



Research article

Body mass index: A determinant of distress, depression, self-esteem, and satisfaction with life amongst recreational athletes from random intermittent dynamic type sports

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ABSTRACT

This study aimed to understand the impact of body mass index on distress, depression, self-esteem, and satisfaction with life amongst recreational athletes from random intermittent dynamic type sports. A cross-sectional study design was selected with 440 recreational athletes to conduct this study. The mean age was 20.34 ± 1.33 years, height was 157.27 ± 5.93 cm, weight was 57.31 ± 13.02 kg, and BMI was 25.82 ± 6.64 kg/m². All the athletes voluntarily participated in this study. Psychological distress was measured with the K10 questionnaire; depression was measured with the PHQ-9 self-reported questionnaire. The Rosenberg self-esteem scale measured self-esteem, and Diener's satisfaction with life scale measured satisfaction with life. The data collection was conducted in the classroom setting. It took 12–15 min to complete the survey. The descriptive statistics were calculated, and the ordinal-scale, qualitative variables and frequency distributions for different categories were determined. The Chi-Square (two-tails) test was applied to find the relationship between the variables. The significant level was set at 0.05 level. The result showed that body mass index was significantly related to distress ($X^2 = 27.59$, $p = .001$) and life satisfaction ($X^2 = 45.14$, $p = .001$). Whereas depression ($X^2 = 15.46$, $p = .148$) and self-esteem ($X^2 = 12.02$, $p = .212$) showed an insignificant relationship with body mass index among recreational athletes from random intermittent dynamic sports. The study highlighted the health implications of psychological distress, depression, self-esteem, and satisfaction with life with body mass index among recreational athletes from random intermittent dynamic sports. Future studies are needed to understand better the interaction between psychological variables and body mass index level.

1. Introduction

Body mass index (BMI) is an important indicator to determine health status in all populations. BMI is also used to identify the risk of morbidity and mortality. Regular participation in rigorous sports decreases morbidity and mortality and is an important part of a healthy lifestyle. A healthy lifestyle leads to better physical, social, emotional, and mental health. Better mental health benefits indicated increased social support and a sense of mastery. It has also been noticed that participating in regular sports activities favors low-stress levels and better cognitive function [1]. One of the most important concerns explored by psychologists and health

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researchers is dealing with mental health issues such as anxiety, distress, and depression. According to the World Health Organization's classification, more than half of the psychological problems associated with mental health are anxiety, stress, and depression [2].

Psychological distress is an emotional disturbance that can affect athletes' social functioning and day-to-day lives [3]. It has already been demonstrated that elite athletes are at a higher risk of poor mental health, either due to high demands for better performance in competitions or due to the maintenance or worsening of pre-existing symptoms [4]. A higher risk of psychological distress has been seen in individual players than in team players [5]. Atlantis and Ball's studied the association between weight perception and psychological distress and revealed a positive association between BMI and psychological distress [6]. Huang et al. also investigated psychological distress and weight status and found that weight status (higher BMI class) was associated with psychological distress [7].

Depression is considered discomfort, loss of interest, eating disturbances, sleep disturbances, fatigue, and poor concentration [2]. From a psychological viewpoint, athletes may be more likely to develop depression symptoms if their performance deteriorates or if they have a disastrous ("choking") sporting performance [8]. According to the World Health Organization, 4.4% global population suffer from depression [2]. High BMI influence the risk of depression via biological mechanisms. Hillman et al. investigated depression and adiposity, revealing that depression had been positively associated with adiposity [9]. Depression may influence the chance of having a high BMI through unhealthy habits, as mental illness is associated with physical inactivity [10]. Kubzansky et al. demonstrated that depression is highly similar to weight status [11].

Self-esteem is a positive feeling about oneself that is usually a crucial factor in healthy growth and development in athletes. Differences in self-esteem between overweight and normal-weight teenagers and their associations have been investigated, and overweight status has been related to poor body perception and poor self-esteem [12]. Evert IB, Álvarez mention that female athletes present a significantly higher level of self-esteem than overweight non-athletes. Such findings are extremely significant when we consider that more than half of obese and overweight children and adolescents have low self-esteem, with only 4% having a high level of self-esteem. As a result, several authors advocate for initiating programs to address BMI and physical activity issues [13]. Self-esteem is positively associated with sports and physical activities, and in the academic field, physically active adolescents are considerably more goal-oriented than inactive kids [14].

