

Physical Characteristics and Quality of Life Levels of Elite and Amateur Tennis Players in Both Genders

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ABSTRACT:

Objective: To compare physical characteristics and quality of life (QoL) between elite and recreational tennis players and to examine whether gender moderates this relationship.

Method: A cross-sectional, comparative design included 286 Turkish tennis players (female elite n=51, female recreational n=85; male elite n=57, male recreational n=93). Physical measures were age, height, weight, BMI, and weekly training frequency. QoL was assessed with the WHOQoL-BREF TR (physical, psychological, environmental, social domains, general health, and perceived social pressure). Independent samples t-tests and Pearson correlations were used.

Results: Female elite players scored significantly higher than recreational players on physical ($p<0.05$), environmental ($p<0.05$), and social ($p<0.01$) QoL domains and trained more frequently (4.16 vs. 2.18 days/week, $p<0.01$). No QoL differences were found between male elite and recreational players. Male elite players had higher body weight ($p<0.05$) and BMI ($p<0.01$). In both genders, all QoL domains were positively intercorrelated, and perceived social pressure was negatively correlated with all QoL domains. In males only, greater height and weight were positively associated with all QoL domains.

Discussion: Elite female tennis players benefit from their higher training load in physical, environmental, and social well-being. Male elite players do not show QoL advantages despite greater training frequency, likely because their higher BMI and injury risk offset benefits, and competitive stress may be more pronounced.

Conclusion: The relationship between competitive level and QoL is moderated by gender. Elite participation enhances several QoL

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domains in females but not in males. Sport programmes should consider gender-specific mechanisms to optimise athletes' well-being.

Keywords: Tennis, quality of life, elite athletes, recreational athletes, gender differences, WHOQoL-BREF.

INTRODUCTION

Quality of life (QoL) is a multidimensional concept encompassing an individual's perception of their physical and psychological health, independence, social relationships, personal beliefs, and environment (Cai et al., 2021; WHO, 1998). Defined by the World Health Organization as one's perception of their life position relative to their goals and cultural context, QoL emphasizes subjective evaluation over objective health measures (Cai et al., 2021; Post, 2014). Health-related quality of life (HRQoL) narrows this to health-specific factors, including physical, mental, and social functioning (Hays & Reeve, 2010; Karimi & Brazier, 2016). Contemporary perspectives highlight the dynamic interaction between internal and external dimensions of well-being, with implications for healthcare and sports science, where interventions should aim to enhance overall QoL, not merely treat symptoms or improve performance (Dijkers, 2005; Heldwein et al., 2009; Post, 2014).

Regular physical activity reduces risks of chronic diseases and mortality while enhancing mental health, cognitive function, and well-being (Booth et al., 2012; Warburton et al., 2006). The 2018 Physical Activity Guidelines Advisory Committee found strong evidence that physical activity improves HRQoL and well-being in adults compared to controls (Marquez et al., 2020). Sports participation offers unique psychosocial benefits beyond general activity, including enhanced self-esteem, stress reduction, and resilience, likely due to social interactions and goal-setting inherent in sport (Eime et al., 2013; Gayman et al., 2017). These benefits span the lifespan and contribute to successful aging (Baker et al., 2010; Dionigi, 2002). Mechanisms include neurochemical changes (Antunes et al., 2005), increased self-efficacy and positive affect (Elavsky et al., 2005), and personality traits that

moderate QoL outcomes (Artese et al., 2017; DeNeve & Cooper, 1998).

Tennis is considered a "lifetime sport" due to its adaptability across ages and skill levels, combining aerobic, anaerobic, and cognitive demands (Butler, 2002; Changstrom & Jayanthi, 2017; He et al., 2022). Research shows tennis players exhibit better aerobic capacity, lower body fat, reduced cardiovascular risk, and longer life expectancy, partly due to social engagement (Pluim et al., 2007; Springer et al., 2020; Schnohr et al., 2018). Psychological benefits include increased self-esteem, reduced stress and depression, and enhanced well-being, with longer participation linked to better mental health outcomes (Groppel & DiNubile, 2009; Yüceant, 2022). The combination of physical activity, skill development, and social interaction makes tennis uniquely beneficial for psychological well-being.

