Mental Health in Elite Taekwondo Athletes

Survey Report

Sustainability Strategy

April 2024

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Executive Summary

World Taekwondo, aligning with the UN Agenda for Sustainable Development and the IOC Olympic Agenda 2020+5, devised its Sustainability Strategy in 2022 with three focus areas. As part of the Health & Well-being Focus Area, World Taekwondo launched its own Mental Health Survey on 10 October 2023 coinciding with World Mental Health Day. This survey aimed to assess the mental well-being of elite Taekwondo athletes, utilizing a modified version of the International Olympic Committee Sport Mental Health Assessment Tool 1 (SMHAT-1) tailored to Taekwondo athletes' needs.

The survey covered 515 athletes across five continents, three disciplines, and four competition phases. It analyzed sport-related psychological distress through the Athlete Psychological Strain Questionnaire (APSQ), as well as anxiety, depression, and disordered eating among elite athletes. Key findings in demographics revealed higher levels of anxiety and depression among female athletes compared to males. Athletes aged 26 to 31 reported the highest levels of psychological distress, anxiety, and depression, while those aged 31 and above reported the lowest ones. Significantly, Africa exhibited lower anxiety scores, while Asia demonstrated higher disordered eating scores. Europe, on the other hand, displayed lower disordered eating scores, while Pan America revealed higher depression scores. Kyorugi athletes demonstrated higher APSQ and disordered eating scores, while Poomsae athletes had significantly lower disordered eating scores. Pre-competition phases correlated with significantly higher anxiety levels. Athletes practicing actively for 7-10 years showed significantly higher APSQ scores. Lastly, athletes with prior injuries exhibited significantly higher levels of psychological distress, anxiety, and depression.

Based on these findings, World Taekwondo plans to collaborate and share the survey results with other institutions to raise awareness about mental health in sports. This collaboration will involve working alongside sports institutions, mental health professionals, and sports psychologists to develop effective solutions for elite athletes facing mental health challenges. Furthermore, World Taekwondo plans to introduce new mental health courses and materials to educate all stakeholders about the importance of mental well-being within the sport.

In conclusion, mental health is integral to both an athlete’s growth and career. The survey findings have highlighted the prevalence of psychological distress, anxiety, depression, and disordered eating among elite Taekwondo athletes, emphasizing the imperative need for intervention and support. World Taekwondo's commitment to establishing a support system represents a key step towards prioritizing the mental health of athletes, ensuring they have the resources and assistance necessary to thrive both in and out of competition.

1. Introduction

In response to the increasing recognition of mental health as a critical aspect of athlete well-being, World Taekwondo (WT) initiated a substantial effort to investigate the mental health status of elite-level Taekwondo athletes. With the context of the World Mental Health Day on October 10, 2023, WT launched a comprehensive survey titled "Mental Health in Elite Level Taekwondo Athletes." The survey, aligned with World Taekwondo's Sustainability Strategy, particularly focusing on Health and Wellbeing (HNW), aimed to understand the current mental health landscape within the elite Taekwondo community. This report presents a summary of the survey results, which not only reflect WT's commitment to the holistic well-being of athletes but also contribute significantly to the ongoing dialogue surrounding mental health in sports.

2. Method

Initially, the Health and Wellbeing (HNW) working group of the Sustainability Committee convened on August 31, 2023, to conceptualize the survey. Following this, the Medical Committee analyzed the survey content on October 4, 2023, providing necessary feedback before the official launch.

On October 10, 2023, World Taekwondo initiated the survey, targeting athletes aged 21 or older actively participating in Taekwondo events, specifically those who had engaged in at least one G-grade event in the past two years. Recruitment primarily occurred through direct communication channels managed by World Taekwondo.

The survey, available in Arabic, French, Spanish, and English, started with athletes accepting an informed consent before proceeding to fill out the questionnaire. Once consent was acknowledged, athletes shared detailed information including continental union, gender, age, discipline, years as an active athlete, years competing at G-ranked events, and any current experiences such as injury or illness. This initial requirement ensured ethical compliance and informed participation in the survey.

Subsequently, athletes completed four questionnaires designed to measure sport-related psychological distress, anxiety, depression, and disordered eating. These questionnaires were directly sourced from the Sport Mental Health Assessment Tool 1 (SMHAT-1) developed by the International Olympic Committee (IOC). Specifically, the Athlete Psychological Strain Questionnaire (APSQ) assessed psychological distress, while self-report rating scales were employed to evaluate anxiety, depression, and disordered eating. The APSQ comprises 10 items tailored to the sport context, assessing concerns such as worry about injury or performance over the past 30 days. Similarly, the anxiety, depression, and disordered eating scales consist of 7, 9, and 6 items respectively, capturing symptoms experienced over the last two weeks.

