUSPI, is a self-report questionnaire for shoulder pain of manual wheelchair users. The second instrument, PASIPD, is a last 7-day physical activity recall for the physical activity level of physically disabled people. It provides a total MET score for a week. The third instrument, SF-12, is a self-assessment tool for the quality of life of individuals with SCI who are also disabled. In addition, a survey is to complete necessary information of the participants such as height, weight, education status, etc. Each instrument is appropriate for individuals with disabilities like manual wheelchair user athletes.

3.3.1. Survey

A survey was prepared for demographic information. It included three open-ended, three multiple-choice, four yes/no questions, and two sub-questions, one open-ended question and one yes/no question. These questions were month and year of birth without asking the day of birth, height and weight if they know, the year they have

been active in sport, whether their disability is congenital or not, having coronavirus past or not, and if they had, how much time has passed, having training regularly in the pandemic or not and if they had, where they were training, such as municipal sports center, sports club, private gym, open-air, or other, whether the curfew prevented training or not, what kind of exercises they did indoors if they could do it during the curfew, such as physical fitness, stretching, resistance, balance, none, or other, the place where they live like a village, small town, large town, city, metropolis, or other, and the education status of the participants like primary education, secondary education, high school, undergraduate, graduate, doctorate or other, respectively.

3.3.2. Wheelchair User's Shoulder Pain Index (WUSPI)

The Wheelchair User's Shoulder Pain Index was developed by Curtis et al. (1995). It is a self-report questionnaire to evaluate the degree of shoulder pain during daily life activities for individuals using a wheelchair. WUSPI has 15 items that score the pain felt during each daily life activity with a VAS by giving a score of 0 to 10. VAS is a 10 cm number line, and "0" means no pain, and "10" means worst pain ever. Therefore, the range of the total WUSPI score is between 0 to 150 points. Types of daily life activities in the 15 items scored for shoulder pain are transfers (4), wheelchair mobility (2), self-care (5), and general activities (4). The Cronbach's Alpha of the WUSPI was calculated as .99 (Curtis et al., 1995). The Turkish version of WUSPI was adapted by Yılmaz (2017) with the abbreviation WUSPI-Tr. The Cronbach's Alpha of the WUSPI-Tr was calculated as .89 (Yılmaz, 2017).

3.3.3. Physical Activity Scale for Individuals with Physical Disabilities (PASIPD)

The Physical Activity Scale for Individuals with Physical Disabilities is a last 7-day physical activity recall in individuals with physical disabilities. It is useful to determine the weekly physical activity level of those individuals. PASIPD was developed by Washburn, Zhu, McAuley, Frogley, and Figoni (2002) and based on the Physical Activity Scale for the Elderly (PASE).

For reliability, Washburn et al. (2002) classified the items of PASIPD under five factors. Factor 1 was for items 9 (home repair), 10 (lawn), and 11 (garden work); factor 2 was for housework items 7, 8, and 12; factor 3 was for vigorous sport and recreational

activity items 5 and 6; factor 4 was light to moderate sport and recreational activity items 3 and 4, and factor 5 was for occupational and transportation items 2 and 13. Cronbach's alpha for each factor was calculated as .59, .55, .65, .48, and .37, respectively. After that, van der Ploeg, Streppel, van der Beek, Vollenbroek-Hutten, van Mechelen, and van der Woude (2007) found the test-retest reliability Spearman correlation as .77 and the criterion validity Spearman correlation as .30 by comparing with an accelerometer. Forty-five adult patients wore an accelerometer for one week and completed PASIPD twice before and after that week. Eventually, de Groot et al. (2010) evaluated the PASIPD with 139 ambulatory and wheelchair user individuals with SCI. They identified four factors such as factor 1 for light to moderate activities and muscle strength training, factor 2 for light and heavy housework, factor 3 for home repair and lawn work, and factor 4 for care for someone, paid work, wheeling outside, and strenuous activities. They found Cronbach's alpha for the total PASIPD score was 0.63. In 2019, it was translated into Turkish by Köçe with the abbreviation FEBFAS. The Cronbach's alpha for the Turkish version of PASIPD was calculated as .72.

There are thirteen questions, and each question has a sub-question. It questions daily life activities in the first six questions, domestic activities from the 7^{th} to 12^{th} questions, and professional duties in the 13^{th} question. It asks participants how often they have participated in these activities in the last seven days with choices of never, seldom (1-2 days), sometimes (3-4 days), and often (5-7 days). If the answer is "never", then it moves on to the next question, and the question's score is considered zero. If they have done that activity, they are asked how many hours a day they spend on average on these activities with options of less than one hour, more than one hour but less than two hours, between two and four hours, and more than four hours. Each question and sub-question has the same options.

The first question is not included in the scoring as it is only asked to familiarize the participant with the scale format. From the next second question to the thirteenth question, a score is obtained by multiplying the MET score, which corresponds to the answer given by the participant, how often they do the activity, and the hours spent each day, by the value of the question itself. The MET values corresponding to the answers to the thirteenth question are different from the other questions, and by applying the same procedure for the thirteenth question, all scores are summed, and a

one-week total MET score is obtained. The scoring of the PASIPD questions is given in table 3.7.

Table 3.7

Scoring of PASIPD

How often do they participate in the activity	How many hours a day do they spend on average on these activities	Corresponding MET score	
		Questions 2-12	The 13th question
Seldom (1-2 days)	Less than 1 hour	.11	.12
	More than one hour but less than two hours	.32	.64
	Between two and four hours	.64	1.39
	More than four hours	1.07	1.93
Sometimes (3-4 days)	Less than 1 hour	.25	.28
	More than one hour but less than two hours	.75	1.5
	Between two and four hours	1.50	3.11
	More than four hours	2.50	4.5
Often (5-7 days)	Less than 1 hour	.43	.49
	More than one hour but less than two hours	1.29	2.57
	Between two and four hours	2.57	5.57
	More than four hours	4.29	7.71

Washburn et al. (2002)

3.3.4. Short Form-12 (SF-12)

Short Form-12 was developed based on Short Form-36 (SF-36) by Ware, Kosinski, and Keller (1995). While SF-36 includes 36 items, SF-12 has 12 items due to being shortened. Since SF-36 is for the health status of individuals without disabilities, it is inappropriate for those with disabilities. If it were applied, the participants would be

hurt by questions like “Does running make you tired?”. Therefore, SF-36 was shortened to SF-12 by removing inappropriate questions for individuals with disabilities like spinal cord injury.

SF-12 provides two continuous data for physical and mental health separately. For the physical component summary (PCS) score, the items 1 (general health), 2a and 2b (physical function), 3a and 3b (physical role difficulties), and 5 (pain) are summed. And for mental component summary (MCS) score, the items 4a and 4b (emotional role difficulties), 6a and 6c (mental health), 6b (vitality), and 7 (social function) are summed. In the U.S. population, the reliability scores of PCS and MCS were calculated as .89 and .76, respectively. Also, in the U.K. population, they were .88 and .78, respectively. For SF-12 version 2, Bhandari, Kathe, Hayes, and Payakachat (2018) studied 420 cancer patients to evaluate its validity and reliability. Cronbach’s alpha for each was calculated as .89 and .88, respectively. Soysal Gündüz, Mutlu, Aslan Başlı, Gül, Akgül, Yılmaz, and Aydemir (2021) translated SF-12 Health Survey version 2 (SF-12v2) into Turkish. In the Turkish version, Cronbach’s alpha coefficient was calculated as .80 and .88 for PCS and MCS scores, respectively (Soysal Gündüz et al., 2021).

3.4. Procedure

This study was conducted in Turkey between October 2021 and March 2022. Before the study, ethics committee approval was obtained from the Applied Ethics Research Center of Middle East Technical University on August 23, 2021 (Appendix A). The approval was revised after replacing one of the instruments, Short Form 36 (SF-36), with Short Form 12 (SF-12v2) and re-approved on September 29, 2021 (Appendix A). After that, legal permission was obtained from the Turkey Physically Disabled Sports Federation on October 22, 2021 (Appendix B).

Manual wheelchair user athletes who live in Ankara (n = 23) were surveyed face to face, and those who live outside Ankara (n = 77) were surveyed via Google Forms. The link was not shared on social media platforms such as Facebook or Instagram to ensure that the participants were only registered with the Turkish Sports Federation of the Physically Disabled because others can use personal accounts on social media, and people who do not meet the criteria may be included in the study and undermine the

validity and reliability of the study. Therefore, trainers were asked to share the google form link via WhatsApp with participants. By sharing the link, the research subject, the purpose, and the significance of the study were explained in writing to the coaches, trainers, and the participants. After stating that volunteering was essential, the consent form was approved. Lastly, it was emphasized that their personal information, such as name, surname, or telephone number, was not required. For face to face survey, the same process was applied verbally, and each participant signed the consent form by writing their name and surname. Nearly it took 15 minutes to complete the study for each individual.

There was no risk to the participants, and they were not given purposely false information. All participants had the option of withdrawing from the study at any time or refusing to answer questions they did not wish to answer. All participant names, demographics, and outcomes were kept anonymous to avoid ethical concerns.

3.5. Data Analysis

IBM's Statistical Package for the Social Sciences (SPSS) version 26.0 was used for statistical analysis. After data analysis, descriptive and inferential statistics were conducted. Descriptive statistics were carried out to present all variables like frequencies, means, or standard deviations. Inferential statistics were applied to reveal the correlation between subgroups and factors. All assumptions for the Mann-Whitney U test were checked before the analysis. An alpha level was set up as .05, which means that alpha should be less than .05 for a significant correlation between variables with a 95% probability.

Also, an a priori power analysis was performed using G*Power version 3.1.9.4 in order to estimate the minimum sample size required for each research question (Faul, Erdfelder, Lang, & Buchner, 2007). For the first research question, the Correlation: Bivariate Normal Model was selected as the statistical test with two tails. According to the results, the sample size needed to achieve 80% power for detecting a medium effect (.03) at a significance criteria of .05 was $N = 84$. Therefore, the total sample size of the study ($N = 100$) was sufficient to test the hypothesis for the first research question. Moreover, for the second, third, and fourth research questions, the Means: Wilcoxon-Mann-Whitney test (two groups) was selected as the statistical test with one

tail. Results indicated that the sample size required for each subgroup was n = 53 in order to attain 80% power for detecting a large effect (.05) at a significance level of .05.

After completing the data collection process, it was obtained that the different sample sizes of the subgroups were created for each research question. Based on the allocation rates, the same test was repeated in order to see how close the sample sizes in the study were to the required sizes. For the second research question, the new required sample sizes according to the allocation rate ($n_{non\text{-}overhead}/n_{overhead}$) 0.69 were n = 65 and n = 45 for overhead and non-overhead sports subgroups, respectively. It could be said that the sample sizes for overhead (n = 59) and non-overhead sports (n = 41) subgroups in this study were close to the required sample sizes. Then, for the third research question, the updated sample sizes according to the allocation rate ($n_{team}/n_{individual}$) 1.22 were n = 49 and n = 59 for individual and team sports subgroups, respectively. That is, the sample sizes for individual (n = 45) and team sports (n = 55) subgroups in this study were close to the required sample sizes. Finally, for the fourth research question, the revised required sample sizes according to the allocation rate ($n_{acquired}/n_{congenital}$) 1.17 were n = 49 and n = 57 for athletes with and without congenital disabilities subgroups, respectively. It could be interpreted that the sample sizes for athletes with congenital (n = 46) and acquired physical disabilities (n = 54) subgroups in this study were close to the required sample sizes. Hence, the total sample size was larger than the required sample size for the first research question, and the sizes of the subgroups required for the second, third, and fourth research questions were almost obtained.

3.6. Limitations

Since this study is a cross-sectional design, there are threats to the internal validity of the survey (Frankel et al., 2012). Conducting many similar research studies on disabled individuals during the pandemic period has created boredom with online surveys and caused the mortality threat, known as the loss of subjects. That is why the online survey participation rate was about 10%. In the face-to-face surveys, the participants who were not there were revisited on another day. In addition, there was no equality between the female and male ratios, and their shoulder pain comparison would not be made. One threat is the location threat. Considering that 77 participants participated in

the study online, this problem was overcome. However, wheelchair basketball players made up the majority of the sample. In the face-to-face surveys, no location problem could prevent the participants from participating in the study, and the participation rate in the face-to-face surveys was 100%. However, more face-to-face surveys could not be conducted due to the late receipt of the disabled sports club list obtained from the Turkish Federation of the Physically Disabled.

For the instrument decay, those who participated in the study online did not have a chance to ask the researcher when they had a question they did not understand. Therefore, it was realized that some participants could not understand how to answer the PASIPD questions. Those who stated that they never did the activity in the PASIPD questions marked that they did it for less than 1 hour or 2-4 hours. For questions answered in this way, MET scores were accepted as 0. Also, using three instruments caused fatigue. Another instrument was WUSPI asking about shoulder pain without distinguishing between right or left shoulder. Moreover, due to the wide range in its scoring that causes the non-normal distribution, most studies using WUSPI had to prefer a non-parametric test, the Mann-Whitney U test or the Wilcoxon test, as in this study, despite 100 participants.

CHAPTER 4

RESULTS

This chapter explains descriptive outcomes, the correlation between shoulder pain, physical activity, and the quality of life, the differences in shoulder pain between overhead and non-overhead sports, individual and team sports, athletes with congenital and acquired disabilities, and the physical activity participation of manual wheelchair user athletes during the pandemic.

4.1. Research Question 1

Is there a correlation between shoulder pain intensity, physical activity level, and the quality of life in manual wheelchair user athletes?

4.1.1. Descriptive statistics of manual wheelchair user athletes

Table 4.1 presents the descriptive statistics of the manual wheelchair user athletes (N = 100) according to branches in terms of age, the duration of wheelchair use, and the years active in sports. Totally, there were nine adaptive sports branches in this study, as seen in table 4.1. These branches were wheelchair basketball (n = 54, M_{age} = 32.43, $M_{wheelchairuse}$ = 15.31, $M_{sportsyears}$ = 10.98), para-archery (n = 16, M_{age} = 37.97, $M_{wheelchairuse}$ = 13.69, $M_{sportsyears}$ = 7.81), disabled table tennis (n = 16, M_{age} = 25.59, $M_{wheelchairuse}$ = 15.69, $M_{sportsyears}$ = 9.50), para-badminton (n = 4, M_{age} = 30.98, $M_{wheelchairuse}$ = 9.50, $M_{sportsyears}$ = 9.50), para-arm-wrestling (n = 3, M_{age} = 29.56, $M_{wheelchairuse}$ = 16.33, $M_{sportsyears}$ = 8.67), sitting volleyball (n = 1, M_{age} = 37.17, $M_{wheelchairuse}$ = 36.00, $M_{sportsyears}$ = 14.00), para-shooting (n = 1, M_{age} = 44.08, $M_{wheelchairuse}$ = 30.00, $M_{sportsyears}$ = 17.00), para-swimming (n = 2, M_{age} = 22.33, $M_{wheelchairuse}$ = 6.50, $M_{sportsyears}$ = 6.50), and boccia (n = 3, M_{age} = 35.81, $M_{wheelchairuse}$ = 20.33, $M_{sportsyears}$ = 5.33).

Table 4.1

Descriptive Statistics of Manual Wheelchair User Athletes by Branches

	N	M_{age}	$M_{wheelchairuse}$	$M_{sportsyears}$
Wheelchair Basketball	54	32.43	15.31	10.98
Para-Archery	16	37.97	13.69	7.81
Disabled Table Tennis	16	25.59	15.69	9.50
Para-Badminton	4	30.98	9.50	9.50
Para-arm-wrestling	3	29.56	16.33	8.67
Sitting Volleyball	1	37.17	36.00	14.00
Para-Shooting	1	44.08	30.00	17.00
Para-Swimming	2	22.33	6.50	6.50
Boccia	3	35.81	20.33	5.33
Total	100	32.14	15.24	9.94

Since there is no homogeneous distribution according to the branches, it would not be logical to interpret these descriptive statistics according to the branches.

Table 4.2

Descriptive Statistics of Wheelchair Use and Sports Years By Gender

		N	*M*	*SD*	Min	Max
Wheelchair Use	Female	31	16.48	9.09	1.00	36.00
	Male	69	14.68	9.41	1.00	54.00
	Total	100	15.24	9.30	1.00	54.00
Sports Years	Female	31	8.00	5.81	1.00	22.00
	Male	69	10.81	6.77	1.00	26.00
	Total	100	9.94	6.59	1.00	26.00

Table 4.2 presents the descriptive statistics of the participants according to gender. The duration of wheelchair use time (M = 15.24, SD = 9.30) ranged from one to 54 years. It was slightly more for female athletes (n = 31, M = 16.48, SD = 9.09) than for males (n = 69, M = 14.68, SD = 9.41). Furthermore, the years active in sports (M = 9.94, SD = 6.59) ranged from one to 26 years. Male athletes (M = 10.81, SD = 6.77) had been actively involved in sports slightly longer than females (M = 8.00, SD = 5.81).

4.1.2. WUSPI results for manual wheelchair user athletes

Before evaluating shoulder pain intensity, there are eight questions about the medical background of the participant in WUSPI. Table 4.3 summarizes the answers given by the participants to questions 1-4 of WUSPI.

Table 4.3

Descriptive Statistics of Medical Background

WUSPI Question	*Yes*	*Which side?*	*N*	*%*
1. Did you have shoulder pain prior to wheelchair use?	21	Left	3	14.3
		Right	5	23.8
		Both of them	13	61.9
2. Have you had shoulder pain during the time you have used a wheelchair?	62	Left	11	17.7
		Right	13	21.0
		Both of them	38	61.3
3. Have you had shoulder surgery?	14	Left	3	21.4
		Right	3	21.4
		Both of them	8	57.1
4. Do you currently have shoulder pain?	54	Left	11	20.4
		Right	19	35.2
		Both of them	24	44.4

For the first question, 79% of the participants stated that they did not have shoulder pain before using a wheelchair. The remaining 21% circled their aching shoulder side before using a wheelchair as three on the left, five on the right, and 13 on both sides. For the second question, 62% of the participants pointed out that they had shoulder pain while using a wheelchair. Thirty-eight participants marked the aching shoulder on both sides, 13 participants on the right side, and 11 on the left side. Then, 14% of the participants stated that they had had shoulder surgery, as three on their left shoulder, three on their right shoulder, and eight on both sides. Also, 54% of the participants remarked that they had shoulder pain at the time of the study. Eleven participants indicated that they had shoulder pain on the left side, 19 participants on the right side, and 24 on both sides.

Table 4.4

Descriptive Statistics of Medical Attention

WUSPI Question	*Yes*	*If yes, who did you apply to?*	*N*	*%*
5. Have you sought medical attention for a shoulder problem?	35	Doctor	8	22.86
		Physiotherapist	22	62.86
		Other	5	14.28

Sixty-five participants indicated that they had not sought medical attention for their shoulder pain, as seen in table 4.4. Only 35 participants pointed out that they had sought medical attention. While eight participants had seen a doctor, 22 preferred a physiotherapist. The remaining five participants chose the “other” option, but they did not give any details.

64% of the participants used practices in order to reduce their shoulder pain, as shown in table 4.5. Nineteen participants indicated that they preferred exercise, 18 participants applied ice, eight participants took medicine, seven participants rested, and four participants applied heat. Eight participants marked the “other” option, but they did not provide further information. The remaining 36% of the participants did nothing to reduce their shoulder pain.

Table 4.5

Frequencies of Practices Used to Reduce Shoulder Pain

	N	*%*
Ice	18	18.0
Heat	4	4.0
Exercise	19	19.0
Medication	8	8.0
Rest	7	7.0
None of them	36	36.0
Other	8	8.0

According to table 4.16, 12% of the participants indicated that their shoulder pain had prevented them from performing their usual activities. Furthermore, 54% of the participants stated that they had experienced hand or elbow pain or injuries while using a wheelchair.

Table 4.6

Answers to WUSPI Questions 7-8

WUSPI Questions	*Answers*	*N*	*%*
7. Did shoulder pain limit you from performing your usual activities during the past week?	Yes	12	12.0
	No	88	88.0
8. Did you experience hand or elbow pain or injuries during the time you have used a wheelchair?	Yes	54	54.0
	No	46	46.0

Table 4.7 presents the mean scores of 15 WUSPI items. The participants reported the daily life activities that they experienced the highest intensity of shoulder pain as while pushing up ramps or inclines outdoors (M = 3.00, SD = 2.86), pushing the wheelchair for 10 minutes or more (M = 2.37, SD = 2.52), lifting objects down from an overhead

shelf (*M* = 1.73, *SD* = 2.59), usual activities at work or school (*M* = 1.57, *SD* = 2.22), performing household chores (*M* = 1.52, *SD* = 2.18), and while loading the wheelchair into a car (*M* = 1.51, *SD* = 2.44), respectively. Moreover, daily life activities that they experienced the lowest intensity of shoulder pain were reported as putting on a button down shirt (*M* = .78, *SD* = 1.78), putting on pants (*M* = 1.04, *SD* = 1.98), transferring from bed to wheelchair (*M* = 1.08, *SD* = 1.87), driving (*M* = 1.15, *SD* = 2.14), transferring from a wheelchair to a tub or shower (*M* = 1.17, *SD* = 2.12), and putting on a t-shirt or pull-over (*M* = 1.17, *SD* = 2.56), respectively.

