

Relationship Between Physical Activity Levels and Psychological Well-Being Among Male University Students in South East, Nigeria: A Cross-Sectional Study

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Fabian Chibunine Ugwueze¹, Olaoluwa Samson Agbaje¹ ,
Prince Christian Ifeanchor Umoke¹,
and Eyuche Lawretta Ozoemena¹

Abstract

This study aimed to evaluate the associations between physical activity (PA) and psychological well-being (PWB) among male university students. An institutionally based cross-sectional study was completed by 243 young men aged 18–30 years in a Nigerian public university. PA was measured using the International Physical Activity Questionnaire-Short Form (IPAQ-SF), and PWB was measured by Ryff's Scale of Psychological Well-being (PWB). The mean age of the participants was 24.9 ($SD = 7.61$) and majority (39.1%) of the participants was aged 18–22 years. Regarding PA, 16.0%, 64.2%, and 19.8% of the participants had low, moderate, and high PA levels, respectively. The mean total PWB score was 119.9 ($SD = 23.64$). For the domains of PWB, male students had mean scores of 25.73 ($SD = 6.05$), 19.42 ($SD = 6.82$), 25.75 (6.10), 14.12 ($SD = 3.89$), 13.70 ($SD = 4.04$) and 21.12 (4.92) for self-acceptance, autonomy, positive relations, environmental mastery, purpose in life and personal growth, respectively. Total PA (total MET min/week) was associated with the total PWB scores ($\beta = 0.13, p < .05$). The total PA METs was significantly associated with self-acceptance ($\beta = 0.13, p < .05$), positive relations ($\beta = 0.16, p < .05$), purpose in life ($\beta = 0.39, p < .05$). Vigorous PA METs showed significantly negative effect on personal growth ($\beta = -0.28, p < .05$) and accounted for 2.0% of the variance of personal growth. PA accounted for 2.5% and 1.2% of the variance of positive relations and purpose in life, respectively. Most of the young men had moderate levels of PA and PWB. PA was significantly associated with PWB among the young men. Male sensitive evidence-based health promotion interventions should aim at promoting PA and PWB among male university students.

Keywords

physical activity, psychological well-being, young men, university, mental health

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Studies have focused on the association between physical activity (PA) and mental health outcomes among young adults, especially in high-income countries (Ahn & Fedewa, 2011; Adeniyi et al., 2016; Biddle et al., 2018; Dale et al., 2019; World Health Organization [WHO], 2003). The physical and psychological benefits of PA are well documented (Bell et al., 2019; WHO, 2003). Despite the benefits of regular PA, such as participation in sports and exercise, the level of PA among persons aged 15 years or older has continued to decline globally (Dumith et al., 2011; Hallal et al., 2012). A high proportion of young adults in both the developed and low-and-middle

incomes countries (LMICs) fall short of the health-related guidelines of engaging in at least 60 min of moderate-to-vigorous- physical activity (MVPA) daily (WHO, 2010).

¹Department of Human Kinetics and Health Education, Faculty of Education, University of Nigeria, Nsukka, Nigeria

Corresponding Author:

Dr. Olaoluwa Samson Agbaje, Department of Human Kinetics and Health Education, Faculty of Education, University of Nigeria, Nsukka, Harding Building besides Faculty of Biological Sciences, UNN, Nsukka, 400001, Nigeria.

Emails: agbajesam@yahoo.com; samson.agbaje@unn.edu.ng



Hallal et al. reported that 31.1% of adults aged 15 years or older are physically inactive worldwide. The decline in PA levels among young adults could be a potential risk factor for the onset of chronic diseases (Bonevski et al., 2013), mental health problems such as depression and anxiety (McMahon et al., 2017), and poor cognitive functioning (Sallis & Owen, 1999).

Young people's transition from secondary school into the university environment in Nigeria is characterized by many challenges such as academic demands and stress, financial difficulties, and other school environment-related factors (Fawzy & Hamed, 2017; Hiester et al., 2009). These challenges pose significant risks to the physical and mental health of university students. Prior studies have reported that university students are vulnerable to mental health problems (Ibrahim et al., 2013; Nunes et al., 2014). Although the university environment provides opportunities for the development of healthy lifestyles and formation of healthy behaviors (Niedermeier et al., 2018), improvement in mental and cognitive functioning among young adults (Sallis & Owen, 1999); it also creates chances for young adults' physical inactivity and sedentary lifestyles (Hallal et al., 2012) and mental health problems (Fawzy & Hamed, 2017). Studies from developed countries have reported that mental health problems among young adults have increased over the past decade (Biddle et al., 2018; Reneflot et al., 2018).

In Nigeria, the overall PA levels of young adults appear to be declining (Adeniyi et al., 2016). For instance, only 37% of young adults engaged in 60 min of MVPA daily (Oyeyemi et al., 2017), 59% engaged at moderate levels (Odunaiya et al., 2010), 3.8% engaged in low levels of PA (Adeniyi et al., 2011), and approximately 72% engaged in PA at least once a month (Senbanjo & Oshikoya, 2010). Atilola et al. (2015) reported that the mental health concerns of young people remain neglected, misunderstood, and under-researched in Nigeria. A study (Ifeagwazi et al., 2015) reported that Nigerian undergraduate students have poor psychological well-being (PWB) due to personal, political, and socioeconomic alienation. Mental disorders have an immense individual and societal financial burden in Nigeria (Esan et al., 2012). The authors further found that mental disorders seem to be more severe in males.

Research evidence suggests that young men are under-represented in interventions aimed at improving physical and mental health outcomes. Pagoto et al. (2012) reported that interventions aimed at improving healthy behaviors are predominantly focused on middle-aged and female participants. Research evidence suggests the need for interventions to be sensitive to both gender and age (Oloff & Greaves 2012). Ashton et al. (2015) conducted a systematic review of health-related interventions exclusively in young males. They found that none of the

interventions included in the review were explicitly designed for young men. The designers of the interventions recruited young men to ensure a similar sample or for expediency (Ashton et al., 2015). The underrepresentation or limited involvement of young men in health-related interventions could be due to a dearth of information on different facets of their health and general well-being. Thus, an investigation of the PA level of male university undergraduates, and positive mental health status (PMH) and their interrelationships could provide vital data for the development of needed health promotion interventions in Nigerian universities. A brief review of related literature on the study's key concepts is presented in the subsequent sections.

Physical Activity

Physical activity is crucial for maintaining good health (Hallal et al., 2012). PA has been conceptualized as any bodily movement produced by skeletal muscles that requires energy expenditure and includes activities completed while working, playing, household chores and exercise, or sport (Craig et al., 2003). Adequate PA is associated with considerable health benefits in young people that can progress into adulthood (Hallal et al., 2012; Janssen & Leblanc, 2010; WHO, 2010). Young adults engage in PA for several reasons. The SLOTH (sleep, leisure-time, occupation, transportation, and home-based activities) model (Pratt et al., 2004) elucidates these reasons and describes the domains of PA. Young men's engagement in these activities contributes to their total daily PA.

Although the health-related PA guidelines expect young adults to be physically active in all areas of living, studies on PA levels among young men in Nigeria, especially in the university context are very scarce (Adeniyi et al., 2016; Odunaiya et al., 2010; Senbanjo & Oshikoya, 2010). Understanding the current PA levels among male university students could provide valuable information for effective PA promotion in a setting where such evidence is scarce or lacking (Bauman et al., 2012; Kohl et al., 2012). Additionally, understanding the association between PA levels and mental outcomes could prove vital information in the development and improvement of evidence-based public health interventions for fostering positive physical and mental health outcomes among male university students. Overall well-being, learning outcomes, and academic achievement could be enhanced in the Nigerian university context.

Psychological Well-being

Psychological well-being has been variously conceptualized. Ryff and Keyes (1995) viewed psychological

well-being as a condition of positive functioning and a high level of personal satisfaction in the spheres of autonomy, environmental mastery, personal growth, and positive relations with other people. Similarly, Burns (2017) viewed “psychological well-being as the inter- and intra-individual levels of positive functioning that can include one’s relatedness with others and self-referent attitudes that include one’s sense of mastery and personal growth. Subjective well-being reflects dimensions of affect judgments of life satisfaction.” Literature suggests that PWB comprises two main dimensions such as the hedonic perspective—the subjective experience of happiness (affect) and life satisfaction feeling good; and eudaimonic perspective, which covers positive psychological functioning, good relationships with others and self-realization (Ryan & Deci, 2001; Stewart-Brown, 2015). In the present study, both the hedonic and eudaimonic aspects of mental health were explored.

