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**LONGITUDINAL ANALYSIS OF THE PSYCHOLOGICAL STATUS OF
ATHLETES WITH DISABILITIES: PRIOR TO THE TOKYO PARALYMPIC
GAMES***

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Abstract: Investigating changes in athletes' psychological states during the preparation period is a significant part of the evaluation and planning during the preparation stage for the games. The aim of this study was to investigate the anxiety, depression, and stress symptoms levels changes over time among athletes preparing for the Tokyo 2020 Paralympic Games. The assessments were performed three times: 40, 20, and 1 week before the Paralympic Games. State-Trait Anxiety Inventory (STAI) was used to determine state and trait anxiety levels, the Center for Epidemiologic Studies Depression Scale (CES-D) was used to assess depression, Perceived Stress Scale (PSS-14) was used to establish stress levels. The athletes in the study had an average age of 32.87±8.56. Fifteen women (33.3%) and 30 men (66.7%) were recruited for this study. The average sports years for the athletes were 10.21±5.54. While 62.2% of the 45 athletes in the study competed in the 2020 Tokyo Paralympic Games, 37.8% did not. Overall levels of anxiety, depression, and perceived stress were low among athletes preparing for the Tokyo Paralympic Games, and no significant changes were observed over time ($p > 0.05$). No significant differences were found in psychological outcomes according to Paralympic participation or COVID-19-related variables. However, female athletes demonstrated significantly higher trait anxiety at both 40 and 20 weeks before the Games, as well as higher perceived stress at 20 weeks prior to the Games. Disabled people who participate in sports may develop enhanced coping strategies for a variety of issues, including daily living, disability, elite sports, and the COVID-19 pandemic. Additionally, Paralympic athletes who successfully balance their impairment and high-level athletic performance can adjust to new conditions and demonstrate resilience against various challenges.

Keywords: 2020 Tokyo Paralympic Games, Anxiety, Depression, Sports for persons with disabilities, Stress

**ENGELLİ SPORCULARIN PSİKOLOJİK DURUMLARININ BOYLAMSAL
ANALİZİ: TOKYO PARALİMPİK OYUNLARI ÖNCESİ**

Öz: Sporcuların hazırlık dönemindeki psikolojik durumlarındaki değişikliklerin nasıl olduğunun araştırılması, oyunlara hazırlık aşamasındaki değerlendirme ve planlamanın önemli bir parçasıdır. Bu çalışmanın amacı, Tokyo 2020 Paralimpik Oyunlar'a hazırlanan sporcular arasında zaman içinde değişen anksiyete, depresyon ve stres semptom seviyelerini incelemektir. Değerlendirmeler üç kez yapıldı: Paralimpik Oyunları'ndan 40, 20 ve 1 hafta önce. Durumluk-Sürekli Anksiyete Envanteri (STAI) durumluk ve sürekli anksiyete seviyelerini belirlemek için, Epidemiyolojik Araştırmalar Merkezi Depresyon Ölçeği (CES-D) depresyonu değerlendirmek için, Algılanan Stres Ölçeği (PSS-14) stres seviyelerini belirlemek için kullanıldı. Çalışmadaki sporcuların ortalama yaşı 32,87±8,56 idi. Bu çalışmaya 15 kadın (%33,3) ve 30 erkek (%66,7) dâhil edildi. Sporcuların ortalama spor yılları 10,21±5,54 idi. Çalışmadaki 45 sporcunun %62,2'si 2020 Tokyo Paralimpik Oyunlar' da yarışırken, %37,8'i yarışmadı. Tokyo Paralimpik Oyunları'na hazırlanan sporcuların anksiyete, depresyon ve algılanan stres düzeyleri genel olarak düşük bulundu ve zaman içinde anlamlı bir değişiklik gözlemlenmedi ($p > 0.05$). Paralimpik Oyunları'na katılım durumu veya COVID-19 ile ilişkili değişkenlere göre psikolojik sonuçlar açısından anlamlı bir fark saptanmadı. Ancak kadın sporcuların, Oyunlar'dan 40 ve 20 hafta önce ölçülen sürekli anksiyete düzeylerinin anlamlı olarak daha yüksek olduğu; ayrıca Oyunlar'dan 20 hafta önce algılanan stres düzeylerinin de erkek sporculara kıyasla daha yüksek olduğu belirlendi. Spor yapan engelli kişiler günlük yaşam, engellilik, elit sporlar ve COVID-19 pandemi süreci dâhil olmak üzere çeşitli sorunlarla başa çıkma konusunda gelişmiş stratejiler geliştirebilirler. Ek olarak, engelliliklerini ve yüksek seviyedeki atletik performanslarını başarıyla dengeleyen Paralimpik sporcular yeni koşullara uyum sağlayabilirler ve çeşitli engellere karşı dayanıklılık gösterebilirler.

Anahtar Kelimeler: 2020 Tokyo Paralimpik Oyunlar, Anksiyete, Depresyon, Engelli kişiler için sporlar, Stres



* Bu çalışma, 'Paralimpik Oyunlar'a hazırlanan engelli sporcuların fiziksel aktivite düzeyleri ile anksiyete, depresyon ve stres arasındaki ilişki' başlıklı yüksek lisans tezinden türetilmiştir.