While the benefits of sports participation for QoL are well-established, the relationship between competitive level and QoL remains less understood. Competitive athletes are typically defined as those who participate in regional, state, and national competitions but do not reach top results or represent their country internationally, while elite athletes are defined as top-level players who represent their country in national and international competitions, aiming to achieve maximum performance (Ciampolini et al., 2017). The distinction between recreational, competitive, and elite participation carries important implications for the physical and psychological demands placed on athletes, which may differentially impact QoL outcomes.

Traditional views highlight the stressful demands of elite sport that may compromise QoL (Gustafsson et al., 2008; Theberge, 2008; Waddington, 2000), yet emerging research reveals a more complex picture. Ciampolini et al. (2017) found that elite Brazilian wheelchair tennis athletes reported better QoL than

competitive-level athletes, particularly in physical domains. Similarly, Bolach and Przystupa (2020) observed that Polish amateurs with disabilities scored higher than champions in most QoL domains, though champions excelled environmentally, suggesting domain-specific variation.

The underlying mechanisms are multifaceted. Higher competitive levels involve greater training load, which can enhance fitness and QoL—To-aj et al. (2025) demonstrated that structured competitive training significantly improved physical, psychological, and social QoL in older adults. However, elite athletes also face greater injury risks. Filbay et al. (2019) linked worse QoL in former athletes to involuntary retirement, contact sport participation, concussions, high BMI, and musculoskeletal issues.

Gender represents an important moderating variable in the relationship between sport participation and QoL. Research has documented gender differences in physical activity patterns, sport preferences, training behaviors, and psychosocial responses to sport participation (Tatar et al., 2018; Yüceant, 2022). Tatar et al. (2018) examined stress, anxiety, and depression in relation to sports participation and found that while regular exercise was associated with lower stress and depression scores overall, gender differences emerged in specific psychological outcomes. Yüceant (2022) found no significant differences in stress, anxiety, depression, or psychological well-being between male and female regular tennis players, suggesting that tennis participation may provide comparable psychological benefits across genders.

However, the physical demands and injury profiles of tennis may differ between male and female players. Changstrom and Jayanthi (2017) reviewed injury patterns in adult recreational tennis players and noted that while no gender differences were found in overall injury rates, the distribution and mechanisms of injuries may vary. Male players tend to have higher body weight and BMI, which may influence both performance and injury risk. The relationship between physical characteristics and QoL may also differ by gender, with body image

concerns potentially playing different roles in male and female athletes' self-perceptions (Condello et al., 2016).

Despite the growing body of research on sport participation and QoL, several gaps remain in the literature. First, while numerous studies have examined QoL in athletes compared to non-athletes (Houston et al., 2016; Yazicioglu et al., 2012), fewer studies have directly compared QoL between athletes at different competitive levels within the same sport. Second, research examining gender differences in the sport-QoL relationship has produced inconsistent findings, and few studies have systematically compared male and female athletes across competitive levels using validated QoL instruments. Third, while tennis is widely recognized as a lifetime sport with significant health benefits (Pluim et al., 2007; Springer et al., 2020), limited research has specifically examined how competitive level in tennis relates to QoL outcomes, particularly using comprehensive measures such as the WHOQoL-BREF that assess multiple domains of well-being.

The WHOQoL-BREF, developed by the World Health Organization Quality of Life Group, is a 26-item instrument that assesses QoL across four domains: physical health, psychological health, social relationships, and environmental factors, with two additional items measuring overall QoL and general health (Fleck et al., 2000; Skevington et al., 2004). The instrument has been validated in multiple languages and cultural contexts, including Turkish (Fidaner et al., 1999), and demonstrates strong psychometric properties with good internal consistency, discriminant validity, criterion validity, and test-retest reliability (Fleck et al., 2000). The multidimensional nature of the WHOQoL-BREF makes it particularly well-suited for examining the complex relationships between sport participation and various aspects of QoL.