Sports participation is associated with various mental health parameters, including higher self-esteem, self-efficacy, reduced stress, positivity, and satisfaction with life. Life satisfaction is the cognitive dimension of subjective well-being [15], a cognitive process of estimation of own life quality, according to some criteria [16], favourable positive estimation of own life conditions, life quality, corresponding to some standard and expectations [17]. Forste and Moore investigated the association between obesity and life satisfaction. Their findings revealed that lower satisfaction with life had been found among people that are overweight and obese relative to healthy-weight youth [18]. A meta-analysis of 46 empirical studies indicated that life satisfaction is stable across gender, with only a minor difference in male participants [19]. Another study showed a stronger negative association between life satisfaction and obesity in females than in males [18].

As earlier studies show, all the parameters are interconnected and have common aspects. It is assumed that BMI, distress, depression, self-esteem, and satisfaction with life will all interact somehow. This context aimed to investigate whether there is an association between body mass index with distress, depression, self-esteem, and satisfaction with life amongst recreational athletes from random intermittent dynamic type sports.

2. Methodology

2.1. Study design, sampling size, and technique

This is an institution-based cross-sectional study conducted at the Fiji National University, Lautoka Campus, Fiji. There were total 440 (male = 337 and female = 103) athletes from different sports (Rugby-15 = 84, Rugby-7 = 45, Touch Rugby = 24, Soccer 78, Futsal 41, Volleyball 61, Netball = 46, Basketball = 27, and Athletics = 34) participated in this study. The mean age was 20.34 ± 1.33 years, height was 157.27 ± 5.93 cm, weight was 57.31 ± 13.02 kg, and BMI was 25.82 ± 6.64 kg/m². Convenience sampling was adopted to collect data among the recreational athletes from random intermittent dynamic type sports. All the athletes voluntarily participated in this study. All study procedures were approved by the institutional review board of the university (FNU-HREC-22-14).

2.2. Instruments

2.2.1. Psychological distress (K10)

K10 was developed as a short screening scale for psychological distress using Item 10. The respondents' responses were graded on a five-point ordinal scale that shows how often they encountered ten symptoms in the previous month, such as "feeling fatigued for no apparent reason" and "sadness or depression.". There are five response categories on the scale, ranging from 0 (none at the time) to 4. (all-time). The items were summed to produce a total score ranging from 0 to 40, with higher scores indicating higher stress levels [20].

2.3. Patient Health Questionnaire-9 (PHQ-9)

The PHQ-9 is a screening instrument that determines whether or not depressed symptoms are present and how severe they are. The PHQ-9 is a nine-item self-report questionnaire for assessing depression symptoms based on the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) criteria. The questionnaire evaluates if the symptom has bothered the person for the past two weeks. Each PHQ-9 item has a score range of 0–3, with a total score of 0–27 for the nine items. The intensity of depression can be determined

by computing a summary result. Mild depression is indicated by a score of 5–9, moderate depression by a score of 10–14, moderately severe depression by a score of 15–19, and severe depression by a score of 20. A categorical algorithm is an alternate method for evaluating PHQ-9 results. If five or more of the nine depressive symptom criteria have been present for at least “greater than half of the days” in the previous two weeks, and one of the symptoms is a depressed mood or anhedonia, major depression is diagnosed [21].

2.4. Rosenberg Self-Esteem scale (RSES)

The scale developed by Rosenberg in 1989 was used to measure self-esteem among university students. The scale is made up of ten things, five of which are positive and five of which are negative. All of the items were graded on a four-point Likert scale, with verbal anchors of Strongly Disagree (1), Disagree (2), Agree (3), and Strongly Agree (4). The item scores on the RSES were coded so that higher scores indicated greater self-esteem [22].