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INTRODUCTION

Participating in sports activities provides both physical and psychosocial benefits to disabled people. It has been suggested that it can improve psychological state, well-being, mood, friendship, and social support (Clément et al., 2024; Tow et al., 2019). However, at the elite level, these benefits coexist with substantial psychological demands arising from high-performance expectations, long-term preparation, and competitive uncertainty (Daumiller et al., 2022). The Paralympic Games are parallel to the Olympic Games. This event is the culmination of each four-year sporting cycle for Paralympic athletes and Paralympic movement components (International Paralympic Committee [IPC], 2020). Each stage of the Olympic/Paralympic cycle presents specific challenges and opportunities. At the end of the Pre-Games stage, challenges are particularly noteworthy (Henriksen et al., 2020). This stage involves the end of a long preparation period, the intensification of high-performance expectations, and the uncertainties surrounding acceptance into the Games. These conditions can create psychological problems for athletes (Blumenstein and Orbach, 2015; Martin, 2012).

Additionally, when combined with the general competitive stresses of elite sports, disability-related stress factors can further increase psychological tension for disabled athletes. Disabled athletes may face problems related to their disability, such as health issues, classification uncertainty, social stigma, functional limitations, and accessibility barriers (Blumenstein and Orbach, 2015; Kirk et al., 2023). The relationship between the Olympic/Paralympic Games and psychological health is significant because athletes dedicating themselves to the pursuit of the Olympics/Paralympics are at risk of experiencing high levels of stress, which can adversely affect their psychological health. The unique aspects of each stage should be taken into account when implementing psychological health screening and support throughout all stages of the 4-year cycle (Henriksen et al., 2020; Stambulova et al., 2022). Despite all these challenges, promising Olympic/Paralympic athletes are recognized for their courage and resilience (Schinke et al., 2020). Distinguished from non-elite athletes, elite athletes focus on highly competitive athletic achievements due to their attainment of excellence in professional sports. In their pursuit of these achievements, elite athletes undergo intensive training and competition pressure, which may render them more resilient to professional challenges (Daumiller et al., 2022).

During the preparation process for the Tokyo 2020 Paralympic Games, a new challenge was added to the existing difficulties of the Olympic/Paralympic cycle with the onset of the global COVID-19 pandemic. This situation adversely affected all sports organizations, leading to the postponement of the Olympic/Paralympic Games by one year. Consequently, athletes' years of rigorous work, effort, and goals were placed in question (Schinke et al., 2020). In addition, COVID-19 may have created new issues for disabled athletes, such as health concerns, social isolation, and interruptions in rehabilitation services.

As the Paralympic Games approach, preparation for the competition is becoming essential for the athletes not only physically, but also psychologically (Blumenstein and Orbach, 2015; Kirk et al., 2023). Understanding how changes in stress, pressure, and psychological states during the preparation period are associated with athletes' readiness and well-being may provide valuable insight for planning and evaluation prior to the Games. Studies examining mental health or psychological distress, particularly anxiety, depression, and stress, in Paralympic athletes during preparation for the Games are limited (Bentzen et al., 2022). Anxiety, depression, and stress are among the frequently reported psychological outcomes in athletes and can vary during different periods, such as training and competition phases (Rosa et al.,

2020; Silva et al., 2012). However, they are reported to be associated with performance, injury, and well-being (Facer-Childs et al., 2021; Kirk et al., 2022; Pillay et al., 2020). Therefore, monitoring anxiety, depression, and stress during high-risk preparation periods is crucial. Longitudinal studies allow for the identification of conditions that change over time and provide data that cannot be detected by cross-sectional studies (Bentzen et al., 2022; Poucher et al., 2021; Rosa et al., 2020). Thus, they are critically important in identifying psychological responses that may dynamically change throughout the Paralympic cycle (Blumenstein and Orbach, 2015). Therefore, this study aimed to longitudinally monitor changes in anxiety, depression, and stress symptom levels among athletes preparing for the Paralympic Games.

METHOD

Study Design

The study was web-based and used an online form between 13 June 2020 and 1 September 2021. It was designed as a prospective, longitudinal study. The questionnaires were distributed to the athletes by TSFPD. The assessments were done three times: 40, 20, and 1 week before the Paralympic Games. The athletes had 1 week to complete the form. The study was carried out on physically disabled athletes who were preparing for the Paralympic Games and volunteered to take part.

The research has been approved by the Ankara Yildirim Beyazit University Ethics Committee (Approval number: 13, Date of approval: 12/06/2020). An Informed Voluntary Consent Form was prepared for the participants, and verbal and written consent was obtained. The study complied with the Helsinki rules.

A longitudinal study was designed to identify changes in psychological symptoms during the preparation period for the Paralympic Games. Longitudinal studies allow for the assessment of temporal fluctuations, or changes, in psychological health. Longitudinal design is particularly important in athlete psychology research because psychological states can change throughout the season depending on many different factors (Bentzen et al., 2022; Henriksen et al., 2020; Poucher et al., 2021; Stambulova et al., 2022).