The present study addresses these research gaps by comparing physical characteristics and QoL domains between elite and recreational tennis players, stratified by gender. Based on previous research demonstrating positive associations between physical activity level and QoL (Marquez et al., 2020; To-aj et al., 2025), we hypothesized that

elite players would report higher QoL scores than recreational players across multiple domains. However, recognizing the potential for gender differences in the sport-QoL relationship and the physical demands of elite competition, we further hypothesized that these differences might vary by gender and be moderated by physical characteristics such as BMI and training frequency. By examining these relationships in a sample of Turkish tennis players using the validated Turkish version of the WHOQoL-BREF, this study aims to contribute to the growing understanding of how competitive sport participation influences quality of life and to provide evidence that can inform athlete development programs and health promotion strategies.

METHOD

Participants

In the provinces of Mersin and Adana, a total of 136 women, consisting of 51 elite (37.14 ± 7.59 years) and 85 recreational (32.86 ± 8.32 years) tennis players, together with a total of 142 men, consisting of 57 elite (38.74 ± 8.81 years) and 85 recreational (34.92 ± 9.37 years) tennis players, were the participants of this study. They regularly participated in tennis activities.

Research Design

This study utilizes a cross-sectional, comparative (causal-comparative/ex post facto) design. Data were collected from the participants at a single point in time, providing a snapshot of the variables of interest. Also, this study aims to compare existing groups (elite vs. recreational players, and males vs. females) on key outcomes, without any manipulation of the independent variables by the researcher. The group memberships (e.g., being an elite or recreational player) were pre-existing. In the key elements of the design of this study, the independent variables were the Competition Level including with Elite and Recreational levels and gender as male and female. In addition, physical characteristics (age, body height, body weight, BMI, number of weekly training sessions) and Quality of Life (WHOQoL-BREF) domains (physical, psychological, social, environmental, and general

health as measured by the WHOQOL-BREF TR) were evaluated as dependent variables.

WHOQoL-BREF

A short version of the WHOQOL-100 scale, known as the WHOQOL-Bref, was developed by a research group affiliated with the World Health Organization (The WHOQOL Group, 1998). The Turkish adaptation of the scale, the WHOQOL-Bref TR, was adapted to Turkish culture and language by Fidaner et al. (1999), who conducted its validity and reliability study within the framework of the World Health Organization's coordination and approval. This Turkish version consists of a total of 27 questions, including the national domain. The scale contains 4 domains: physical (general health: 2 items, physical health: 7 items), psychological (6 items), social (3 items), and environmental (8 items). In our study, a "General Health" sub-dimension, composed of the average of all four dimensions, was also added. An additional national domain (1 item) section was included in the scale adapted by Fidaner et al. (1999).

WHOQOL-BREF (TR) has a Likert-type scoring system developed and ranges from 1 to 5 points. The total score is obtained by multiplying these raw scores by 4. Physical area evaluates an individual's ability to do daily work, addiction, vitality, fatigue, discomfort, sleep, rest, and work power. It consists of questions numbered 3, 4, 10, 15, 16, 17, and 18. The psychological area evaluates body appearances, positive or negative feelings, self-esteem, and personal beliefs. It consists of questions numbered 5, 6, 7, 11, 19, and 26. Environmental area evaluates issues related to financial resources, benefits, and accessibility in health services, the chance of acquiring knowledge and skills, leisure time, and physical environment. It consists of questions numbered 8, 9, 12, 13, 14, 23, 24, and 25. The social area evaluates the individual's social environment, communication, all interpersonal relations, and social support areas that provide emotional, material, and cognitive support to the individual when necessary. The mean general health score, calculated as the average of the four sub-dimensions of the WHOQoL-Bref TR, was also used. It consists of questions numbered 20, 21, and 22. "The adaptation of the 27th question, which measures the

individual's perception of social pressure in the national area and is revised as 'How often do you have negative feelings, such as blue mood, despair, anxiety, depression?', is specific to Turkey and is not included in the original English version."