Following the closure of the survey on November 24, 2023, collected responses were entered into a database for statistical analysis and data cleaning. Statistical analyses comprised descriptive statistics to summarize participant characteristics, followed by Multiple Regression Analyses (MRAs) to explore relationships between dependent (psychological distress, anxiety, depression, disordered eating) and independent variables (gender, age, continental union, discipline, competition phase, years as an active athlete, injury). Dummy variables were created for categorical independent variables, enabling regression analysis while controlling for relevant covariates.

3. Results

3.1. Descriptive Statistics

After data cleaning, out of a total of 515 responses, 16 were excluded from further analysis mainly because participants did not agree with the informed consent. Participants comprised 311 (62.3%) males and 188 (37.7%) females, 240 (48.1%) from 21-25 years old, 79 (15.8%) from 26-30, and 180 (36.1%) 31 years old and above. Among the athletes, 99 (19.8%) belong to the Continental Union (CU) of Africa, 128 (25.7%) to Asia, 98 (19.6%) to Europe, 42 (8.4%) to Oceania, and 132 (26.5%) to Pan America.

Kyorugi/Sparring is performed by 331 (66.3%) athletes, while 144 (28.9%) practice Poomsae/Forms, and 24 (4.8%) Para Taekwondo. Less than 3 years of active participation in Taekwondo was reported by 51 (10.2%) athletes, 83 (16.6%) reported 4-7 years of active participation, 96 (19.2%) reported 7-10 years, and 269 (53.9%) 11 years and above. Similarly, 254 (50.9%) have less than 3 years of competition experience in WT G-ranked events, 127 (25.5%) have 4-7 years of experience, 71 (14.2%) have 7-10 years, and 47 (9.4%) have more than 11 years of experience.

Regarding the competition phase, 118 (23.6%) athletes informed being the pre-competition period, while 64 (12.8%) were in the mid-season period, 190 (38.1%) in the end-season period, and 127 (25.5%) do not know.

Athletes informed experiencing various situations/events, 204 (40.9%) reported having an injury, 91 (18.2%) an unexplained performance concern, 66 (13.2%) the end of a competitive cycle, 55 (11.0%) illness, 52 (10.4%) the end of a major competition, 51 (10.2%) transitioning out of sport, 47 (9.4%) an adverse life event, 39 (7.8%) surgery, 16 (3.2%) harassment, and 7 (1.4%) abuse. Also, 187 (37.5%) reported no such experiences.

Lastly, regarding sport-related psychological distress, the mean score for APSQ was 19.7 (±7.2), for anxiety 5.5 (±5.0), for depression 6.3 (±5.9), and for disordered eating 6.6 (±4.4). About the latter, 280 (56.1%) athletes reported currently trying to lose weight, 397 (79.6%) have tried to lose weight, and among them 118 (29.7%) have tried it 1-2 times, 98 (24.7%) 3-5 times, and 181 (45.6%) more than 5 times. Also, 45 (9%) have considered using a harmful or prohibited substance/practice to lose weight, 26 (5.2%) do not know, and 18 (3.6%) prefer not to say. Table 1 summarizes the participants' characteristics.

Table 1. Characteristics of athletes

Characteristics (N = 499)	Category	N	%
Gender	Male	311	62.3
	Female	188	37.7
Age	21-25	240	48.1
	26-30	79	15.8
	31 and above	180	36.1
Continental Union	Africa	99	19.8
	Asia	128	25.7
	Europe	98	19.6
	Oceania	42	8.4

	Pan America	132	26.5
Discipline	Kyorugi/Sparring	331	66.3
	Poomsae/Forms	144	28.9
	Para Taekwondo	24	4.8
Years as an active athlete	Less than 3	51	10.2
	4-7	83	16.6
	7-10	96	19.2
	11 and above	269	53.9
Years competing at G-ranked events	Less than 3	254	50.9
	4-7	127	25.5
	7-10	71	14.2
	11 and above	47	9.4
Competition Phase	Pre-competition period	118	23.6
	Mid-season period	64	12.8
	End-season period	190	38.1
	I do not know	127	25.5
Situations/Events	Injury	204	40.9
	None	187	37.5
	Unexplained performance concern	91	18.2
	End of a competitive cycle	66	13.2
	Illness	55	11.0
	End of a major competition	52	10.4
	Transitioning out of sport	51	10.2
	Adverse life event	47	9.4
	Surgery	39	7.8
	Harassment	16	3.2
	Abuse	7	1.4
APSQ Score (10-50) (Mean ± SD)		19.7 ± 7.2	
Anxiety Score (0-21) (Mean ± SD)		5.5 ± 5.0	
Depression Score (0-27) (Mean ± SD)		6.3 ± 5.9	
Disordered Eating Score (0-18) (Mean ± SD)		6.6 ± 4.4	

Currently trying to lose weight	Yes	280	56.1
	No	219	43.9
Have tried to lose weight	Yes	397	79.6
	No	102	20.4
Times trying to lose weight	1-2	118	29.7
	3-5	98	24.7
	More than 5	181	45.6
Consideration of harmful or prohibited substance/practice to lose weight	Yes	45	9.0
	No	410	82.2
	I do not know	26	5.2
	I prefer not to say	18	3.6

3.2. SMHAT-1

The SMHAT-1 establishes threshold scores for all screening tools. In this study, 300 (60%) elite Taekwondo athletes surpassed the APSQ threshold (≥17), while 199 (40%) fell below it (Figure 1). For anxiety, 102 (20%) exceeded the threshold (≥10), with 397 (80%) scoring below it (Figure 2). Likewise, 116 (23%) surpassed the depression threshold (≥10), while 383 (77%) did not (Figure 3). Regarding disordered eating, 350 (70%) were above the threshold (≥4), with 149 (30%) scoring below it (Figure 4).