Research Group

Inclusion criteria were being physically disabled athletes, being eligible to participate in the Tokyo 2020 Paralympic Games, having secured a quota or being under consideration for selection (i.e., athletes preparing for potential participation in the Games), and volunteering to participate in the study. Exclusion criteria were psychiatric disorder, regularly using sedative or neuropsychiatric drugs, and addiction to alcohol or drugs. The presence of psychiatric disorders was determined based on self-reported medical history. Athletes were asked to indicate whether they had been diagnosed with a psychiatric condition or were receiving treatment for such conditions. No clinical psychiatric assessment was conducted as part of this study. Also it should be noted that the study did not aim to diagnose any mental disorder. The instruments used in this study are self-report tools suitable for assessing risk levels or symptom trends, not for clinical diagnosis.

Wheelchair curling will not be available at the Tokyo 2020 Paralympic Games, so the seven curlers who fulfilled the forms were excluded. 18 people who participated in the first assessment but did not participate in the second assessment or who participated in the second assessment and did not participate in the first assessment were excluded from the study. Additionally, one athlete who only completed the third assessment but not the first or second was excluded from the analysis.

The study included 45 athletes who participated in the first and second assessments. Twenty-eight of these athletes competed in the Paralympic Games. Six athletes participated in all three assessments (first, second and third), but five of these competed in the Paralympic Games. For the analysis involving all three time points (40, 20, and 1 week before the Paralympic Games), data from only five athletes who completed all three assessments and also competed in the Games were included. Although the limited sample size restricts the strength of any statistical inference, this analysis was conducted to explore possible patterns of changes over time (Table 3). Figure 1 presents an overview of assessed, excluded, and analyzed. Since all Turkish athletes preparing for the Paralympic Games were reached through the Turkish Sports Federation for Physically Disabled (TSFPD), the sample size was not calculated at the beginning of the study.

Given the elite nature of the sample and the challenges associated with longitudinal data collection in Paralympic sport, small sample sizes are common in this field (Blumenstein and Orbach, 2015; Kirk et al., 2023). Thus, the analyses of athletes who completed the three assessments were used not to draw definitive conclusions, but as exploratory analyses aimed at identifying potential trends. The primary analyses of this study were conducted on a population of 45 athletes who participated in the first and second assessments.

Data Collection

All instruments were administered together within a single online questionnaire at each assessment time point.

Sociodemographic information form: Participants filled out this form with information such as their height, weight, gender, age, education level, marital status, year of sport, and use of alcohol/cigarettes. In addition, questions about having COVID-19, having lost any relatives or close friends as a result of COVID-19, and being affected by the postponement of the Paralympic Games and COVID-19 were added. Body mass index was calculated by dividing body weight by the square of height (kg/m^2).

Anxiety assessment: State-Trait Anxiety Inventory (STAI) was used to establish the anxiety risk levels of the athletes. The inventory created by Spielberger et al. (1970) consists of two subscales, each with 20 questions. This 4-point Likert scale can be scored between 20 and 80. Higher scores indicate high anxiety symptoms, while lower scores indicate low anxiety symptoms (Spielberger, 1970). Subscales provide the advantage of determining both state and trait anxiety separately. The State Anxiety Inventory (STAI-S) measures anxiety concerning specific times and conditions, whereas the Trait Anxiety Inventory (STAI-T) measures anxiety regardless of time or circumstances. The Turkish validity and reliability study was conducted by Öner and Le Compte (1998). The STAI is widely used in high-performance and elite athlete populations to assess both situational and dispositional anxiety, which are particularly relevant in competitive sport settings. Previous Turkish validation studies have reported good internal consistency for the State-Trait Anxiety Inventory, with Cronbach's alpha values ranging from 0.83 to 0.87 for the State Anxiety subscale and from 0.86 to 0.92 for the Trait Anxiety subscale (Öner & Le Compte, 1983).

Depression assessment: Center for Epidemiologic Studies Depression Scale (CES-D) was used to establish the depression risk levels of the athletes. The CES-D was developed by Radloff at the Center for Epidemiologic Studies, National Institute of Mental Health (Radloff, 1977). The Turkish validity and reliability study was conducted by Tatar and Saltukoğlu (2010). CES-D is a short self-report scale developed to detect depressive symptoms. It is widely used in research.

It is a 20-item, 4-point Likert-type scale. The scale can be scored between 0-60, high scores indicate high depression risk, and low scores indicate low depression risk. CES-D is an assessment method frequently used to identify depressive symptoms in athletes. CES-D demonstrates high internal consistency, with Cronbach's alpha values ranging from 0.75 to 0.90 (Tatar and Saltukoglu, 2010).

Stress assessment: The Perceived Stress Scale (PSS-14) was used to examine the stress risk levels of the athletes. PSS-14 was developed by Cohen et al. (1983) and consists of 14 questions and is a 5-point Likert-type scale. It measures how stressful some situations are perceived. The scale can be scored between 0-56, high scores indicate high stress risk, and low scores indicate low stress risk (Cohen et al., 1983). The Turkish validity and reliability study was conducted by Eskin et al. (2013). The PSS-14 has been commonly used in athlete populations to assess perceived stress related to training demands and competitive pressure. The Turkish adaptation of the PSS-14 demonstrated good internal consistency, with reported Cronbach's alpha values 0.84 (Eskin et al., 2013).