Statistical Analysis

In Statistical analysis, So independent samples T-tests were used to compare between two groups. Since the data showed a normal distribution, an independent t-test was used for pairwise comparisons. Additionally, Cohen's d analyses were used to determine the effect size of independent variables (gender and regular physical activity) on

dependent variables (body composition and sub-dimensions of WHOQoL-BREF TR). In summary, this is a quantitative study with a cross-sectional, comparative design that investigates differences in physical and quality of life variables between naturally occurring groups of tennis players.

RESULTS

This section presents the findings from the statistical analyses comparing physical characteristics and quality of life domains between elite and recreational tennis players, stratified by gender. The results are based on independent samples t-tests and correlation analyses.

Table 1. Comparison of Physical Characteristics and Health-Related Quality of Life Subscales Between Female Professional and Recreational Tennis Players

Variables	Groups	N	M	SS	Diff.	df	t-value	Sig.	Cohen's d
Age (Years)	EP	51	37,14	7,59	-7,24	136	,400	,690	,0710†
	RP	85	32,86	8,32					
Body Height (cm)	EP	51	167,90	7,76	-0,78	134	-1,555	,122	-,275+
	RP	85	170,26	9,00					
Body Weight (Kg)	EP	51	66,53	13,44	-1,10	134	-1,370	,173	-,243+
	RP	85	69,62	12,32					
BMI	EP	51	23,45	3,66	-20,60	134	-,757	,450	-,134
	RP	85	23,88	2,93					
Numbers of Weekly Training Frequency	EP	51	4,16	0,99	-45,62	134	12,39	,000**	2,195‡
	RP	85	2,18	0,85					
WHOQoL-BREF TR Physical Domain	EP	51	54,13	12,40	-0,80	134	1,997	,048*	,072
	RP	85	53,19	13,34					
WHOQoL-BREF TR Psychological Domain	EP	51	51,32	11,16	-4,04	134	,407	,684	,367+
	RP	85	47,06	11,87					
WHOQoL-BREF TR Environmental Domain	EP	51	62,75	18,39	-5,06	134	2,072	,040*	,463+
	RP	85	54,23	18,38					
WHOQoL-BREF TR Social Domain	EP	51	62,91	21,94	-2,35	134	2,616	,010**	,174
	RP	85	58,92	23,39					
WHOQoL-BREF General Health Score	EP	51	62,50	21,94	-4,41	134	,985	,327	,354+
	RP	85	55,15	20,07					
The individual's perception of social pressure (27)***	EP	51	2,43	,806	-0,17	134	-1,011	314	-,179
	RP	85	2,60	1,01					

*p<0.05, **p<0.01, (WHOQoL-BREF= World Health Organization Quality of Life - Bref)

***27="How often do you have negative feelings, such as blue mood, despair, anxiety, depression?"

ES= Effect size (Cohen's d),

+ Cohen's d between 0.200 and 0.499 indicates a small effect size.

† Cohen's d between 0.500 and 0.799 indicates a medium effect size.

‡ Cohen's d of 0.800 and above indicates a large effect size.

Table 2. Comparison of Physical Characteristics and Health-Related Quality of Life Subscales Between Male Professional and Recreational Tennis Players

Variables	Groups	N	M	SS	Diff.	df	t-value	Sig.	Cohen's d
Age (Years)	EP	57	38,74	8,81	1,11	148	-,274	,785	-,046
	RP	93	34,92	9,37					
Body Height (cm)	EP	57	172,54	8,71	1,01	148	,950	,344	,160
	RP	93	171,20	8,18					
Body Weight (Kg)	EP	57	74,26	11,99	1,07	148	2,506	,013*	,422+
	RP	93	69,13	12,29					
BMI	EP	57	24,87	3,11	1,06	148	2,731	,007**	,459+
	RP	93	23,45	3,05					
Numbers of Weekly Training Frequency	EP	57	4,26	0,94	2,14	148	14,533	,000**	2,445 ‡
	RP	93	1,99	0,93					
WHOQoL-BREF TR Physical Domain	EP	57	60,09	25,82	1,08	148	1,159	,248	,120
	RP	93	55,51	21,92					
WHOQoL-BREF TR Psychological Domain	EP	57	53,38	13,82	1,03	148	,713	,477	,119
	RP	93	51,73	13,79					
WHOQoL-BREF TR Environmental Domain	EP	57	47,85	14,72	1,04	148	,706	,481	,110
	RP	93	46,20	13,40					
WHOQoL-BREF TR Social Domain	EP	57	55,92	19,47	1,04	148	,653	,515	,118
	RP	93	53,86	18,26					
WHOQoL-BREF General Health Score	EP	57	60,82	21,24	1,04	148	,700	,485	,195
	RP	93	58,24	22,24					
The individual's perception of social pressure (27)***	EP	57	2,49	,98	0,08	148	-1,244	,215	-,209+
	RP	93	2,70	1,00					