Based on the Ryff’s multidimensional model of psychological well-being, the broad elements of eudaimonia has been used extensively in the literature (Ryff, 2014). The six dimensions of well-being include self-acceptance (SA), positive relations with others (PR), autonomy (AU), environmental mastery (EM), purpose in life (PL), and personal growth (PG). Self-acceptance implies the ability to have a positive attitude and feelings of satisfaction, and acceptance of self despite inherent limitations or deficiencies. PR exemplifies the subject’s empathy and capacity to establish intimate, meaningful, and trusting relationships with others. AU implies a person’s ability to control his/her behavior, resist social pressure, make independent decisions even if they at variance with other people’s views. EM connotes the ability to create and manage situations conducive for mental conditions and daily activities; PL measures subject’s intentionality and ability to set goals in life; PG represents the ability to develop one’s potentials and readiness for new experiences and the feelings of improving over time (Gómez-López et al., 2019; Ryff, 1989; Ryff & Singer, 2008).

Prior studies have examined the association between PWB and demographic factors of gender, education, age, and socioeconomic factors with mixed results (Clarke et al., 2001; Lindfors et al., 2006; Ryff & Keyes, 1995). Findings reported that environmental mastery and autonomy increase with age while purpose in life, and personal growth decrease with age. Conversely, there were no age differences for self-acceptance. Furthermore, Ryff (1989), Ryff and Keyes (1995), Keyes et al. (2002) reported gender differences in the PWB dimensions of positive relations with others and personal growth. Similarly, persons with higher education are more likely to have high levels of psychological well-being, especially in relation to purpose in life and personal growth (Ryff et al., 2003). Regular PA is strongly linked to the

experience of higher levels of dimensions of PWB in regular exercisers compared to non-exercisers (Edwards et al., 2005). However, none of the previous studies was conducted among male university students in Nigeria. It is unclear as to whether the dimensions of PWB are associated with demographic characteristics of Nigerian male university students. This research aims to explore the relationship between PA level and PWB.

Theoretical Framework

The self-determination theory (SDT) (Ryan & Deci, 2000) posits that people have three basic psychological needs, such as competence, autonomy, and relatedness. This emphasizes that the attainment of these needs is crucial for psychological growth. The three basic needs underscore Ryff’s six factors of psychological well-being. Specifically, other dimensions of PWB such as environmental mastery, purpose in life, and personal growth appear to accentuate need of competence which implies “feeling effective in one’s ongoing interactions with the social environment and experiencing opportunities to exercise and express one’s capacities” (Ryan & Deci, 2000). The desire to fulfill these basic psychological needs can serve as the impetus for individuals to engage in PA as well as promote their psychological well-being (B Owen et al., 2014). However, the appreciation of the basic needs varied among individuals. This could explain why there are different levels of PA and PMH among individuals, including young university men. Nevertheless, the promotion of the basic psychological needs in the individuals could be a viable channel for encouraging young men to engage in PA. Consequently, regular, and adequate engagement in moderate to high PA could improve PMH in young university men.

The Present Study

Regardless of increasing evidence on the association between PA and PWB (Ahn & Fedewa, 2011; Adeniyi et al., 2016; Biddle et al., 2018; Dale et al., 2019; WHO, 2003), it is unclear whether PA, on its own, promotes PWB, or whether the association between PA and PWB is null among Nigerian young men. Understanding the relationships between PA and PWB could help Nigerian policymakers, mental health experts, and public health agencies focus on interventions aimed at increasing the PA level. This may decrease the young men’s chances of developing mental illness (Harvey et al., 2010). A better understanding of the links between PA and PWB could spur evidence-based strategies for increasing PA levels; promoting and strengthening mental health promotion services for youths in Nigeria, since research evidence indicates that poor documentation and limited data hinder

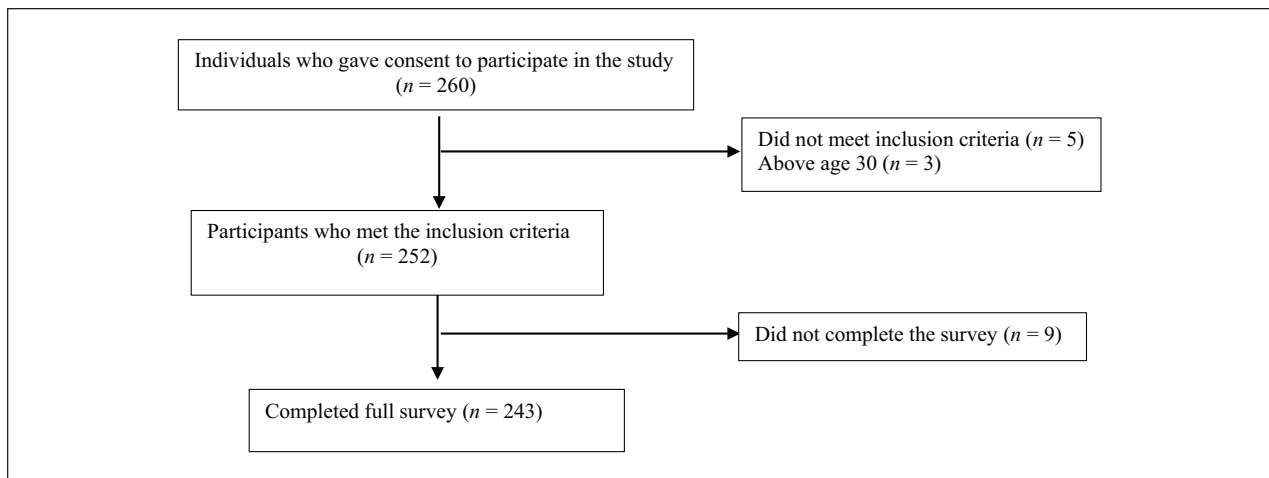


Figure 1. Participants' selection and eligibility.

planning and adequate provision of mental health services for this subpopulation (Heath et al., 2012; Jacob et al., 2007). The availability of research evidence on the nexus between PA and PWB among Nigeria young men could be useful for future mental health surveillance and help to identify Nigerian young adults' populations at risk of PA inactivity and related harms. Besides, empirical evidence is needed to ascertain the PA levels, and PWB status of young men and explore these outcomes based on demographic characteristics to identify significant disparities that may occur within the subgroups. The objectives of the present study include: (1) determine the PA levels of male university students, (2) determine PWB status of male undergraduate students, (3) determine the relationship between PA and PWB among male students, and (4) determine whether the PA levels and domains of PWB are associated with age, year of study, ethnic origin and body mass index (BMI), among male students.

Method

Study Design and Participants

The conduct and reporting of this survey adhered to the STROBE statement for cross-sectional studies (Vandenbroucke et al., 2007). Eligible participants were 19, 438 male students who were enrolled during the 2017/2018 academic session in a public university, Southeast Nigeria (National Universities Commission [NUC], 2018). The study was conducted in one of the main campuses of the university. The campus has nine faculties. These include the Faculties of Agriculture, Arts, Biological Sciences, Education, Engineering, Pharmaceutical Sciences, Physical Sciences, Social Sciences, and Veterinary Medicine. The sample size ($n = 260$) was determined using the Fischer's formula ($n = (Z^2 pq)/d^2$)

as the population from which the sample size was drawn was more than 3000 (WHO, 1995). The prevalence of PA was 37% based on a previous study (Oyeyemi et al., 2017) with a 5% margin of error and 95% confidence level. The young men were recruited via random sampling to participate in the study. The participants' ages ranged from 18 to 30 years. The sample was representative of the male students registered at the University during the 2017/2018 academic year. The criteria for inclusion included young male adults enrolled as freshmen and old students in both full-time and part-time bachelor's degree program. Female students, students who enrolled for the diploma program, sub-degree program (Joint Universities Preliminary Examinations Board-JUPEB) or non-Nigerian students, or those who had already completed a bachelor's degree, were not included in the study. We conducted the survey between June 20 and September 27, 2018. The present study was conducted according to the stipulated guidelines in the (Blinded for Review). The flow chart for the selection and eligibility of the participants is shown in Figure 1.

Procedure

Permission was sought from the different departments in the Faculty of Education to access the students. The course representatives (i.e., class appointed/elected leaders) and the students were informed about the study. The researchers arranged a date and time to explain the study's purpose to the male students at the end of semesters' examinations. This period did not interfere with the regular academic sessions. Male students were given information sheets and consent forms to be completed before responding to the items in the questionnaires. The students who gave written consent were permitted to participate in the study, and they individually assented to

participation in the study. The questionnaires were self-administered in classroom settings under the supervision of the principal investigators to assist with any queries that might arise. The interviews were conducted on a date and time agreed upon by the participants and the researchers. It took approximately 30–40 min for the students to complete their responses. The principal investigators adhered to a strict procedure in the administration, processing, and use of the collected data. The total sample pool was 260. However, only 243 students (93.5% response rate) completed the study. The remaining 17 students did not have the complete information required for data analysis.