Statistical Analysis

Statistical analyses were performed using The Statistical Package for Social Sciences (Version 25.0, SPSS Inc., Chicago, IL, USA) mean \pm standard deviation and median (minimum-maximum) were used as descriptive for quantitative variables, and the number of athletes (percentage) for qualitative variable. The normality of data distribution was assessed using the Shapiro-Wilk test prior to the selection of appropriate statistical methods. The difference between the categories of the qualitative variable, which has two categories in terms of quantitative variables, was examined using the Mann-Whitney U test since they were not normally distributed. When the data provided a normal distribution in the comparison of two measurement values, the "Paired samples t test" and when it did not, the "Wilcoxon test" analysis methods were used. Since the data did not provide a normal distribution in the comparison of the values at the three measurement times, the "Friedman test" method was used. The statistical significance level was accepted as 0.05..

RESULTS

The forty five athletes were enrolled in this study. The athletes in the study were on average 32.87 \pm 8.56 years old. Fifteen women (33.3%) and 30 men (66.7%) were recruited in the study. The athletes' average sports years were found as 10.21 \pm 5.54. Athletes from 9 different sports branches participated in the study. While 62.2% of the 45 athletes in the study competed in the 2020 Tokyo Paralympic Games, 37.8% did not. Descriptive statistics of other demographic variables are provided in Table 1.

Table 1. General descriptives

Age	Mean±SD	32.87±8.56
	Median (Min.-Max.)	32.00 (16.00-52.00)
Gender, n(%)	Female	15 (33.3)
	Male	30 (66.7)
Year of sport	Mean±SD	10.21±5.54
	Median (Min.-Max.)	10.00 (2.00-27.00)
Competing at the 2020 Tokyo Paralympic Games, n(%)	Yes	28 (62.2)
	No	17 (37.8)
Body mass index	Mean±SD	25.25±7.06
	Median (Min.-Max.)	23.57 (16.16-48.75)
Marital status, n(%)	Married	14 (31.1)
	Single	31 (68.9)
Using cigarette, n(%)	Yes	10 (22.2)
	No	35 (77.8)
Alcohol consumption, n(%)	Yes	5 (11.1)
	No	40 (88.9)
Education status, n(%)	High School and Lower	22 (48.9)
	University and Higher	23 (51.1)
Have you had COVID-19? n(%)	Yes	8 (17.8)
	No	37 (82.2)
Have you lost any of your relatives or close friends due to COVID-19? n(%)	Yes	13 (28.9)
	No	32 (71.1)
Did the postponement of the Paralympic Games and the COVID-19 pandemic affect you? n(%)	Yes	38 (84.4)
	No	7 (15.6)

SD: Standard Deviation, Min: Minimum, Max: Maximum, n(%):Number of athletes (Percent)

The athletes generally had low levels of anxiety, depression and stress risk. According to the table, no statistically significant difference was found between the measurement times in the comparisons made both in all participants and athletes competing in the Paralympic Games ($p>0.05$). The first and second measurements have similar mean values in terms of all psychological risk levels (Table 2).

Table 2. Psychological risk levels of athletes 40 and 20 weeks before the Paralympic Games

Scales		Times		Test Statistics	
		40 Weeks Before the Paralympic Games	20 Weeks Before the Paralympic Games	Test value	<i>p</i>
Athletes preparing for the Paralympic Games (n=45)					
STAI-S	Mean±SD	32,56±8,76	31,93±9,36	0,747	0,455 [‡]
	Median (Min.-Max.)	31 (20-53)	32 (20-52)		
STAI-T	Mean±SD	35,71±7,51	36,87±10,77	0,450	0,653 [‡]
	Median (Min.-Max.)	37 (22-53)	35 (20-78)		
CES-D	Mean±SD	10,62±6,89	12,0±10,32	0,746	0,456 [‡]
	Median (Min.-Max.)	10 (0-26)	7 (0-40)		
PSS-14	Mean±SD	18,56±8,33	19,0±8,30	0,336	0,737 [‡]
	Median (Min.-Max.)	20 (0-39)	19 (4-32)		
Athletes competing in the Paralympic Games (n=28)					
STAI-S	Mean±SD	33,14±9,01	31,0±8,36	1,693	0,102 [*]
	Median (Min.-Max.)	32,50 (20-53)	31 (20-50)		
STAI-T	Mean±SD	36,25±7,79	37,07±8,70	0,506	0,613 [‡]
	Median (Min.-Max.)	37 (22-53)	35 (25-53)		
CES-D	Mean±SD	10,96±7,45	11,86±10,24	0,267	0,789 [‡]
	Median (Min.-Max.)	10 (0-26)	7,50 (2-40)		
PSS-14	Mean±SD	19,04±8,58	19,14±8,31	0,067	0,947 [*]
	Median (Min.-Max.)	20 (0-39)	19,50 (4-32)		

$p<0.05$, SD: Standard Deviation, Min: Minimum, Max: Maximum, n: Number of athletes, STAI- S: State Anxiety Inventory, STAI-T: Trait Anxiety Inventory, CES-D: the Center for Epidemiologic Studies Depression Scale, PSS-14: Perceived Stress Scale [‡]: Wilcoxon test, ^{*}: Paired samples t test

When the measurements of the three time points are examined according to the table, the Friedman test results show that there is no statistically significant difference ($p>0.05$). STAI-S, STAI-T, CES-D, PSS-14 scores did not change significantly between the measurement times (Table 3).