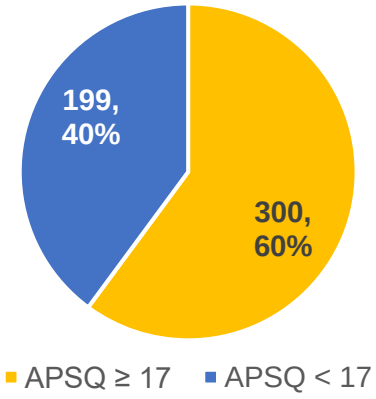

Figure 1. APSQ scores above (≥17) and under (<17) threshold among elite Taekwondo athletes

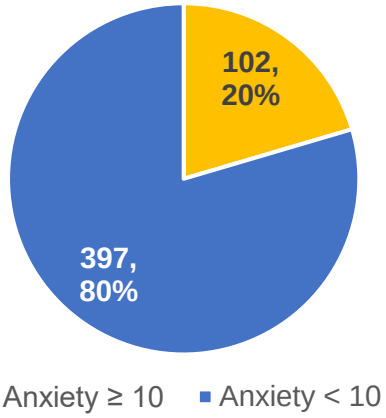

Figure 2. Anxiety scores above (≥10) and under (<10) threshold among elite Taekwondo athletes

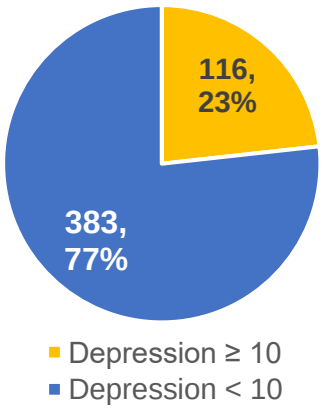

Figure 3. Depression scores above (≥10) and under (<10) threshold among elite Taekwondo athletes

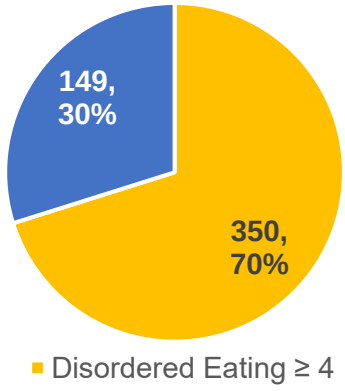

Figure 4. Disordered eating scores above (≥4) and under (<4) threshold among elite Taekwondo athletes

Anxiety and depression are assessed according to standardized categories outlined by the SMHAT-1 tool. Among the athletes, 145 (29%) experienced mild anxiety (score 5-9), 70 (14%) reported moderate anxiety (score 10-14), and 32 (6%) indicated severe anxiety (score ≥15) (Figure 5). In terms of depression, 144 (29%) athletes exhibited mild symptoms (score 5-9), 63 (13%) reported moderate depression (score 10-14), 32 (6%) showed moderately severe symptoms (score 15-19), and 21 (4%) presented severe depression (≥20) (Figure 6).