Table 4.7

Means of WUSPI Items

	N	*M*	*SD*	Min	Max
1. Transferring from bed to wheelchair	100	1.08	1.87	0	9
2. Transferring from a wheelchair to a car	100	1.35	2.20	0	10
3. Transferring from a wheelchair to a tub/shower	100	1.17	2.12	0	10
4. Loading the wheelchair into a car	100	1.51	2.44	0	10
5. Pushing the wheelchair for 10 min or more	100	2.37	2.52	0	9
6. Pushing up ramps or inclines outdoors	100	3.00	2.86	2	10
7. Lifting objects down from an overhead shelf	100	1.73	2.59	0	10
8. Putting on pants	100	1.04	1.98	0	10
9. Putting on a t-shirt or pull-over	100	1.17	2.56	0	10
10. Putting on a button down shirt	100	.78	1.78	0	9
11. Washing your back	100	1.49	2.46	0	10
12. Usual activities at work or school	100	1.57	2.22	0	9
13. Driving	100	1.15	2.14	0	10
14. Performing household chores	100	1.52	2.18	0	10
15. Sleeping	100	1.39	2.26	0	10
Total WUSPI score	100	22.30	27.75	0	128

The remaining daily life activities that experienced moderate shoulder pain compared to other daily life activities were specified as washing their back (M = 1.49, SD = 2.46), sleeping (M = 1.39, SD = 2.26), and transferring from a wheelchair to a car (M = 1.35, SD = 2.20).

4.1.3. Means of WUSPI, PASIPD, and SF-12

The mean scores of shoulder pain intensity, physical activity level, and quality of life of the participants were given in table 4.8. According to the results, the mean total WUSPI score for shoulder pain intensity was 22.30 (SD = 27.75), ranging from .00 to 128.00. Furthermore, the mean total PASIPD score for physical activity level was 27.04 (SD = 19.79), ranging from .71 to 108.21. For SF-12, the mean PCS score for physical quality of life was 58.35 (SD = 18.28), ranging from 15.00 to 100.00, and the mean MCS score for mental quality of life was 62.25 (SD = 17.16), ranging from 16.67 to 100.00.

Table 4.8

Mean Scores of WUSPI, PASIPD, and SF-12

	N	*M*	*SD*	Min	Max
WUSPI	100	22.30	27.75	.00	128.00
PASIPD	100	27.04	19.79	.71	108.21
PCS	100	58.35	18.28	15.00	100.00
MCS	100	62.25	17.16	16.67	100.00

4.1.4. Result of Pearson correlation coefficient

Pearson correlation was used to investigate whether there is a significant relationship between the mean scores of WUSPI, PASIPD, and SF-12, as seen in table 4.9. Since SF-12 provides two continuous variables, PCS and MCS, there were four continuous data. According to Pearson correlation coefficient results, there is a significant positive correlation between the WUSPI score and the PASIPD score ($r(98) = .293$, $p<.01$). On the other hand, there is a negative correlation between the WUSPI score and the PCS score ($r(98) = -.415$, $p<.01$). However, there is no significant correlation between the

WUSPI score and the MCS score ($r(98) = -.101$, $p>.05$), the PASIPD score and the PCS score ($r(98) = .029$, $p>.05$), and the PASIPD score and MCS score ($r(98) = .157$, $p>.05$).

Table 4.9

Intercorrelations for Shoulder Pain, Physical Activity Level, and Quality of Life

	1	2	3	4
1. Shoulder Pain	-			
2. Physical Activity	.29**	-		
3. Physical Component Summary	-.41**	.03	-	
4. Mental Component Summary	-.10	.16	.47**	-

**. Correlation is significant at the 0.01 level (2-tailed).

4.2. Research Question 2

Does shoulder pain differ according to sports categories and type of physical disability in manual wheelchair user athletes?

4.2.1. Is there a significant difference in shoulder pain between overhead (wheelchair basketball, para-badminton, and sitting volleyball) and non-overhead sports (para-archery, disabled table tennis, para-arm-wrestling, para-shooting, para-swimming, and boccia) athletes using manual wheelchairs?

4.2.1.1.Descriptive statistics of overhead and non-overhead sports

The total sample (N = 100) was divided into two subgroups, overhead (n = 59) and non-overhead sports (n = 41), in order to compare shoulder pain differences between them. Of nine adaptive sports, there were three adaptive sports branches for overhead sports and six branches for non-overhead sports in this study, respectively. Wheelchair basketball (n = 54), para-badminton (n = 4), and sitting volleyball (n = 1) were classified under the name of overhead sports, as displayed in figure 4.1.

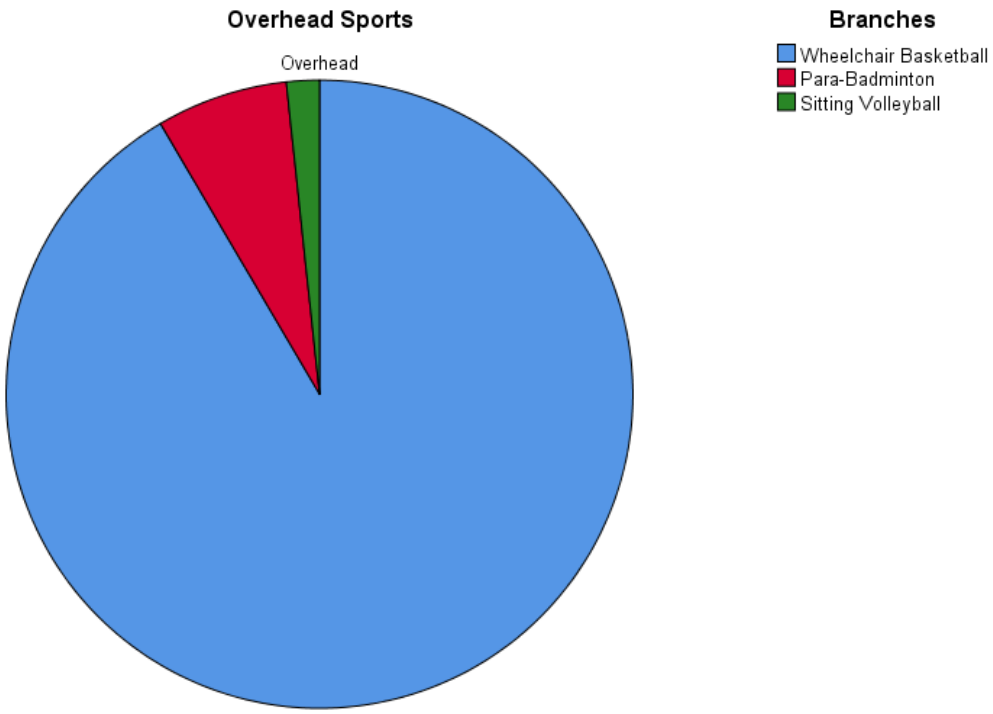


Figure 4.1 *Pie Chart for Overhead Sports by Branches*

Para-archery (*n* = 16), disabled table tennis (*n* = 16), para-arm-wrestling (*n* = 3), para-shooting (*n* = 1), para-swimming (*n* = 2), and boccia (*n* = 3) were categorized as non-overhead sports, as shown in figure 4.2.

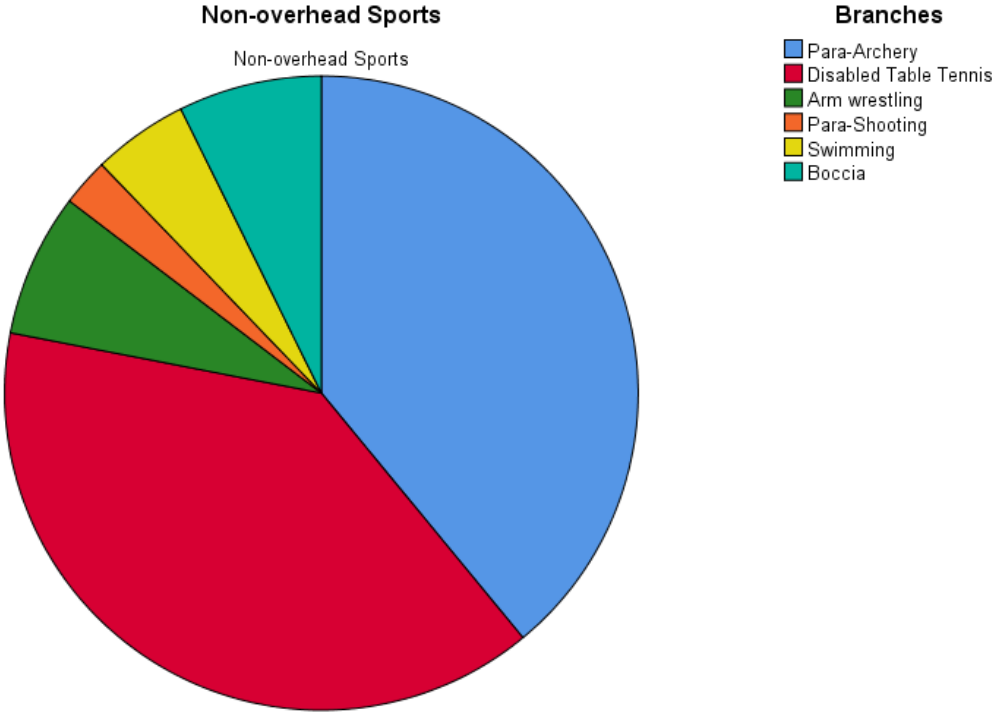


Figure 4.2 *Pie Chart for Non-Overhead Sports by Branches*

Since homogenized subgroups were not formed, it would not be logical to examine the means according to the branches. Instead, it would be more appropriate to compare the means of age, the duration of wheelchair use, and the active years in sports of the overhead and non-overhead sports according to gender, as presented in table 4.10.

Table 4.10

Descriptive Statistics of Overhead and Non-overhead Sports By Gender

Type of Sport	*Gender*	*N*	*%*	M_{age}	$M_{wheelchairuse}$	$M_{sportsyears}$
Overhead Sports	Female	15	25.42	27.34	16.93	6.60
	Male	44	74.58	34.14	14.70	12.41
	Total	59	100.0	32.41	15.27	10.93
Non-overhead Sports	Female	16	39.02	31.49	16.06	9.31
	Male	25	60.98	31.92	14.64	8.00
	Total	41	100.0	31.75	15.20	8.51
Total	Female	31	31.0	29.48	16.48	8.00
	Male	69	69.0	33.33	14.68	10.81
	Total	100	100.0	32.14	15.24	9.94

The order from the oldest to the youngest was male overhead athletes (M_{age} = 34.14), male non-overhead athletes (M_{age} = 31.92), female non-overhead athletes (M_{age} = 31.49), and female overhead athletes (M_{age} = 27.34). That is, all age averages were close to each other. However, the wheelchair usage time of females in overhead ($M_{wheelchairuse}$ = 16.93) and non-overhead sports ($M_{wheelchairuse}$ = 16.06) were slightly higher than that of males in overhead ($M_{wheelchairuse}$ = 14.70), and non-overhead sports ($M_{wheelchairuse}$ = 14.64). Also, the mean of the years active in sports was the highest for male overhead athletes ($M_{sportsyears}$ = 12.41). After that, female non-overhead athletes ($M_{sportsyears}$ = 9.31), male non-overhead athletes ($M_{sportsyears}$ = 8.00) and female overhead athletes ($M_{sportsyears}$ = 6.60) came, respectively. In general, overhead (M_{age} = 32.41, $M_{wheelchairuse}$ = 15.27) and non-overhead sports (M_{age} = 31.75, $M_{wheelchairuse}$ = 15.20) had similar ages and duration of wheelchair use. On the other hand, overhead

sports ($M_{sportsyears}$ = 10.93) had been active in sports slightly longer than non-overhead sports ($M_{sportsyears}$ = 8.51).

4.2.1.2.Means of WUSPI, PASIPD, and SF-12

Table 4.11 gives the mean scores of WUSPI, PASIPD, and SF-12 for overhead and non-overhead sports athletes. Overhead athletes (M_{WUSPI} = 23.61, SD_{WUSPI} = 28.57, M_{PCS} = 59.07, SD_{PCS} = 17.60) had slightly more shoulder pain and better physical quality of life than non-overhead athletes (M_{WUSPI} = 20.41, SD_{WUSPI} = 26.76, M_{PCS} = 57.32, SD_{PCS} = 19.40). On the other hand, non-overhead athletes (M_{PASIPD} = 27.53, SD_{PASIPD} = 21.84, M_{MCS} = 65.04, SD_{MCS} = 18.63) were more physically active and had a better quality of life mentally than overhead athletes (M_{PASIPD} = 26.70, SD_{PASIPD} = 18.42, M_{MCS} = 60.31, SD_{MCS} = 15.94).

Table 4.11

WUSPI, PASIPD, and SF-12 Means for Overhead and Non-overhead Sports

		N	*M*	*SD*
WUSPI	Overhead Sports	59	23.61	28.57
	Non-overhead Sports	41	20.41	26.76
	Total	100	22.30	27.75
PASIPD	Overhead Sports	59	26.70	18.42
	Non-overhead Sports	41	27.53	21.84
	Total	100	27.04	19.79
PCS	Overhead Sports	59	59.07	17.60
	Non-overhead Sports	41	57.32	19.40
	Total	100	58.35	18.28
MCS	Overhead Sports	59	60.31	15.94
	Non-overhead Sports	41	65.04	18.63
	Total	100	62.25	17.16

4.2.1.3.Mann-Whitney U test for shoulder pain differences

Mann-Whitney U test was used to compare shoulder pain differences between overhead and non-overhead sports athletes using manual wheelchairs.

4.2.1.4.Assumptions of Mann-Whitney U test

Independent observation and non-normality are the main assumptions of the Mann-Whitney U test. In this study, there is no such dependency on the scores between observations.

4.2.1.5.Non-Normality

The samples picked from the two populations should not be normal. For the non-normality check, the skewness and kurtosis values should not be between -3 and 3 and not be close to zero. The skewness value for overhead sports was 1.69 (*SE* = .31), and for non-overhead sports was 2.40 (*SE* = .61). For the kurtosis, the value for overhead sports was 2.40 (*SE* = .37), and for non-overhead sports was 6.76 (*SE* = .72). Hence, there was a non-normal distribution.

4.2.1.6.Result of Mann-Whitney U test

According to Mann-Whitney U test results, the *p*-value was found as .752. So Mann-Whitney U test result indicated that there is no significant difference in shoulder pain between overhead (Median = 15, *n* = 59) and non-overhead sports athletes using manual wheelchairs (Median = 10, *n* = 41, *U* = 1164.500, *z* = -.316, *p* = .752). Thus, the null hypothesis was rejected.

4.2.2. Is there a significant difference in shoulder pain between adaptive individual (disabled table tennis, para-archery, para-badminton, para-arm-wrestling, para-swimming, para-shooting, and boccia) and team sports (wheelchair basketball and sitting volleyball athletes who use manual wheelchairs?

4.2.2.1.Descriptive statistics of individual and team sports

The total sample (*N* = 100) was divided into two subgroups, individual (*n* = 45) and team sports (*n* = 55), in order to compare shoulder pain differences between them.

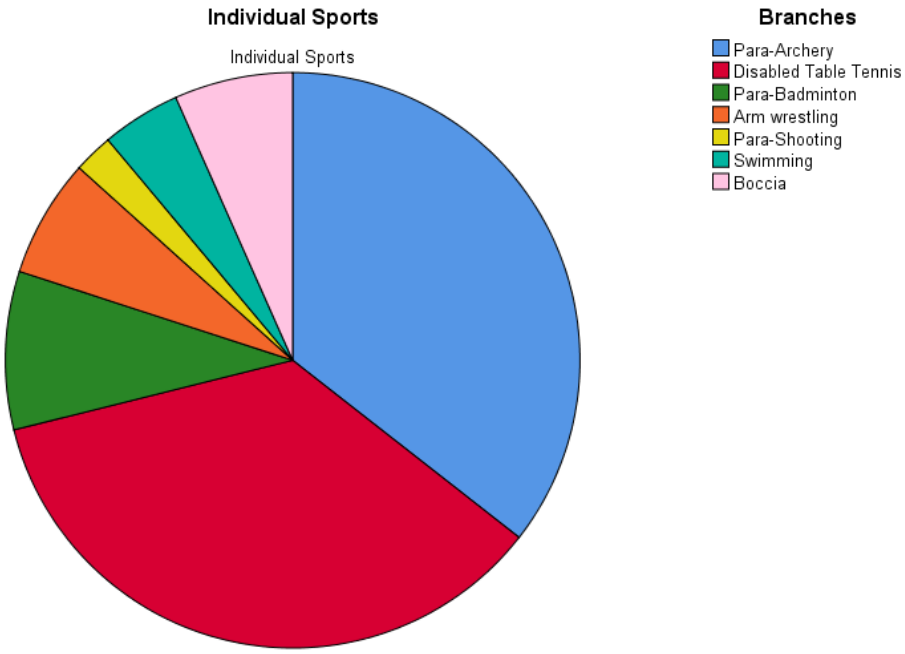
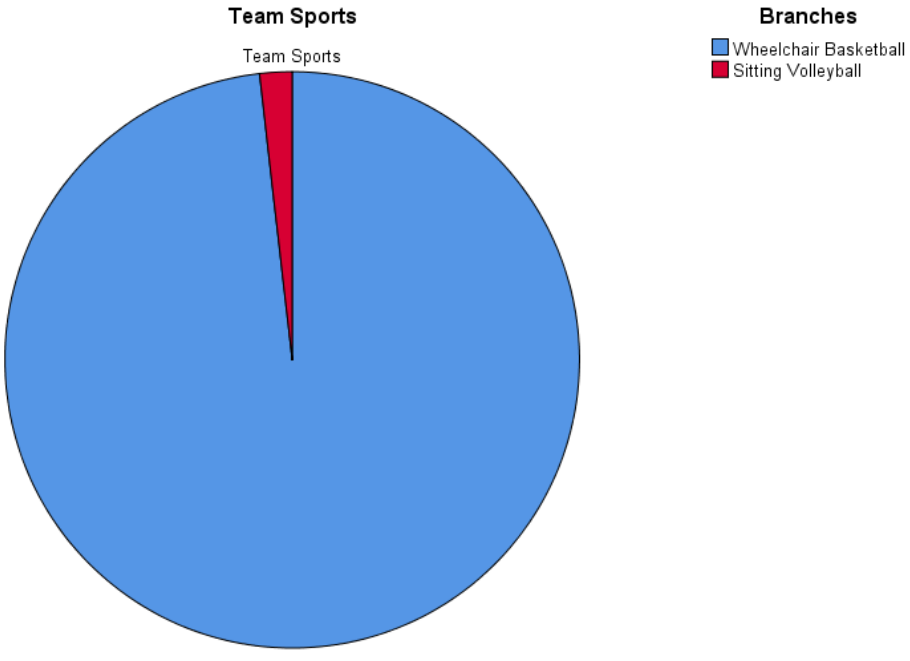


Figure 4.3 *Pie Chart for Individual Sports by Branches*

Disabled table tennis (*n* = 16), para-archery (*n* = 16), para-badminton (*n* = 4), para-arm-wrestling (*n* = 3), para-swimming (*n* = 2), para-shooting (*n* = 1), and boccia (*n* = 3) are individual sports, as shown in figure 4.3.



,

Figure 4.4 *Pie Chart for Team Sports by Branches*

Wheelchair basketball (*n* = 54) and sitting volleyball (*n* = 1) are team sports, as displayed in figure 4.4.

Table 4.12

Descriptive Statistics of Individual and Team Sports by Gender

		N	%	M_{age}	$M_{wheelchairuse}$	$M_{sportsyears}$
Individual Sports	Female	18	40.0	30.74	15.06	9.00
	Male	27	60.0	32.31	14.44	8.33
	Total	45	100.0	31.68	14.69	8.60
Team Sports	Female	13	23.64	27.74	18.46	6.62
	Male	42	76.36	33.99	14.83	12.40
	Total	55	100.0	32.51	15.69	11.04
Total	Female	31	31.0	29.48	16.48	8.00
	Male	69	69.0	33.33	14.68	10.81
	Total	100	100.0	32.14	15.24	9.94

For a better description, descriptive statistics of individual and team sports according to gender were shown in table 4.12. While females (M = 30.74) and males in individual sports (M = 32.31) were of similar age, females in team sports (M = 27.74) were younger than males in team sports (M = 33.99). For wheelchair usage time, males in individual sports (M = 14.44) and team sports (M = 14.83) had similar averages. On the other hand, females in team sports (M = 18.46) have been using wheelchairs slightly longer than in individual sports (M = 15.06). When looking at the total, individual (M_{age} = 31.68, $M_{wheelchairuse}$ = 14.69, $M_{sportsyears}$ = 8.60) and team sports (M_{age} = 32.51, $M_{wheelchairuse}$ = 15.69, $M_{sportsyears}$ = 11.04) had similar characteristics.