Table 3. Changes over time in the scales for athletes competing in the Paralympic Games

Scales		Times			Test Statistics	
(n=5)		40 Weeks Before the Paralympic Games	20 Weeks Before the Paralympic Games	1 Week Before the Paralympic Games	Friedman test value	<i>p</i>
STAI-S	Mean±SD	39,80±8,81	37,60±8,73	34,60±11,32	0,316	0,854
	Median (Min.-Max.)	37 (31-53)	8,73 (27-47)	37 (19-50)		
STAI-T	Mean±SD	37,0±6,12	41,0±9,40	43,40±7,76	4,778	0,092
	Median (Min.-Max.)	37 (27-42)	43 (29-52)	46 (34-53)		
CES-D	Mean±SD	12,0±9,31	19,0±18,19	15,40±13,52	1,368	0,504
	Median (Min.-Max.)	11 (0-26)	15 (2-40)	14 (3-36)		
PSS-14	Mean±SD	17,80±7,88	22,0±10,55	21,40±9,78	2,800	0,247
	Median (Min.-Max.)	20 (4-24)	24 (11-32)	27 (8-30)		

Note: Results are exploratory due to limited sample size ($n = 5$). $p<0.05$, SD: Standard Deviation, Min: Minimum, Max: Maximum, n: Number of athletes, STAI- S: State Anxiety Inventory, STAI-T: Trait Anxiety Inventory, CES-D: the Center for Epidemiologic Studies Depression Scale, PSS-14: Perceived Stress Scale.

When the scores for the STAI-S, STAI-T, CES-D, and PSS-14 were measured 40 weeks before the Paralympic Games, a significant gender difference was discovered in the STAI-T score ($p=0.039$). The mean STAI-T score was 38.60 ± 5.69 in female athletes and 34.27 ± 7.97 in male athletes (Table 4). Also, differences were examined in terms of Paralympic Games and COVID-19 related variables and it was detected that there was no significant difference for any of the variables ($p>0.05$) (Table 4).

Table 4. Comparisons of gender, Paralympic Games, and COVID-19 variables for scales 40 weeks before the Paralympic Games

		Mean±SD	Median (Min.-Max.)	p	Mean±SD	Median (Min.-Max.)	p	Mean±SD	Median (Min.-Max.)	p	Mean±SD	Median (Min.-Max.)	p
Gender	Female	35.53±8.58	34.00 (21.00-53.00)	0.109 ^a	38.60±5.69	38.00 (27.00-50.00)	0.039^a	12.60±6.72	11.00 (0.00-26.00)	0.148 ^a	20.07±7.51	21.00 (4.00-29.00)	0.257 ^a
	Male	31.07±8.61	30.50 (20.00-52.00)		34.27±7.97	35.00 (22.00-53.00)		9.63±6.88	9.50 (1.00-26.00)		17.80±8.74	17.50 (0.00-39.00)	
Competing at the 2020 Tokyo Paralympic Games	Yes	33.14±9.01	32.50 (20.00-53.00)	0.573 ^a	36.25±7.79	37.00 (22.00-53.00)	0.796 ^a	10.96±7.45	10.00 (0.00-26.00)	0.760 ^a	19.04±8.58	20.00 (0.00-39.00)	0.639 ^a
	No	31.59±8.52	30.00 (20.00-49.00)		34.82±7.16	38.00 (23.00-45.00)		10.06±6.04	10.00 (1.00-21.00)		17.76±8.11	18.00 (4.00-33.00)	
Have you had COVID-19?	Yes	32.63±6.07	32.00 (27.00-45.00)	0.988 ^a	37.13±5.14	38.50 (26.00-42.00)	0.439 ^a	11.13±5.06	10.50 (3.00-18.00)	0.651 ^a	19.88±4.16	20.50 (11.00-24.00)	0.590 ^a
	No	32.54±9.31	31.00 (20.00-53.00)		35.41±7.95	37.00 (22.00-53.00)		10.51±7.28	10.00 (0.00-26.00)		18.27±9.01	18.00 (0.00-39.00)	
Have you lost any of your relatives or close friends due to COVID-19?	Yes	33.77±8.76	33.00 (20.00-52.00)	0.498 ^a	34.00±7.52	31.00 (23.00-47.00)	0.366 ^a	8.77±5.76	7.00 (0.00-24.00)	0.264 ^a	18.00±7.15	17.00 (4.00-28.00)	0.726 ^a
	No	32.06±8.86	31.00 (20.00-53.00)		36.41±7.51	37.00 (22.00-53.00)		11.38±7.25	10.50 (1.00-26.00)		18.78±8.87	20.00 (0.00-39.00)	
Did the postponement of the Paralympic Games and the COVID-19 pandemic affect you?	Yes	33.08±8.61	32.00 (20.00-53.00)	0.433 ^a	36.45±7.45	37.00 (23.00-53.00)	0.148 ^a	10.05±6.33	10.00 (0.00-26.00)	0.347 ^a	18.89±8.60	20.00 (0.00-39.00)	0.529 ^a
	No	29.71±9.76	31.00 (20.00-45.00)		31.71±7.04	32.00 (22.00-40.00)		13.71±9.39	12.00 (1.00-26.00)		16.71±6.97	18.00 (6.00-25.00)	

p<0.05, SD: Standard Deviation, Min: Minimum, Max: Maximum, n(%): Number of athletes (Percent), STAI- S: State Anxiety Inventory, STAI-T: Trait Anxiety Inventory, CES-D: the Center for Epidemiologic Studies Depression Scale, PSS-14: Perceived Stress Scale, a: Mann-Whitney U test