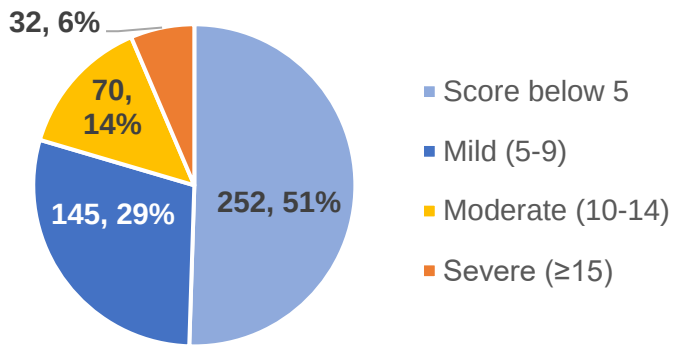

Figure 5. Mild, moderate, and severe anxiety among elite Taekwondo athletes

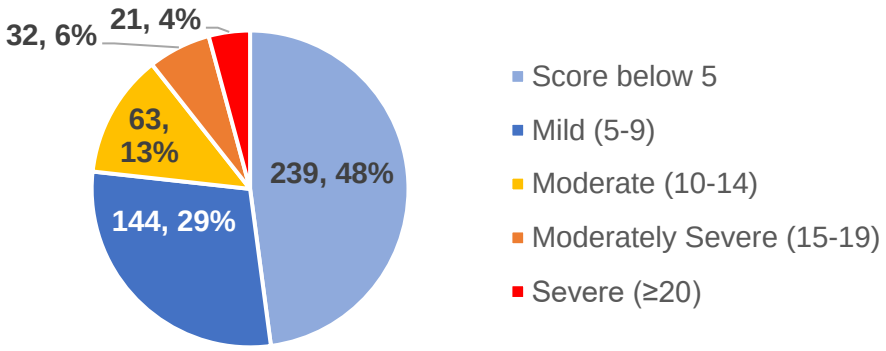

Figure 6. Mild, moderate, moderately severe, and severe depression among elite Taekwondo athletes

In the additional questions related to disordered eating, 280 (56%) athletes reported current attempts to lose weight (Figure 7), with 397 (80%) having attempted weight loss previously (Figure 8). Among the latter, 118 (30%) tried 1-2 times, 98 (25%) 3-5 times, and 181 (45%) tried more than five times (Figure 9). Moreover, 410 (82%) athletes stated they never considered using harmful substances for weight loss, while 45 (9%) admitted to considering it, 26 (5%) were uncertain, and 18 (4%) declined to disclose (Figure 10).

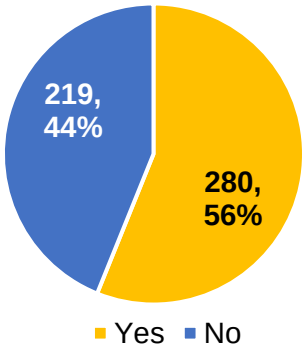

Figure 7. Elite Taekwondo athletes currently trying to lose weight

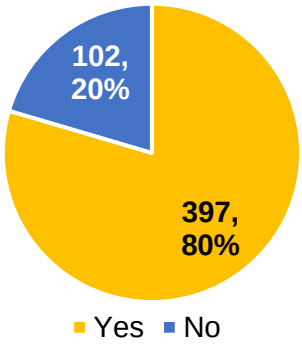

Figure 8. Elite Taekwondo athletes having attempted to lose weight

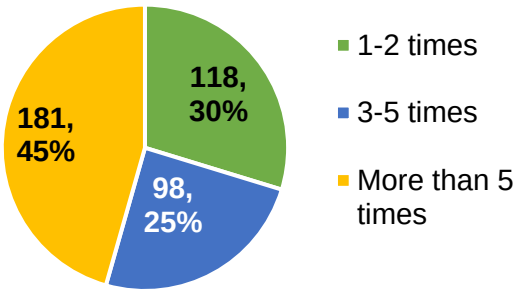

Figure 9. Losing weight attempts among elite Taekwondo athletes

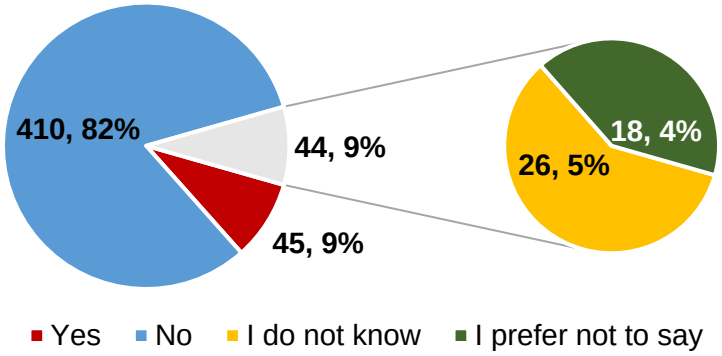

Figure 10. Consideration of using harmful substances for weight loss among elite Taekwondo athletes

The SMHAT-1, a standardized assessment tool, aims to identify elite athletes potentially at risk for or already experiencing mental health symptoms and disorders. According to the framework described by the SMHAT-1, in this survey 108 (22%) athletes require immediate attention or support, 269 (54%) need clinical assessment, 47 (9%) need a brief intervention and monitoring, and 75 (15%) require no further action (Figure 11).