4.2.2.2.Means of WUSPI, PASIPD, and SF-12

The means of WUSPI, PASIPD, and SF-12 for individual and team sports were presented in table 4.13. The athletes interested in individual sports (M_{WUSPI} = 20.47, SD_{WUSPI} = 26.21; M_{MCS} = 65.00, SD_{MCS} = 19.00) had slightly lower shoulder pain and better quality of life mentally than athletes involved in team sports (M_{WUSPI} = 23.80, SD_{WUSPI} = 29.11; M_{MCS} = 60.00, SD_{MCS} = 15.31). However, individual sports (M_{PCS} =

57.89, SD_{PCS} = 18.90; M_{PASIPD} = 27.16, SD_{PASIPD} = 21.36) had almost the same score for physical quality of life and physical activity level as team sports (M_{PCS} = 58.73, SD_{PCS} = 17.90; M_{PASIPD} = 26.94, SD_{PASIPD} = 18.61).

Table 4.13

WUSPI, PASIPD, and SF-12 Means for Individual and Team Sports

		N	*M*	*SD*
WUSPI	Individual	45	20.47	26.21
	Team	55	23.80	29.11
PASIPD	Individual	45	27.16	21.36
	Team	55	26.94	18.61
PCS	Individual	45	57.89	18.90
	Team	55	58.73	17.90
MCS	Individual	45	65.00	19.00
	Team	55	60.00	15.31

4.2.2.3.Mann-Whitney U test for shoulder pain differences

The Mann-Whitney U test was used to compare shoulder pain differences between individual and team sports athletes using manual wheelchairs.

4.2.2.4.Assumptions of the Mann-Whitney U test

The main assumptions of the Mann-Whitney U test are independent observation and non-normal distribution. There is no such dependency on the scores between observations in this study.

4.2.2.5.Non-Normality

The samples selected from the two populations should not be normal for the Mann-Whitney U test. To check non-normality, all values for skewness and kurtosis should not be close to zero and between -3 and 3. The skewness values were 2.34 (*SE* = .35)

for individual sports and 1.69 (*SE* = .32) for team sports. In addition, the kurtosis values were 6.59 (*SE* = .69) for the individual sports and 2.33 (*SE* = .63) for the team sports. Hence, the distribution was not normal.

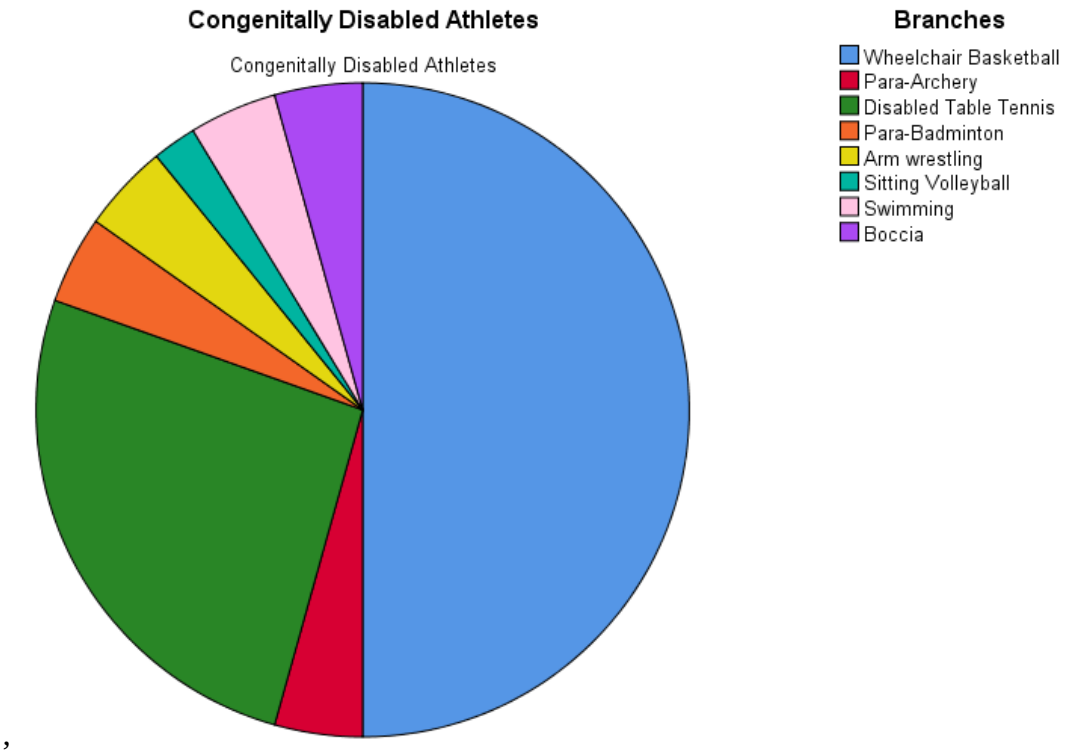
4.2.2.6.Result of the Mann-Whitney U test

According to Mann-Whitney U test result, the *p*-value was found as .821. So, there is no significant difference in shoulder pain between individual (Median = 10, *n* = 45) and team sports (Median = 15, *n* = 55, *U* = 1205.000, z = -.226, *p* = .821). As a result of this, the null hypothesis was rejected.

4.2.3. Is there a significant difference in shoulder pain between athletes with congenital and acquired disabilities who use manual wheelchairs?

4.2.3.1.Descriptive statistics of athletes with congenital and acquired disabilities

The total sample (*N* = 100) was divided into two subgroups, manual wheelchair user athletes with congenital (*n* = 46) and acquired disabilities (*n* = 54), in order to compare shoulder pain differences between them.



,

Figure 4.5 *Pie Chart for Athletes with Congenital Disabilities by Branches*

The branches of athletes with congenital disabilities group were wheelchair basketball (n = 23, M_{age} = 26.53, $M_{wheelchairuse}$ = 15.35, $M_{sportsyears}$ = 7.87), para-archery (n = 2, M_{age} = 33.12, $M_{wheelchairuse}$ = 18.00, $M_{sportsyears}$ = 14.00), disabled table tennis (n = 12, M_{age} = 24.17, $M_{wheelchairuse}$ = 15.92, $M_{sportsyears}$ = 9.25), para-badminton (n = 2, M_{age} = 29.42, $M_{wheelchairuse}$ = 8.50, $M_{sportsyears}$ = 12.50), para-arm-wrestling (n = 2, M_{age} = 23.12, $M_{wheelchairuse}$ = 11.50, $M_{sportsyears}$ = 8.50), sitting volleyball (n = 1, M_{age} = 37.17, $M_{wheelchairuse}$ = 36.00, $M_{sportsyears}$ = 14.00), para-swimming (n = 2, M_{age} = 22.33, $M_{wheelchairuse}$ = 6.50, $M_{sportsyears}$ = 6.50) and boccia (n = 2, M_{age} = 30.96, $M_{wheelchairuse}$ = 26.00, $M_{sportsyears}$ = 3.50), as seen in figure 4.5.

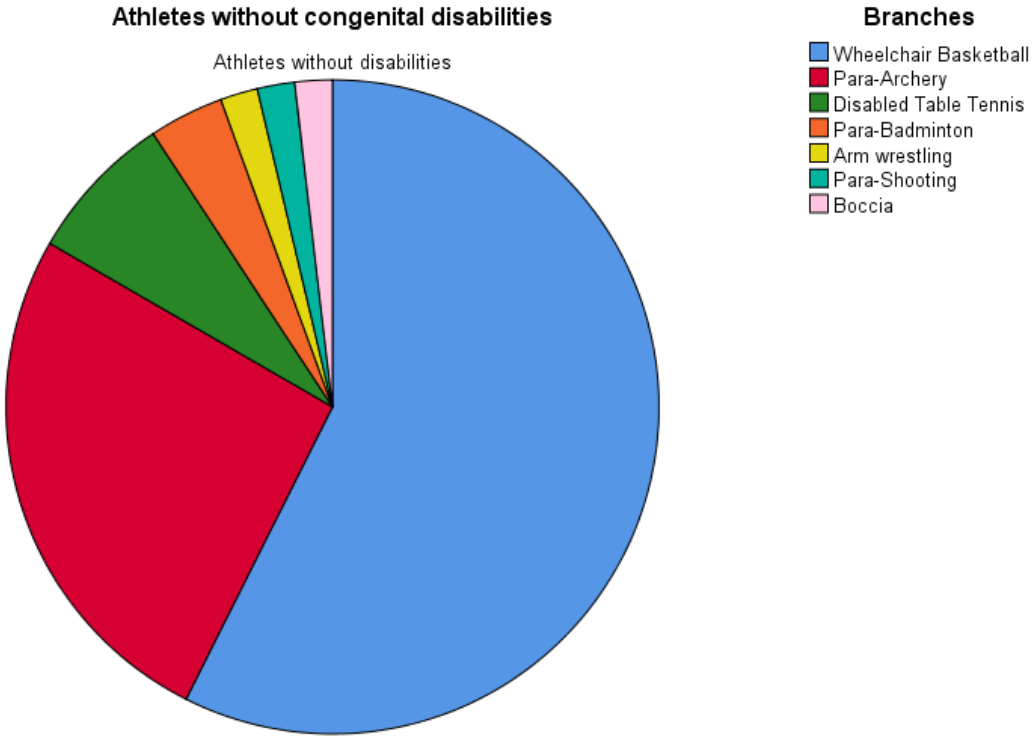


Figure 4.6 *Pie Chart for Athletes with Acquired Disabilities by Branches*

The branches of athletes with congenital disabilities were wheelchair basketball (n = 31, M_{age} = 36.80, $M_{wheelchairuse}$ = 15.29, $M_{sportsyears}$ = 13.29), para-archery (n = 14, M_{age} = 38.67, $M_{wheelchairuse}$ = 13.07, $M_{sportsyears}$ = 6.93), disabled table tennis (n = 4, M_{age} = 29.85, $M_{wheelchairuse}$ = 15.00, $M_{sportsyears}$ = 10.25), para-badminton (n = 2, M_{age} = 32.54, $M_{wheelchairuse}$ = 10.50, $M_{sportsyears}$ = 6.50), para-arm-wrestling (n = 1, M_{age} = 42.42, $M_{wheelchairuse}$ = 26.00, $M_{sportsyears}$ = 9.00), para-shooting (n = 1, M_{age} = 44.08, $M_{wheelchairuse}$ = 30.00, $M_{sportsyears}$ = 17.00), and boccia (n = 1, M_{age} = 45.50, $M_{wheelchairuse}$ = 9.00, $M_{sportsyears}$ = 9.00), as displayed in figure 4.6.

Table 4.14 presents descriptive statistics of athletes with congenital and acquired disabilities who use wheelchairs in terms of age, the duration of wheelchair use, and the years active in sports. Since the distributions of branches were not equal in both groups, interpretations based on these values would be wrong. For a better comparison, it would be more appropriate to compare athletes with congenital and acquired disabilities according to gender.

Table 4.14

Descriptive Statistics of Athletes with Congenital and Acquired Disabilities by Branches

		N	M_{age}	$M_{wheelchairuse}$	$M_{sportsyears}$
Congenital	Wheelchair Basketball	23	26.53	15.35	7.87
	Para-Archery	2	33.12	18.00	14.00
	Disabled Table Tennis	12	24.17	15.92	9.25
	Para-Badminton	2	29.42	8.50	12.50
	Para-arm-wrestling	2	23.12	11.50	8.50
	Sitting Volleyball	1	37.17	36.00	14.00
	Swimming	2	22.33	6.50	6.50
	Boccia	2	30.96	26.00	3.50
	Total	46	26.42	15.67	8.61
Acquired	Wheelchair Basketball	31	36.80	15.29	13.29
	Para-Archery	14	38.67	13.07	6.93
	Disabled Table Tennis	4	29.85	15.00	10.25
	Para-Badminton	2	32.54	10.50	6.50
	Para-arm-wrestling	1	42.42	26.00	9.00
	Para-Shooting	1	44.08	30.00	17.00
	Boccia	1	45.50	9.00	9.00
	Total	54	37.01	14.87	11.07

The groups were compared according to gender, as seen in table 4.15. While there were 18 females (M_{age} = 27.30, $M_{wheelchairuse}$ = 18.94, $M_{sportsyears}$ = 9.22) and 28 males (M_{age} = 25.86, $M_{wheelchairuse}$ = 13.57, $M_{sportsyears}$ = 8.21) in the athletes with congenital disabilities, there were 13 females (M_{age} = 32.51, $M_{wheelchairuse}$ = 13.08, $M_{sportsyears}$ = 6.31) and 41 males (M_{age} = 38.44, $M_{wheelchairuse}$ = 15.44, $M_{sportsyears}$ = 12.59) in the athletes with acquired disabilities. As a result, the two groups had similar characteristics regarding wheelchair use and active years in sports, except for age.

In general, athletes with acquired disabilities (M = 37.01, SD = 10.49) were older than athletes with congenital disabilities (M = 26.42, SD = 6.94). However, it was not expected that athletes with congenital disabilities (M = 15.67, SD = 8.87) had been using wheelchairs slightly longer than athletes with acquired disabilities (M = 14.87, SD = 9.72). Since they were born disabled, their mean wheelchair usage time was expected to be much longer than athletes with acquired disabilities. Still, athletes with congenital disabilities (M = 8.61, SD = 6.15) had been doing sports longer than athletes with acquired disabilities (M = 11.07, SD = 6.79).

Table 4.15

Descriptive Statistics of Athletes with Congenital and Acquired Disabilities by Gender

Disability type	*Gender*	*N*	*%*	M_{age}	$M_{wheelchairuse}$	$M_{sportsyears}$
Congenital	Female	18	39.13	27.30	18.94	9.22
	Male	28	60.87	25.86	13.57	8.21
	Total	46	100.0	26.42	15.67	8.61
Acquired	Female	13	24.07	32.51	13.08	6.31
	Male	41	75.93	38.44	15.44	12.59
	Total	54	100.0	37.01	14.87	11.07
Total	Female	31	31.0	29.48	16.48	8.00
	Male	69	69.0	33.33	14.68	10.81
	Total	100	100.0	32.14	15.24	9.94

4.2.3.2.Means of WUSPI, PASIPD, and SF-12

According to table 4.16, athletes with congenital disabilities (M_{WUSPI} = 15.00, SD_{WUSPI} = 19.97; M_{PCS} = 64.13, SD_{PCS} = 18.89; M_{MCS} = 65.79, SD_{MCS} = 15.59) had considerably less shoulder pain and a better quality of life than athletes with acquired disabilities (M_{WUSPI} = 28.52, SD_{WUSPI} = 31.85; M_{PCS} = 28.52, SD_{PCS} = 31.85; M_{MCS} = 59.26, SD_{PCS} = 18.00). However, athletes with congenital disabilities (M_{PASIPD} = 25.28, SD_{PASIPD} = 16.95) were slightly less active than athletes with acquired disabilities (M_{PASIPD} = 28.54, SD_{PASIPD} = 21.97).

Table 4.16

WUSPI, PASIPD, and SF-12 Means for Congenital and Acquired Disabled Athletes

		N	*M*	*SD*
WUSPI	Congenital	46	15.00	19.97
	Acquired	54	28.52	31.85
PASIPD	Congenital	46	25.28	16.95
	Acquired	54	28.54	21.97
PCS	Congenital	46	64.13	18.89
	Acquired	54	53.42	16.36
MCS	Congenital	46	65.76	15.59
	Acquired	54	59.26	18.00

4.2.3.3.Mann-Whitney U test results for shoulder pain differences

The Mann-Whitney U test was used to compare shoulder pain between manual wheelchair user athletes with congenital and acquired disabilities.

4.2.3.4.Assumptions of Mann-Whitney U test

The main assumptions of the Mann-Whitney U test are independent observation and non-normal distribution. In this study, there is no dependency on the scores between observations.

4.2.3.5.Non-Normality

For normality, the values for skewness and kurtosis should be between -3 and 3 and close to zero. For athletes with congenital disabilities, the skewness was 2.84 (*SE* = .35), and the kurtosis was 11.21 (*SE* = .69). Moreover, for athletes with acquired disabilities, the skewness was 1.46 (*SE* = .32), and the kurtosis was 1.54 (*SE* = .64). Hence, there was a non-normal distribution.

4.2.3.6.Result of the Mann-Whitney U test

According to the Mann-Whitney U test results, the *p*-value was found as .024, which means that there is a significant difference in shoulder pain between athletes with congenital (Median = 8.50, *n* = 46) and acquired disabilities using manual wheelchairs (Median = 16.50, *n* = 54, *U* = 915.500, *z* = -2.263, *p* = .024, r = 0.23). Hence, the null hypothesis was not rejected.

4.3. Research Question 5

How has the duration of the pandemic affected the participation of athletes using manual wheelchairs in physical activity?

4.3.1. Physical activity participation of manual wheelchair user athletes during the pandemic

As described previously in table 3.6, 17% of the participants had a covid-19 disease before participating in the study. It had been 9.71 months (*SD* = 4.96), ranging from one to eighteen months, since they got over the disease. Also, 3% were still suffering from the COVID-19 disease when they participated in the study.

39% of the participants pointed out that they could train regularly during the pandemic, while 61% could not. Those who could train regularly were asked where they could train and were allowed to tick more than one option. As seen in table 4.17, 39 participants selected 48 options in total. Sports clubs (*n* = 16), municipal sports centers (*n* = 11), private sports clubs (*n* = 11), open-air (*n* = 5), and other (*n* = 5) were preferred most, respectively. No one specified what the other was. Also, 72% of the participants stated that the curfew had prevented them from training.

Table 4.17

Frequencies of Exercise Places Preferred

	N	*%*
Municipal Sports Center	11	22.9
Sport Club	16	33.3
Private Gym	11	22.9
Open Air	5	10.4
Other	5	10.4
Total	48	100.0

60% of the participants reported that they could do exercise at home during the curfew, but 40% did not. Table 4.18 summarizes the frequencies of indoor exercises during the curfew. In total, 60 participants selected 171 options. Physical fitness (n = 43), stretching (n = 41), flexibility (n = 40), resistance (n = 29), and balance exercises (n = 14) were preferred most, respectively. The remaining participants who marked the other option (n = 4) did not specify what exercise was.

Table 4.18

Frequencies of Exercises Done at Home During Curfew

	N	*%*
Physical Fitness	43	25.1
Flexibility exercises	40	23.4
Stretching exercises	41	24.0
Resistance exercises	29	17.0
Balance exercises	14	8.2
Other	4	2.3
Total	171	100.0

4.4. Summary of Results

This section contains specific information about this study. Firstly, Pearson correlation coefficient results indicated a significant positive correlation between the WUSPI score and PASIPD score of manual wheelchair user athletes. On the other hand, there was a significant negative correlation between the WUSPI and PCS scores of manual wheelchair user athletes. However, the WUSPI score was not correlated with the MCS score. Furthermore, the PASIPD score did not correlate with either PCS or MCS scores.

In addition, the results of the Mann-Whitney U test revealed that there was no difference in shoulder pain between overhead and non-overhead sports and between individual and team sports. Nevertheless, there was a significant difference in athletes with congenital and acquired disabilities in terms of shoulder pain.

Lastly, descriptive statistics showed that the pandemic had prevented disabled athletes from training regularly. Some of them were able to train thanks to sports clubs, municipal sports centers, and private sports clubs. It turned out that the most common exercises at home during the curfew were physical fitness, stretching, flexibility, and resistance exercises, respectively.

CHAPTER 5

DISCUSSION AND CONCLUSION

This chapter discusses the results of the study for each research question. At the end of this chapter, the study's implications and recommendations for future research will be provided.

5.1. Correlation Between Shoulder Pain, Physical Activity Level, and Quality of Life in Manual Wheelchair User Athletes

The study's results indicated that there was a significant correlation between WUSPI and PASIPD scores, and a significant negative correlation was found between WUSPI and PCS scores. On the other hand, WUSPI was not significantly correlated to MCS. Furthermore, PASIPD had no significant correlation with PCS and MCS scores.