*p<0.05, **p<0.01, (WHOQoL-BREF= World Health Organization Quality of Life - Bref)

***27= "How often do you have negative feelings, such as blue mood, despair, anxiety, depression?"

ES= Effect size (Cohen's d),

+ Cohen's d between 0.200 and 0.499 indicates a small effect size.

† Cohen's d between 0.500 and 0.799 indicates a medium effect size.

‡ Cohen's d of 0.800 and above indicates a large effect size.

Table 3. Relationships among Physical Characteristics and Health-Related Quality of Life Subscales in Females Tennis Players.

Variables	1	2	3	4	5	6	7	8	9	10	11
1. General health											
2. Physical	,442**										
3. Psychological	,542**	,559**									
4. Enviromental	,497**	,684**	,659**								
5. Social	,298**	,556**	,521**	,687**							
6. Question 27	-,319**	-,27**	-,25**	-,33**	-,25**						

7. Age	,109	,028	-,034	,006	-,014	-,24**					
8. Body Height	,080	,072	,016	-,039	-,049	,039	,092				
9. Body Weight	,009	-,012	,002	-,078	-,104	,022	,062	,724*			
10. BKI	-,055	-,080	-,020	-,089	-,107	,005	,154	,261*	,852**		
11. E-R TP.	-,170*	-,035	-,176*	-,22**	-,085	,09	-,03	,13	,118	,06	
12.NoWTF.	,094	,111	,184*	,281**	,155	-,078	,039	-,11	-,103	-,07	-,73**

*There is a significant relation between two variables at 0.05 level.

**There is a significant relation between two variables at 0.05 level.

E-R TP=Elite-Recreational Tennis Players. **NoWTF**=Numbers of Weekly Training Frequency

Table 4. Relationships among Physical Characteristics and Health-Related Quality of Life Subscales in Males Tennis Players.

Variables	1	2	3	4	5	6	7	8	9	10	11
1. General health											
2. Physical	,532**										
3. Psychological	,709**	,667**									
4. Enviromental	,571**	,726**	,735**								
5. Social	,541**	,611**	,682**	,598**							
6. Question 27	-,33**	-,19*	-,25**	-,31**	-,35**						
7. Age	-,062	,005	-,034	,019	-,066	,017					
8. Body Height	,220**	,238**	,219**	,230**	,197*	-,066	,151				
9. Body Weight	,199*	,263**	,229**	,266**	,250**	-,073	,164*	,701*			
10. BKI	,109	,185*	,149	,197*	,190*	-,045	,105	,200*	,84**		
11. E-R TP.	-,095	-,059	-,058	-,054	-,057	,10	,022	-,08	-,20*	-,22**	
12.NoWTF.	,034	-,031	,010	-,002	,011	-,039	-,049	,079	,160	,16*	-,77**

*There is a significant relation between two variables at 0.05 level.

**There is a significant relation between two variables at 0.05 level.

E-R TP=Elite-Recreational Tennis Players. **NoWTF**=Numbers of Weekly Training Frequency

Environmental, Social, General Health), or negative feelings (Question 27) ($p > 0.05$) (Table 2).