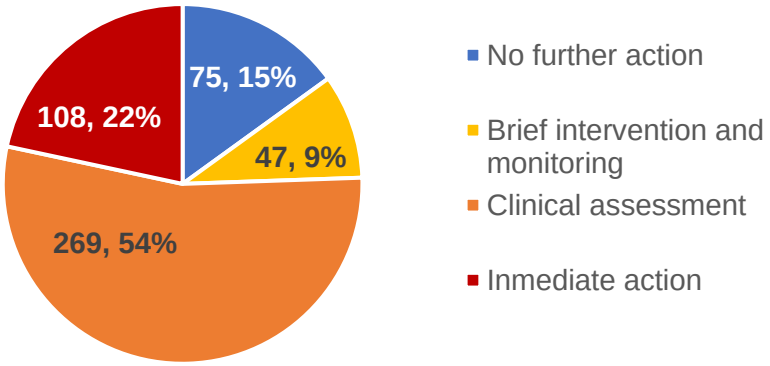

Figure 11. Elite Taekwondo athletes' needs based on the SMHAT-1 criteria

3.3. Multiple Regression Analysis (MRAs)

The following sections employ multiple regression analyses (MRAs) to explore the relationships among the dependent variables—APSQ, anxiety, depression, and disordered eating—and the independent variables: gender, age, continental union, discipline, competition phase, years as an active athlete, and injury. Each table presents overall results, including coefficients, standard errors, and significance levels (p-values). Accompanying descriptions summarize only the statistically significant findings. Variance explanation (R^2) and overall model significance, assessed by the F-statistic and its associated degrees of freedom, are reported in the last row of each model.

Data from 499 elite Taekwondo athletes were used to perform the analyses. Section 3.3.1 explores the influence of age and gender on each dependent variable. Subsequent sections (3.3.2 to 3.3.6) conduct regression analyses for the remaining categorical independent variables, employing dummy variables to enable individual analysis for each category while controlling for age and gender as covariates.

3.3.1. Age and Gender

Statistically significant findings from the MRAs in Table 2, examining APSQ, anxiety, depression, and disordered eating in relation to age and gender, include:

- Males scored significantly lower than females in anxiety and depression.
- Athletes aged 31 and above had significantly lower scores in APSQ, anxiety, and depression compared to other age groups, and significantly lower scores in disordered eating compared to ages 21-25.
- Athletes aged 26-31 had significantly higher scores in APSQ, anxiety, and depression compared to other age groups.

Table 2. Multiple regression analysis of APSQ, anxiety, depression, and disordered eating related to age and gender among elite Taekwondo athletes

Characteristics	APSQ		Anxiety		Depression		Disordered Eating	
(N = 499)	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Intercept	20.86	0.57	7.30	0.39	8.19	0.45	7.16	0.35
Gender								
Female (ref)								
Male	-1.26	0.67	-1.80***	0.46	-1.59**	0.53	-0.10	0.42
Age								
21-25 (ref)								
26-31	2.13*	0.92	0.42	0.62	1.54*	0.72	-0.34	0.57
31 and above	-1.87**	0.72	-1.94***	0.49	-3.09***	0.56	-1.10*	0.45
R^2	0.05		0.09		0.12		0.01	
$F_{3,495}$	8.26***		15.37***		22.74***		2.32	

Note: Coef = regression coefficient; SE = standard error, ref = reference category.

*p < 0.05, **p < 0.01, ***p < 0.001.

3.3.2. Continental Union

Statistically significant findings from the MRAs in Table 3, analyzing APSQ, anxiety, depression, and disordered eating in relation to each Continental Union while controlling for age and gender, include:

- Athletes in Africa had significantly lower scores in anxiety compared to other continents.
- Athletes in Asia had significantly higher scores in disordered eating compared with those in other continents.
- Athletes in Europe had significantly lower scores in disordered eating compared to other continents.
- Athletes in Pan America scored significantly higher in depression compared to other continents.

Table 3. Multiple regression analysis of APSQ, anxiety, depression, and disordered eating related to each Continental Union while controlling for age and gender among elite Taekwondo athletes

Characteristics	APSQ		Anxiety		Depression		Disordered Eating	
(N = 499)	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Intercept	20.86	0.58	7.46	0.39	8.26	0.46	7.03	0.36
Gender								
Female (ref)								
Male	-1.25	0.68	-1.72***	0.46	-1.55**	0.53	-0.17	0.42
Age								
21-25 (ref)								
26-31	2.13*	0.92	0.50	0.62	1.57*	0.72	-0.41	0.57
31 and above	-1.87**	0.72	-1.98***	0.49	-3.10***	0.56	-1.08*	0.45
Continental Union								
Others (ref)								
Africa	-0.06	0.80	-1.09*	0.54	-0.43	0.62	0.88	0.50
R^2	0.05		0.09		0.12		0.02	
$F_{4,494}$	6.18***		12.62***		17.16***		2.54	
Intercept	20.74	0.59	7.29	0.40	8.35	0.46	6.86	0.36
Gender								
Female (ref)								
Male	-1.28	0.67	-1.80***	0.46	-1.55**	0.53	-0.17	0.41
Age								
21-25 (ref)								
26-31	2.14*	0.92	0.42	0.62	1.52*	0.72	-0.31	0.56
31 and above	-1.91**	0.72	-1.94***	0.49	-3.02***	0.56	-1.22**	0.44
Continental Union								