Measures. All the participants were requested to complete self-report questionnaires. These include the sociodemographic profile form, the International Physical Activity Questionnaire (IPAQ-SF), and Ryff's Scale Psychological Well-Being (PWB). The young men's height (cm) and weight (kg) measurements were taken for computation of the BMI.

Physical Activity. Physical activity was measured using the short form of the IPAQ-SF. The IPAQ instruments are available from www.ipaq.ki.se. The IPAQ is a self-reported questionnaire that accounts for the duration of different levels of PA for the past seven days or a week. The short form is a dimension-based instrument. The questionnaire is structured to capture physical activity in four fundamental domains of PA, namely vigorous, moderate, walking, and sitting. Each type of PA was assigned an intensity code in units of METs (e.g., 3.3, 4.0, & 8.0) (Craig et al., 2003). Estimation of energy expenditure was obtained multiplying the MET score by the number of minutes per week spent in each activity. The score on sitting was not included in any summary score of PA (Craig et al., 2003). To achieve the health benefits of PA, Haskell et al. (2007) recommended that an individual should engage in at least 150 min per week of moderate-intensity PA. This corresponds to 600 MET-min/week. Based on this recommendation, the male university students were classified into three groups: Low PA (insufficiently active/participants getting less than 600 MET-min/week), moderate PA/sufficiently active (600 to < 3,000 MET-min/week), and high PA (participants reporting more than $\geq 3,000$ MET-min/week). The cut-points for the categories were informed by previous studies (Craig et al., 2003; Rääsk et al., 2017; WHO, 2010). The IPAQ short version has been reported to be reliable and valid (Craig et al., 2003). The IPAQ-SF and IPAQ-LF have been validated and translated in previous Nigerian studies (Oyeyemi et al., 2013; 2014). In this study, the Cronbach alpha coefficient for the IPAQ-SF scale was .79 (Supplemental File S1).

Psychological Well-Being. Ryff's psychological well-being scale (Ryff, 1989, Ryff & Keyes, 1995) was used to measure PWB and its different dimensions. The Ryff's PWB measures psychological well-being (PWB) and covers six dimensions: self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life and personal growth. Items illustrating each dimension are as follows: "I like most aspects of my personality" (self-acceptance, $n = 7$; $\alpha = .76$), "Maintaining close relationships has been difficult and frustrating for me" (positive relations, $n = 7$; $\alpha = .50$), "I tend to be influenced by people with strong opinions" (autonomy, $n = 7$; $\alpha = .71$), "I am quite good at managing the responsibilities of my daily life" (environmental mastery, $n = 7$; $\alpha = .68$), "I sometimes feel as if I've done all there is to do in life" (purpose in life, $n = 7$; $\alpha = .60$) and "For me, life has been a continuous process of learning, changing, and growth" (personal growth, $n = 7$; $\alpha = .61$). There are 20 positively worded items and 22 negatively worded items in the PWB scale (Supplemental Files 2 and 3). Before data analysis, items with negative content were reverse scored so that high values indicated well-being. The different dimensions are mixed into a single 42-item measure. Participants were requested to indicate how precisely each item describes them by rating on a 6-point Likert scale ranging from "disagree strongly" to "agree strongly." Scores are calculated for the different domains of PWB with higher scores indicating higher levels of psychological well-being (Ryff & Keyes, 1995).

Sociodemographic Characteristics. Sociodemographic data included age in years, current academic level/year of study, and ethnic origin. We coded the participants' age in years, both continuously and as a polytomous variable. These include younger adults (18–22 years) coded as 1, intermediate young adults (23–26 years) coded as 2 and older young adults (27–30 years) coded as 3. The academic level/year of study was categorized into four groups. Year one (100 Level coded as 1), Year two (200 Level coded as 2), Year three (300 Level coded as 3), and Year four (400 Level coded as 4). Ethnic origin/ethnicity was coded 1 for Igbo, 2 for Yoruba, 3 for Hausa/Fulani, and 4 for others while the academic program was dichotomized as the regular program (coded as 1) and sandwich/part-time program (coded as 2). The covariates were selected based on previous studies, which focused on demographic and socioeconomic correlates of health and well-being (Lundqvist & Mäki-Opas, 2016; Stranges et al., 2014).

Weight Status. Physical educators and health educators measured all the body parameters. Participants' body height and weight were measured after filling the questionnaires. Height was measured in the stand-

ing position to the nearest 0.1 cm using Harpenden Portable Stadiometer (Holtain Model 603VR). Bodyweight was measured with minimal clothing with SECA 813 electronic scale (non-medical) to the nearest 0.1 kg. Participants were requested to remove shoes and heavy clothing such as cardigan and sweaters because the measurements were taken during the cold season (July–August). Based on the recommended guidelines, we adjusted bodyweight measures by subtracting 0.3 kg to account for clothing (Dalene et al., 2018). Thereafter, BMI was computed as the body mass divided by the square of body height (kg/m^2). The BMI categories were defined based on the commonly accepted cut-off points, that is, BMI $<18.5 \text{ kg}/\text{m}^2$ for underweight, 18.5 to 24.99 kg/m^2 for a healthy weight, 25.0 to 29.99 kg/m^2 for overweight, and $\geq 30 \text{ kg}/\text{m}^2$ for obese (WHO, 2000).

Statistical Analysis

The preliminary analysis was conducted to identify outliers, coding error, and missing value points on the participants' questionnaire items. Next, the main variables were examined concerning the normal and bivariate assumption of distribution. Pearson's product-moment correlation coefficients were computed to examine intercorrelations between PA (Total MET-min/week), PWB, and their dimensions. Pearson's χ^2 test, independent samples *t*-test and univariate ANOVA with a post-hoc test (Bonferroni method) were used to explore differences in the mean PA scores (i.e., total MET-min/week), PA levels (i.e., low PA, moderate PA, and high PA) in relation to PWB, and across all subgroups which included age, year of study, academic program type, ethnicity, and BMI. We also examined differences in the total mean PWB and subscale scores by participants' demographics and BMI.

We conducted a preliminary evaluation of the multicollinearity test to detect if there is a high correlation among predictor variables (i.e., $\geq .80$) (Tabachnick & Field, 2013). Additional analysis for multicollinearity was conducted using the variance inflation factor (VIF). A variable with $\text{VIF} < 5$ indicates a potential presence of collinearity of that variable with other variables in the model. There was no violation of the assumptions for multicollinearity (Supplemental Files 4 and 5). The assumptions for multicollinearity were met for the study variables. Cohen's (1988) criteria were adopted to interpret the effect size, signifying that the effect was small when $\eta^2 = 0.01$ ($d = 0.20$), medium when $\eta^2 = 0.059$ ($d = 0.50$), and large when $\eta^2 = 0.138$ ($d = 0.80$). Hierarchical multiple linear regression was used to analyze the associations of PA, PWB, and participants' demographic characteristics (Supplemental file 6). A *p*-value $\leq .05$ was considered statistically significant.

Table 1. Demographic Characteristics of the Participants.

Characteristics	n (%), M (SD)	
Age (years)	24.9 (7.61)	
Age group	n	(%)
18–22 years	95	(39.1)
23–26 years	67	(27.6)
27–30 years	81	(33.3)
Year of study		
100 level	59	(24.3)
200 level	69	(28.4)
300 level	62	(25.5)
400 level	53	(21.8)
Ethnicity		
Igbo	159	(65.4)
Yoruba	23	(9.5)
Hausa/Fulani	19	(7.8)
Others ^a	42	(17.3)
Type of academic program		
Part-time/sandwich	100	(41.2)
Regular	143	(58.8)
BMI		
$<18.5 \text{ kg}/\text{m}^2$ (underweight)	40	(16.5)
18.5 to 24.99 kg/m^2 (normal)	175	(72.0)
25.0 to 29.99 kg/m^2 (overweight)	11	(4.5)
$\geq 30 \text{ kg}/\text{m}^2$ (obese)	17	(7.0)

Note. BMI, body mass index; a, other tribes such Kanuri, Igalala, Idoma.

For each model, individuals with missing values in variables were removed. All analyses were conducted using IBM Statistical Package for Social Science (SPSS) version 25.0 for Windows (IBM, Armonk, NY, USA).