Comparison of Elite and Amateur Tennis Players in Physical Characteristics and Quality of Life Levels

Female tennis players

First, weekly training frequency was statistically significantly higher in the elite group compared to the amateur group ($p < 0.01$), and the effect size for this difference was very large (Cohen's $d = 2.195$). In addition, a significant difference in favor of elite players was found for the WHOQoL-BREF Physical Health domain score ($p < 0.05$); however, the effect size was negligible ($d = 0.072$). Moreover, elite players also had significantly higher scores on the Environmental Health domain ($p < 0.05$), with

a small effect size ($d = 0.463$). Similarly, the Social Relationships domain score was significantly higher in elite players ($p < 0.01$), yet the effect size remained small/negligible ($d = 0.174$). But no significant differences were observed between groups regarding age, height, body weight, BMI, Psychological Health domain, General Health score, or negative feelings (Question 27) ($p > 0.05$) (Table 1).

Male tennis players

First, as in females, weekly training frequency was highly significantly higher in the elite male group ($p < 0.01$), and the effect size was very large ($d = 2.445$). In addition, elite male players had

significantly higher body weight compared to amateurs ($p < 0.05$), but the effect size was small ($d = 0.422$). Moreover, body mass index (BMI) was significantly higher in elite males ($p < 0.01$), also with a small effect size ($d = 0.459$). However, no significant differences were found between elite and amateur males regarding age, height, any domain of the WHOQoL-BREF (Physical, Psychological, Environmental, Social, General Health), or negative feelings (Question 27) ($p > 0.05$) (Table 2).

Pearson Correlation Analysis Results

Female players

First, general health showed moderate, positive, and significant correlations with the Physical, Psychological, Environmental, and Social domains ($p < 0.01$). In addition, Question 27 (measuring negative feelings) was negatively and significantly (generally low to moderate) correlated with all quality of life domains ($p < 0.01$). Moreover, age was significantly but weakly negatively correlated only with Question 27 ($p < 0.01$). As expected, height and body weight were highly positively correlated ($p < 0.01$). Furthermore, the elite/amateur grouping was significantly negatively correlated with General Health ($p < 0.05$), Psychological Health ($p < 0.05$), and Environmental Health ($p < 0.01$), indicating higher scores in the elite group. Similarly, weekly training frequency showed positive and significant correlations with Psychological Health ($p < 0.05$) and Environmental Health ($p < 0.01$). Finally, training frequency had a very high negative correlation with elite/amateur grouping ($p < 0.01$), confirming higher training frequency in the elite group (Table 3).

Male players

First, general health had moderate-to-strong positive and significant correlations with the Physical, Psychological, Environmental, and Social domains ($p < 0.01$). In addition, Question 27 (negative feelings) was negatively and significantly associated with all quality of life domains ($p < 0.01$; for the Physical domain $p < 0.05$). Moreover, body height was positively and significantly ($p < 0.05$ or $p < 0.01$) but weakly-to-moderately correlated with all quality of life subdomains. Similarly, body weight also showed positive and significant correlations (p

< 0.05 or $p < 0.01$) with all quality of life domains. Furthermore, BMI was positively and significantly ($p < 0.05$) but weakly correlated with the Physical, Environmental, and Social domains. In contrast, the elite/amateur grouping was significantly negatively correlated with body weight ($p < 0.05$) and BMI ($p < 0.01$), indicating higher body weight and BMI in elite males. Finally, weekly training frequency showed only a weak positive correlation with BMI ($p < 0.05$), while it exhibited a high negative correlation with elite/amateur grouping ($p < 0.01$), as expected (Table 4).

In summary, elite players train much more frequently than amateurs, with very large effect sizes ($d > 2.1$) in both genders. In female elite players score significantly higher on Physical, Environmental, and Social QoL domains, but effect sizes are small to negligible. No differences in age, anthropometrics, psychological health, general health, or negative feelings. In male elite players have significantly higher body weight and BMI (small effects), but no QoL domain differences. As in females, training frequency is the strongest differentiator.