The studies conducted with only non-athletic wheelchair users showed that the WUSPI score is inversely related to the PASIPD score (Gutierrez et al., 2007; Stirane et al., 2012). For the effect of physical activity on shoulder pain, other studies compared shoulder pain between athletic and non-athletic wheelchair users. Soo Hoo et al. (2021) found that wheelchair users had more rate of shoulder pain (32.5%) than non-wheelchair users (0%). It could be understood that shoulder pain is a problem due to using a wheelchair. Also, they found that non-athletic wheelchair users (50%) had more rate of shoulder pain than wheelchair athletes (29.4%) despite a non-significant difference. In a previous study, Fullerton et al. (2003) found that non-athletic wheelchair users had almost twice shoulder pain intensity as athletic wheelchair users. After those studies, the relationship between shoulder pain and physical activity become the main focus of the subsequent studies. It was revealed that lower physical activity levels were correlated with higher intensity of shoulder pain significantly (Gutierrez et al., 2007; Stirane et al., 2012). This means that sports participation has a

reducing effect on shoulder pain in the literature. However, Patel et al. (2015) found no significant differences in PASIPD scores between the pain group and the no pain group and no correlation between shoulder pain and physical activity level but had a small positive relationship. They explained that the mean score of WUSPI was not so high to prevent participation in physical activity. In order for shoulder pain to be inversely related to physical activity, it must reach a certain threshold value. Therefore, the expected result from this study was an inverse relationship between the WUSPI score and the PASIPD score. However, the current study was conducted during the pandemic period, and there are a couple of studies about this topic during the same period. In a recent study, although it was reported that the severity of shoulder pain increased and the number of transfers decreased with less daily wheelchair use during the lockdown when a comparison was requested compared to the pre-pandemic period, no significant relationship was found between the level of physical activity and the severity of shoulder pain (Warner, Mason, Goosey-Tolfrey, & Webborn, 2022). On the other hand, in the current study, there is a significant positive correlation between the scores of WUSPI and PASIPD.

One reason for this result is that PASIPD Cronbach's Alpha score was around 0.7 due to various measurements (de Groot et al., 2010; van der Ploeg et al., 2007; Washburn et al., 2002). It may be that this scale is not suitable enough for measuring the physical activity level of disabled athletes. Alternatively, some questions might not be clear, and explanations cannot be requested since the study was conducted online. For example, the question of whether they have worked as a volunteer in the last week may require an explanation. In addition, Patel et al. (2015) argue that the limitation of PASIPD is that it uses an average MET value for each activity, which does not distinguish preciously how the activity actually is performed. For this reason, it causes similar scores to be obtained for people who may have performed the activity at quite different levels of intensity and difficulty. Perhaps more reliable results would have been obtained if the objective instrument tools like an accelerometer were used to calculate the MET score or if another measurement tool with higher reliability should be used.

Furthermore, there is a negative correlation between the scores of WUSPI and PCS in the current study, but there is no correlation between the WUSPI score and the MCS

score. These results implied that shoulder pain causes a lower quality of life physically but not mentally. Still, the means of both the PCS and MCS scores were low in the current study. It was determined that lower quality of life was significantly correlated with higher intensity of shoulder pain in the literature (Gutierrez et al., 2007; Stirane et al., 2012). Even though Patel et al. (2015) found that shoulder pain intensity was not significantly correlated with quality of life, those without shoulder pain had a significantly better quality of life scores of PCS and MCS than those with shoulder pain in their study. They concluded that it could be because the average hours of wheelchair use per day in their study were 3.49, but it was 11.8 hours in the study of Stirane et al. (2012). In this case, it may be necessary that a certain period of daily wheelchair use has passed in order for shoulder pain to affect the quality of life adversely. Future studies may look at whether there is a correlation in line with certain parameters like hours of wheelchair use per day.

Lastly, there was no correlation between physical activity and quality of life in manual wheelchair user athletes. In the literature, McVeigh, Hitzig, and Craven (2009) found that quality of life was higher in athletic wheelchair users with SCI than in non-athletic wheelchair users with SCI. Based on interviews, Giacobbi et al. (2008) listed the benefits of physical activity participation on quality of life as psychological benefits, social opportunities, physical health, social influences, and augmented entire quality of life. Although there is a low quality of life that is inversely proportional to shoulder pain and a level of physical activity that is directly proportional, the reason why there is no correlation between physical activity and quality of life may be because both quality of life scores, PCS and MCS, are generally low. The reason for this situation may be the psychological side effects of staying at home during the pandemic.

5.2. Shoulder Pain Differences According to Sports Categories and Type of Physical Disability in Manual Wheelchair User Athletes

Shoulder pain differences were analyzed based on dual groups of overhead and non-overhead sports, individual and team sports, and athletes with congenital and acquired disabilities using manual wheelchairs in this study.

5.2.1. Shoulder pain differences in overhead and non-overhead sports

The study's outcomes denoted that there was no significant difference in shoulder pain between overhead and non-overhead sports disabled athletes using wheelchairs.

Although the wheelchair user population suffers from shoulder pain due to overload on the shoulder (Curtis et al., 1995), the thought that overhead movements in sports would increase shoulder pain could not be proven (Heyward et al., 2017). This may be because the increased workload cannot be separated into daily life activities or sports activities. Athletes with disabilities engaged in non-overhead sports may be performing overhead movements in their daily lives where they raise their arms above their heads, just like overhead athletes. In this case, the reason why there is no significant difference between the overhead athletes and the non-overhead athletes is due to the indefinitely increased workload and the inability to determine and ask the compelling movements exactly.

Although female overhead athletes were younger than other athletes and had been using wheelchairs for longer in this study, the reason why they were less active in sports than other athletes may be that there are not enough disabled sports clubs in their area or that overhead sports can be more challenging for them when using a wheelchair. That is because female non-overhead athletes had the highest average time since they have been active in the sport. It could be implied that non-overhead sports might be more appropriate for female athletes using manual wheelchairs.

The reason why overhead sports are considered a risk factor for shoulder pain is that the overhead throw is the most dangerous maneuver for the body. The shooter needs to strike a delicate balance between the power produced by their lower extremities and trunk to accelerate the ball and enough laxity for extreme range of motion and adequate stability to prevent instability and subluxation. At the same time, their arm tries to distribute this power with their shoulder muscles and capsules as their arm slows down after throwing the ball. That delicate balance is called the "throwers paradox" (Seroyer et al., 2009).

For the first time in the literature, Jobe, Kvitne, and Giangarra (1989) explain the mechanism of the possible cause of shoulder pain in overhead (volleyball, tennis, etc.)

or throw sports (baseball, cricket, etc.) athletes. They consider that repetitive and high-energy pressures passing through the shoulder result in chronic stresses on the shoulder's stabilizing mechanism. This chronic stress makes the static stabilizers of the shoulder hyperelastic and causes the subluxation of the anterior glenohumeral for athletes involved in overhead or throwing sports. Seroyer, Nho, Bach, Bush-Joseph, Nicholson, and Romeo (2009) suggest that the disruption of the shoulder's stabilizing mechanism interrupts the energy transfer in the kinetic chain. This could cause scapular dyskinesis (Pribicevic, 2012, October 24).

Soo Hoo et al. (2021) compared shoulder pain according to sports branches. According to the results, wheelchair basketball players (n = 8, M = 17.2, SD = 21.8) had more shoulder pain than hand-cycling (n = 8, M = 4.91, SD = 8.32), sled hockey (n = 9, M = 7.76, SD = 13.1), and quad rugby (n = 9, M = 4.29, SD = 7.75) players. They concluded that athletes involved in overhead sports are at risk for shoulder pain. However, the number of players for each branch was not enough compared to this study. Therefore, if they had found for participants to join their study, their results could have been different.

In this study, the reason why the overhead athletes did not have shoulder pain, with a significant difference from the non-overhead athletes, may be because the participants were not divided into active and passive. Although the study started at the beginning of the leagues, it was not possible for the sports clubs, which were closed during the pandemic period, to return to their pre-pandemic order and do regular training.

Another reason might be that wheelchair basketball players make up the majority of overhead athletes in this study. While it was reported the shoulder pain of wheelchair tennis and wheelchair volleyball players in the literature, these sports could not be included in this study. Reeser, Verhagen, Briner, Askeland, and Bahr (2006) state that shoulder pain, which is the third most common problem in both male and female wheelchair volleyball players and the second problem due to overuse, constitutes 8-20% of volleyball injuries. However, the contact information of the wheelchair volleyball teams was not given by the federation, and sitting volleyball players who currently use a wheelchair are infrequent in Turkey. Wheelchair fencing and wheelchair tennis players were also not available due to the exact reason for this study.

That is why future studies should be careful to include different branches for comparison.

One last important fact is that the subject of this study is manual wheelchair user athletes, not wheelchair athletes. All branches of adaptive sports whose players had agreed to participate in this study were included, but wheelchairs are not used in those branches for racing. Perhaps, using a wheelchair during the competition would be more complex and causes overload and constant stress on the shoulder because, in addition to sports movements, the workload of pushing the wheelchair will also be on the shoulders. For this reason, future studies might compare the difference in shoulder pain between different adaptive overhead sports branches that required wheelchairs or not.

5.2.2. Shoulder pain differences in individual and team sports

The results revealed that there was no significant difference between individual and team sports players using wheelchairs in terms of shoulder pain.

The reason may be because there are just two branches in the team sports group due to the small number of team sports clubs other than wheelchair basketball in Turkey. Considering that wheelchair basketball players in this study constitute 54 of the 55 participants in the team sports subgroup, the total number of wheelchair basketball clubs in Turkey is more than all individual sports clubs. In order to form a team, a minimum number of players is needed according to each branch, and if this number cannot be completed, the team cannot be formed, and the players cannot enter the leagues.

De Subijana, Galatti, Moreno, and Chamorro (2020) compared the athletic career of the non-disabled individual (n = 185) and team sports players (n = 225) who were formerly elite athletes from 32 Olympic sports branches. They found that individual sports players were more physically active and had a higher average of training hours than those involved in team sports. On the other hand, the physical activity levels of both groups were similar to each other in the current study, but there is no information about the training hours of the participants. Future studies may compare shoulder pain with that factor.

Boyd, Schary, Worthington, and Jenny (2018) found that team sports athletes experienced more flow than those involved in individual sports. Pluhar, McCracken, Griffith, Christino, Sugimoto, and Meehan (2019) found that individual sports athletes participate in sports for goal-oriented aims rather than for enjoyment like team sports athletes, and also, they are more prone to experience depression and anxiety than team sports athletes. Since mean scores of quality of life for both individual and team sports are close to each other in the current study, the psychological well-being of athletes did not make a difference.

Since the focus of the current study is shoulder pain, the participants were not asked about sports injuries past for the rest of their bodies. In a study of the frequency of sports injuries, the distribution of shoulder injuries in 85 athletes from seven branches was reported as 13% (Lemoyne, Poulin, Richer, & Bussières, 2017). Even though acute injuries experienced in team sports were more common than those in individual sports, they stated that overuse injuries in individual sports had a significantly higher degree than in team sports. Pasulka, Jayanthi, McCann, Dugas, and LaBella (2017) highlight that individual sports are primarily technical and require frequent repetition of sport-specific skills, but team sports need visual scanning of the field additionally. Franco, Madaleno, Paula, Ferreira, Pinto, and Resende (2021) explain this as all demand in individual sports is focused on a single athlete, but demand in team sports is distributed among teammates. Hence, future studies may compare even team players playing in the same branch with each other according to their positions in the team by considering this explanation,.

If the athletes were divided into elite and recreational, a critical result could have been obtained. There is no significant difference between the two groups when considering the age, duration of wheelchair use, years of active sports, physical activity, and quality of life. Thus, there is a vast diversity in individual and team sports, such as overhead, wheelchair, indoor, ball, athletics, or adaptive water sports. Future studies may separate the same type of branches as individual and team sports, then compare shoulder pain. There were not enough participants in the current study to compare shoulder pain between overhead individual and team sports or wheelchair individual and team sports.

5.2.3. Shoulder pain differences in athletes with congenital and acquired disabilities using manual wheelchairs

The findings of the study showed that there was a significant difference in shoulder pain between athletes with congenital and acquired disabilities who use wheelchairs. Shoulder pain in athletes with acquired disabilities was twice that of athletes with congenital disabilities.

The reason why less shoulder pain was seen in wheelchair-user athletes with congenital disabilities may be the development of their body compositions by adapting to their disability types. As a result of compensating for the deficiency of the lower extremities with the upper extremities, the shoulder joint could not adapt to this change, and shoulder pain may have occurred.

It has been considered in the literature that increased workload and repetitive stress on the shoulder cause shoulder pain in the wheelchair user population (Curtis et al., 1995). There is no certain definition for the increased workload, but it can be predicted that when a person who uses their legs while walking has to use a wheelchair and will have to cover the distance s/he travels by turning the wheels of the wheelchair with their arms. This will increase the workload on the upper extremity. Similarly, when going from a wheelchair to another place, such as going to the car, bed, or shower, or when going from the bed, shower, or car to the wheelchair, their own body will have to bear the weight. These transfers will cause a heavy load on their shoulders, like the weight of their own body. A person with a congenital disability will be accustomed to such situations, and their body structures will develop according to such workload. In other words, the concept of increased workload does not apply to people with congenital disabilities because there is no changing workload in their life. Since athletes with acquired disabilities have to do the work they do with their legs throughout their lives by pushing the wheelchair after they become disabled, an extra workload occurs on their upper extremities, and therefore, an overload occurs on their shoulders.

Another reason is that athletes with acquired disabilities may have started sports later than those with a congenital disability, or their adaptive sports career may have started later because they must have an existing disability to engage in disability sports. Those with a congenital disability already have a disability. However, those with acquired

disabilities become disabled later, and their sports careers start late. Dehghansai, Lemez, Wattie, and Baker (2017) confirmed that the severity of athletes' disabilities does not affect the onset of sports milestones. Also, they found that athletes with acquired disabilities reach most of the milestones in sports at an older age, while athletes with congenital disabilities reach sports milestones at a younger age. In the current study, the average of active years in sports for congenitally disabled athletes was slightly lower than for athletes with acquired disabilities, but those with acquired disabilities were relatively older than those with congenital disabilities. This means that probably all athletes reach most milestones in sports in the current study. Future studies may compare the correlation between shoulder pain and sports milestones.

5.3. Physical Activity Participation of Manual Wheelchair User Athletes During The Curfew

Based on the study's outcomes, COVID-19 conditions prevented manual wheelchair user athletes from training and caused low motivation in domestic exercises. Curfews may be the reason why the rate of survivors (80%) is so high. However, curfews also caused disabled athletes not to go to sports clubs and play sports, and as a result, most disabled sports clubs were closed during the pandemic period.

61% of the participants stated that they could not train regularly during the pandemic. The reason for those not being able to train outdoors may be curfews or avoiding the possibility of contagion of the coronavirus. Thanks to the sports clubs, municipal sports centers, and private sports clubs that remained open during the pandemic, the remaining 39% had the opportunity to train.

As indoor exercises, physical fitness, stretching exercises, and flexibility movements were frequently preferred by manual wheelchair user athletes. In this way, athletes had found a way to be physically active even if they were closed at home during the pandemic. The reason for this situation may be psychological side effects such as low motivation to stay at home constantly during the pandemic.

WHO (2020) recommends 150 to 300 minutes of moderate-intensity or 75 to 150 minutes of vigorous-intensity physical activity per week to see its optimum effect on mental health. One study that was conducted twice during the pandemic period is that

compared the impact of physical activity and the training routine on the mental health of the participants at the beginning of the pandemic and at the ending of the pandemic in Serbian (Sokić et al., 2021). The results indicated that at the beginning of the pandemic, elite athletes who decreased their training routine had lower anxiety than recreational athletes who decreased their training routine, too, or kept it the same. Even though both elite and recreational athletes had been better than non-athletic participants in terms of psychological well-being, the psychological well-being of all participants had diminished during the curfew compared to the pandemic's beginning. That is, the pandemic conditions and curfews in the world have affected the psychological well-being of elite and recreational athletes and non-athletes (Sokić et al., 2021).

5.4. Implications of the Study

This study has important implications for wheelchair user athletes, coaches, clinicians, and policymakers. The implications were listed as follows:

- Every athlete needs to learn prevention and strength programs against shoulder pain development. For instance, trainers, coaches, and physical education teachers should teach not to pass pre-workout warm-up and post-workout cool-down for wheelchair user athletes (Curtis et al., 1995).
- Coaches should consider the long-term effects of COVID-19 pandemics on wheelchair user athletes' mental and physical health while preparing for their training routine.
- After having an acquired disability, every disabled person using a manual wheelchair needs to learn how to adapt themselves to their new situation concerning wheelchair propulsion.
- Every clinician needs to evaluate the quality of life together with other variables in order to ensure that the individual with a disability is healthy.
- Coaches, clinicians, wheelchair user athletes, and their families should be aware of the underlying mechanism of sports injuries based on the types of sport so that necessary precautions should be taken before having sports injuries.

- During the strict regulations due to the COVID-19 pandemic period, the physical activity level of wheelchair user athletes seems to decrease. That is why policymakers should apply specific rules to ensure their physical activity participation keeps the same.

5.5. Recommendations for Future Studies

Future studies on shoulder pain, physical activity, and quality of life in manual wheelchair user athletes should pay attention to the following points:

- The area of shoulder pain perceived depends on the participant's perception, but the question of which parts of their shoulder hurt should be added to the questions of shoulder pain existence and scoring for shoulder pain as drawings in the shoulder pain questionnaires.
- The selection of instruments is crucial for this type of study. A couple of WUSPI questions are not suitable to be answered. The instruments used in the study should be appropriate based on the wheelchair user population's life situation. Different scales might be adapted for each adaptive sport due to physical demands.
- To determine physical activity level, the objective instrument tools, such as pedometer, accelerometer, heart rate monitors, or GPS, should be added to future studies.
- Since shoulder pain is multifactorial, different parameters such as the effects of age, gender, and the location of pain should be investigated for future research questions.
- The number of players from each branch should be close to each other in order to compare shoulder pain differences between them in future studies.
- Experimental studies might be designed to examine the role of physical activity on shoulder pain and quality of life for wheelchair user athletes in future studies.

- Qualitative information could be obtained from wheelchair user athletes to deeply analyze their sports experiences on shoulder pain, physical activity, and quality of life.

REFERENCES

Aytar, A., Zeybek, A., Pekyavas, N. O., Tigli, A. A., & Ergun, N. (2015). Scapular resting position, shoulder pain, and function in disabled athletes. *Prosthetics and Orthotics International*, *39*(5), pp. 390–396. Retrieved from https://doi.org/10.1177/0309364614534295

Bhandari, N. R., Kathe, N., Hayes, C., & Payakachat, N. (2018). Reliability and validity of SF-12v2 among adults with self-reported cancer. *Research in social & administrative pharmacy: RSAP*, *14*(11), pp. 1080–1084. https://doi.org/10.1016/j.sapharm.2018.01.007

Boyd, J., Schary, D., Worthington, A., & Jenny, S. (2018). An examination of the differences in flow between individual and team athletes. *Physical Culture and Sport. Studies and Research*, *78*(1), pp. 33-40. https://doi.org/10.2478/pcssr-2018-0011

Burnham, R. S., May, L., Nelson, E., Steadward, R., & Reid, D. C. (1993). Shoulder pain in wheelchair athletes. The role of muscle imbalance. *The American Journal of Sports Medicine*, *21*(2), pp. 238–242. https://doi.org/10.1177/036354659302100213

Campbell, E. (1995). Psychological well-being of participants in wheelchair sports: Comparison of individuals with congenital and acquired disabilities. *Perceptual and Motor Skills*, *81*(2), pp. 563–568. https://doi.org/10.1177/003151259508100241

Cooper, R. A., Quatrano, L. A., Axelson, P. W., Harlan, W., Stineman, M., Franklin, B., Krause, J. S., Bach, J., Chambers, H., Chao, E. Y., Alexander, M., & Painter, P. (1999). Research on physical activity and health among people with disabilities: A consensus statement. *Journal of Rehabilitation Research and Development*, *36*(2), pp. 142–154. Retrieved from https://www.rehab.research.va.gov/jour/99/36/2/cooper.pdf

Curtis, K. A., & Black, K. (1999). Shoulder pain in female wheelchair basketball players. *The Journal of Orthopedic and Sports Physical Therapy*, *29*(4), pp. 225–231. https://doi.org/10.2519/jospt.1999.29.4.225

Curtis, K. A., Roach, K. E., Applegate, E. B., Amar, T., Benbow, C. S., Genecco, T. D., & Gualano, J. (1995). Reliability and validity of the Wheelchair User's Shoulder Pain Index (WUSPI). *Paraplegia*, *33*(10), pp. 595–601. https://doi.org/10.1038/sc.1995.126

Curtis, K., Tyner, T., Zachary, L., Lentell, G., Brink, D., Didyk, T., Gean, K., Hall, J., Hooper, M., Klos, J., Lesina, S., & Pacillas, B. (1999). Effect of a standard exercise protocol on shoulder pain in long-term wheelchair users. *Spinal Cord, 37*, pp. 421–429. https://doi.org/10.1038/sj.sc.3100860

De Luigi, A., J. (2018). *Adaptive sports medicine.* Springer International Publishing AG. 10.1007/978-3-319-56568-2.