Results

Descriptive Statistics and Pearson's Correlations

The participants' demographic characteristics are summarized in Table 1. The findings of descriptive statistics such as mean, standard deviation, and Pearson's correlation analysis for determining the relationship level between the PA levels and PWB and its subdomains among male students are presented in Table 2. The data analysis showed that the total PA (MET-min/week) was 1,923.7 ($SD = 1,500.2$), and the mean PWB score was 119.9 ($SD = 23.64$). The total PWB score suggests that the participants had moderate levels of PWB (Table 2). Another aim of this study was to examine the association between PA levels and PWB of university young men. According to the Pearson's correlation matrix (Table 2), TPA was not positively related with MWB ($r = .06$). PWB was weakly correlated to PWB ($r = .13$), and PWB dimensions such as

Table 2. Descriptive Statistics and Correlation Analysis on Study Variables and Sub-Dimensions.

Variables	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11
IPAQ-SF TPA MET-min/wk.	1923.7	1500.2	–										
IPAQ-SF LPA ^a	593.9	600.9	.61**	–									
IPAQ-SF MPA ^b	465.0	535.6	.68**	.22*	–								
IPAQ-SF HPA ^c	975.4	1099.7	.82**	.28*	.55**	–							
PWB	119.9	23.64	.13*	.08	.13*	.03	–						
SA	25.7	6.05	.13*	.08	.14*	.03	.36**	–					
AUT	19.4	6.82	.26*	.03	.02	–.05	.48**	.23**	–				
PR	25.8	6.06	.16*	.06	.17*	.12	.61**	.43**	.23**	–			
EM	14.1	3.89	.08	.05	.10	.00	.51**	.37**	.52**	.15*	–		
PL	13.7	4.05	.12	.06	.07	.05	.50**	.20**	.45**	.48**	.22**	–	
PG	21.1	4.92	.09	.07	.08	–.01	.51**	.32**	.52**	.52**	.53**	.26**	–
Skewness	–	–	1.36	1.62	1.58	1.11	–.19	2.00	–.41	–.11	.15	–.20	
Kurtosis	–	–	2.00	1.59	1.20	1.69	–.31	1.73	1.13	–.08	–.20	.78	

Note. PA, physical activity; PWB, psychological well-being; MET, metabolic equivalent task; TPA, total PA MET-min/week; Min, minutes; wk, week; M, mean; SD, standard deviation; IPAQ-SF, International physical activity questionnaire-short form; LPA, low physical activity; MPA, moderate physical activity; VPA, high physical activity; IPAQ-SF LPA^a = < 600 MET-min/week; IPAQ-SF MPA^b = > 600 to < 3,000 MET-min/week; High PA/IPAQ-SF HPA^c = ≥ 3,000 MET-min/week; PWB, psychological well-being; SA, self-acceptance; AUT, autonomy; PR, positive relations with others; EM, environmental mastery; PL, purpose in life; PG, personal growth.

* $p \leq .05$. ** $p \leq .01$.

Table 3. PA Levels and PWB Subscales Among Participants (N = 243).

PA levels	M (SD)
Low PA (n = 39)	236.8 (225.25)
Moderate PA (n = 156)	1609.9 (636.89)
High PA (n = 48)	4313.9 (1500.22)
PWB subscales	
Self-acceptance	25.73 (6.05)
Autonomy	19.42 (6.82)
Positive relation	25.75 (6.10)
Environmental mastery	14.12 (3.89)
Purpose in life	13.70 (4.04)
Personal growth	21.12 (4.92)

Note. Low PA = < 600 MET-min/week; Moderate PA = > 600 to < 3,000 MET-min/week; High PA = ≥ 3,000 MET-min/week.

self-acceptance ($r = .13$), autonomy ($r = .26$), and positive relations ($r = .16$). As regards the correlations of the dimensions of PWB, the results indicated positive associations among all the dimensions, with small values ranging from 0.20 (purpose in life) to 0.61 (positive interpersonal relationships) (Table 2). Similarly, PA has a significant positive relationship with PWB ($p < .05$). There were significant correlations among the levels of PA ($r = .22 - .55$). Table 2 further shows that the variables' skewness (between -0.11 and 2.00) and kurtosis (between -0.08 and 2.00) values are within the normal range of $+2$ to -2 . Additionally, 16.0%, 64.2%, and 19.8% of the students had low, moderate, and high levels

of PA, respectively (Table 3). The results of descriptive analysis of PWB subscales among male university students indicated that they had highest scores in positive relations ($M = 25.75$, $SD = 6.10$) and self-acceptance ($M = 25.73$, $SD = 6.05$) (Table 3). The univariate ANOVA showed statistically significant differences on PA (total MET-min/week) among male undergraduates of different weight status ($F_{3,239} = 3.061$, $p < .05$; partial $\eta^2 = 0.04$). However, the results of the independent samples t -test and Pearson's χ^2 test conducted to compare all the variables according to the participants' demographic characteristics were not statistically significant (Table 4). The univariate ANOVA showed statistically significant differences on a subscale of PWB, which is personal growth ($F_{3,239} = 2.089$, $p < .05$; partial $\eta^2 = 0.03$). However, other results of the univariate ANOVA and independent samples t -test conducted to compare all the total mean PWB scores and the subscales according to the participants' demographic characteristics were not statistically significant (Table 5). Cohen's (1988) guidelines for interpretation of values of partial eta-squared were used. A value above .06 is considered a moderate effect size, and a value above .14 is considered a large effect size. The results of regression models showed that none of the demographic factors were associated with self-acceptance in model 1. For self-acceptance Model 2, the total PA MET-min/week was significantly associated with self-acceptance ($\beta = 0.13$, $p < .05$). In model 3, higher vigorous METs/week was positively associated ($\beta = -0.27$, $p < .05$) with self-acceptance. For positive relations, the total PA MET-min/

Table 4. Total PA Scores and PA Levels with Participants' Demographic Characteristics (N = 243).

Variables	Total PA score (MET-min/week) M (SD)		t (df), F (df), p-value	η^2	Physical activity			χ^2 (df), p-value
					Low PA (n = 39)	Mod. PA (n = 156)	High PA (n = 48)	
Age group								
18–22 years (n = 95)	1897.97	(1417.48)	F (2,240) = 0.034, 0.967	0.004	17 (17.9)	61 (64.2)	17 (17.9)	χ^2 (4) = 0.802, 0.938
23–26 years (n = 67)	1960.61	(1540.35)			9 (13.4)	44 (65.7)	14 (20.9)	
27–30 years (n = 81)	1923.23	(1577.32)			13 (16.0)	51 (63.0)	17 (21.0)	
Year of study								
100 level (n = 59)	1713.93	(1448.06)	F (3,239) = 0.674, 0.569	0.08	13 (22.0)	37 (62.7)	9 (15.3)	χ^2 (6) = 9.424, 0.151
200 level (n = 69)	2015.73	(1473.84)			7 (10.1)	47 (68.1)	15 (21.7)	
300 level (n = 62)	2065.40	(1326.69)			6 (9.7)	44 (71.0)	12 (19.4)	
400 level (n = 53)	1871.48	(1772.60)			13 (24.5)	28 (52.8)	12 (22.6)	
Ethnicity								
Igbo (n = 159)	2062.93	(1521.65)	F (3,239) = 0.153, 0.053	0.02	20 (12.6)	105 (66.0)	34 (21.4)	χ^2 (6) = 6.936, 0.327
Yoruba (n = 23)	1696.39	(1568.99)			6 (26.1)	13 (56.5)	4 (17.4)	
Hausa/Fulani (n=19)	1322.90	(1174.21)			4 (21.1)	14 (73.7)	1 (5.3)	
Others ^a (n = 42)	1792.67	(1464.99)			9 (21.4)	24 (57.1)	9 (24.4)	
Academic program								
PTS ^b (n = 100)	1811.84	(1509.35)	t (241) = -0.972, 0.332	0.003	19 (19.0)	65 (65.0)	16 (16.0)	χ^2 (2) = 2.151, 0.341
Regular (n = 143)	2001.86	(1494.11)			20 (14.0)	91 (63.6)	32 (22.4)	
BMI								
<18.5 kg/m ²	1568.83	(1439.84)	F (3,239) = 3.061, 0.029	0.04	24 (13.7)	113 (64.6)	38 (21.7)	χ^2 (3) = 7.282, 0.296
18.5 to 24.99 kg/m ²	1982.39	(1431.85)			9 (22.5)	27 (67.5)	4 (10.0)	
25.0 to 29.99 kg/m ²	2941.56	(2629.77)			2 (18.2)	5 (45.5)	4 (36.4)	
≥ 30 kg/m ²	1495.47	(1053.63)			4 (23.5)	11 (64.7)	2 (11.8)	

Note. All post-hoc comparisons (Bonferroni's test); Low PA (< 600 MET-min/week); moderate PA (600 to < 3,000 MET-min/week); High PA (≥ 3,000 MET-min/week); df, degree of freedom; BMI, body mass index; Mod., moderate; p-values from χ^2 tests indicated possible associations between PA categories and sociodemographic variables; χ^2 (df), Pearson's χ^2 /degrees of freedom; F(df), F-ratio/ degrees of freedom; t (df), independent-samples t-test and degree of freedom; η^2 , partial eta squared; PTS^b, part-time/sandwich; Others^a, other tribes such as Igala, Idoma, Kanuri.