2.5. Satisfaction with life scale (SWLS)

Diener et al. established the satisfaction with life scale in 1985 [15]. This is a five-component measure of life satisfaction. On a 7-point Likert scale, participants were asked to rate their level of agreement with each statement (1 = strongly disagree to 7 = strongly agree). Values range from 5 to 35, with higher scores indicating better life satisfaction. Pavot and Diener (1993) suggested a set of criteria for categorizing people based on a set of breakpoints that corresponded to the seven response categories: 15–19, slightly unhappy, 10–14, dissatisfied, 5–9, extremely dissatisfied; 31–35, very satisfied; 26–30, satisfied; 21–25, slightly satisfied, 20, neutral; 15–19, slightly unsatisfied, 10–14, dissatisfied, 5–9, very dissatisfied [23].

2.6. Procedure

An open invitation letter was circulated among recreational athletes to participate in a survey study. Voluntary participation was accepted. The date, time and venue were mentioned in the flyer. Data were collected in three phases with a gap of twelve days in between. All the recreational athletes were invited to the lecture hall, where a brief introduction and the purposes of the research were conveyed to all recreational athletes with the clearance of their doubts about the survey. A hard copy of the questionnaires and consent form was provided to all recreational athletes. Participants were requested to sign a written consent form before they started to provide their responses to the survey. Upon giving their consent to the study, they were asked to fill out self-administered questionnaires about their general information (name, age, height, weight, etc.) and Patient Health Questionnaire-9 (PHQ-9), Psychological Distress (K10), Rosenberg Self-Esteem scale (RSES), and Satisfaction with Life Scale (SWLS). The data collection was conducted in the classroom setting by the researcher. It took 12–15 min to complete the survey. Data were collected from May to June 2022.

Statistical Analyses: Statistical analysis was performed using IBM SPSS version 22. Descriptive statistics (minimum, maximum, mean, and standard deviations) were calculated. Then the variables were tested for normal distribution (Skewness and Kurtosis test). Frequency distributions for different categories were determined for the ordinal-scale and qualitative variables. The internal consistency (reliability) of all the questionnaires' (PHQ-9, K10, RSES, and SWLS) items were tested by Cronbach's Alpha. To determine the relationship between the nominal variables, a Chi-Square (2-tailed) test was applied. The significant level was set at 0.05 levels.

3. Results

Table 1 shows descriptive statistics of anthropometric characteristics among recreational athletes from random intermittent dynamic type sports. The athletes belonging to body mass index categories were as Underweight (n = 30), Normal (n = 204), Overweight (n = 96), and Obese (n = 110).

Table 2 shows descriptive statistics and normality tests of distress, depression, self-esteem, and satisfaction with life among recreational athletes from random intermittent dynamic type sports. The table indicated that skewness values are far from 1, reflecting that data on distress, depression, self-esteem, and satisfaction with life is not normally distributed.

Table 3 indicated that the 192 athletes showed no distress, whereas 140 athletes suffered from severe distress disorder. As per the BMI categories - most of the normal (n = 158) athletes do not show distress, whereas overweight (n = 62) and obese (n = 68) recreational athletes have severe distress disorder. The inferential statistics showed a significant relationship ($\chi^2 = 27.59$, $p = .001$) between body mass index and the level of distress among recreational athletes from random intermittent dynamic-type sports.

Table 4 indicated that 168 recreational athletes have mild depression, 82 recreational athletes have moderate depression, 96 have moderately severe depression, and 64 have severe depression. As per the body mass index categories, 70 healthy recreational athletes

Table 1
Anthropometric characteristics of recreational athletes from random intermittent dynamic type sports.

	N	Minimum	Maximum	Mean	Std. Deviation
Age (Years)	440	18	23	20.34	1.33
Height (cm)	440	146	176	157.27	5.93
Weight (kg)	440	46	152	57.31	13.02
BMI (kg/m ²)	440	16	54	25.82	6.64

Table 2
Descriptive data and normality test of psychological parameters among recreational athletes from random intermittent dynamic type sports.