De Subijana, C. L., Galatti, L., Moreno, R., & Chamorro, J. L. (2020). Analysis of the athletic career and retirement depending on the type of sport: A comparison between individual and team sports. *International Journal of Environmental Research and Public Health, 17*(24), pp. 9265. https://doi.org/10.3390/ijerph17249265

Dehghansai, N., Lemez, S., Wattie, N., & Baker, J. (2017). Training and development of Canadian wheelchair basketball players. *European Journal of Sport Science, 17*(5), pp. 511-518, 10.1080/17461391.2016.1276636

Diaz, R., Miller, E. K., Kraus, E., & Frederickson, M. (2019). Impact of adaptive sports participation on quality of life. *Sports Medicine and Arthroscopy Review, 27*(2), pp. 73–82. https://doi.org/10.1097/JSA.0000000000000242

Dysterheft, J., Rice, I, Learmonth, Y., Kinnett-Hopkins, D., & Motl, R. (2017). Effects of daily physical activity level on manual wheelchair propulsion technique in full-time manual wheelchair users during steady-state treadmill propulsion, *Archives of Physical Medicine and Rehabilitation, 98*(7), pp. 1374-1381. https://doi.org/10.1016/j.apmr.2017.01.007.

Faul, F., Erdfelder, E., Lang, A. G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*(2), 175–191. Retrieved from https://doi.org/10.3758/bf03193146

Felce, D., & Perry, J. (1995). Quality of life: Its definition and measurement. *Research in Developmental Disabilities, 16*(1), pp. 51-74. https://doi.org/10.1016/0891-4222(94)00028-8.

Ferrara, M. S., & Davis, R. W. (1990). Injuries to elite wheelchair athletes. *Paraplegia, 28*(5), pp. 335–341. https://doi.org/10.1038/sc.1990.44

Feter, N., Calonego, C., Cavanhi, A. C., & del Vecchio, F. B. (2018). Wheelchair basketball: Fitness and quality of life. *European Journal of Adapted Physical Activity, 11*(1), pp. 1-5. 10.5507/euj.2018.001

Finley, M. A., & Rodgers, M. M. (2004). Prevalence and identification of shoulder pathology in athletic and nonathletic wheelchair users with shoulder pain: A pilot study. *Journal of Rehabilitation Research and Development, 41*(3B), pp. 395–402. https://doi.org/10.1682/jrrd.2003.02.0022

Franco, M., Madaleno, F., Paula, T., Ferreira, T., Pinto, R. Z., & Resende, R. A. (2021). Prevalence of overuse injuries in athletes from individual and team sports: A systematic review with meta-analysis and GRADE recommendations. *Brazilian Journal of Physical Therapy*, *25*(5), pp. 500-513. 10.1016/j.bjpt.2021.04.013.

Friedman, C., & VanPuymbrouck, L. (2021). Telehealth use by persons with disabilities during the COVID-19 pandemic. *International Journal of Telerehabilitation*, *13*(2). https://doi.org/10.5195/ijt.2021.6402

Fullerton, H. D., Borckardt, J., & Alfano, A. (2003). Shoulder pain: A comparison of wheelchair athletes and non-athletic wheelchair users. *Medicine & Science in Sports & Exercise*. *35*(12), pp. 1958-1961. 10.1249/01.MSS.0000099082.54522.55

Giacobbi, P. R., Jr, Stancil, M., Hardin, B., & Bryant, L. (2008). Physical activity and quality of life experienced by highly active individuals with physical disabilities. *Adapted physical activity quarterly: APAQ*, *25*(3), pp. 189–207. https://doi.org/10.1123/apaq.25.3.189

Gill, D. L., Hammond, C. C., Reifsteck, E. J., Jehu, C. M., Williams, R. A., Adams, M. M., Lange, E. H., Becofsky, K., Rodriguez, E., & Shang, Y. T. (2013). Physical activity and quality of life. *Journal of Preventive Medicine and Public Health*, *46*(1), pp. 28-34. http://dx.doi.org/10.3961/jpmph.2013.46.S.S28

Gómez, S. G., & Pérez-Tejero, J. (2017). Wheelchair basketball: influence of shoulder pain in sport skills. *Journal of Sport Psychology*. *26*(1). 45-49. Retrieved from https://www.researchgate.net/publication/317023407_Wheelchair_basketball_Influence_of_Shoulder_pain_in_sport_skills

Gómez, S. G., Pérez-Tejero, J., García, B., & Barakat, R. (2020). Validity and reliability of the shoulder pain index for wheelchair basketball players. *Revista de Psicología Del Deporte*, *29*, pp. 42–50. WOS:000615781000006

Greer, N., Balser, D., McKenzie, L., Nicholson, H., MacDonald, R., Rosebush, C., Senk, A., Tonkin, B., & Wilt, T. J. (2019, February). *Adaptive Sports for Disabled Veterans*. Department of Veterans Affairs (US). Retrieved from https://www.ncbi.nlm.nih.gov/books/NBK554909/

Gutierrez, D. D., Thompson, L., Kemp, B., & Mulroy, S. J., (2007). The relationship of shoulder pain intensity to quality of life, physical activity, and community participation in persons with paraplegia. *The Journal of Spinal Cord Medicine*, *30*(3), pp. 251–255. https://doi.org/10.1080/10790268.2007.11753933

Heyward, O. W., Vegter, R. J. K, de Groot, S., & van der Woude, L. H. V. (2017). Shoulder complaints in wheelchair athletes: A systematic review. *PLoS ONE 12(*11): e0188410. https://doi.org/10.1371/journal.pone.0188410

Individual sport. (n.d.). In *Definitions.net.* Retrieved May 20, 2022, from https://www.definitions.net/definition/individual+sport.

Jenkinson, C. (2020, May 6). Quality of life. In *Encyclopedia Britannica.* Retrieved October 30, 2021, from https://www.britannica.com/topic/quality-of-life

Jobe, F. W., Kvitne, R. S., & Giangarra, C. E. (1989). Shoulder pain in the overhand or throwing athlete. The relationship of anterior instability and rotator cuff impingement. *Orthopaedic Review. 18*(9), pp. 963-975. PMID: 2797861.

Lemoyne, J., Poulin, C., Richer, N., & Bussières, A. E. (2017). Analyzing injuries among university-level athletes: Prevalence, patterns and risk factors. *The Journal of the Canadian Chiropractic Association, 61*(2), pp. 88-95. Retrieved from https://pubmed.ncbi.nlm.nih.gov/28928492/

Lim, M.A., & Pranata, R. (2021). Sports activities during any pandemic lockdown. *Irish Journal of Medical Science, 190*, pp. 447–451. https://doi.org/10.1007/s11845-020-02300-9

McVeigh, S. A., Hitzig, S. L., & Craven, B. C. (2009). Influence of sport participation on community integration and quality of life: A comparison between sport participants and non-sport participants with spinal cord injury. *The Journal of Spinal Cord Medicine, 32*(2), pp. 115–124. https://doi.org/10.1080/10790268.2009.11760762

Merriam-Webster. (n.d.). Congenital. In *Merriam-Webster.com dictionary*. Retrieved April 25, 2022, from https://www.merriam-webster.com/dictionary/congenital

Merriam-Webster. (n.d.). Health. In *Merriam-Webster.com dictionary*. Retrieved October 31, 2021, from https://www.merriam-webster.com/dictionary/health

Merriam-Webster. (n.d.). Telehealth. In *Merriam-Webster.com dictionary*. Retrieved May 21, 2022, from https://www.merriam-webster.com/dictionary/telehealth

Mohseni-Bandpei, M. A., Keshavarz, R., Minoonejhad, H., Mohsenifar, H., & Shakeri, H. (2012). Shoulder pain in Iranian elite athletes: the prevalence and risk factors. *Journal of manipulative and physiological therapeutics*, *35*(7), 541–548. https://doi.org/10.1016/j.jmpt.2012.07.011

Ortega-Santiago, R., González-Aguado, Á. J., Fernández-de-Las-Peñas, C., Cleland, J. A., de-la-Llave-Rincón, A. I., Kobylarz, M. D., & Plaza-Manzano, G. (2020). Pressure pain hypersensitivity and referred pain from muscle trigger points in elite male wheelchair basketball players. *Brazilian Journal of Physical Therapy*, *24*(4), pp. 333–341. Retrieved from https://doi.org/10.1016/j.bjpt.2019.05.008

Overhead Sport. (n.d.) *Segen's Medical Dictionary*. (2011). Retrieved May 20 2022 from https://medical-dictionary.thefreedictionary.com/Overhead+Sport

Pasulka, J., Jayanthi, N., McCann, A., Dugas, L. R., & LaBella, C. (2017). Specialization patterns across various youth sports and relationship to injury risk. *The Physician and Sportsmedicine, 45*(3), pp. 344-352. 10.1080/00913847.2017.1313077

Patel, N., Patel, F., & Jadeja, T. (2015). To study the consequences of shoulder pain intensity on quality of life and physical activity in manual wheelchair users - A correlation study. *National Journal of Integrated Research in Medicine*, *6*(5), pp. 11–16. Retrieved from https://web.p.ebscohost.com/ehost/pdfviewer/pdfviewer?vid=0&sid=aded93f0-8dbe-48d6-bbc0-aadb0ad84b98%40redis

Perez-Tejero, J., Martinez-Sinovas, R., & Rossignoli, I. (2006). Shoulder pain in Spanish wheelchair basketball players. Proceedings of the 15th European Congress of Physical and Rehabilitation Medicine and 45th National Congress of the Spanish Society of Physical and Rehabilitation Medicine. Madrid, Spain.

Pérez-Tejero, J., & García-Gómez, S. (2019). Shoulder pain assessment in elite wheelchair basketball players. *Revista Andaluza de Medicina del Deporte. 12*. 99-102. 10.33155/j.ramd.2018.06.004.

Pluhar, E., McCracken, C., Griffith, K. L., Christino, M. A., Sugimoto, D., & Meehan, W. P., 3rd. (2019). Team sport athletes may be less likely to suffer anxiety or depression than individual sport athletes. *Journal of Sports Science & Medicine*, *18*(3), pp. 490–496. Retrieved from https://pubmed.ncbi.nlm.nih.gov/31427871/

Preedy V.R., & Watson R.R. (Eds.). (2010). Physical Component Summary. In: *Handbook of Disease Burdens and Quality of Life Measures*. Springer, New York, NY. https://doi.org/10.1007/978-0-387-78665-0_6349

Pribicevic, M. (2012, October 24). The epidemiology of shoulder pain: A narrative review of the literature. In S. Ghosh (Ed.). *Pain in perspective*. [Ebook]. (pp. 147-186). IntechOpen. https://doi.org/10.5772/52931

Pucci, G. C., Rech, C. R., Fermino, R. C., & Reis, R. S. (2012). Association between physical activity and quality of life in adults. *Revista de Saude Publica*, *46*(1), pp. 166–179. https://doi.org/10.1590/s0034-89102012000100021

Pucci, G., Reis, R. S., Rech, C. R., & Hallal, P. C. (2012). Quality of life and physical activity among adults: Population-based study in Brazilian adults. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation*, *21*(9), pp. 1537–1543. https://doi.org/10.1007/s11136-011-0083-5

Rajati, F., Ashtarian, H., Salari, N., Ghanbari, M., Naghibifar, Z., & Hosseini, S. Y. (2018). Quality of life predictors in physically disabled people. *Journal of Education and Health Promotion, 7*(61). 10.4103/jehp.jehp_115_17

Rejeski, W. J., & Mihalko, S. L. (2001). Physical activity and quality of life in older adults. *The Journals of Gerontology: Series A, 56*(2), pp. 23–35. https://doi.org/10.1093/gerona/56.suppl_2.23

Reeser, J. C., Verhagen, E., Briner, W. W., Askeland, T. I., & Bahr, R. (2006). Strategies for the prevention of volleyball related injuries. *British Journal Of Sports Medicine, 40*(7), pp. 594–600. https://doi.org/10.1136/bjsm.2005.018234

Salguero, A., Martínez-García, R., Molinero, O., & Márquez, S. (2011). Physical activity, quality of life and symptoms of depression in community-dwelling and institutionalized older adults. *Archives of Gerontology and Geriatrics, 53*(2), pp. 152-157. https://doi.org/10.1016/j.archger.2010.10.005

Scarpa, S. (2021). Exploring psychological well-being and bodily identities formation of youth sports adapted practitioners. Comparison of people with congenital and acquired disabilities. *Italian Journal of Health Education, Sports and Inclusive Didactics, 5*(2), pp. 127-138. https://doi.org/10.32043/gsd.v5i2.388

Seroyer, S. T., Nho, S. J., Bach, B. R., Bush-Joseph, C. A., Nicholson, G. P., & Romeo, A. A. (2009). Shoulder Pain in the overhead throwing athlete. *Sports Health, 1*(2), pp. 108–120. https://doi.org/10.1177/1941738108331199

Sokić, J., Popov, S., Dinić, B. M., & Rastović, J. (2021). Effects of physical activity and training routine on mental health during the COVID-19 pandemic and curfew. *Frontiers in Psychology, 12*(624035). https://doi.org/10.3389/fpsyg.2021.624035

Soo Hoo, J. A., Kim, H., Fram, J., Lin, Y. S., Page, C., Easthausen, I., & Jayabalan, P. (2021). Shoulder pain and ultrasound findings: A comparison study of wheelchair athletes, non-athletic wheelchair users, and nonwheelchair users. *PM & R: The Journal of Injury, Function, and Rehabilitation*, 10.1002/pmrj.12648.

Soysal Gündüz, Ö., Mutlu, S., Aslan Başlı, A., Gül, C., Akgül, Ö., Yılmaz, E., & Aydemir, Ö. (2021). Validation of the Turkish Form of Short Form-12 Health Survey Version 2 (SF-12v2). *Archives of Rheumatology*. 36.10.46497/ArchRheumatol.2021.8458.

Stirane, D., Kiukucane, E., Vetra, A., & Nulle A. (2012). The consequences of shoulder pain intensity on quality of life and community participation in paraplegic wheelchair users. *SHS Web of Conferences, 2*, p. 33. 10.1051/shsconf/20120200033

Stöppler, M. C. (2021, March 29). Shoulder pain. In *Medicinenet.* Retrieved October 31, 2021, from https://www.medicinenet.com/shoulder_pain/definition.htm

Team sport. (n.d.). In *Definitions.net.* Retrieved May 24, 2022, from https://www.definitions.net/definition/TEAM+SPORT.

The International Association for the Study of Pain. (2020, 16 July). *IASP announces revised definition of pain.* Retrieved October 31, 2021, from https://www.iasp-pain.org/publications/iasp-news/iasp-announces-revised-definition-of-pain/

Tsunoda, K., Mutsuzaki, H., Hotta, K., Tachibana, K., Shimizu, Y., Fukaya, T., Ikeda, E., & Wadano, Y. (2016). Correlates of shoulder pain in wheelchair basketball players from the Japanese national team: A cross-sectional study. *Journal of Back and Musculoskeletal Rehabilitation*, *29*(4), 795–800. https://doi.org/10.3233/BMR-160691

U.S. Department of Health and Human Services. (2018). *Physical activity guidelines for Americans*. (2nd ed.). Washington, DC: U.S. Department of Health and Human Services. Retrieved from https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf

Üstünkaya, O., Edeer, A.O., Donat, H., & Yozbatıran, N. (2007). Shoulder pain, functional capacity, and quality of life in professional wheelchair basketball players and non-athlete wheelchair users. *The Pain Clinic*. *19*. pp. 71-76. 10.1179/016911107X268657

Van den Akker, L. E., Holla, J. F. M., Dadema, T., Visser, B., Valent, L. J., de Groot, S., Dallinga, J. M., Deutekom, M., & WHEELS-study group. (2020). Determinants of physical activity in wheelchair users with spinal cord injury or lower limb amputation: perspectives of rehabilitation professionals and wheelchair users. *Disability and Rehabilitation*. *42*(14), pp. 1934-1941. DOI: 10.1080/09638288.2019.1577503

van der Ploeg, H. P., Streppel, K. R. M., van der Beek, A. J., Vollenbroek-Hutten, M., van Mechelen, W., & van der Woude, L. H. (2007). The Physical Activity Scale for Individuals with Physical Disabilities: Test-retest reliability and comparison with an accelerometer. *Journal of Physical Activity and Health*, *4*(1), pp. 96-100. Retrieved from https://doi.org/10.1123/jpah.4.1.96

Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Health benefits of physical activity: The evidence. *Cmaj*, *174*(6), pp. 801-809. https://doi.org/10.1503/cmaj.051351

Ware, J.E., Kosinski, M., & Keller, S.D. (1995). SF-12: How to score the SF-12 physical and mental health summary scales. (2nd ed, pp. 29-30). Boston, MA: The Health Institute, New England Medical Center.

Warner, M. B., Mason, B. S., Goosey-Tolfrey, V. L., & Webborn, N. (2022). Physical activity levels and shoulder pain in wheelchair users during COVID-19 restrictions, *Disability and Health Journal*, in press. https://doi.org/10.1016/j.dhjo.2022.101326

Washburn, R. A., Zhu, W., McAuley, E., Frogley, M., & Figoni, S. F. (2002). The physical activity scale for individuals with physical disabilities: development and evaluation. *Archives of physical medicine and rehabilitation*, *83*(2), 193–200. https://doi.org/10.1053/apmr.2002.27467

Wessels, K. K., Brown, J. L., Ebersole, K. T., & Sosnoff, J. J. (2013). Sex, shoulder pain, and range of motion in manual wheelchair users. *Journal of Rehabilitation Research and Development. 50,* pp. 351-356. 10.1682/JRRD.2011.02.0025.

World Health Organization. (2020, December 1). *Disability and health.* Retrieved October 30, 2021, from https://www.who.int/news-room/fact-sheets/detail/disability-and-health

World Health Organization. (2020). *Guidelines on physical activity and sedentary behavior*. Geneva: World Health Organization. License: CC BY-NC-SA 3.0 IGO. Retrieved from https://www.who.int/publications/i/item/9789240015128

World Health Organization. (2008, May 13). *Guidelines on the provision of manual wheelchairs in less resourced settings* [E-book]. World Health Organization.

World Health Organization. (2020, November 26). *Physical activity*. Retrieved October 31, 2021, from https://www.who.int/news-room/fact-sheets/detail/physical-activity

Yıldırım, N. Ü., Büyüköztürk, Ş., Bayramlar, K., Özengin, N., Külünkoğlu, B. A., & Çoban, Ö. (2019). Developing a shoulder pain scale for wheelchair basketball players. *Journal of back and musculoskeletal rehabilitation*, *32*(3), 479–485. https://doi.org/10.3233/BMR-181192

Yıldırım, N. Ü., Cömert, E., & Özengin, N. (2010). Shoulder pain: a comparison of wheelchair basketball players with trunk control and without trunk control. *Journal of Back and Musculoskeletal Rehabilitation*, *23*(2), 55–61. https://doi.org/10.3233/BMR-2010-0250

APPENDICES

A. APPROVAL OF THE METU HUMAN SUBJECTS ETHICS COMMITTEE

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

DUMLUPINAR BULVARI 06800
ÇANKAYA ANKARA/TURKEY
T: +90 312 210 22 91
F: +90 312 210 79 59
ueam@metu.edu.tr
www.ueam.metu.edu.tr

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

Sayı: 28620816 /

23 AĞUSTOS 2021

Konu : Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi : İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç. Dr. Irmak HÜRMERİÇ ALTUNSÖZ

Danışmanlığını yürüttüğünüz Hande Gül PANPALLI'nın "Pandemi Döneminde Tekerlekli Sandalye Kullanan Sporculardaki Omuz Ağrısı, Fiziksel Aktivite Düzeyi ve Yaşam Kalitesi Arasındaki İlişki" başlıklı araştırmanız İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **348-ODTU-2021** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

Prof.Dr. Mine MISIRLISOY
İAEK Başkan

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER

ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY

DUMLUPINAR BULVARI 06800
ÇANKAYA ANKARA/TURKEY
T: +90 312 210 22 91
F: +90 312 210 79 59
ueam@metu.edu.tr
www.ueam.metu.edu.tr

Sayı: 28620816 / 383

29 EYLÜL 2021

Konu : Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (İAEK)

İlgi : İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Doç.Dr. Irmak Hürmeriç ALTUNSÖZ

Danışmanlığını yürüttüğünüz Hande Gül PANPALLI'nın "Pandemi Döneminde Tekerlekli Sandalye Kullanan Sporculardaki OmuzAğrısı, Fiziksel Aktivite Düzeyi ve Yaşam Kalitesi Arasındaki İlişki" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve **383-ODTU-2021** protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

Dr.Öğretim Üyesi Ali Emre TURGUT
İAEK Başkan Vekili

B. TURKISH SPORTS FEDERATION OF PHYSICALLY DISABLED PERMISSION

Pandemi Döneminde Tekerlekli Sandalye Kullanan Sporculardaki Omuz Ağrısı, Fiziksel Aktivite Düzeyi ve Yaşam Kalitesi Arasındaki İlişki başlıklı araştırma/ çalışma TBESF Sağlık ve Eğitim kurulu tarafından uygun görülmüştür.