* $p \leq .05$.

week was found to be significantly associated with positive relations ($\beta = 0.16, p < .05$) and accounted for 2.5% of the variance in model 2. The total PA MET-min/week was significantly associated with purpose in life ($\beta = 0.39, p < .05$) in Model 3. Vigorous PA METs showed significantly negative effect on personal growth ($\beta = -0.28, p < .05$) in model 3 and accounted for 2.0% of the variance (Table 6).

Discussion

Main Findings

This study is the first to assess self-reported PA levels and explored the associations of young men's PA with PMH and demographic characteristics within the university

setting in Southeast Nigeria. Despite the numerous mental and psychological health benefits associated with engagement in PA (Ahn & Fedewa, 2011; Adeniyi et al., 2016; Biddle et al., 2018; Dale et al., 2019; WHO, 2003), limited research has examined the association between PA and PWB within the context of university environment in Nigeria. The study findings showed that most participants had a moderate PA level ($M = 1923.7, SD = 1500.20$). This finding is inconsistent with a previous study (Lapa, 2015) that reported a high level of PA among male university students. The discrepancies in the findings may be attributed to the fact that the study was among male and female university students in Turkey who have access to sports infrastructure that support adequate engagement in diverse forms of PA compared to male students in Nigeria with a shortage of quality

Table 5. Total PWB and Subscales' Scores by Participants' Demographic Characteristics.

Variables	Dimensions of PWB						
	Total PWB scores, M (SD)	SA M (SD)	AU M (SD)	PR M (SD)	EM M (SD)	PL M (SD)	PG M (SD)
Age (years)							
18–22 Years	116.11 (17.12)	24.60 (5.15)	18.92 (4.74)	25.38 (5.28)	13.60 (3.36)	13.04 (3.74)	20.57 (4.19)
23–26 years	123.63 (29.12)	26.36 (6.49)	20.78 (9.93)	26.34 (7.02)	14.83 (4.36)	14.01 (7.02)	21.29 (5.82)
27–30 years	121.11 (24.85)	26.54 (6.52)	18.90 (5.56)	25.75 (6.10)	14.14 (3.99)	14.22 (3.71)	21.61 (4.90)
F (df)/t (df)	F (2, 240) = 2.182 0.115, 0.02	F (2, 240) = 2.786 0.064, 0.02	F (2, 240) = 1.828 0.163, 0.01	F (2, 240) = 0.500 0.607, 0.004	F (2, 240) = 2.006 0.137, 0.02	F (2, 240) = 2.155 0.118, 0.01	F (2, 240) = 1.034 0.357, 0.008
Year of study							
100 level	119.27 (25.71)	25.89 (6.45)	19.66 (5.90)	26.51 (6.92)	13.61 (3.99)	12.84 (4.65)	20.75 (5.81)
200 level	120.12 (22.40)	25.01 (6.02)	20.61 (9.58)	25.59 (5.29)	13.61 (3.61)	13.87 (3.78)	21.42 (4.51)
300 level	119.36 (25.78)	25.77 (6.00)	18.50 (4.90)	25.93 (6.28)	15.01 (4.21)	13.81 (4.39)	20.32 (4.99)
400 level	120.72 (20.70)	26.43 (5.76)	18.69 (5.12)	24.89 (5.78)	14.32 (3.59)	14.32 (3.06)	22.05 (4.16)
F (df)/t (df)	F (3, 239) = 0.047 0.986, 0.005	F (3, 239) = 0.573 0.633, 0.007	F (3, 239) = 1.300 0.275, 0.02	F (3, 239) = 0.697 0.554, 0.008	F (3, 239) = 1.904 0.130, 0.02	F (3, 239) = 1.351 0.259, 0.01	F (2, 239) = 1.388 0.247, 0.02
Ethnicity							
Igbo	119.59 (21.78)	25.54 (5.89)	18.96 (4.86)	25.95 (5.85)	14.14 (3.78)	13.77 (4.16)	21.21 (4.72)
Yoruba	123.83 (28.95)	25.91 (6.47)	22.26 (11.72)	26.87 (6.33)	14.21 (4.34)	14.00 (3.26)	20.57 (5.13)
Hausa/Fulani	118.79 (29.04)	25.74 (7.55)	21.47 (12.91)	23.58 (7.25)	14.32 (4.19)	13.37 (3.96)	20.32 (4.55)
Others ^a	119.17 (25.35)	26.36 (5.89)	18.69 (5.39)	25.36 (6.12)	13.90 (4.01)	13.45 (4.14)	21.41 (5.78)
F (df)/t (df)	F (3, 239) = 0.246 0.864, 0.003	F (3, 239) = 0.207 0.892, 0.002	F (3, 239) = 2.339 0.074, 0.03	F (3, 239) = 1.192 0.313, 0.01	F (3, 239) = 0.065 0.978, 0.004	F (3, 239) = 0.150 0.929, 0.001	F (2, 239) = 0.330 0.804, 0.004
Academic program							
Part-time/sandwich	121.68 (27.33)	26.21 (6.68)	20.20 (9.01)	25.71 (6.24)	14.32 (4.17)	13.88 (4.06)	21.36 (5.11)
Regular	118.57 (20.70)	25.40 (5.58)	18.88 (4.69)	25.78 (5.95)	13.99 (3.68)	13.58 (4.04)	20.94 (4.80)
F (df)/t (df)	t (241) = 1.010 0.314, 0.004	t (241) = 1.028 0.305, 0.004	t (241) = 1.486 0.139, 0.009	t (241) = -.084 0.933, 0.000	t (241) = 0.659 0.511, 0.002	t (241) = 0.567 0.571, 0.001	t (241) = 0.647 0.518, 0.002
p-value, partial η^2							
BMI							
< 18.5 kg/m ²	116.95 (26.53)	25.02 (5.92)	19.40 (5.23)	25.15 (6.71)	14.01 (3.72)	13.18 (4.13)	20.30 (5.75)
18.5 to 24.99 kg/m ²	119.94 (22.76)	25.69 (5.91)	19.39 (7.34)	25.77 (5.92)	13.90 (4.54)	13.78 (4.01)	21.30 (4.75)
25.0 to 29.99 kg/m ²	133.91 (33.55)	28.91 (9.92)	21.09 (6.55)	28.09 (6.67)	16.27 (4.67)	15.36 (4.43)	24.18 (5.33)
≥ 30 kg/m ²	116.65 (15.52)	25.82 (4.29)	18.71 (4.78)	25.41 (5.75)	14.47 (3.26)	13.06 (3.99)	19.18 (3.30)
F (df)/t (df)	F (3, 239) = 1.613 0.187, 0.02	F (3, 239) = 1.199 0.311, 0.01	F (3, 239) = 0.280 0.840, 0.003	F (3, 239) = 0.693 0.557, 0.008	F (3, 239) = 1.269 0.286, 0.02	F (3, 239) = 1.012 0.388, 0.01	F (2, 239) = 2.809 0.040, 0.03
p-value, partial η^2							

Note. PWB, psychological well-being; BMI, body mass index; SA, self-acceptance; AU, autonomy; PR, positive relations with others; EM, environmental mastery; PL, purpose in life; PG, personal growth; M, arithmetic mean; SD, standard deviation; F, F-ratio; df, degree of freedom; t (df), independent-samples t-test and degree of freedom; η^2 , partial eta square. *p ≤ .05.

Table 6. Hierarchical Linear Regression Analyses of Factors Associated with PWB.