	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis		Cronbach's Alpha
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error	
Distress	10.00	45.00	17.69	6.36	1.248	.116	1.766	.232	.872
Depression	.00	23.00	6.93	4.28	.687	.116	.661	.232	.802
Self-Esteem	10.00	33.00	17.75	4.86	.367	.116	-.471	.232	.810
Satisfaction with Life	7.00	35.00	25.65	5.71	-.696	.116	.470	.232	.813

Table 3
Descriptive and inferential statistics for body mass index and the level of distress among recreational athletes from random intermittent dynamic type sports.

		Body Mass Index Categories				Total	Chi-Square test	
		Underweight	Normal	Overweight	Obese		χ^2	p-value
Distress	Well	20	158	2	12	192	27.59*	.001
	Mild Disorder	4	26	22	8			
	Moderate Disorder	4	12	10	22			
	Severe Disorder	2	8	62	68			
Total		30	204	96	110	440		

showed no depression, whereas 44 and 24 overweight recreational athletes showed moderately severe depression and severe depression. As 40, 38, and 22 obese recreational athletes showed moderate depression, moderately severe depression, and severe depression, respectively. The inferential statistics showed an insignificant relationship ($X^2 = 15.46, p = .148$) between body mass index and the level of depression among recreational athletes from random intermittent dynamic-type sports.

Table 5 indicated that 42 recreational athletes have high self-esteem and 66 recreational athletes showed low self-esteem. One hundred fifty-two recreational athletes showed moderate self-esteem, and 180 recreational athletes showed average self-esteem. As per body mass index categories, most healthy 96 and 32 recreational athletes showed moderate and high self-esteem. In contrast, most low self-esteem can be seen in obese ($n = 30$) and overweight ($n = 28$) athletes. The inferential statistics showed an insignificant relationship ($X^2 = 12.02, p = .212$) between body mass index and self-esteem among recreational athletes from random intermittent dynamic-type sports.

Table 6 indicated that 102, 122, 136, 62, and 14 recreational athletes showed very satisfied, satisfied, slightly satisfied, slightly dissatisfied, and dissatisfied, respectively, from satisfaction from life. As per the body mass index categories, 178 healthy recreational athletes were satisfied with life, whereas 26 healthy recreational athletes were dissatisfied with life. Sixty-four overweight recreational athletes showed satisfaction with life and 32 were dissatisfied. For obese athletes, 18 recreational athletes showed dissatisfaction with life. The inferential statistics showed a significant relationship ($X^2 = 45.14, p = .001$) between body mass index and the level of satisfaction with life among recreational athletes from random intermittent dynamic-type sports.

4. Discussion

The present study investigates the effect of body mass index on distress, depression, self-esteem, and satisfaction with life amongst recreational athletes from random intermittent dynamic type sports. The result of this study showed that most of the healthy ($n = 158$) recreational athletes do not show distress, whereas overweight ($n = 62$) and obese ($n = 68$) recreational athletes have severe distress disorders. The 168 recreational athletes have mild depression, 82 recreational athletes have moderate depression, 96 have moderately severe depression, and 64 have severe depression. As per the body mass index categories, 70 healthy recreational athletes showed no depression, whereas 44 and 24 overweight recreational athletes showed moderately severe depression and severe depression. The 42 recreational athletes showed high self-esteem, 66 recreational athletes showed low self-esteem, 152 recreational athletes showed

Table 4
Descriptive and inferential statistics for body mass index and the level of depression among recreational athletes from random intermittent dynamic type sports.

		Body Mass Index Categories				Total	Chi-Square test	
		Underweight	Normal	Overweight	Obese		χ^2	p-value
Depression	None-minimal depression	8	70	0	4	82	15.46	0.148
	Mild depression	12	96	2	6			
	Moderate depression	4	30	26	22			
	Moderately severe depression	6	8	44	38			
	Severe depression	0	0	24	40			
Total		30	204	96	110	440		

Table 5

Descriptive and inferential statistics for body mass index and the level of self-esteem among recreational athletes from random intermittent dynamic type sports.