Ad-Soyad

Nevin ERGUN

Sağlık Kurulu Başkanı

İmza

C. INFORMED CONSENT FORM

1956
ORTA DOĞU TEKNİK ÜNİVERSİTESİ
MIDDLE EAST TECHNICAL UNIVERSITY
06531 ANKARA-TURKEY

Beden Eğitimi ve Spor Bölümü
Department of Physical Education and Sport

Tel: 90 (312) 210 4016
Faks: 90 (312) 210 7968

Katılımcı Onay Formu

Sayın Katılımcılar,

Bu araştırma, Orta Doğu Teknik Üniversitesi, Beden Eğitimi ve Spor Bölümü yüksek lisans öğrencisi Hande Gül Panpallı tarafından Doç. Dr. Irmak Hürmeriç Altunsöz danışmanlığındaki "Pandemi Döneminde Tekerlekli Sandalye Kullanan Sporculardaki Omuz Ağrısı, Fiziksel Aktivite Düzeyi ve Yaşam Kalitesi Arasındaki İlişki" başlıklı yüksek lisans tezi kapsamında yürütülmektedir. Bu form sizi araştırma koşulları hakkında bilgilendirmek için hazırlanmıştır.

Bu çalışmanın amacı nedir? Bu çalışmanın kavramsal amacı, TS kullanıcısı sporcuların yaygın bir problemi olan omuz ağrısına eşlik eden faktörleri (yaş, spor branşı, cinsiyet, fiziksel aktivite seviyesi, yaşam kalitesi, vb.) belirlemektir.

Sizden katılımcı olarak ne bekliyoruz?: Araştırmaya katılmayı kabul etmeniz durumunda yüz yüze görüşebilecek mesafedeyseniz yüz yüze, değilseniz mail veya Whatsapp üzerinden size gönderilecek anketleri doldurmanız beklenmekte. İsteğiniz durumunda telefon görüşmesi ile anketleri doldurmanıza yardımcı olunabilecektir.

Sizden alınan bilgiler ne amaçla kullanılacak?: Bu çalışmaya katılmak tamamen gönüllülük esasına dayalıdır. Anketlere vereceğiniz cevaplar kesinlikle gizli tutulacak olup bilimsel araştırma amacıyla kullanılacak ve sadece araştırmacı tarafından değerlendirilecektir. Sizden kimlik veya kurum belirleyici hiçbir bilgi **istenmemektedir.** Sağladığınız veriler gönüllü katılım formlarında toplanan kimlik bilgileri ile eşleştirilmeyecektir. Ancak arzu etmeniz durumunda, çalışmamızı tamamladıktan sonra size küçük bir hatıra yollamamız için anketlerin sonunda adresinizi verebilirsiniz.

Çalışmayı yarıda kesmek isterseniz ne yapmalısınız?: Çalışma, genel olarak kişisel rahatsızlık verecek sorular içermemektedir. Yine de herhangi bir nedenden ötürü kendinizi rahatsız hissederseniz cevaplama işini yarıda bırakabilirsiniz.

Bu çalışmayla ilgili daha fazla bilgi almak isterseniz: Araştırmayla ilgili sorularınızı aşağıdaki e-posta adresini kullanarak araştırmacıya yöneltebilirsiniz.

Saygılarımla,

Hande Gül Panpallı (Yüksek Lisans Öğrencisi)
Orta Doğu Teknik Üniversitesi,
Eğitim Fakültesi,
Beden Eğitimi ve Spor Bölümü, Ankara
e-posta: h_g_p_27_10@hotmail.com

Yukarıdaki bilgileri okudum ve bu çalışmaya tamamen gönüllü olarak katılıyorum.

Ad Soyad	Tarih	İmza
_____	---/----/-----	_____

Online katılanlar için:

☐**Okudum, onaylıyorum.**

D. INSTRUMENTS

ANKET SORULARI

Doğduğunuz ay ve yıl (Gün gerekmez):

Boy:

Kilo:

Spora aktif başladığınız yıl:

Engeliniz doğuştan mı?:

Covid-19 geçirdiniz mi?:

Geçirdiyseniz, hastalığı atlatmanızın üzerinden ne kadar zaman geçti?

Pandemi döneminde düzenli antrenman yapabildiniz mi?

Evetse, nerede antrenman yapıyorsunuz?

Sokağa çıkma yasağı antrenman yapmanıza engel oldu mu?

Sokağa çıkma yasağı sırasında ev içi ne gibi egzersizler yaptınız?

Yaşadığınız yer:

Eğitim durumunuz:

Demografik Bilgi Formu

KATILIMCI BİLGİLERİ:

1. Yaş:_

2. Cinsiyet: 1. Kadın
2. Erkek

3. Medeni Hal: 1. Bekar
2. Evli
3. Boşanmış
4. Ayrı
5. Dul

4. Dominant taraf: 1. Sol 2. Sağ

5. A. Kaç yıldır tekerlekli sandalye kullanıyorsunuz? _____yıl

B. Tekerlekli sandalye türü : 1. Manuel
2. Aktülü
3. Her ikisi

6. A. Tekerlekli sandalye kullanmanıza sebep olan tıbbi durumunuz nedir?

1.Omurilik Yaralanması
2. Çocuk Felci
3. Amputasyon
4. Spina Bifida
5. Diğer _____

B. Omurilik Yaralanması seviyesi (biliyorsanız)

1. Servikal _____
2. Torasik _____
3. Lomber _____
4. Sakral _____

1. Tam kesi
2. Yarı kesi
3. Bilmiyorum

7. Bir gün içinde ortalama kaç defa transfer gerçekleştiriyorsunuz?_____
(banyo,araba, yatak ve diğer transferler)

8. A. Temel uğraşınız nedir: (en çok zaman harcadığınız aktiviteyi veya mesleğinizi yazınız.)

1. Çalışan
2. Öğrenci
3. Gönüllü
4. Emekli
5. Diğer: _____

B. Haftada toplam kaç saat okulda/işte geçiriyorsunuz? _____saat

C. İlgilendiğiniz / lisanslı olduğunuz spor ya da sanat dalı/ dalları _____

D. Haftada toplam kaç saat spor ve boş zaman aktivitelerine katılarak harcıyorsunuz. _____saat

9. A. Araba kullanıyor musunuz? 1. Evet
2. Hayır

B.Evetse haftada kaç saat araba kullanıyorsunuz: ___saat

C. Evetse, hangi tür araç kullanıyorsunuz?1. Araba
2. Asansörlü minibüs
3. Asansörsüz minibüs
4. Kamyon/ pikap
5. Diğer_____

HASTALIK GEÇMİŞİ: (Aşağıdaki uygun cevapları işaretleyiniz)

1. Tekerlekli sandalye kullanmadan önce omuz ağrınız var mıydı? 1.Evet 2.Hayır evetse hangi omuz? 1.Sol 2. Sağ 3. Her ikisi

2. Tekerlekli sandalye kullandığınız süre içinde omuz ağrısı yaşadınız mı? 1.Evet 2.Hayır evetse hangi omuz? 1.Sol 2. Sağ 3. Her ikisi

3. Herhangi bir omuz ameliyatı geçirdiniz mi? 1.Evet 2.Hayır evetse hangi omuz? 1.Sol 2. Sağ 3. Her ikisi

4. Son zamanlarda omuz ağrısı yaşıyor musunuz? 1.Evet 2.Hayır evetse hangi omuz? 1.Sol 2. Sağ 3. Her ikisi

5. Omuz probleminiz için tıbbi müdahaleye başvurdunuz mu? 1. Evet 2. Hayır evetse kime başvurdunuz? 1 Doktor 2 Fizyoterapist 3 Karyopraktör 4 Diğer:

6. Omuz ağrınızı gidermek için hangilerini kullandınız?
1. Buz
2. Sıcak
3. Egzersiz
4. İlaç
5. İstirahat
6. Hiçbiri
7. Diğer: _____

7.Geçen hafta boyunca omuz ağrınız sıradan aktivitelerinizi yapmanızı kısıtladı mı? 1. Evet 2. Hayır

8. Tekerlekli sandalye kullandığınız süre içinde el veya dirsek ağrısı ya da yaralanması yaşadınız mı? 1. Evet 2. Hayır

Aşağıdaki aktivitelerle ağrı düzeyinizi tahmin etmek için ölçek üzerine bir "X" yerleştirin. Geçtiğimiz hafta etkinlik yapılmadıysa, sağ taraftaki onay kutusunu işaretleyin.
Geçtiğimiz haftaki deneyimlerinize dayanarak, aşağıdaki aktiviteleri yaparken ne kadar omuz ağrısı yaşıyorsunuz? Yapılamadı

1.Yataktan tekerlekli sandalyeye geçerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
2.Tekerlekli sandalyeden arabaya geçerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
3.Tekerlekli sandalyeden küvete veya duşa geçerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
4.Tekerlekli sandalyenizi arabaya yüklerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
5.Tekerlekli sandalyenizi 10 dakika veya daha fazla iterken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
6.Rampa veya eğimli dış yüzeylerde yukarı çıkarken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
7.Baş üstü seviyesindeki bir raftan eşya indirirken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
8.Pantolon giyerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
9.Tişört veya kazak giyerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
10.Düğmeli gömlek giyerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
11.Sırtınızı yıkarken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
12.Okulda veya işte her zamanki günlük işlerinizde	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
13.Araba sürerken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
14. Ev işlerini yaparken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]
15.Uyurken	Ağrı Yok [ ]	_____	Yaşanmış En Kötü Ağrı	[ ]

FİZİKSEL ENGELLİ BİREYLER İÇİN FİZİKSEL AKTİVİTE ÖLÇEĞİ

Talimatlar: Bu anket şu anki fiziksel aktivite ve egzersiz seviyenizle ilgilidir. Lütfen doğru ya da yanlış cevap olmadığını unutmayın. Sadece sizin mevcut aktivite seviyenizi değerlendirmemiz bizim için yeterlidir.

Boş zaman aktiviteleri

1. Okuma, TV izleme, bilgisayar oyunları oynama ya da el işleri yapma gibi sabit aktivitelerle geçtiğimiz 7 gün boyunca ne sıklıkla meşgul oldunuz?

• Hiçbir zaman (2. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Bu aktiviteler nelerdi?

Bu *sabit aktiviteler* için günde ortalama kaç saat harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

2. Geçtiğimiz 7 gün boyunca ne sıklıkla yürüdünüz, tekerlekli sandalye sürdünüz ve özellikle egzersiz yapmak için evinizin dışına çıktınız? Örneğin, işe ya da okula gitmek, köpek ile alış verişe gitmek ya da diğer günlük işler?

• Hiçbir zaman (3. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi *tekerlekli sandalye sürmek ya da evinizin dışında* geçirdiniz?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

3. Bowling oynamak, golf arabasıyla golf oynamak, avlanmak veya balık tutma, dart, bilardo veya Amerikan bilardosu oynamak, tedavinize yönelik egzersizler (fizik tedavi veya meşguliyet tedavisi, germe, ayakta durma masası kullanma) gibi hafif spor veya eğlenceli aktiviteleri veya diğer benzer aktiviteleri geçtiğimiz 7 gün boyunca ne sıklıkla gerçekleştirdiniz?

• Hiçbir zaman (4. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Bu aktiviteler nelerdi?

Bu *hafif spor veya eğlenceli aktiviteler* için günde ortalama kaç saat harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

4. Çiftli tenis, softbol, golf arabası olmadan golf oynamak, salon dansı, tekerlekli sandalye sürmek veya eğlence için dışarı çıkmak gibi orta dereceli spor ve eğlenceli aktivitelerle veya benzeri aktivitelerle geçtiğimiz 7 gün boyunca ne sıklıkla meşgul oldunuz?

• Hiçbir zaman (5. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Bu aktiviteler nelerdi?

Bu *orta dereceli spor ve eğlenceli aktiviteler* için günde ortalama kaç saat harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

5.Tempolu koşu, tekerlekli sandalye yarışı (antrenman), araziye çıkma, yüzme, aerobik dans, kol yarışı, bisiklet (el veya bacak), tekli tenis, ragbi, basketbol oynama, koltuk değneği ve ya ortez ile yürüme gibi yorucu (şiddetli) spor ve eğlence aktivitelerle veya benzeri aktivitelerle geçtiğimiz 7 gün boyunca ne sıklıkla meşgul oldunuz?

• Hiçbir zaman (6. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Bu aktiviteler nelerdi?

Bu *yorucu(şiddetli) spor veya eğlenceli aktiviteler* için günde ortalama kaç saat harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

6. Geçtiğimiz 7 gün boyunca, ne sıklıkla ağırlık kaldırma, şınav çekme, barfiks çekme, dalma veya tekerlekli sandalye ile şınav çekme gibi özellikle kas kuvvetini ve dayanıklılığını arttıran herhangi bir egzersiz yaptınız?

• Hiçbir zaman (7. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Bu aktiviteler nelerdi?

Kas kuvveti ve dayanıklılığı artırmak için bu egzersizlere günde ortalama kaç saat harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

Evle ilgili aktiviteler

7. Toz alma, yerleri silme veya bulaşık yıkama gibi hafif ev işlerinden herhangi birini geçtiğimiz 7 gün boyunca ne sıklıkla yaptınız?

• Hiçbir zaman (8. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi *hafif ev işleri* yapmak için harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

8. Elektrik süpürgesi ile yerleri süpürme, ovalayarak yerleri silme, pencere veya duvar silme gibi ağır ev işlerini geçtiğimiz 7 gün boyunca, ne sıklıkla yaptınız?

• Hiçbir zaman (9. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi *ağır ev işleri* yapmak için harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

9. Marangozluk, boya yapma, mobilya tadilatı, elektrik işleri gibi ev tamiri işlerini geçtiğimiz 7 gün içerisinde, ne sıklıkla yaptınız?

• Hiçbir zaman (10. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi *ev tamir işleri* yapmak için harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

10. Çim biçme, yaprak veya kar temizleme, ağaç veya çalı budama, odun kesme gibi aktiviteleri içeren çim işleri veya bahçe bakım işlerini geçtiğimiz 7 gün boyunca, ne sıklıkla yaptınız?

• Hiçbir zaman (11. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi *bahçe işi* yapmak için harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

11. Geçtiğimiz 7 gün boyunca, ne sıklıkla açık hava bahçe işleri yaptınız?

• Hiçbir zaman (12. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi açık hava bahçe işleri yapmak için harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

12. Çocuk, engelli bir eş veya başka bir yetişkin gibi başka bir kişiye geçtiğimiz 7 gün boyunca, ne sıklıkla baktınız?

• Hiçbir zaman (13. soruya geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi başka bir kişiye bakmak için harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

İşle İlgili Aktiviteler

13. Geçtiğimiz 7 gün boyunca, ne sıklıkla ücretli ya da gönüllü olarak çalıştınız?

• Hiçbir zaman (Test sonuna geçin)

• Nadiren (1-2 gün)

• Ara sıra (3-4 gün)

• Sıklıkla (5-7 gün)

Günde ortalama kaç saatinizi ağırlıklı olarak hafif ofis işleri, bilgisayar işleri, hafif montaj işleri, otobüs veya minibüs sürmek gibi hafif kol aktiviteleri ile çoğunlukla oturarak yapılan aktivitelerde ücretli ve ya gönüllü çalışmak için harcadınız?

• 1 saatten az

• 1 saatten fazla fakat 2 saatten daha az

• 2-4 saat

• 4 saatten fazla

SF-12 YAŞAM KALİTESİ ÖLÇEĞİ

Bu soru formu size sağlığınızla ilgili görüşlerinizi sormaktadır. Bu bilgiler sizin nasıl hissettiğinizi ve her zamanki faaliyetlerinizi ne rahatlıkla yapabildiğinizi izlemekte yardımcı olacaktır. Bu formu doldurduğunuz için teşekkürler!

Aşağıdaki her soru için lütfen en uygun cevabın karsısındaki kutuyu ile işaretleyin.

1. Genel olarak sağlığınızı nasıl değerlendirirsiniz?

☐ Mükemmel[1] ☐ Çok iyi[2] ☐ İyi[3] ☐ Zayıf [4] ☐ Kötü [5]

2. Aşağıdakiler normal olarak gün içerisinde yapıyor olabileceğiniz bazı faaliyetlerdir. Şu sıralarda sağlığınız sizi bu faaliyetler bakımından kısıtlıyor mu? Kısıtlıyorsa ne kadar?

	Evet, oldukça kısıtlıyor	**Evet, biraz kısıtlıyor**	**Hayır, hiç kısıtlamıyor**
a. <u>Orta zorlukta faaliyetler,</u> örneğin masa kaldırmak, süpürmek, ya da bisiklete binme, yüzme gibi hafif spor yapmak	☐[1]	☐[2]	☐[3]
b. Birkaç kat merdiven çıkmak	☐[1]	☐[2]	☐[3]

3 <u>Geçtiğimiz 4 hafta boyunca,</u> isinizde veya diğer günlük faaliyetlerinizde, bedensel sağlığınız nedeniyle aşağıdaki sorunların herhangi biriyle zamanın ne kadarında karşılaştınız?

	Her Zaman	**Çoğu Zaman**	**Bazen**	**Seyrek Olarak**	**Hiç bir Zaman**
Yapmak istediğinizden daha Azını Yapabilmek.....	☐[1]	☐[2]	☐[3]	☐[4]	☐[5]
Yapabildiğiniz iş türünde ya da diğer faaliyetlerde kısıtlanmak.....	☐[1]	☐[2]	☐[3]	☐[4]	☐[5]

4. Geçtiğimiz 4 hafta boyunca işinizde veya diğer günlük faaliyetlerinizde duygusal problemler nedeniyle aşağıdaki sorunların herhangi biriyle ne kadar sıklıkta karsılaştınız (bunalım veya fazla heyecan hissetmek gibi)?

	Her zaman	**Çoğu zaman**	**Bazen**	**Seyrek olarak**	**Hiç bir zaman**
a. Yapmak istediğinizden daha azını yapabilmek.....	☐[1]	☐[2]	☐[3]	☐[4]	☐[5]
İs ya da diğer uğraşları her zaman gibi dikkatlice yapamamak……	☐[1]	☐[2]	☐[3]	☐[4]	☐[5]

5. Geçtiğimiz 4 hafta boyunca, ağrı normal isinize (ev dışında ve ev isinde) ne kadar engel oldu?

☐ Hiç olmadı[1] ☐ Biraz[2] ☐ Orta derecede[3] ☐ Epey[4] ☐ Çok fazla[5]

6. Aşağıdaki sorular geçtiğimiz 4 hafta boyunca kendinizi nasıl hissettiğinizle ve işlerin sizin için nasıl gittiğiyle ilgilidir. Lütfen, her soru için nasıl hissettiğinize en yakın olan cevabı verin. Geçtiğimiz 4 hafta içindeki sürenin ne kadarı-

	Her zaman	Çoğu zaman	Bazen	Seyrek olarak	Hiç bir zaman
a. Sakin ve huzurlu hissettiniz?....	☐[1]	☐[2]	☐[3]	☐[4]	☐[5]
b Çok enerjiniz oldu?.....	☐[1]	☐[2]	☐[3]	☐[4]	☐[5]
c. Çökkün ve kederli oldunuz?	☐[1]	☐[2]	☐[3]	☐[4]	☐[5]

7. Geçtiğimiz 4 hafta boyunca, bu sürenin ne kadarında bedensel sağlığınız ya da duygusal problemleriniz, sosyal faaliyetlerinize (arkadaş, akraba ziyareti gibi) engel oldu? Bu soruları cevapladığınız için teşekkürler!