Others (ref)								
Asia	0.58	0.73	0.03	0.50	-0.80	0.57	1.49***	0.45
R^2	0.05		0.09		0.12		0.04	
$F_{4,494}$	6.34***		11.51***		17.59***		4.54**	
Intercept	20.94	0.58	7.31	0.40	8.28	0.46	7.56	0.35
Gender								
Female (ref)								
Male	-1.27	0.67	-1.81***	0.46	-1.60**	0.53	-0.16	0.41
Age								
21-25 (ref)								
26-31	2.15*	0.92	0.42	0.63	1.56*	0.72	-0.25	0.56
31 and above	-1.80*	0.73	-1.93***	0.50	-3.01***	0.57	-0.77	0.44
Continental Union								
Others (ref)								
Europe	-0.52	0.81	-0.10	0.55	-0.55	0.63	-2.54***	0.49
R^2	0.05		0.09		0.12		0.07	
$F_{4,494}$	6.29***		11.52***		17.24***		8.63***	
Intercept	20.89	0.58	7.29	0.39	8.17	0.45	7.21	0.36
Gender								
Female (ref)								
Male	-1.26	0.67	-1.80***	0.46	-1.59**	0.53	-0.11	0.42
Age								
21-25 (ref)								
26-31	2.14*	0.92	0.41	0.63	1.53*	0.72	-0.33	0.57
31 and above	-1.87**	0.72	-1.94***	0.49	-3.09***	0.56	-1.10*	0.45
Continental Union								
Others (ref)								
Oceania	-0.38	1.14	0.02	0.77	0.24	0.89	-0.55	0.71
R^2	0.05		0.09		0.12		0.02	
$F_{4,494}$	6.21***		11.51***		17.04***		1.89	
Intercept	20.83	0.64	6.91	0.43	7.57	0.50	7.13	0.40
Gender								
Female (ref)								
Male	-1.25	0.68	-1.73***	0.46	-1.47**	0.53	-0.09	0.42
Age								
21-25 (ref)								

26-31	2.14*	0.93	0.53	0.63	1.72*	0.72	-0.33	0.57
31 and above	-1.86*	0.73	-1.77***	0.50	-2.80***	0.57	-1.09*	0.45
Continental Union								
Others (ref)								
Pan America	0.06	0.74	0.97	0.50	1.55**	0.57	0.08	0.46
R^2	0.05		0.09		0.13		0.01	
$F_{4,494}$	6.18***		12.55***		19.11***		1.75	

Note: Coef = regression coefficient; SE = standard error, ref = reference category.

*p < 0.05, **p < 0.01, ***p < 0.001.

3.3.3. Discipline

Statistically significant findings from the MRAs in Table 4, analyzing APSQ, anxiety, depression, and disordered eating in relation to each discipline while controlling for age and gender, include:

- Kyorugi (sparring) athletes had significantly higher scores in APSQ and disordered eating compared to other disciplines.
- Poomsae (forms) athletes had significantly lower scores in disordered eating compared to other disciplines.

Table 4. Multiple regression analysis of APSQ, anxiety, depression, and disordered eating related to each discipline while controlling for age and gender among elite Taekwondo athletes

Characteristics	APSQ		Anxiety		Depression		Disordered Eating	
(N = 499)	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Intercept	19.75	0.75	6.95	0.51	8.32	0.59	6.20	0.46
Gender								
Female (ref)								
Male	-1.50*	0.68	-1.88***	0.46	-1.56**	0.53	-0.31	0.42
Age								
21-25 (ref)								
26-31	2.41**	0.92	0.50	0.63	1.50*	0.73	-0.09	0.57
31 and above	-1.41	0.74	-1.80***	0.51	-3.14***	0.58	-0.71	0.46
Discipline								
Others (ref)								
Kyorugi/Sparring	1.58*	0.70	0.49	0.47	-0.18	0.55	1.36**	0.43
R^2	0.06		0.09		0.12		0.03	
$F_{4,494}$	7.53***		11.79***		17.05***		4.29**	
Intercept	21.20	0.60	7.40	0.41	8.13	0.47	7.44	0.37
Gender								
Female (ref)								
Male	-1.46*	0.68	-1.86***	0.46	-1.55**	0.53	-0.27	0.42
Age								
21-25 (ref)								
26-31	2.31*	0.92	0.47	0.63	1.50*	0.72	-0.19	0.57
31 and above	-1.50*	0.75	-1.83***	0.51	-3.15***	0.58	-0.80	0.46
Discipline								
Others (ref)								
Poomsae/Forms	-1.32	0.73	-0.39	0.50	0.23	0.57	-1.08*	0.45
R^2	0.06		0.09		0.12		0.03	
$F_{4,494}$	7.05***		11.68***		17.07***		3.19*	

Intercept	20.91	0.57	7.32	0.39	8.20	0.45	7.22	0.35
Gender								
Female (ref)								
Male	-1.25	0.67	-1.80***	0.46	-1.59**	0.53	-0.09	0.42
Age								
21-25 (ref)								
26-31	2.19*	0.92	0.44	0.63	1.54*	0.72	-0.28	0.57
31 and above	-1.85*	0.72	-1.94***	0.49	-3.08***	0.56	-1.09*	0.45
Discipline								
Others (ref)								
Para Taekwondo	-1.64	1.48	-0.58	1.00	-0.16	1.16	-1.68	0.92
R^2	0.05		0.09		0.12		0.02	
$F_{4,494}$	6.50***		11.60***		17.03***		2.59*	

Note: Coef = regression coefficient; SE = standard error, ref = reference category.