Table 5. Comparisons of gender, Paralympic Games, and COVID-19 variables for scales 20 weeks before the Paralympic Games

		Mean±SD	Median (Min.-Max.)	p	Mean±SD	Median (Min.-Max.)	p	Mean±SD	Median (Min.-Max.)	p	Mean±SD	Median (Min.-Max.)	p
Gender	Female	33.33±6.28	32.00 (22.00-46.00)	0.262 ^a	40.20±8.41	40.00 (27.00-53.00)	0.044^a	11.93±9.60	11.00 (0.00-26.00)	0.596 ^a	23.40±5.94	23.00 (11.00-32.00)	0.013^a
	Male	31.23±10.60	26.50 (20.00-52.00)		35.20±11.55	30.00 (20.00-78.00)		12.03±10.83	6.50 (0.00-36.00)		16.80±8.52	15.00 (4.00-32.00)	
Competing at the 2020 Tokyo Paralympic Games	Yes	31.00±8.37	31.00 (20.00-50.00)	0.581 ^a	37.07±8.70	35.00 (25.00-53.00)	0.474 ^a	11.86±10.24	7.50 (2.00-40.00)	0.907 ^a	19.14±8.32	19.50 (4.00-32.00)	0.944 ^a
	No	33.47±10.90	32.00 (20.00-52.00)		36.53±13.83	35.00 (20.00-78.00)		12.24±10.77	7.00 (0.00-32.00)		18.76±8.54	19.00 (4.00-29.00)	
Have you had COVID-19?	Yes	34.75±7.69	34.00 (25.00-48.00)	0.246 ^a	44.00±15.81	42.00 (29.00-78.00)	0.121 ^a	13.00±10.13	9.50 (2.00-28.00)	0.738 ^a	21.00±6.95	22.50 (11.00-29.00)	0.511 ^a
	No	31.32±9.67	32.00 (20.00-52.00)		35.32±8.92	34.00 (20.00-53.00)		11.78±10.49	7.00 (0.00-40.00)		18.57±8.59	19.00 (4.00-32.00)	
Have you lost any of your relatives or close friends due to COVID-19?	Yes	32.31±9.26	32.00 (20.00-50.00)	0.763 ^a	35.23±9.88	34.00 (20.00-52.00)	0.643 ^a	8.92±10.06	5.00 (2.00-36.00)	0.090 ^a	18.31±8.60	17.00 (4.00-32.00)	0.696 ^a
	No	31.78±9.54	31.00 (20.00-52.00)		37.53±11.20	35.50 (25.00-78.00)		13.25±10.32	9.00 (0.00-40.00)		19.28±8.31	19.50 (4.00-32.00)	
Did the postponement of the Paralympic Games and the COVID-19 pandemic affect you?	Yes	32.50±9.61	32.00 (20.00-52.00)	0.380 ^a	37.39±11.49	35.00 (20.00-78.00)	0.657 ^a	12.32±10.85	7.50 (0.00-40.00)	0.988 ^a	19.47±8.28	19.50 (4.00-32.00)	0.451 ^a
	No	28.86±7.73	29.00 (20.00-41.00)		34.00±5.06	35.00 (25.00-40.00)		10.29±7.20	7.00 (3.00-21.00)		16.43±8.60	19.00 (4.00-29.00)	

p<0.05, SD: Standard Deviation, Min: Minimum, Max: Maximum, n(%):Number of athletes (Percent), STAI- S: State Anxiety Inventory, STAI-T: Trait Anxiety Inventory, CES-D: the Center for Epidemiologic Studies Depression Scale, PSS-14: Perceived Stress Scale, a:Mann-Whitney U test

STAI-S, STAI-T, CES-D and, PSS-14 scores were evaluated 20 weeks before the Paralympic Games. Differences were examined in terms of gender and a significant difference was found in the STAI-T ($p=0.044$) and PSS-14 ($p=0.013$) scores. The mean STAI-T score was 40.20 ± 8.41 in female athletes and, 35.20 ± 11.55 in male athletes. The mean PSS-14 score was 23.40 ± 5.94 in female athletes and, 16.80 ± 8.52 in male athletes (Table 5). Also, differences were examined in terms of Paralympic Games and COVID-19 related variables and, it was discovered that there was no significant difference for any of the variables ($p>0.05$) (Table 5).

DISCUSSION

This study was planned to determine changes over time in anxiety, depression, and stress risk levels of the athletes preparing for the Tokyo 2020 Paralympic Games. Overall, the athletes exhibited low levels of anxiety, depression, and stress. There was no significant changes over time in the psychological risk levels of the athletes during the preparation period for the Paralympic Games. Although most of the athletes reported that the postponement of the Paralympic Games and the COVID-19 pandemic had an impact on them, there was no significant difference in their anxiety, depression, or stress symptom scores according to these variables.