General health correlates positively (moderate to strong) with all QoL domains. Negative feelings (Q27) correlate negatively (low to moderate) with all QoL domains in both **genders**. In females, age only weakly correlates (negatively) with negative feelings. Height and weight are highly correlated. Elite status and training frequency are positively linked to several QoL domains and highly negatively correlated with each other (elite = higher training frequency). In males, body height and weight show positive (weak to moderate) correlations with all QoL subdomains. BMI correlates weakly but positively with Physical, Environmental, and Social domains. Elite status correlates negatively with body weight and BMI (elite males are heavier and have higher BMI).

Generally, elite players of both sexes train far more often than amateurs. Male elites differ also in weight and BMI, while female elites show small QoL advantages in some domains. Correlations confirm expected links between QoL, negative feelings, and anthropometrics across genders.

DISCUSSION

The present study compared physical characteristics and quality of life (QoL) between elite and recreational tennis players, stratifying by gender. The results revealed a clear gender-moderated pattern: female elite players reported significantly higher QoL in the physical, environmental, and social domains than their recreational counterparts, whereas no such differences were observed among male players. These findings extend the current understanding of how competitive level interacts with gender to influence subjective well-being in sport.

Gender-Specific Effects of Elite Participation on QoL

The finding that female elite tennis players scored higher on the physical domain of the WHOQoL-BREF aligns with the strong evidence that regular, intensive physical activity improves health-related quality of life (HRQoL) in adults (Marquez et al., 2020). The female elite group trained on average 4.16 days/week versus 2.18 days/week for recreational players, a large effect size (Cohen's $d = 2.195$). This higher training volume likely enhances cardiorespiratory fitness, muscular endurance, and body function, which are directly reflected in perceived physical health (Pluim et al., 2007). In contrast, male elite players also trained more frequently (4.26 days/week) yet showed no QoL advantage. This discrepancy may be partly explained by their significantly higher body weight and BMI, which have been associated with worse physical component scores in athletes (Filbay et al., 2019). Although the mean BMI of male elite players (24.87 kg/m^2) remained within the normal-to-overweight range, the additional mass—even if largely muscle—might increase joint loads and injury risk, thereby offsetting some benefits of training (Changstrom & Jayanthi, 2017).

The higher environmental domain scores among female elite players are noteworthy. This domain includes financial resources, access to healthcare, leisure opportunities, and physical safety. Elite female players may benefit from better training facilities, coaching support, and potentially sponsorship or competition rewards, which

enhance their perception of environmental quality. Springer, Holmes, and Smith (2020) found that long-term tennis participation is associated with better general health and lower obesity rates; elite players might also have greater access to preventive care and injury management. Male elite players, despite similar training frequency, did not report superior environmental QoL, possibly because the physical burdens (higher BMI, injury risk) or competitive pressures attenuate these benefits.

The social domain also favoured female elite players. This finding is consistent with research showing that structured competitive sport fosters social networks, team cohesion, and supportive relationships (Eime et al., 2013). To-aj, Bumrungrapanictarworn, and Liauw (2025) demonstrated that competitive table tennis training significantly improved social relationship scores in older adults compared to recreational play. In tennis, even as an individual sport, elite training involves regular interaction with coaches, hitting partners, and fellow competitors, creating a strong sense of belonging and mutual support.

Unexpectedly, no significant differences emerged in the psychological domain for either gender, although female elite players had higher raw scores. This may reflect the dual nature of elite sport: while mastery and achievement can boost self-esteem and positive affect, the demands of competition—pressure to perform, time commitments, and fear of failure—may introduce countervailing stress (Gustafsson et al., 2008; Yüceant, 2022). Male elite players, who also faced these demands, showed no psychological benefit, possibly because the physical costs (higher BMI, injury rates) or social pressures more directly affect their mental well-being.