*p < 0.05, **p < 0.01, ***p < 0.001.

3.3.4. Competition Phase

Statistically significant findings from the MRAs in Table 5, analyzing APSQ, anxiety, depression, and disordered eating in relation to each competition phase while controlling for age and gender, include:

- Athletes currently in the stage of pre-competition had significantly higher scores in anxiety compared to other competition phases.

Table 5. Multiple regression analysis of APSQ, anxiety, depression, and disordered eating related to each competition phase while controlling for age and gender among elite Taekwondo athletes

Characteristics	APSQ		Anxiety		Depression		Disordered Eating	
(N = 499)	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Intercept	20.88	0.61	7.58	0.41	8.46	0.47	7.14	0.38
Gender								
Female (ref)								
Male	-1.26	0.67	-1.80***	0.46	-1.58**	0.53	-0.10	0.42
Age								
21-25 (ref)								
26-31	2.13*	0.92	0.37	0.62	1.49*	0.72	-0.33	0.57
31 and above	-1.88**	0.72	-2.03***	0.49	-3.16***	0.56	-1.10*	0.45
Competition Phase								
Others (ref)								
Pre-competition	-0.11	0.75	-1.07*	0.50	-1.01	0.58	0.08	0.46
R^2	0.05		0.09		0.13		0.01	
$F_{4,494}$	6.19***		12.73***		17.89***		1.74	
Intercept	20.89	0.58	7.27	0.39	8.20	0.45	7.19	0.36
Gender								
Female (ref)								
Male	-1.24	0.68	-1.81***	0.46	-1.59**	0.53	-0.09	0.42
Age								
21-25 (ref)								
26-31	2.13*	0.92	0.42	0.62	1.54*	0.72	-0.34	0.57
31 and above	-1.88**	0.72	-1.94***	0.49	-3.09***	0.56	-1.11*	0.45
Competition Phase								
Others (ref)								
Mid-season	-0.35	0.95	0.23	0.64	-0.09	0.74	-0.25	0.59
R^2	0.05		0.09		0.12		0.01	
$F_{4,494}$	6.22***		11.54***		17.03***		1.78	

Intercept	20.94	0.63	7.22	0.42	8.13	0.49	7.29	0.39
Gender								
Female (ref)								
Male	-1.27	0.68	-1.79***	0.46	-1.58**	0.53	-0.12	0.42
Age								
21-25 (ref)								
26-31	2.13*	0.92	0.41	0.62	1.54*	0.72	-0.33	0.57
31 and above	-1.86*	0.72	-1.95***	0.49	-3.09***	0.56	-1.09*	0.45
Competition Phase								
Others (ref)								
End-season	-0.21	0.65	0.21	0.44	0.17	0.51	-0.33	0.41
R^2	0.05		0.09		0.12		0.02	
$F_{4,494}$	6.21***		11.57***		17.05***		1.90	
Intercept	20.72	0.60	7.15	0.40	8.00	0.46	7.05	0.37
Gender								
Female (ref)								
Male	-1.25	0.67	-1.80***	0.46	-1.59**	0.53	-0.10	0.42
Age								
21-25 (ref)								
26-31	2.10*	0.92	0.38	0.62	1.50*	0.72	-0.36	0.57
31 and above	-1.90**	0.72	-1.97***	0.49	-3.13***	0.56	-1.13*	0.45
Competition Phase								
Others (ref)								
I do not know	0.57	0.73	0.62	0.49	0.81	0.57	0.48	0.45
R^2	0.05		0.09		0.13		0.02	
$F_{4,494}$	6.34***		11.94***		17.6***		2.03	

Note: Coef = regression coefficient; SE = standard error, ref = reference category.

*p < 0.05, **p < 0.01, ***p < 0.001.

3.3.5. Years as an Active Athlete

Statistically significant findings from the MRAs in Table 6, analyzing APSQ, anxiety, depression, and disordered eating in relation to years as an active athlete while controlling for age and gender, include:

- Athletes competing for between 4-7 years had significantly higher scores in APSQ and depression compared to being active less than 3 years or more than 11.
- Those competing for between 7-10 years had significantly higher scores in APSQ compared to all other groups.
- Those competing for more than 11 years as an athlete had significantly higher scores in APSQ, anxiety, and depression compared to being active less than 3 years.