Variable	Self-acceptance			Autonomy			Positive relations		
	Step 1 (β)	Step 2(β) [†]	Step 3(β) ^{††}	Step 1 (β)	Step 2(β) [†]	Step 3(β) ^{††}	Step 1 (β)	Step 2(β) [†]	Step 3(β) ^{††}
	Age group	0.175	0.166	0.156	0.000	0.000	-0.009	0.146	0.136
Academic level	-0.050	-0.054	-0.050	-0.118	-0.119	-0.115	-0.139	-0.144	-0.139
Ethnicity	-0.024	-0.008	0.000	-0.028	-0.027	-0.027	-0.111	-0.092	-0.084
Academic program	0.009	0.002	-0.015	-0.143	-0.143	-0.154	-0.011	-0.019	-0.036
BMI	0.028	0.022	0.006	0.003	0.002	-0.011	-0.002	-0.008	-0.011
PA (total METs)		0.131*	0.363		0.010	0.103		0.159*	0.200
LPA METs			-0.097			0.000			-0.060
Moderate PA METs			0.079			0.063			0.084
Vigorous PA METs			-0.272*			-0.164			-0.073
F	1.070	1.592	1.749	1.098	0.916	0.897	1.028	1.893	1.457
R ²	0.022	0.039	0.063	0.023	0.023	0.033	0.021	0.046	0.053
Adj R ²	0.001	0.014	0.027	0.002	-0.002	-0.004	0.001	0.022	0.017
ΔR^2	0.022	0.017	0.024	0.023	0.000	0.011	0.021	0.025	0.007

* $p \leq .05$; ** $p < .01$.Step 1(β) unadjusted model.†Step 2 (β) adjusted for Age, academic level, ethnicity, academic program, BMI, and PA (Total MET-min/week).††Step 3 (β) adjusted for domains/categories of physical activity (PA).

a. Dependent variable: Self-acceptance, autonomy, positive relations.

b. Predictors in the Model: (constant), age group, academic level, ethnicity, academic prog. type, BMI.

c. Predictors in the model: (constant), age group, academic level, ethnicity, academic prog. type, BMI, PA (total METs).

d. Predictors in the Model: (Constant), age group, academic level, ethnicity, academic prog. type, BMI, PA (Total MET-min/week), LPA METs/week, Moderate PA METs/week, vigorous PA METs/week.

(continued)

Table 6. (continued)

Variable	Environmental mastery			Purpose in life			Personal growth		
	Step 1 (β)	Step 2(β) [†]	Step 3(β) ^{††}	Step 1 (β)	Step 2(β) [†]	Step 3(β) ^{††}	Step 1 (β)	Step 2(β) [†]	Step 3(β) ^{††}
Age group	0.013	0.008	0.000	0.145	0.138	0.143	0.099	0.094	0.090
Academic level	0.089	0.086	0.089	0.053	0.050	0.045	0.001	-0.002	-0.002
Ethnicity	-0.064	-0.055	-0.049	-0.113	-0.100	-0.094	-0.065	-0.055	-0.052
Academic program	-0.037	-0.041	-0.055	0.004	-0.001	0.004	-0.013	-0.017	-0.021
BMI	0.054	0.051	0.036	0.033	0.029	0.017	0.056	0.053	0.034
PA (total METs)		0.075	0.275		0.103	0.386*		0.080	0.342
LPA METs			-0.078			-0.119			-0.070
Moderate PA METs			0.064			-0.052			0.012
Vigorous PA METs			-0.235			-0.212			-0.276*
F	0.804	0.895	1.075	1.473	1.662	1.423	-0.007	-0.005	0.003
R ²	0.017	0.022	0.040	0.030	0.041	0.052	0.014	0.020	0.040
Adj R ²	-0.004	-0.003	0.003	0.010	0.016	0.015	0.680	0.818	1.076
ΔR^2	0.017	0.006	0.018	0.030	0.010	0.012	0.014	0.006	0.020

* $p \leq .05$; ** $p < .01$.

Step 1 (β) unadjusted model.

[†]Step 2 (β) adjusted for age, academic level, ethnicity, academic program, BMI, and PA (Total MET-min/week).

^{††}Step 3 (β) adjusted for domains/categories of physical activity (PA).

PWB, Ryff's psychological well-being scale; β , standardized coefficients.

a. Dependent variable: Emotional mastery, purpose in life, personal growth.

b. Predictors in the Model: (Constant), age group, academic level, ethnicity, academic program, type, BMI.

c. Predictors in the Model: (constant), age group, academic level, ethnicity, academic program, type, BMI, PA (total MET-min/week).

d. Predictors in the Model: (constant), age group, academic level, ethnicity, academic program, type, BMI, PA (total MET-min/week), LPA METs/week, moderate PA METs/week, vigorous PA METs/week.

facilities that could promote participation in PA. Thus, the university management must drive the enhancement of a high level of PA activity among university students via the device of better strategies for increasing students' participation in regular and adequate PA. The present study found that one-fifth and about two-thirds of the participants had high and moderate PA levels, respectively. The low proportion of young men with a high PA level in this study is a concern. This may suggest that male students face certain barriers to adequate participation in PA. Future research should investigate the barriers to PA participation among university students in Nigeria. The finding is consistent with previous studies (Lapa, 2015; Oyeyemi et al., 2013).

The finding further showed that young men had moderate levels of MWB and PWB. The results could be attributed to academic demands and stress, financial difficulties and other school environment-related factors (Fawzy & Hamed, 2017; Hiester et al., 2009), personal, political and socioeconomic alienation of youth in Nigeria (Ifeagwazi et al., 2015). This finding is inconsistent with a prior study (Lapa, 2015) that reported high levels of psychological well-being among the university students. University campuses may thus provide essential structures, support, and resources, including recreation facilities, and mental health services for promoting psychological well-being and overall well-being of the students (deJonge et al., 2020). Although Nigerian public universities lack adequate structures and resources to promote and support the mental well-being of the teeming student populations; collaboration with non-governmental organizations (NGOs), corporate bodies (e.g., banks, youth development agencies) may be important in providing these essential services.

Additionally, university-based mental health professionals such as health educators, sports psychologists, and clinical psychologists should educate the students on the available, appropriate and cost-effective interventions that could improve their mental health (Fibbins et al., 2019; Rowley et al., 2018). Further research is required to explore the mental health benefits of implementing integrated and multidisciplinary approaches for PA and mental health services for youth in the university environment (DeJonge et al., 2020). Future studies should explore the predictors (personal, school-level factors, environmental factors, etc.) of psychological well-being among university students and the contributory roles of university-based mental health services and interventions in promoting students' psychological well-being in Nigeria.

In the present study, PA emerged as a significant predictor of PWB with its subdimensions- self-acceptance, positive relations, purpose in life and personal growth. Although the strength of the association is weak, the finding confirmed the central study hypothesis. The finding is

consistent with the literature (Biddle et al., 2018; Dale et al., 2019; Edwards, 2006; Huppert, 2009; McMahon et al., 2017; Nicole et al., 2013). A plausible explanation for the weak association could be the low level of PWB among the participants. Also, other confounders such as a dearth of sports facilities, peer influence, and personality traits might have influenced the participants' engagement in PA. This could indirectly impinge on their psychological well-being. The self-determination theory (SDT) may have partially explained this association. The desire of young men to fulfill their basic psychological needs could prompt engagement in PA. Since engagement in PA has the potential to improve PWB, the observed association in this study is plausible. Future studies may endeavor to explore the link between PA and PWB with empirical evidence based on SDT. Besides BMI, there were no significant results of demographic factors with total PA score (TPA MET-min/week) or PA levels

Since limited data exists about PA and its associations with dimensions of PWB, especially in Nigerian young men, the association between PA and dimensions of PWB could be a new area in studies that focus on adolescents and youth mental health in Nigeria. This study fills the gap in this area of studies. This finding suggests that a high level of physical activity in young adult males may have the potential to decrease their risk of psychological problems. In other words, young men with higher TPA MET-min/week may have more beneficial effects. Hence, physical activity could be a protective factor for psychological distress in male university students (Haskell et al., 2007; Heath et al., 2012).

Limitations and Directions for Further Studies

The study has contributed to the literature on associations between PA and PWB in young university men. However, there are some limitations. First, the cross-sectional design does not permit causal inferences or confirm directions of associations. Future studies should consider a longitudinal examination of the associations between different modes of PA and PWB. The study made use of validated self-report measures that are susceptible to recall bias, overestimation or underreporting of PA, varying interpretations of PA in diverse social-cultural contexts, and age groups (Hallal et al., 2012). Although the use of objective measures of PA in large-scale studies is costly and faces several challenges in LMICs, future studies should endeavor to measure PA objectively with relatively small samples. Some unobserved individual and school-related factors are not considered in the present study, which may have confounded the findings. Further research should include additional and unexplored variables that could help explain the association between PA and PWB in young

men. The use of male students in an institutionalized setting (university environment) may limit the generalizability of findings. Future studies should sample young male adults outside of university settings. Also, future studies should explore potential mediators between PA engagement and psychological well-being among young men.