☐ Her zaman[1] ☐ Çoğu zaman[2] ☐ Bazen[3] ☐ Seyrek olarak[4] ☐ Hiçbir zaman[5]

Çalışmamıza Verdiğiniz Katkılar İçin Teşekkür Ederiz…

E. CURRICULUM VITAE

HANDE GÜL PANPALLI

EDUCATION

2019 – still	Middle East Technical University, Ankara, Turkey Department of Physical Education and Sports, Ms.
2018 – still	Middle East Technical University, Ankara, Turkey Department of Chemistry Education, BA
2014 – 2018	Hacettepe University, Ankara, Turkey Department of Physical Therapy and Rehabilitation, BA
2010 – 2014	ISE Anatolian Teacher High School, Adana, Turkey

WORK EXPERIENCE

4-week volunteer internship at Hacettepe University, Swallowing Disorder Rehabilitation Unit

LANGUAGE SKILLS

English	YDS 59,75 YÖKDİL 79,75

ACADEMIC INTERESTS

Cardiopulmonary Rehabilitation

Physical Activity

Disabled Sports

Cystic Fibrosis

CERTIFICATES

2017 Training Certificate, Kinesio Taping Course by Ms. Pt. Erkan ALP

2018 Training Certificate, Upper Extremity Manual Therapy course by Ms. Pt. Erkan ALP

2018 Training Certificate, Clinical Pilates 1st stage course by Prof. Dr. Edibe ÜNAL

2019 Training Certificate, Clinical Pilates 2nd stage course by Prof. Dr. Edibe ÜNAL

ACADEMIC PUBLICATIONS

Correlates of Shoulder Pain in Wheelchair Basketball Players: A Systematic Review (in publishing)

The Postpartum Recovery of Athletes: A Systematic review (Co-author)

MEMBERSHIPS

Young TEMA Volunteer

Active Member of the Science Fiction and Fantasy Community, METU

EXTRACURRICULAR ACTIVITIES

Listening music

Reading novels

Knitting and Re-designing

Drawing

Playing bowling and billiard

F. TURKISH SUMMARY / TÜRKÇE ÖZET

PANDEMİ DÖNEMİNDE MANUEL TEKERLEKLİ SANDALYE KULLANICISI SPORCULARIN OMUZ AĞRISI, FİZİKSEL AKTİVİTE DÜZEYİ VE YAŞAM KALİTESİ İNCELENMESİ

GİRİŞ

Pandemi döneminde alınan önlemler ve uygulanan sokağa çıkma yasakları herkesin hayatını olumsuz etkilemiştir. Özellikle normal dönemde sokağa çıkmada, iş yerine gitmede ve spor yapmada sorun yaşayan engelli bireyler, pandemi döneminde iyice eve kapanmıştır. Pandemi döneminde alınan tedbirler gereği maçlar iptal edilmiş ve spor kulüpleri kapalı kalmıştır. Bu durumdan sporla ilgilenen engelli bireyler zarar görmüştür. Uzun süre devam eden kısıtlamalar sonucu Türkiye'deki pek çok spor kulübü kapanmıştır. Fiziksel aktivitesinde kısıtlanma olan bir engelli grubu tekerlekli sandalye kullanıcısı sporculardır.

Tekerlekli sandalye kullanan popülasyonun genel bir problemi omuz ağrısıdır (Curtis & Black, 1999). Omuz ağrısının çeşitli nedenleri vardır, ancak altında yatan mekanizmalar çeşitli araştırmalara rağmen kesin olarak belirlenmemiştir (Heyward et al., 2017). Genel sebep olarak tekerlekli sandalye kullanıcısının tekerleği itmesi için uyguladığı kuvvetin omuzlarına fazladan bir yük bindirdiği ve bu hareketin çok sık tekrarlanması sonucu omuz eklemi üzerinde tekrarlayıcı bir stres oluşturduğu düşünülmektedir (Curtis & Black, 1999). Yapılan çalışmalar sonucunda Tekerlekli Sandalye Kullananlarda Omuz Ağrı İndeksi geliştirilmiştir (Curtis, Roach, Applegate, Amar, Benbow, Genecco, & Gualano, 1995).

Omuz ağrısının fiziksel aktivite ile ilişkili olduğu sonucuna ulaşan çalışmalar (Fullerton et al., 2003; Üstünkaya et al., 2007; Soo Hoo et al., 2021) sebebiyle pandemi döneminde fiziksel olarak aktif kalma imkanı bulamayan engelli sporcuların omuz ağrısının arttığı düşünülmüştür. Ancak pandeminin ne zaman biteceği bilinmediği için pandemi öncesi ve sonrası omuz ağrısı değerlendirmesi mümkün olmamıştır. Bu sebeple tekerlekli sandalye kullanan sporcuların omuz ağrısı ile birlikte fiziksel aktivitesinin karşılaştırılarak aralarında bir ilişki olup olmadığına bakılmaya karar verilmiştir. Literatürdeki çalışmalarda fiziksel aktivitenin yaşam kalitesine olumlu etki ettiği, ancak omuz ağrısının yaşam kalitesine olumsuz etki ettiği saptanmıştır. Bu sebeple klinisyen bakış açısıyla yapılan bu çalışmada omuz ağrısı, fiziksel aktivite düzeyi ve yaşam kalitesi birlikte incelenmiştir.

Omuz ağrısı sadece sedanter yaşam sürdüren bireylerin yaşadığı bir problem değildir. Tekerlekli sandalye kullanan sporcular da omuz ağrısından mustariptir. Tekerlekli Sandalye Kullananlarda Omuz Ağrısı İndeksi kullanılarak yapılan çalışmalarda tekerlekli sandalye kullanıcısı sporcularda da omuz ağrısı saptanmış (Curtis & Black, 1999) ve sonraki çalışmalarda çeşitli faktörlerle karşılaştırma yapılarak altında yatan muhtemel sebepler ortaya konmaya çalışılmıştır. Tekerlekli sandalye kullanan sporcuların omuz ağrısının altında yatabilecek muhtemel faktörler olarak yaş, cinsiyet (Tsunoda et al., 2016; Wessels et al., 2013), tekerlekli sandalye kullanım süresi, omuz hareket açıklığı (Tsunoda et al., 2019; Wessels et al., 2013), spora katılım (Fullerton et al., 2003; Üstünkaya et al., 2007), gövde kontrolü (Yıldırım et al., 2010), spor türü (Aytar et al., 2015; Mohseni-Bandpei et al., 2012; Soo Hoo et al., 2021), ağrı hassasiyeti (Ortega-Santiago et al., 2020) ve fonksiyonel kapasite (Üstünkaya et al., 2007) üzerine çalışmalar yapılmıştır.

1.1 Çalışmanın Amacı

Çalışmanın ana amacı manuel tekerlekli sandalye kullanan sporcularda omuz ağrısı, fiziksel aktivite düzeyi ve yaşam kalitesi arasındaki bir ilişki olup olmadığını incelemektir. Çalışmanın diğer amaçları ise kafaüstü olan ve olmayan sporlar, engelli bireysel ve takım sporları, konjenital ve edinilmiş engeli olan sporcuların omuz ağrısını karşılaştırmaktır. Son olarak pandemi döneminde tekerlekli sandalye kullanan

sporcuların fiziksel aktiviteye katılımları ve sokağa çıkma yasaklarının antrenman yapmalarına etkisi incelenmiştir.

1.2 Araştırma Soruları

Araştırma soruları aşağıdaki gibidir:

1. Manuel tekerlekli sandalye kullanan sporcularda omuz ağrısı, fiziksel aktivite düzeyi ve yaşam kalitesi arasında anlamlı bir ilişki var mıdır?
2. Omuz ağrısı, manuel tekerlekli sandalye kullanan sporcularda spor kategorilerine ve fiziksel engel türüne göre farklılık gösterir mi?

2.1 Kafaüstü ve kafaüstü olmayan sporlarla ilgilenen tekerlekli sandalye kullanıcıları arasında omuz ağrısı açısından anlamlı bir fark var mıdır?

2.2 Bireysel ve takım sporlarıyla ilgilenen tekerlekli sandalye kullanıcıları arasında omuz ağrısından bakımından anlamlı bir fark var mıdır?

2.3 Doğuştan ve sonradan edinilmiş engeli bulunan tekerlekli sandalye kullanan sporcular arasında omuz ağrısı bakımından anlamlı bir fark var mıdır?

3. Pandemi döneminde tekerlekli sandalye kullanan sporcuların fiziksel aktiviteye katılımları nasıl olmuştur?

1.3 Çalışmanın önemi

Engelli bireyleri topluma kazandırmanın yollarından biri fiziksel aktiviteye katılımlarını sağlamaktır. Altyapısal sorunlar nedeniyle birçok şehirde protezi olan, koltuk değneği veya tekerlekli sandalye kullanan bireylerin çalışma hayatına ve sosyal aktivitelere katılmaları zordur. Bu sebeple fiziksel olarak aktif kalmaları için spora teşvik edilmeleri önemlidir. Engelli bireylerin spor yapmalarındaki engelleri kaldırmanın yollarından biri de günlük yaşantılarında mustarip oldukları veya spor esnasında yaşayabilecekleri spor yaralanmalarının ve diğer sağlık sorunlarının önüne geçmektir.

Bugüne kadar yapılan pek çok çalışmada tekerlekli sandalye kullanan sedanter veya fiziksel olarak aktif bir yaşam sürdüren bireylerin omuz ağrısından mustarip olduğu saptanmıştır. Sedanter bireylerle yapılan çalışmalarda yaşam kalitesine bakılsa da sporcularla yapılan çalışmalarda yaşam kalitesine bakılmamıştır. Üstelik bu çalışma pandemi döneminde yapılmıştır. Pandemi dönemi boyunca eve kapanan sporcuların

pandemi döneminin sonlarına doğru yaşadıkları omuz ağrısı, fiziksel aktiviteleri ve yaşam kaliteleri arasındaki ilişki hakkında bilgi verecektir.

YÖNTEM

2.1 Çalışmanın Yöntemi

Bu çalışmada nicel yöntem ve amaçlı örnekleme kullanılmıştır.

2.2 Örneklem

Çalışma için Türkiye Bedensel Engelliler Spor Federasyonu'ndan onay alınmıştır. Pandemi döneminin halihazırda devam etmesi ve COVID-19 bulaşma ve bulaştırma ihtimaline karşın çalışma amaçlı örneklem seçilmiştir. Federasyondan onay alındıktan sonra Türkiye'de bulunan tüm engelli spor kulüplerinin listesi alınmış ve kulüplerle iletişime geçilmiştir. Katılımcıların kişisel bilgileri istenmemiş, antrenörleri ile telefonda görüşülerek Whatsapp'tan gönderilecek olan anket formunu engelli sporcularla paylaşmaları istenmiştir. Ankara'da yaşayan katılımcılarla yüz yüze (n = 23) görüşme yapılmış, diğer illerde yaşayan katılımcılara (n = 77) antrenörleri aracılığı ile Whatsapp üzerinden anketin Google Form hali paylaşılmıştır. Google Form linkinin yanında duyuru metni de gönderilmiş, duyuru metninde araştırmacının adı, soyadı, mesleği, araştırma konusu paylaşılmıştır. Ayrıca katılımcılardan kimlik bilgisi, iletişim numarası vb. istenmediği ve gönüllüğün esas olduğu belirtilmiştir.

Çalışmaya dahil edilme kriteri manuel tekerlekli sandalye kullanmak ve sporcu olmaktır. Çalışmaya katılan bedensel engelli sporcular arasında elit veya rekreasyonel sporcu gibi ayrımlar yapılmamıştır. Gönüllülük esas olduğu için çalışmaya dahil edilecek engelli spor branşları çalışmaya katılmayı kabul eden sporculara göre değişmektedir.

2.3 Araçlar

2.3.1 Anket

Katılımcıların demografik bilgilerini elde etmek amacıyla doğduğu ay ve sene, eğitim, yaşanılan yer vb. bilgiler sorulmuş, ayrıca pandemi dönemi ve sokağa çıkma yasaklarının egzersiz akışkanlıklarına etkisi sorulmuştur.

2.3.2 Tekerlekli Sandalye Kullananlarda Omuz Ağrısı İndeksi (WUSPI-Tr)

60% of the participants reported that they could do exercise at home during the curfew, but 40% did not. Table 4.18 summarizes the frequencies of indoor exercises during the curfew. In total, 60 participants selected 171 options. Physical fitness (*n* = 43), stretching (*n* = 41), flexibility (*n* = 40), resistance (*n* = 29), and balance exercises (*n* = 14) were preferred most, respectively. The remaining participants who marked the other option (*n* = 4) did not specify what exercise was.

Curtis ve ark. (1995) tarafından geliştirilen Tekerlekli Sandalye Kullananlarda Omuz Ağrısı İndeksi, 15 çeşit günlük yaşam aktiviteleri esnasında tecrübe edilen omuz ağrısına 0'dan 10'a kadar puan verme imkanı sağlayan görsel analog skalası ile 0'dan 150'ye kadar puan aralığına sahiptir. Orijinal versiyonunun Cronbach's Alpha katsayısı .99 olarak hesaplanmıştır. (Curtis ve ark., 1995). Yılmaz (2017) tarafından Türkçe'ye WUSPI-tr kısaltmasıyla adapte edilmiştir. Türkçe versiyonunun Cronbach's Alpha katsayısı .89 olarak hesaplanmıştır.

2.3.3 Fiziksel Engelli Bireyler için Fiziksel Aktivite Skalası (FEBFAS)

Washburn, Zhu, McAuley, Frogley ve Figoni (2002) tarafından geliştirilen Fiziksel Engelli Bireyler için Fiziksel Aktivite Skalası (FEBFAS) son bir haftadaki fiziksel aktivite düzeyini belirleme aracıdır. 13 sorudan oluşmaktadır ve sorulara verilen cevaplarda o aktivitenin ne sıklıkta ve ne kadar yapıldığına göre belirli MET değerleri toplanarak 7 günün toplam MET skoru elde edilir. Van der Ploeg ve ark. (2007) tarafından akselerometreyle yapılan karşılaştırması sonucu Spearman korelasyonu .77 olarak hesaplanmıştır. Türkçe'ye Köçe (2019) tarafından çevrilmiştir. Türkçe versiyonunun Cronbach's Alpha katsayısı .72 olarak hesaplanmıştır.

2.3.4 Kısa Form-12 (KF-12)

Ware, Kosinski ve Keller (1995) tarafından geliştirilen Kısa Form-36'nın omurilik yaralanması olan bireyler için kısaltılmış versiyonudur. Bireylerin fiziksel (PCS) ve mental (MCS) yaşam kalitesi hakkında fikir sunan iki ayrı puan verir. Bhandari ve ark (2018) tarafından KS-12'nin 2. Versiyonunun Crpnbach's Aplha katsayıları sırasıyla .89 ve .88 olarak hesaplanmıştır. Soysal Gündüz, Mutlu, Aslan Başlı, Gül, Akgül, Yılmaz ve Aydemir (2021) tarafından Türkçe'ye çevrilmiştir. Türkçe versiyonunun Cronbach's Alpha katsayıları sırasıyla .80 ve .88 olarak hesaplanmıştır.

2.4 Prosedür

Bu çalışma Ekim 2021 ile Mart 2022 arasında Türkiye'de gerçekleştirilmiştir. 23 Ağustos 2021'de Orta Doğu Teknik Üniversitesi'nin Uygulamalı Etik Araştırma Merkezi'nden etik kurul onayı alınmıştır. Bu onay Kısa Form-36 isimli ölçeğin Kısa Form-12 ile değiştirilmesine karar verilmesinden sonra revize edilmiş ve 29 Eylül 2021'de tekrar onay alınmıştır. Daha sonra etik kurul onayıyla birlikte çalışmanın yapılacağı Türkiye Bedensel Engelliler Spor Federasyonu'na resmi izin başvurusunda bulunulmuştur. Federasyondan resmi izin 22 Ekim 2021 tarihinde alınmıştır.

Ankara'da yaşayan 23 manuel tekerlekli sandalye kullanıcısı sporcuyla yüz yüze görüşülmüş ve çalışmaya katılım oranı %100'ü bulmuştur. Ankara dışında yaşayan 77 manuel tekerlekli sandalye kullanıcısı ile Google Form bağlantısı paylaşılarak çalışmaya katılmaları sağlanmıştır. Online olarak çalışmaya katılım oranı %10'u geçememiştir. Katılımcıların güvenliği ve kimsenin zarar görmemesi için online yapılan anket isim, soy isim, e-mail veya telefon numarası gibi hiçbir kişisel bilgi istenmemiştir. Katılımcıları online çalışmaya davet etmek için Türkiye'de bulunan bedensel engelli spor kulüplerinin bir listesi federasyondan istenmiştir. Her bir spor kulübü tek tek aranarak antrenörler ile görüşme sağlanmış ve çalışma hakkında bilgi verilmiştir. Whatsapp üzerinden yollanan Google Form bağlantısını duyuru metni ile birlikte sporcularıyla paylaşmaları istenmiş, böylece hiçbir katılımcının kişisel bilgisi istenmemiştir. Yüz yüze yapılan görüşmelerde de aynı prosedür uygulanmış, ek olarak katılımcıların ad, soy ad ve imzaları alınmıştır.

2.5 Veri Analizi

İstatiksel analiz için SPSS versiyon 26.0 kullanılmıştır. Hem tanımlayıcı hem de çıkarımsal istatistikten yararlanılmıştır. Tanımlayıcı istatistik ile ortalama, standart sapma ve yüzdelik değerler gösterilmiştir. Çıkarımsal istatistik ile omuz ağrısı, fiziksel aktivite düzeyi ve yaşam kalitesi arasında bir korelasyon olup olmadığına, kafaüstü ve kafaüstü olmayan sporlar, bireysel ve takım sporları ile doğuştan ve sonradan edinilmiş engeli olan manuel tekerlekli sandalye kullanıcısı sporcuların omuz ağrıları arasında anlamlı bir fark olup olmadığına bakılmıştır. Birinci araştırma sorusu için Pearson korelasyonu ve ikinci araştırma sorusunun alt soruları içi Mann-Whitney U testi kullanılmıştır. Alfa seviyesi .05 olarak ayarlanmıştır.

SONUÇ

3.1 Araştırma Sorusu 1

Manuel tekerlekli sandalye kullanan sporcularda omuz ağrısı, fiziksel aktivite düzeyi ve yaşam kalitesi arasında anlamlı bir ilişki var mıdır?

Pearson korelasyon sonuçlarına göre tekerlekli sandalye kullanan sporcularda omuz ağrısı ile fiziksel aktivite arasında anlamlı bir pozitif korelasyon bulunmuştur ($r(98) = .293$, $p<.01$). Ayrıca, omuz ağrısı ile fiziksel yaşam kalitesi arasında anlamlı negatif korelasyon bulunmuştur ($r(98) = -.415$, $p<.01$). Ancak omuz ağrısı ile mental yaşam kalitesi arasında ($r(98) = -.101$, $p>.05$) ve fiziksel aktivite ile yaşam kalitesinin fiziksel ($r(98) = .029$, $p>.05$) ve mental komponenti arasında bir korelasyon saptanamamıştır ($r(98) = .157$, $p>.05$).

3.2 Araştırma Sorusu 2

Omuz ağrısı, manuel tekerlekli sandalye kullanan sporcularda spor kategorilerine ve fiziksel engel türüne göre farklılık gösterir mi?

3.2.1 Kafaüstü ve kafaüstü olmayan sporlarla ilgilenen tekerlekli sandalye kullanıcıları arasında omuz ağrısı açısından anlamlı bir fark var mıdır?

Kafa üstü sporlarla ilgilenen sporcularla ($n = 59$, $M_{yaş} = 32.41$, $M_{TSkullanım} = 15.27$, $M_{aktifspor} = 10.93$) kafaüstü olmayan sporlarla ilgilenen sporcular ($n = 41$, $M_{yaş} = 31.75$, $M_{TSkullanım} = 15.20$, $M_{aktifspor} = 8.51$) arasında ortalama yaş, tekerlekli sandalye kullanım süresi ve sporda aktif oldukları yıllar bakımından belirgin bir fark yoktur. Kafa üstü sporcular ($M_{WUSPI} = 23.61$, $M_{PCS} = 59.07$) kafa üstü olmayan sporculardan ($M_{WUSPI} = 20.41$, $M_{PCS} = 57.32$) ortalama olarak daha fazla omuz ağrısına ve daha iyi fiziksel yaşam kalitesine sahiptir. Öte yandan, kafa üstü olmayan sporcular ($M_{PASIPD} = 27.53$, $M_{MCS} = 65.04$) kafa üstü olan sporculardan ($M_{PASIPD} = 26.70$, $M_{MCS} = 60.31$) fiziksel olarak daha aktiftirler ve daha iyi mental yaşam kalitesine sahiptirler.

3.2.1.1 Omuz ağrısı farkı için Mann-Whitney U testi

Kafa üstü olan ve olmayan sporlarla ilgilenen tekerlekli sandalye kullanıcısı sporcuların omuz ağrısını karşılaştırmak için Mann-Whitney U testi kullanılmıştır.

3.2.1.2 Mann-Whitney U testi için varsayımlar

Frenkel ve ark. (2012)'na göre, bağımsız gözlem ve normal olmayan dağılım Mann-Whitney U testi için ana varsayımlardır. Bu çalışmada gözlemler arasında herhangi bir bağımlılık yoktur. Skewness ve kurtosis değerlerine bakıldığında normal olmayan bir dağılım gözlenmiştir. Bu sebeple Mann-Whitney U testi kullanılmıştır.