		Body Mass Index Categories				Total	Chi-Square test	
		Underweight	Normal	Overweight	Obese		χ^2	p-value
Self-Esteem	Low	6	2	28	30	66	12.02	.212
	Average	16	74	42	48			
	Moderate	8	96	20	28			
	High	0	32	6	4			
Total		30	204	96	110	440		

Table 6

Descriptive and inferential statistics for body mass index and the level of satisfaction with life among recreational athletes from random intermittent dynamic type sports.

		Body Mass Index Categories				Total	Chi-Square test	
		Underweight	Normal	Overweight	Obese		χ^2	p-value
Satisfaction with Life	Very satisfied	8	66	10	18	102	45.14*	.001
	Satisfied	10	64	22	26			
	Slightly satisfied	8	48	32	48			
	Slightly dissatisfied	4	22	30	6			
	Dissatisfied	0	4	2	8			
	Extremely dissatisfied	0	0	0	4			
Total		30	204	96	110	440		

moderate self-esteem, and 180 recreational athletes showed average self-esteem. At the same time, most low self-esteem can be seen in obese ($n = 30$) and overweight ($n = 28$) recreational athletes. Findings indicated that 102, 122, 136, 62, and 14 recreational athletes were satisfied, slightly satisfied, slightly dissatisfied, and dissatisfied with life satisfaction, respectively. Sixty-four overweight recreational athletes showed satisfaction with life and 32 were dissatisfied. For obese athletes, 18 recreational athletes showed dissatisfaction with life. The result showed that body mass index was significantly related to distress ($r = 0.133$, $p = .005$) and satisfaction with life ($r = 0.132$, $p = .005$). In contrast, body mass index was insignificantly related to depression ($r = 0.072$, $p = .132$) and self-esteem ($r = 0.073$, $p = .124$) among recreational athletes from random intermittent dynamic type sports.

The effect of body mass index on psychological parameters identified in observational studies was likely to be affected by confounding factors on mental health. The mechanisms associated with body mass index and psychological parameters are likely to be intense, as many studies have shown that one can cause or worsen the other. Fletcher and Scott proposed that extreme obesity is related to the increased risk for depression across gender and racial groups. A review found that people who were obese had a 55% increased risk of developing depression over time, whereas people experiencing depression had a 58% increased risk of becoming obese. A detailed examination of the published literature on the association between body mass index categories and various characteristics of psychological distress reveals that physical activities play a role in this relationship [24]. Lack of regular physical activity is associated with increased body mass index and psychological distress [25]. Regular participation in sports activities can assist those suffering from psychological distress by giving resources that allow them to reduce or omit psychological distress by generating and sharing personal experiences about how they built and maintained a positive sense [26]. Psychological distress is associated with sports achievement. Athletes who strive for better performance in sports have an adaptive pattern of success goals, but those who negatively react to poor performance suffer psychological distress. So, striving for better performance is adaptive for athletes [27]. Filaire et al. revealed that if a player suffers from psychological distress, his performance declines with changes in their physiological states before and during competitions and training [28]. Fletcher and Scott revealed that psychological distress hurts athletes' performance and generates anxiety and depression [29].

According to a review report published by the International Olympic Committee (IOC), anxiety and depression in male elite athletes in team sports range from 5% to approximately 45% [30]. A previous study was conducted by Nicholls et al. to investigate the degree and prevalence of depression and anxiety symptoms in UK professional rugby players. They found that 18.9% of athletes had mild anxiety symptoms, and 13.7% had moderate/severe anxiety symptoms. They also discovered that the athletes had mild (11.6%) and moderate/severe (2.6%) depression symptoms [31]. A study investigated depression among informal professional soccer athletes. It revealed that depression was associated with being younger, recently resigned, having a strong athletic identity, and stating injury is the prime reason for resigned [32]. In a study of the prevalence of depression and anxiety in top-level football players, several significant differences in depression were observed regarding athlete characteristics. A higher prevalence of depression was found in female athletes than male athletes as their body mass index was higher; injured athletes had higher scores for depression than uninjured players as their body mass index was higher [33].