Conclusion

The findings of this study showed that male university students were sufficiently active with a moderate level of psychological well-being. The findings showed that PA is significantly associated with PWB among the students. The finding may be useful for the development of evidence-based interventions by public health experts, health education experts, physical educators, school counselors, psychologists, and others that give care to young men who are vulnerable to intense academic stress and demands. The findings from this study suggest that moderate to high levels of PA may be important for achieving a high level of psychological well-being in male university students. Given the strength of these findings, the results can help public health experts, health educators, and physical educators develop future physical activity and psychosocial interventions that emphasize the promotion of PA and psychological health. Such interventions could boost young adults' resilience to academic stress, emotional difficulties, and enhance academic achievement.

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Declaration of Conflicting Interests

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Ethical Statement

The present study was conducted according to the stipulated guidelines in the Declaration of Helsinki and all procedures involving human subjects. Ethical approval of research was granted by the Faculty of Education Research Ethics Committee, University of Nigeria, Nsukka (Approval Reference #: ERA-018). We obtained written, informed consent from all the participants.

ORCID iD

Olaoluwa Samson Agbaje  <https://orcid.org/0000-0003-4332-3451>

Supplemental Material

Supplemental material for this article is available online.

References

- Abbott, R. A., Ploubidis, G. B., Huppert, F. A., Kuh, D., & Croudace, T. J. (2010). An evaluation of the precision of measurement of Ryff's Psychological well-being scales in a population sample. *Social Indicators Research*, *97*(3), 357–373. <https://doi.org/10.1007/s11205-009-9506-x>
- Adeniyi, A. F., Odukoya, O. O., Oyeyemi, A. L., Adedoyin, R. A., Ojo, O. S., Metseagharun, E., & Akinroye, K. K. (2016). Results from Nigeria's 2016 report card on physical activity for children and youth. *Journal of Physical Activity & Health*, *13*(11 Suppl 2), S231–S236. <https://doi.org/10.1123/jpah.2016-0305>
- Adeniyi, A. F., Okafor, N. C., & Adeniyi, C. Y. (2011). Depression and physical activity in a sample of Nigerian adolescents: Levels, relationships, and predictors. *Child and Adolescent Psychiatry and Mental Health*, *5*, 16. <https://doi.org/10.1186/1753-2000-5-16>
- Ahn, S., & Fedewa, A. L. (2011). A meta-analysis of the relationship between children's physical activity and mental health. *Journal of Pediatric Psychology*, *36*(4), 385–397. <https://doi.org/10.1093/jpepsy/jsq107>
- Ainsworth, B. E., Haskell, W. L., Herrmann, S. D., Meckes, N., Bassett, D. R., Jr, Tudor-Locke, C., Greer, J. L., Vezina, J., Whitt-Glover, M. C., & Leon, A. S. (2011). 2011 Compendium of physical activities: A second update of codes and MET values. *Medicine and Science in Sports and Exercise*, *43*(8), 1575–1581. <https://doi.org/10.1249/MSS.0b013e31821eccc12>
- Akinroye, K. K., Oyeyemi, A. L., Odukoya, O. O., Adeniyi, A. F., Adedoyin, R. A., Ojo, O. S., Alawode, D. A., Ozomata, E. A., & Awotidebe, T. O. (2014). Results from Nigeria's 2013 report card on physical activity for children and youth. *Journal of Physical Activity & Health*, *11*(Suppl 1), S88–S92. <https://doi.org/10.1123/jpah.2014-0181>
- Ashton, L. M., Hutchesson, M. J., Rollo, M. E., Morgan, P. J., Thompson, D. I., & Collins, C. E. (2015). Young adult males' motivators and perceived barriers towards eating healthily and being active: A qualitative study. *International Journal of Behavioral Nutrition and Physical Activity*, *12*(1), 93. <https://doi.org/10.1186/s12966-015-0257-6>
- Atilola, O., Ayinde, O. O., Emedoh, C. T., & Oladimeji, O. (2015). State of the Nigerian child - neglect of a child and adolescent mental health: A review. *Paediatrics and International Child Health*, *35*(2), 135–143. <https://doi.org/10.1179/2046905514Y.0000000137>
- B Owen, K., Smith, J., Lubans, D. R., Ng, J. Y., & Lonsdale, C. (2014). Self-determined motivation and physical activity in children and adolescents: A systematic review and meta-analysis. *Preventive Medicine*, *67*, 270–279. <https://doi.org/10.1016/j.ypmed.2014.07.033>

- Bauman, A. E., Reis, R. S., Sallis, J. F., Wells, J. C., Loos, R. J., & Martin, B. W., & Lancet Physical Activity Series Working Group (2012). Correlates of physical activity: Why are some people physically active and others not? *Lancet (London, England)*, *380*(9838), 258–271. [https://doi.org/10.1016/S0140-6736\(12\)60735-1](https://doi.org/10.1016/S0140-6736(12)60735-1)
- Bell, S. L., Audrey, S., Gunnell, D., Cooper, A., & Campbell, R. (2019). The relationship between physical activity, mental wellbeing, and symptoms of mental health disorder in adolescents: A cohort study. *The International Journal of Behavioral Nutrition and Physical Activity*, *16*(1), 138. <https://doi.org/10.1186/s12966-019-0901-7>
- Biddle, S. J., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine*, *45*(11), 886–895. <https://doi.org/10.1136/bjsports-2011-090185>
- Biddle, S. J. H., Ciaccioni, S., Thomas, G., & Vergeer, I. (2018). Physical activity and mental health in children and adolescents: An updated review of reviews and an analysis of causality. *Psychology of Sport and Exercise*. <https://doi.org/10.1016/j.psychsport.2018.08.011>
- Bonevski, B., Guillaumier, A., Paul, C., & Walsh, R. (2013). The vocational education setting for health promotion: A survey of students' health risk behaviours and preferences for help. *Health Promotion Journal of Australia: Official Journal of Australian Association of Health Promotion Professionals*, *24*(3), 185–191. <https://doi.org/10.1071/HE13047>
- Braunholtz, S., Davidson, S., Myant, K., et al. (2007) Well? What Do You Think? (2006). *The third national scottish survey of public attitudes to mental health, mental wellbeing and mental health problems*. Scottish Government.
- Burns, R. A. (2017). *Psychosocial well-being*. In: N. A. Pachana (ed.), *Encyclopedia of geropsychology*. Springer.
- Clarke, P. J., Marshall, V. W., Ryff, C. D., & Wheaton, B. (2001). Measuring psychological well-being in the Canadian Study of Health and Aging. *International psychogeriatrics*, *13*(Supp 1), 79–90. <https://doi.org/10.1017/s1041610202008013>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Erlbaum.
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J. F., & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, *35*(8), 1381–1395. <https://doi.org/10.1249/01.MSS.0000078924.61453.FB>
- Dale, L. P., Vanderloo, L., Moore, S., & Faulkner, G. (2019). Physical activity and depression, anxiety, and self-esteem in children and youth: An umbrella systematic review. *Mental Health and Physical Activity*, *16*, 66–79. <https://doi.org/10.1016/j.mhpa.2018.12.001>
- Dalene, K. E., Anderssen, S. A., Andersen, L. B., Steene-Johannessen, J., Ekelund, U., & Hansen, B. H. (2018). Secular and longitudinal physical activity changes in population-based samples of children and adolescents. *Scandinavian Journal of Medicine & Science in Sports*, *28*(1), 161–171. <https://doi.org/10.1111/sms.12876>
- Deci, E. L., & Ryan, R. M. (2000). *Handbook of self-determination research [Internet]*. University Rochester Press.
- deJonge, M. L., Omran, J., Faulkner, G. E., & Sabiston, C. M. (2020). University students' and clinicians' beliefs and attitudes towards physical activity for mental health. *Mental Health and Physical Activity*, *18*, 100316. <https://doi.org/10.1016/j.mhpa.2019.100316>
- Dumith, S. C., Hallal, P. C., Reis, R. S., & Kohl, H. W., III (2011). Worldwide prevalence of physical inactivity and its association with human development index in 76 countries. *Preventive Medicine*, *53*(1-2), 24–28. <https://doi.org/10.1016/j.ypmed.2011.02.017>
- Edwards, S. (2006). Physical exercise and psychological well-being. *South African Journal of Psychology*, *36*(2), 357–373. <https://doi.org/10.1177/008124630603600209>
- Esan, O. B., Kola, L., & Gureje, O. (2012). Mental disorders and earnings: Results from the Nigerian National Survey of Mental Health and Well-Being (NSMHW). *The Journal of Mental Health Policy and Economics*, *15*(2), 77–82.
- Fawzy, M., & Hamed, S. A. (2017). Prevalence of psychological stress, depression and anxiety among medical students in Egypt. *Psychiatry Research*, *255*, 186–194.
- Fibbins, H., Lederman, O., Morell, R., Furzer, B., Wright, K., & Stanton, R. (2019). Incorporating exercise professionals in mental health settings: An Australian perspective. *Journal of Clinical Exercise Physiology*, *8*(1), 21–25.
- Gao, J., & McLellan, R. (2018). Using Ryff's scales of psychological well-being in adolescents in mainland China. *BMC psychology*, *6*(1), 17. <https://doi.org/10.1186/s40359-018-0231-6>
- Garber, C. E., Blissmer, B., Deschenes, M. R., Franklin, B. A., Lamonte, M. J., Lee, I. M., Nieman, D. C., & Swain, D. P., & American College of Sports Medicine (2011). American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Medicine and Science in Sports and Exercise*, *43*(7), 1334–1359. <https://doi.org/10.1249/MSS.0b013e318213fefb>
- Gómez-López, M., Viejo, C., & Ortega-Ruiz, R. (2019). Psychological well-being during adolescence: Stability and association with romantic relationships. *Frontiers in psychology*, *10*, 1772. <https://doi.org/10.3389/fpsyg.2019.01772>
- Guinhouya, B. C., Samouda, H., & de Beaufort, C. (2013). Level of physical activity among children and adolescents in Europe: A review of physical activity assessed objectively by accelerometry. *Public Health*, *127*(4), 301. <https://doi.org/10.1016/j.puhe.2013.01.020>
- Hallal, P. C., Andersen, L. B., Bull, F. C., Guthold, R., Haskell, W., & Ekelund, U., & Lancet Physical Activity Series Working Group (2012). Global physical activity levels: Surveillance progress, pitfalls, and prospects. *Lancet (London, England)*, *380*(9838), 247–257. [https://doi.org/10.1016/S0140-6736\(12\)60646-1](https://doi.org/10.1016/S0140-6736(12)60646-1)
- Harvey, S. B., Hotopf, M., Overland, S., & Mykletun, A. (2010). Physical activity and common mental disorders. *The British Journal of Psychiatry: The Journal of Mental Science*, *197*(5), 357–364. <https://doi.org/10.1192/bjp.bp.109.075176>