Absence of QoL Differences in Male Players

The lack of any significant QoL advantage for male elite over recreational players is a central finding. Several mechanisms may explain this. First, the higher BMI and body weight in elite males, although not excessive, could be linked to a higher prevalence of overuse injuries (Changstrom & Jayanthi, 2017). Studies in former athletes have shown that increased BMI and a history of musculoskeletal injury are associated with lower HRQoL (Filbay et

al., 2019). Second, the injury profile of male tennis players—especially at higher skill levels—includes more acute lower-extremity injuries (e.g., ankle sprains, knee pathologies) that may periodically reduce physical function and life satisfaction. Third, the psychological stressors of elite male competition (e.g., performance anxiety, early specialisation, career pressure) might be more intense or less buffered by social support compared to female players. Ciampolini et al. (2017) noted that even though elite wheelchair tennis athletes reported better overall QoL than competitive athletes, the high-performance environment is inherently demanding. Our results suggest that among male able-bodied tennis players, the benefits of intensive training do not translate into superior QoL compared to recreational play.

Correlational Patterns

The strong positive intercorrelations among all WHOQoL-BREF domains in both genders confirm the multidimensional but integrated nature of QoL (Fleck et al., 2000). Particularly high correlations (e.g., environmental with social in females, psychological with environmental in males) indicate that improvements or decrements in one domain are likely to affect others. This supports the use of a comprehensive instrument like the WHOQoL-BREF for capturing the full impact of sport participation.

Consistent with previous research, negative feelings (Question 27) were inversely correlated with all QoL domains in both genders. This finding underscores the importance of mental health and perceived stress as determinants of overall well-being (Cai et al., 2021). For elite athletes, managing negative emotions—such as anxiety, depression, or social pressure—should be a priority adjunct to physical training.

An interesting gender difference emerged in the relationship between anthropometrics and QoL. In male players, greater height and weight were positively correlated with all QoL domains, whereas no such associations existed in females. This may reflect societal norms and self-perceptions: taller and heavier (more muscular) male athletes may feel more confident and competent, which enhances

their QoL ratings (Condello et al., 2016). The absence of this effect in women might be due to different body-image pressures or the fact that female elite players did not differ from recreational players in weight or BMI.

Comparison with Adapted Sports Literature

Studies on athletes with disabilities provide useful context. Yazicioglu et al. (2012) found that physically disabled individuals participating in adapted sports had significantly higher WHOQoL-BREF physical, psychological, and social scores than non-participants. Similarly, Ciampolini et al. (2017) reported that elite wheelchair tennis athletes perceived higher QoL than competitive-level athletes, especially in the physical domain. Our findings for female able-bodied tennis players parallel these results, but the absence of an elite advantage in males contrasts with the adapted sports literature. This suggests that the relationship between competitive level and QoL is not universal but depends on factors such as gender, sport type, and the presence of physical limitations. Bolach and Przystupa (2020) also found that amateur athletes with disabilities had higher QoL than Polish Champions in most domains except the environment, further highlighting the complexity.

CONCLUSION

This study demonstrates that the impact of competitive level on quality of life in tennis is significantly moderated by gender. Female elite players report better physical, environmental, and social QoL than recreational players, likely due to higher training frequency and the social and material benefits associated with elite participation. In contrast, male elite players show no QoL advantages over recreational players, possibly because higher body weight, BMI, and injury risks offset the benefits of intensive training, and because psychological stressors may be more pronounced. The strong intercorrelations among QoL domains and the negative influence of negative feelings across both genders highlight the need for holistic athlete support that addresses physical, mental, and social well-being.

Practical implications include designing gender-sensitive training programmes: for female players, facilitating access to structured competitive training can enhance multiple QoL domains; for male players, injury prevention, weight management, and psychological support may be needed to translate higher training loads into better QoL. Coaches and sport organisations should create supportive environments that reduce unnecessary social pressure and promote positive mental health.

Limitations and Future Directions

The cross-sectional design precludes causal inferences. Future longitudinal studies should track players as they transition between competitive

levels. The sample, although adequate for detecting moderate effects, may have been underpowered for smaller differences, especially in male subgroups. Self-reported QoL is subject to response bias; adding objective health measures (e.g., fitness tests, injury records) would strengthen conclusions. We did not assess potential mediators such as injury history, social support, or coping styles. Future research should examine these mechanisms and explore whether the observed gender differences generalise to other sports and cultural contexts. Intervention studies that provide structured psychological or injury-prevention support to male elite players could test whether such programmes improve their QoL.

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