Studies have shown that the levels of anxiety, depression, and stress in athletes and non-athletes are comparable. These levels are lower in athletes than non-athlete (Gulliver et al., 2015; Junge and Feddermann-Demont, 2016). Other studies have indicated that elite athletes and non-elite athletes have similar levels of anxiety, depression, and stress, or elite athletes have lower levels despite the additional challenges that are specific to elite sports (Gulliver et al., 2015; Junge and Prinz, 2019). Di Fronso et al. (2022) reported that elite athletes have lower levels of stress and anxiety compared to non-elite athletes. A review including Paralympic athletes holds the view that the athletes are not at risk for mental health problems although they are exposed to social problems related to both elite sports performance and disability (Swartz et al., 2019). Studies on this subject in elite and disabled athletes are very limited. In this study, state anxiety, trait anxiety, depression, and stress were evaluated 40, 20, and 1 week before the Paralympic Games. It was discovered that the athletes did not have symptoms of anxiety, depression, or stress symptoms. A possible explanation is that participation in sports might provide mental health benefits to athletes through factors such as social interaction, positive interpersonal relationships, a sense of purpose, and avoidance of negative thoughts. Elite athletes may also have stronger psychological resilience than other people. The outcomes might indicate that these athletes have achieved high-level sports performance by overcoming the difficulties of life, sports, and disabilities.

Recent research suggests that the escalation of competitive pressure and training load in international sports causing an increase in pressure on elite athletes, posing a threat to their psychological well-being. Balancing athletic careers and psychological health can be burdensome, and fluctuations in athletes' psychological well-being are to be expected. Some of these challenges are associated with strenuous training, multiple demands, high-performance expectations, and numerous transitional events (e.g., career development in the national team, injuries, career decline, and selection for the Olympic/Paralympic cycle) (Henriksen et al., 2020; Stambulova et al., 2022). A study conducted on Brazilian Paralympic athletes before the 2008 Beijing Paralympic Games noted that the athletes' anxiety levels increased the day before the competition (Silva et al., 2012). Rosa et al. (2020) investigated the stress levels of 11 Brazilian male Paralympic swimmers at 3 training camps held 8 months, 6 months, and 1 month before the Rio 2016 Paralympic Games and reported a moderate increase in stress levels that

could positively affect sports performance. In a study of seven athletes preparing for the 2020 Tokyo Paralympic Games, it was found that these athletes coped best with the stress of the upcoming competition by using problem-focused coping strategies, including smart training and recovery planning (Dehghansai et al., 2021). The state of an athlete's mental health may change over time. Anxiety, depression, and stress may increase as the competition approaches, but this tends to be evident in evaluations done just before the competition. In this study, assessments were done 40, 20, and 1 week before the Paralympic Games, and a nonsignificant increase was detected in the symptoms of state anxiety, trait anxiety, depression, and stress as the competition approached. The challenges of advancing to the Paralympic Games did not undermine the mental health of the athletes. Thus, participation in sports may have provided a protective barrier for athletes against potential life and athletic challenges. Additionally, elite athletes can transfer their skills in coping with adversity to different domains even during challenging times.

In the first year of the pandemic, Poucher et al. (2021) conducted longitudinal research, with the last evaluation taking place one year before the Olympics. They demonstrated, similarly to our study, that the levels of anxiety, depression, and stress experienced by Olympic/Paralympic athletes were not influenced by temporal factors. However, they showed that anxiety, depression, and stress levels were high. This result may be explained by the fact that Poucher et al. (2021) conducted this study at the beginning of the pandemic, when many things were uncertain for the athletes, such as the status of the pandemic and the postponement of the competitions. The heterogeneity of athletes evaluated (Olympic/Paralympic) was one of the reasons for this discrepancy. Martínez-Patiño et al. (2021), who conducted their study during the COVID-19 pandemic, reported that Paralympic athletes had a better ability to cope with personal problems and life events, and felt less lonely during quarantine than Olympic athletes. We believe that Paralympic athletes may have a better ability to cope with life challenges, in accordance with the findings of the study by Martínez-Patiño et al. (2021).

It's possible to classify athletes as an at-risk population for the COVID-19 pandemic. It has been noted that increased symptoms of depression, anxiety, and stress are associated with uncertainty and disruptions in social interaction, education, sleep patterns, nutrition, training, and return to sports (Facer-Childs et al., 2021; Pillay et al., 2020). Pensgaard et al. (2021) found low anxiety levels and high depression levels in Olympic/Paralympic, elite, and semi-elite athletes during the COVID-19 pandemic. In addition, Olympic/Paralympic athletes had lower anxiety and depression levels compared to other elite and semi-elite athletes. According to Sokic et al. (2021), elite athletes experienced the lowest levels of stress, anxiety, and depression during the COVID-19 pandemic and curfew, followed by recreational athletes. Non-athletes had the highest scores. According to Stambulova et al. (2022), the predominant scenario adopted by Olympic and Paralympic athletes during the COVID-19 pandemic was characterized as a "fighting" scenario. In this scenario, athletes believed that the pandemic would not hinder their preparation for the Tokyo 2020 Olympic/Paralympic Games. The impact of the pandemic on sports participants provided an additional opportunity for them to demonstrate resilience and discover how well they coped with adverse conditions. Therefore, those who successfully navigated the stress encountered during this period may seek ways to gain resilience (Roslan and Cho, 2024). One reason for the difference in the literature is that most of the studies were conducted at the beginning of the COVID-19 pandemic when strict measures were taken. Also, a small number of studies have been conducted on elite athletes. Our findings are in line with the research on elite athletes. The majority of the athletes stated that the COVID-19 pandemic process and the postponement of the Paralympic Games had an impact on them. In contrast, no statistically significant differences were found in anxiety,