Self-esteem is an emotional assessment of an individual himself, and it is a key component in predicting a healthy psychological state. Weight stigmatization has been associated with the negative psychosocial reactions affecting self-esteem. Self-esteem may also be affected by ideal self-image or ideal body model. Overweight individuals are socially marginalized due to weight-based teasing that

may increase sadness, loneliness, and unhappiness about weight [34]. These phenomena led them the participation in the sports activity. Peng et al. revealed that self-esteem positively affects sports participation attitude. Self-esteem plays a mediating role between body mass index level and sports participation [35]. Ortega Becerra et al. conducted a study on the influence of body mass index on self-esteem. They revealed that self-esteem is affected by higher body mass index through a negative correlation [36]. Feltz revealed that team sports are important for athletes to have high self-esteem and perform well subjectively [37]. Hoda investigated self-esteem and sports activity and showed that sports activities are negatively associated with body mass index [38]. Kristjánsson et al. revealed that self-esteem positively influenced sports activity [39], whereas self-esteem was negatively influenced by increasing body mass index [40].

Satisfaction with life is an overall assessment of recreational athletes' quality of life in their own lives. Sports participation is associated with various benefits, including satisfaction with life. Forste and Moore studied obesity and satisfaction with life. They revealed that a negative relationship between obesity and satisfaction with life among adolescents has also been stronger for females than males [18]. Carr et al. reported that obese persons showed a higher level of negative affect than persons with lower BMI [41]. Vankim and Nelson reported that overweight and obese students had significantly poor satisfaction with life and higher perceived stress levels than normal-weight students [42]. Overall, satisfaction with sportspersons' life is associated with health status, family and friends, and performance [43,44]. Sports performance might be directly related to sportspersons positive and negative effects on life satisfaction.

The study's findings revealed that recreational athletes with a high body mass index indicated more depression than those with a lower body mass index. In the World Mental Health Surveys, multiple large-scale studies and meta-analyses have shown a connection between body mass index and increased anxiety and depression, with moderate effects (OR in the range of 1.2–1.5) across 13 different countries [45]. Athletes are more prone to experience psychological distress than the overall population. Distress, depression, anxiety, and lack of self-esteem are a few mental health issues affecting many athletes. Mental healthcare professionals should pay great attention to evaluating athletes' main causes of mental health. Athletes and their family members provide huge support to encounter mental illness. The involvement of sports psychologists, team coaches, sports trainers, sports therapists, and athletes' family members are crucial to the all-encompassing treatment of players with mental illness. All these may interact with the athletes in various ways, including by conducting athletes' assessments or athletes' counselling, educating the athletes through psychoeducation, and assisting with their physical, emotional, and social needs.

This study had some limitations which need acknowledging. The study's cross-sectional design excludes causality relations with the variables of interest. Although body mass index has four levels (Normal, Healthy, Overweight, and Obese), the relationship between body mass index levels and other parameters (Distress, Depression, Self-esteem, and Satisfaction with life) can be multidirectional. The reporting of psychological variables, distress, self-esteem, depression, and life satisfaction can be subjected to biases.

The strengths of this study were that all the psychological parameters (distress, depression, self-esteem, and satisfaction with life) test tools were standardized. Additionally, a large sample size of recreational athletes from different sports was also a strength of the study. Appropriate statistical analysis has been done to determine the relationship among parameters. The selected sampling technique used in the study to reduce biasness. This study was a quantitative type and there are possibilities to use data for replication. Moreover, the fact that reliability of all parameters (distress, depression, self-esteem, and satisfaction with life) was calculated.

5. Conclusion

In conclusion, the present study showed a statistically significant relationship between body mass index, distress, and life satisfaction but not between depression and self-esteem. A significant relationship was found between the body mass index and distress and satisfaction with life. An insignificant relationship was seen between depression and self-esteem among recreational athletes from random intermittent dynamic type sports. The study highlighted the health implications of psychological distress, depression, self-esteem, and life satisfaction with body mass index among recreational athletes. In order to overcome the psychological problems, recreational athletes from random intermittent dynamic sports should control their level of BMI. Future studies are needed to understand better the interaction between various psychological variables and body mass index levels.

Author contribution statement

Mohammad Ahsan: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

Mohammad Feroz Ali: Conceived and designed the experiments; Performed the experiments; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data will be made available on request.

Declaration of interest's statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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