Table 6. Multiple regression analysis of APSQ, anxiety, depression, and disordered eating related to years as an active athlete while controlling for age and gender among elite Taekwondo athletes

Characteristics	APSQ		Anxiety		Depression		Disordered Eating	
(N = 499)	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Intercept	18.26	1.05	6.07	0.72	6.64	0.83	6.86	0.66
Gender								
Female (ref)								
Male	-1.37*	0.68	-1.93***	0.46	-1.75**	0.53	-0.05	0.42
Age								
21-25 (ref)								
26-31	2.27*	0.93	0.38	0.63	1.52*	0.73	-0.24	0.58
31 and above	-1.83*	0.76	-2.10***	0.52	-3.24***	0.59	-0.94*	0.47
Years as an active athlete								
Less than 3 (ref)								
4-7	3.21*	1.25	1.64	0.85	2.25*	0.98	0.25	0.78
7-10	3.39**	1.22	1.19	0.83	1.49	0.96	0.75	0.76
11 and above	2.68*	1.11	1.60*	0.75	1.95*	0.87	0.01	0.69
R^2	0.06		0.09		0.13		0.02	
$F_{6,492}$	5.65***		8.55***		12.47***		1.48	

Note: Coef = regression coefficient; SE = standard error, ref = reference category.

*p < 0.05, **p < 0.01, ***p < 0.001.

3.3.6. Injury

Statistically significant findings from the MRAs in Table 7, analyzing APSQ, anxiety, depression, and disordered eating in relation to having an injury while controlling for age and gender, indicate that:

- Athletes experiencing an injury had significantly higher scores in APSQ, anxiety, and depression.

Table 7. Multiple regression analysis of APSQ, anxiety, depression, and disordered eating related to injury while controlling for age and gender among elite Taekwondo athletes

Characteristics	APSQ		Anxiety		Depression		Disordered Eating	
(N = 499)	Coef	SE	Coef	SE	Coef	SE	Coef	SE
Intercept	19.47	0.61	6.60	0.42	7.51	0.49	7.11	0.39
Gender								
Female (ref)								
Male	-1.30*	0.66	-1.83***	0.45	-1.61**	0.52	-0.10	0.42
Age								
21-25 (ref)								
26-31	1.99*	0.87	0.35	0.62	1.47*	0.71	-0.34	0.57
31 and above	-1.64*	0.70	-1.83***	0.48	-2.98***	0.56	-1.10*	0.45
Injury	3.31***	0.63	1.67***	0.43	1.63**	0.50	0.12	0.40
R^2	0.10		0.11		0.14		0.01	
$F_{4,494}$	13.46***		15.61***		20.06***		1.76	

Note: Coef = regression coefficient; SE = standard error, ref = reference category.

*p < 0.05, **p < 0.01, ***p < 0.001.

4. Conclusions

The analysis of survey data concerning elite Taekwondo athletes reveals a significant prevalence of psychological distress, anxiety, depression, and disordered eating behaviors. These findings underscore the imperative for tailored interventions and robust support mechanisms aimed at mitigating the mental health challenges faced by elite practitioners of Taekwondo. Moreover, through multiple regression analyses, it has become evident that various demographic factors, competition phases, and disciplines significantly influence the psychological well-being of athletes, thereby emphasizing the intricate nature of mental health dynamics in elite sports. The implications extend beyond Taekwondo, advocating for a broader discourse on mental health within the realm of high-performance athletics, urging stakeholders to prioritize athletes' psychological well-being alongside their physical prowess.

5. Recommendations

Based on the identified challenges and insights collected from the survey data, the following recommendations are proposed to address the mental health needs of elite Taekwondo athletes:

- **Implement Targeted Mental Health Interventions:** Develop and implement specialized mental health interventions and support programs tailored to the unique needs and challenges faced by elite Taekwondo athletes. These initiatives should prioritize early detection, prevention, and treatment of psychological issues, leveraging evidence-based practices and interdisciplinary collaboration to maximize effectiveness.

- **Integrate Mental Health Education and Awareness Initiatives:** Integrate mental health education and awareness initiatives into training and development programs offered by World Taekwondo and its partners. By promoting a culture of psychological well-being and resilience from the grassroots level, athletes can better navigate the pressures of competition and training while fostering a supportive and inclusive environment within the sport.

- **Collaborate with Mental Health Professionals and Stakeholders:** Forge partnerships with mental health professionals, sports psychologists, and relevant stakeholders to design and implement evidence-based interventions tailored to the specific needs of elite Taekwondo athletes. Collaboration across disciplines and sectors is essential for developing holistic approaches that address the multifaceted nature of mental health in high-performance sports.

- **Conduct Comparative Analyses and Knowledge Sharing:** Conduct comparative analyses with existing studies in other sports, particularly combat sports, to enhance understanding of mental health dynamics across different athletic contexts. By identifying common challenges and effective strategies, insights from these analyses can inform the development of targeted interventions and best practices for supporting athletes' mental health.

- **Enhance Accessibility of Mental Health Resources:** Enhance the accessibility and availability of mental health resources and support services for elite athletes in collaboration with the Athletes Committee and other relevant stakeholders. This includes providing easily accessible information, confidential counseling services, and proactive outreach efforts to ensure athletes have the support they need to prioritize their mental well-being alongside their athletic pursuits.