depression, or stress scores based on athletes' self-reported experiences with COVID-19 or the postponement of the Paralympic Games. Similarly, no significant group differences were observed between those who reported losing a relative or close friend due to COVID-19 and those who did not. There were several possible explanations for this result. The athletes included in this study did not perceived the pandemic as a threat to their performance. Paralympic athletes could also adapt to new challenges, such as the COVID-19 pandemic because they could cope with old challenges such as sports and their disabilities. Furthermore, the postponement of the Paralympic Games extended the preparatory period. Athletes might have seen this as an opportunity. These findings indicate that Paralympic athletes have managed to address the uncertainties brought about by the pandemic resiliently. Coping with the challenges posed by COVID-19 can be considered as resilience training, which has the potential to strengthen and enhance the psychological health of Paralympic athletes.

The prevalence of trait anxiety was found to be higher in females than in males in professional Swedish football players (Ivarsson et al., 2013). Likewise, a meta-analysis study found that the female gender was associated with higher competitive anxiety in athletes (Rocha and Osório, 2018). Di Fronso et al. (2022) reported that female athletes perceive higher levels of stress compared to male athletes. Watson (2016) reported that male athletes had lower perceived stress than female athletes. Female athletes in the current study exhibited higher stress and anxiety levels than their male counterparts. Numerous factors, including biological and social variables, different social roles, society's perception of women in sports, a lack of social support, gender-based prejudice, inequality, and discrimination, may contribute to this predicament. Moreover, these findings are consistent with previous literature, which suggests that biological differences, including sex hormone fluctuations and cortisol reactivity, may contribute to increased emotional sensitivity in females (Birinci et al., 2023). Although we did not directly assess hormonal parameters, these factors may be relevant in interpreting the gender-based variations observed in psychological measures.

Junge and Feddermann-Demont (2016) claimed that female athletes had higher depression levels than male athletes. In contrast, Weber et al. (2018) observed no statistically significant difference in depression levels between male and female athletes. Similar to our study, Jörngrden et al. (2006) discovered that depression ratings were not significant between male and female athletes, but that male athletes scored lower on anxiety. In this study, it was found that the levels of depression in male and female athletes did not differ significantly. The most likely causes of this inconsistency in the literature are evaluation at various times and using various scales.

Many scholars hold the view that longitudinal studies investigating the temporal factors of anxiety, depression, and stress levels in elite athletes are needed. However, there is little published data on para-athletes and female athletes. The strengths of this study are the inclusion of elite disabled athletes and the presence of female athletes. On the other hand, it was carried out in preparation for the Paralympic Games, during the pandemic, and longitudinally. Longitudinal studies are valuable for recognizing fluctuations in mental health during different training and competitive periods. They can also provide information to support athletes in challenging situations throughout their careers. A key limitation of this study is the limited number of athletes who completed all three assessment time points. These results should be interpreted with caution due to the limited sample size and low statistical power. However, we chose to include these data as an exploratory analysis to provide preliminary insight into psychological symptom trajectories in Paralympic athletes across the preparation period. These findings, while not generalizable, may contribute to the foundation for future longitudinal

research with larger samples. Several factors may have contributed to this issue. By the final weeks leading up to the Paralympic Games, it had become clear which athletes would not be included in the final competition roster, which may have negatively affected their motivation to complete the final psychological assessment. Conversely, for those who were selected to compete, the increasing proximity of the Games may have heightened their stress and time demands, limiting their willingness or availability to participate. These logistical and psychological dynamics likely contributed to the reduced response rate at the final time point.

Further longitudinal studies on the mental health of Paralympic athletes are suggested. Another possible area of future research would be to investigate the correlation between these athletes' mental health and their participation in individual/team sports. Particularly, it can also focus on studying a larger sample group and post-competition evaluations can be added.

CONCLUSION

Although the uncertainties brought about by COVID-19 and the challenges inherent in the Paralympic Games, Paralympic athletes have low levels of anxiety, depression, and stress symptoms during the preparation period, and these levels have remained stable throughout the process. However, gender differences were observed in this study. This study provides important information about the anxiety, depression, and stress symptoms experienced by Paralympic athletes while preparing for the Games. These results suggest that participation in sports may be associated with lower psychological risk levels; however, clinical evaluations are needed for diagnostic interpretations. Also these rates have remained stable during the season leading up to the Paralympic Games. Taken together, these results suggest that participating in sports can help disabled people cope with a wide range of problems in daily life, including disability and the COVID-19 pandemic. Moreover, Paralympic athletes who successfully manage problems arising from their disabilities and elite athletic performance may be skilled at overcoming different conditions and challenges. Overall, these results strengthen the idea that the participation of disabled individuals in sports, especially women, should be supported. This study adds to the rapidly expanding field of the sports psychology.

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