3.2.1.3 Mann-Whitney U testi sonuçları

Sonuçlara göre kafa üstü (Median = 15, n = 59) ve kafa üstü olmayan sporlarla ilgilenen tekerlekli sandalye kullanıcıları arasında omuz ağrısı açısından anlamlı bir fark bulunamamıştır (Median = 10, n = 41, U = 1164.500, z = -.316, p = .752).

3.2.2 Bireysel ve takım sporlarıyla ilgilenen tekerlekli sandalye kullanıcıları arasında omuz ağrısından bakımından anlamlı bir fark var mıdır?

Bireysel sporlarla ilgilenen sporcularla (n = 45, $M_{yaş}$ = 31.68, $M_{TSkullanım}$ = 14.69, $M_{aktifspor}$ = 8.60) takım sporlarıyla ilgilenen sporcular (n = 55, $M_{yaş}$ = 32.51, $M_{TSkullanım}$ = 15.69, $M_{aktifspor}$ = 11.04) arasında ortalama yaş, tekerlekli sandalye kullanım süresi ve sporda aktif oldukları yıllar bakımından belirgin bir fark yoktur. Bireysel sporcular (M_{WUSPI} = 20.47, M_{PCS} = 27.16) takım sporcularından (M_{WUSPI} = 23.80, M_{PCS} = 58.73) ortalama olarak daha az omuz ağrısına ve fiziksel yaşam kalitesine sahiptir. Öte yandan, takım sporcuları (M_{PASIPD} = 26.94, M_{MCS} = 60.00) bireysel sporculardan (M_{PASIPD} = 27.16, M_{MCS} = 65.00) fiziksel olarak daha az aktiftirler ve daha düşük mental yaşam kalitesine sahiptirler.

3.2.2.1 Omuz ağrısı farkı için Mann-Whitney U testi

Bireysel ve takım sporlarıyla ilgilenen tekerlekli sandalye kullanıcısı sporcuların omuz ağrısını karşılaştırmak için Mann-Whitney U testi kullanılmıştır.

3.2.2.2 Mann-Whitney U testi için varsayımlar

Frenkel ve ark. (2012)'na göre, bağımsız gözlem ve normal olmayan dağılım Mann-Whitney U testi için ana varsayımlardır. Bu çalışmada gözlemler arasında herhangi bir bağımlılık yoktur. Skewness ve kurtosis değerlerine bakıldığında normal olmayan bir dağılım gözlenmiştir. Bu sebeple Mann-Whitney U testi kullanılmıştır.

3.2.2.3 Mann-Whitney U testi sonuçları

Sonuçlara göre adaptif bireysel (Median = 10, n = 45) ve takım sporlarla ilgilenen tekerlekli sandalye kullanıcıları arasında omuz ağrısı bakımından anlamlı bir fark bulunamamıştır (Median = 15, n = 55, U = 1205.000, z = -.226, p = .821).

3.2.3 Doğuştan ve sonradan edinilmiş engeli bulunan tekerlekli sandalye kullanan sporcular arasında omuz ağrısı bakımından anlamlı bir fark var mıdır?

Doğuştan engelli (n = 46, , $M_{TSkullanım}$ = 15.67, $M_{aktifspor}$ = 8.61) ve sonradan edinilmiş engeli bulunan manuel tekerlekli sandalye kullanıcısı sporcular (n = 54, $M_{TSkullanım}$ = 14.87, $M_{aktifspor}$ = 11.07) arasında ortalama tekerlekli sandalye kullanım süresi ve sporda aktif oldukları yıllar bakımından belirgin bir fark yoktur. Ancak sonradan edinilmiş engeli bulunan sporcular ($M_{yaş}$ = 37.01) doğuştan engelli sporculardan ($M_{yaş}$ = 26.42) daha yaşlıdır. Doğuştan engelli sporcular (M_{WUSPI} = 15.00, M_{PASIPD} = 25.28) sonradan edinilmiş engeli bulanan sporculara göre (M_{WUSPI} = 28.52, M_{PASIPD} = 28.54) ortalama olarak daha az omuz ağrısına ve fiziksel aktivite seviyesine sahiptir. Öte yandan, sonradan edinilmiş engeli bulunan sporcular (M_{PCS} = 53.42, M_{MCS} = 59.26) doğuştan engelli sporculardan (M_{PCS} = 64.13, M_{MCS} = 65.76) fiziksel ve mental olarak daha düşük yaşam kalitesine sahiptirler.

3.2.3.1 Omuz ağrısı farkı için Mann-Whitney U testi

Doğuştan ve edinilmiş engeli bulunan tekerlekli sandalye kullanıcısı sporcuların omuz ağrısını karşılaştırmak için Mann-Whitney U testi kullanılmıştır.

3.2.3.2 Mann-Whitney U testi için varsayımlar

Frenkel ve ark. (2012)'na göre, bağımsız gözlem ve normal olmayan dağılım Mann-Whitney U testi için ana varsayımlardır. Bu çalışmada gözlemler arasında herhangi bir bağımlılık yoktur. Skewness ve kurtosis değerlerine bakıldığında normal olmayan bir dağılım gözlenmiştir. Bu sebeple Mann-Whitney U testi kullanılmıştır.

3.2.3.3 Mann-Whitney U testi sonuçları

Sonuçlara göre tekerlekli sandalye kullanıcısı doğuştan ve edinilmiş engeli bulunan atletler arasında omuz ağrısı bakımından anlamlı bir fark saptanmıştır (p = .024).

Doğuştan engelli tekerlekli sandalye kullanan sporcuların (Median = 8.50, *n* = 46) omuz ağrısı sonradan engelli olanlara göre anlamlı derecede daha azdır (Median = 16.50, *n* = 54, *U* = 915.500, *z* = -2.263, *p* = .024, r = 0.23).

3.3 Araştırma Sorusu 3

Pandemi döneminde tekerlekli sandalye kullanan sporcuların fiziksel aktiviteye katılımları nasıl olmuştur?

Pandemi dönemi koşullarında tekerlekli sandalye kullanan sporcular (%61) düzenli antrenman yapamadıklarını belirtmişlerdir. Pandemi döneminde düzenli antrenman yapabilenlerin en çok tercih ettikleri yerler spor kulüpleri (*n* = 16) ve belediye spor merkezleri (*n* = 11) olmuştur. Sokağa çıkma yasaklarının ise antrenman yapmalarına engel olduklarını belirtmişlerdir (%72). Sokağa çıkma yasağı esnasında %60'ı ev içi egzersiz yapabildiklerini belirtmişlerdir. Sokağa çıkma yasağı sırasında ev içi yapılan egzersizler fiziksel uygunluk hareketleri (*n* = 43), germe egzersizleri (*n* = 41), esneklik hareketleri (*n* = 40), dirençli egzersizler (*n* = 29) ve denge egzersizleri (*n* = 14) olarak sıralanmıştır.

TARTIŞMA

4.1 Pandemi Döneminde Manuel Tekerlekli Sandalye Kullanan Sporcularda Omuz Ağrısı, Fiziksel Aktivite ve Yaşam Kalitesi Arasındaki Korelasyon

Çalışmanın sonuçlarına göre omuz ağrısı ile fiziksel aktivite seviyesi arasında anlamlı bir korelasyon, omuz ağrısı ile yaşam kalitesinin fiziksel komponenti arasında anlamlı negatif bir korelasyon vardır. Ancak, omuz ağrısı ile yaşam kalitesinin mental komponenti arasında ve fiziksel aktivite düzeyinin yaşam kalitesinin hiçbir komponentiyle arasında korelasyon yoktur.

Sporcu olmayan tekerlekli sandalye kullanıcılarıyla yapılan çalışmalarda düşük fiziksel aktive seviyesinin ve düşük yaşam kalitesinin yüksek derecede omuz ağrısıyla ilişkili olduğu bulunmuştur (Gutierrez ve ark., 2007; Stirane ve ark., 2012). Fiziksel aktivitenin omuz ağrısına etkisi için yapılan çalışmalarda Soo Hoo ve ark. (2021) tekerlekli sandalye kullananlarının (%32.5), kullanmayanlara göre (%0) daha fazla omuz ağrısına sahip olduğunu bulmuşlardır. Ayrıca, sporcu olmayan tekerlekli

sandalye kullanıcılarının (%50) sporcu olan tekerlekli sandalye kullananlara göre (%29.4) daha fazla omuz ağrısına sahip olduğunu, ancak anlamlı bir fark olmadığını bulmuşlardır. Fullerton ve ark. (2003), sporcu olmayan tekerlekli sandalye kullanıcılarında, sporcu tekerlekli sandalye kullanıcılarına göre neredeyse iki kat daha sık omuz ağrısı görüldüğünü rapor etmişlerdir. Bu sebeple literatürdeki bulgular doğrultusunda bu çalışmadan beklenen sonuç omuz ağrısı ile fiziksel aktivite seviyesi arasında bir ters ilişki olmasıydı. Ancak Patel ve ark. (2015) ağrısı olan ve olmayan tekerlekli sandalye kullanıcılarını karşılaştırdığı çalışmalarında FEBFAS skorları bakımından anlamlı bir fark bulamamışlardır. Sebebini omuz ağrısı ortalama skorunun fiziksel aktiviteye katılımı engelleyemeyecek kadar az olduğunu belirtmişlerdir. Bu demektir ki, fiziksel aktivite ile omuz ağrısı arasında ters bir ilişki çıkması için omuz ağrısının belli bir eşik değere ulaşması gerekmektedir.

Ayrıca bu çalışma pandemi döneminde yapıldığı için aynı dönemde yapılan az sayıda çalışma mevcuttur. Warner ve ark. (2022) tarafından pandemi döneminde yapılan çalışmada katılımcılar pandemi öncesine göre omuz ağrılarının arttıklarını belirtmelerine rağmen fiziksel aktivite ile arasında bir korelasyon çıkmamıştır. Mevcut çalışmadaki pozitif korelasyonun sebebi online olarak çalışmaya katılanların FEBFAS sorularını anlamakta güçlük çekmesi ve akselerometre kullanılamadığı için yeterince güvenilir sonuçlar elde edilememesi olabilir.

Literatürde düşük yaşam kalitesi ile yüksek yoğunluklu omuz ağrısı birbirleriyle ilişkili bulunmuştur (Gutierrez et al., 2007; Stirane et al., 2012). Ancak Patel ve ark. (2015)'nın yaptığı çalışmada aralarında bir ilişki bulunamamıştır. Patel ve ark. (2015) bu durumun sebebinin katılımcıların günlük ortalama tekerlekli sandalye kullanım sürelerinin 3.49 saat olduğunu ancak Stirane ve ark. (2012)'nın yaptığı çalışmada bu sürenin 11.8 saat olduğunu belirtmişlerdir. Gelecek çalışmalar omuz ağrısının yaşam kalitesini olumsuz etkileyebilmesi için günlük tekerlekli sandalye kullanım süresi gibi parametrelere bakabilir.

Son olarak, fiziksel aktivite düzeyi ve yaşam kalitesi arasında anlamlı bir ilişki bulunamamıştır. Literatürde ise fiziksel aktivitenin yaşam kalitesine olumlu etkisinin saptandığı çalışmalar mevcuttur (Giacobbi ve ark., 2008; McVeigh ve ark., 2009). Bu durumun sebebi yaklaşık 2 yıl süren pandeminin psikolojik etkileri olabilir.

4.2 Spor Kategorilerine ve Fiziksel Engel Türlerine Göre Manuel Tekerlekli Sandalye Kullanan Sporcularda Omuz Ağrısı Farklılıkları

Omuz ağrısı farklılıkları, çalışmanın örneklemi kafa üstü ve kafa üstü olmayan sporlar, bireysel ve takım sporları ve doğuştan ve sonradan engelli sporcular olmak üzere ikili gruplara ayrıştırılarak analiz edildi.

4.2.1 Kafa üstü ve Kafa üstü Olmayan Sporlarda Omuz Ağrısı

Çalışmanın sonuçlarına göre kafa üstü ve kafa üstü olmayan sporlarda omuz ağrısı bakımından anlamlı bir fark yoktur. Bu durumun sebebi örneklemin çoğunluğunu tekerlekli sandalye basketbol oyuncularının (n = 54) oluşturması ve kafa üstü spor branşlarından daha fazla sporcunun çalışmaya dahil olmaması olabilir. Daha evvel yapılan bir çalışmada tekerlekli sandalye basketbol oyuncularının omuz ağrısının diğer branşlardan anlamlı olarak fazla olmasının sebebi branşlara göre benzer sayıda katılımcı dahil olmuş olsa da, toplamda çalışmaya az sayıda kişinin katılması olabilir (Soo. Hoo. Ve ark., 2021).

4.3 Bireysel ve Takım Sporlarında Omuz Ağrısı

Çalışma sonuçlarına göre bireysel ve takım sporlarıyla ilgilenen sporcular arasında omuz ağrısı bakımından anlamlı bir fark bulunamamıştır. Bu durumun sebeplerinden biri takım sporlarında sadece iki branşın bulunması ve 55 kişiden 54'ünü tekerlekli sandalye basketbolu oyuncularının oluşturmasıdır. Literatürde ise, Lemoyne ve ark. (2017) akut yaralanmaların takım sporlarında daha sık olduğunu, öte yandan aşırı kullanım sonucu gelişen yaralanmaların bireysel sporlarda daha fazla görüldüğünü bildirmişlerdir. Franco ve ark. (2021 bireysel sporlarda gereken tüm hareketleri tek bir sporcunun yapması gerektiğini, ancak takım sporlarında bunun oyuncular arasında dağıtıldığını belirtmiştir. Gelecek çalışmalar bu açıklama doğrultusunda oyun sırasında kullanılan hareketler sorgulanarak yapılabilir.

4.2.3 Konjenital ve Sonradan Edinilmiş Engelli Sporcularda Omuz Ağrısı

Çalışmanın sonuçlarına göre konjenital engelli sporcular, sonradan edinilmiş engeli bulunan manuel tekerlekli sandalye kullanıcısı sporculara göre anlamlı derecede daha az omuz ağrısına sahiptir. Bu durumun, omuz ağrısının tekerlekli sandalye kullanıcısı

popülasyonda görülmesinin sebebinin omuz üzerinde artan iş yükü ve stres ile açıklanması olabilir (Curtis ve ark., 1995). Heyward ve ark. (2017) artan iş yükünü tekerlekli sandalyenin itilmesi, spora özgü spesifik hareketler, ve günlük yaşam aktiviteleri olarak tanımlamıştır. Tekerlekli sandalyenin itilmesi, sonradan edinilmiş engel bulunan sporcular için artan bir iş yüküdür. Ancak doğuştan engelli olan sporcularda tekerlekli sandalyenin itilmesi olağan iş yüküne dahildir ve vücut yapıları bu iş yükünü karşılayacak doğrultuda gelişmiştir. Bu sebeple omuz ağrısı gelişmeden önce tekerlekli sandalye kullanmaya başlayan her birey kuvvetlendirme programına başlamalıdır.

4.3 Sokağa Çıkma Yasağında Tekerlekli Sandalye Kullanan Sporcuların Fiziksel Aktivite Katılımları

Pandemi döneminde alınan tedbirler nedeniyle eve kapanan tüm bireylerin fiziksel aktiviteleri kısıtlanmıştır. Bu dönemde yapılan bir çalışmada (Sokić ve ark., 2021), elit ve rekreasyonel sporcuların yaşam kalitesi sporcu olmayan bireylerden daha fazla olmasına rağmen tüm katılımcılar pandeminin başından bu yana yaşam kalitelerinin düştüğünü belirtmişlerdir. Bu durum mevcut çalışmada ev içi egzersiz yapanların sayısının az olmasını açıklamaktadır.

4.4 Öneriler

- Her sporcunun omuz ağrısı gelişimine karşı korunma ve kuvvetlendirme programlarını öğrenmesi gerekir. Örneğin, antrenörler, antrenörler ve beden eğitimi öğretmenleri, tekerlekli sandalye kullanan sporcular için antrenman öncesi ısınma ve antrenman sonrası soğuma aşamalarını geçmemeyi öğretmelidir (Curtis ve ark, 1995).
- Antrenörler, antrenman rutinlerini hazırlarken COVID-19 pandemilerinin tekerlekli sandalye kullanan sporcuların zihinsel ve fiziksel sağlıkları üzerindeki uzun vadeli etkilerini göz önünde bulundurmalıdır.
- Manuel tekerlekli sandalye kullanan her engelli, tekerlekli sandalye itme teknikleriyle ilgili yeni durumlarına kendilerini nasıl adapte edeceklerini öğrenmelidir.
- Engelli bireylerle yapılan çalışmalarda hiçbir klinisyen yaşam kalitesini değerlendirmeyi ihmal etmemelidir.

- Antrenörler, klinisyenler, tekerlekli sandalye kullanan sporcular ve aileleri, spor türlerine göre spor yaralanmalarının altında yatan mekanizmayı bilmeli ve spor yaralanması geçirmeden önce gerekli önlemleri almalıdır.
- COVID-19 pandemisi dönemi nedeniyle sıkı düzenlemeler sırasında tekerlekli sandalye kullanan sporcuların fiziksel aktivite düzeylerinin düştüğü görülmektedir. Bu nedenle politikacılar, fiziksel aktivite katılımlarının aynı kalmasını sağlamak için belirli kurallar uygulamalıdır.

4.5 Gelecek Çalışmalar için Öneriler

Manuel tekerlekli sandalye kullanan sporcularda omuz ağrısı, fiziksel aktivite ve yaşam kalitesi ile ilgili gelecekteki çalışmalar aşağıdaki noktalara dikkat etmelidir:

- Algılanan omuz ağrısı yeri, katılımcının algısına bağlıdır, ancak omuz ağrısı değerlendirmelerinde çizim olarak omuzlarının hangi bölgelerinin ağrıdığı sorusu eklenmelidir.
- Bu tür bir çalışma için araç seçimi çok önemlidir. Birkaç WUSPI sorusu yanıtlanmaya uygun değildir. Çalışmada kullanılan araçlar, tekerlekli sandalye kullanan nüfusun yaşam durumuna göre uygun olmalıdır. Her adaptif spor için farklı ölçekler uyarlanabilir.
- Fiziksel aktivite düzeyini belirlemek için adımsayar, ivmeölçer, kalp atış hızı monitörleri veya GPS gibi objektif ölçüm araçları ilerideki çalışmalara eklenmelidir.
- Omuz ağrısı çok faktörlü olduğundan, ilerideki araştırma soruları için yaş, cinsiyet ve ağrının yeri gibi farklı parametreler araştırılmalıdır.
- Gelecekteki çalışmalarda omuz ağrısı farklarını karşılaştırmak için her branştan oyuncu sayısı birbirine yakın olmalıdır.

G. THESIS PERMISSION FORM / TEZ İZİN FORMU

(Please fill out this form on computer. Double click on the boxes to fill them)

ENSTİTÜ / INSTITUTE

Fen Bilimleri Enstitüsü / Graduate School of Natural and Applied Sciences ☐

Sosyal Bilimler Enstitüsü / Graduate School of Social Sciences ☒

Uygulamalı Matematik Enstitüsü / Graduate School of Applied Mathematics ☐

Enformatik Enstitüsü / Graduate School of Informatics ☐

Deniz Bilimleri Enstitüsü / Graduate School of Marine Sciences ☐

YAZARIN / AUTHOR

Soyadı / Surname : PANPALLI
Adı / Name : HANDE GÜL
Bölümü / Department : Beden Eğitimi ve Spor / Physical Education and Sports

TEZİN ADI / TITLE OF THE THESIS (**İngilizce** / English):

EXAMINATION OF SHOULDER PAIN, PHYSICAL ACTIVITY LEVEL, AND QUALITY OF LIFE IN MANUAL WHEELCHAIR USER ATHLETES DURING THE PANDEMIC PERIOD

TEZİN TÜRÜ / DEGREE: **Yüksek Lisans** / Master ☒ **Doktora** / PhD ☐

1. **Tezin tamamı dünya çapında erişime açılacaktır. /** Release the entire work immediately for access worldwide. ☒
2. **Tez iki yıl süreyle erişime kapalı olacaktır.** / Secure the entire work for patent and/or proprietary purposes for a period of **two years. *** ☐
3. **Tez altı ay süreyle erişime kapalı olacaktır.** / Secure the entire work for period of **six months**. ***** ☐

***** *Enstitü Yönetim Kurulu kararının basılı kopyası tezle birlikte kütüphaneye teslim edilecektir. / A copy of the decision of the Institute Administrative Committee will be delivered to the library together with the printed thesis.*

Yazarın imzası / Signature ..... **Tarih** / Date .....
(Kütüphaneye teslim ettiğiniz tarih. Elle doldurulacaktır.)
(Library submission date. Please fill out by hand.)

Tezin son sayfasıdır. / This is the last page of the thesis/dissertation.