- Haskell, W. L., Lee, I. M., Pate, R. R., Powell, K. E., Blair, S. N., Franklin, B. A., Macera, C. A., Heath, G. W., Thompson, P. D., & Bauman, A. (2007). Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Circulation, 116*, 1081–1093.
- Heath, G. W., Parra, D. C., Sarmiento, O. L., Andersen, L. B., Owen, N., Goenka, S., Montes, F., Brownson, R. C., & Lancet Physical Activity Series Working Group (2012). Evidence-based intervention in physical activity: Lessons from around the world. *Lancet (London, England), 380*(9838), 272–281. [https://doi.org/10.1016/S0140-6736\(12\)60816-2](https://doi.org/10.1016/S0140-6736(12)60816-2)
- Hiester, M., Nordstrom, A., & Swenson, L. M. (2009). Stability and change in parental attachment and adjustment outcomes during the first semester transition to college life. *Journal of College Student Development, 50*(5), 521–538.
- Huppert, F. A. (2009). Psychological well-being: Evidence Regarding its causes and consequences. *Applied Psychology: Health and Well-Being, 1*, 137–164. <https://doi.org/10.1111/j.1758-0854.2009.01008.x>
- Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research, 47*(3), 391–400.
- Ifeagwazi, C., Chukwuorji, J., & Zachaeus, E. (2015). Alienation and psychological wellbeing: Moderation by resilience. *Social Indicators Research, 120*(2), 525–544. Retrieved April 16, 2020, from www.jstor.org/stable/24721127
- Jacob, K. S., Sharan, P., Mirza, I., Garrido-Cumbrera, M., Seedat, S., Mari, J. J., Sreenivas, V., & Saxena, S. (2007). Mental health systems in countries: Where are we now? *Lancet (London, England), 370*(9592), 1061–1077. [https://doi.org/10.1016/S0140-6736\(07\)61241-0](https://doi.org/10.1016/S0140-6736(07)61241-0)
- Janssen, I., & Leblanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *The International Journal of Behavioral Nutrition and Physical Activity, 7*, 40. <https://doi.org/10.1186/1479-5868-7-40>
- Jenkins, R., Meltzer, H., & Jones, P. B. (2008). *Foresight Mental Capital and Wellbeing Project. Mental health: Future challenges*. The Government Office for Science. Retrieved from http://www.bis.gov.uk/assets/BISCore/corporate/MigratedD/ec_group/116-08-FO_b.pdf
- Keyes, C. L. (2002). The mental health continuum: From languishing to flourishing in life. *Journal of Health and Social Behavior, 43*(2), 207–222.
- Keyes, C. L. (2005). Mental illness and/or mental health? Investigating axioms of the complete state model of health. *Journal of Consulting and Clinical Psychology, 73*(3), 539–548. <https://doi.org/10.1037/0022-006X.73.3.539>
- Keyes, C. L., Shmotkin, D., & Ryff, C. D. (2002). Optimizing well-being: The empirical encounter of two traditions. *Journal of Personality and Social Psychology, 82*(6), 1007–1022.
- Keyes, C. L., & Simoes, E. J. (2012). To flourish or not: Positive mental health and all-cause mortality. *American Journal of Public Health, 102*(11), 2164–2172. <https://doi.org/10.2105/AJPH.2012.300918>
- Kohl, H. W., 3rd, Craig, C. L., Lambert, E. V., Inoue, S., Alkandari, J. R., Leetongin, G., Kahlmeier, S., & Lancet Physical Activity Series Working Group (2012). The pandemic of physical inactivity: Global action for public health. *Lancet (London, England), 380*(9838), 294–305. [https://doi.org/10.1016/S0140-6736\(12\)60898-8](https://doi.org/10.1016/S0140-6736(12)60898-8)
- Lapa, T. Y. (2015). Physical activity levels and psychological well-being: A Case Study of University Students. *Procedia - Social and Behavioral Sciences, 186*, 739–743. <https://doi.org/10.1016/j.sbspro.2015.04.122>
- Lindfors, P., Berntsson, L., & Lundberg, U. (2006). Factor structure of Ryff's psychological well-being scales in Swedish female and male white-collar workers. *Personality and Individual Differences, 40*(6), 1213–1222. <https://doi.org/10.1016/j.paid.2005.10.016>
- Lundqvist, A., & Mäki-Opas, T. (Eds.). (2016). *Health 2011 Survey – Methods. Report 8/2016*. National Institute for Health and Welfare.
- McMahon, E. M., Corcoran, P., O'Regan, G., Keeley, H., Cannon, M., Carli, V., Wasserman, C., Hadlaczky, G., Sarchiapone, M., Apter, A., Balazs, J., Balint, M., Bobes, J., Brunner, R., Cozman, D., Haring, C., Iosue, M., Kaess, M., Kahn, J. P., Nemes, B., . . . Wasserman, D. (2017). Physical activity in European adolescents and associations with anxiety, depression and well-being. *European Child & Adolescent Psychiatry, 26*(1), 111–122. <https://doi.org/10.1007/s00787-016-0875-9>
- Ng Fat, L., Scholes, S., Boniface, S., Mindell, J., & Stewart-Brown, S. (2017). Evaluating and establishing national norms for mental wellbeing using the short Warwick-Edinburgh Mental Well-being Scale (SWEMWBS): Findings from the Health Survey for England. *Quality of Life Research: An International Journal of Quality of Life Aspects of Treatment, Care and Rehabilitation, 26*(5), 1129–1144. <https://doi.org/10.1007/s11136-016-1454-8>
- Niedermeier, M., Frühauf, A., Kopp-Wilfling, P., Rumpold, G., & Kopp, M. (2018). Alcohol consumption and physical activity in Austrian College Students-A Cross-Sectional Study. *Substance Use & Misuse, 53*(10), 1581–1590. <https://doi.org/10.1080/10826084.2017.1416406>
- National Universities Commission. (2018). Nigerian University System Statistical Digest. <https://nuc.edu.ng/wp-content/uploads/2018/12/REVISED-April-25-Statistical-Digest-min.pdf>
- Nunes, M., Walker, J. R., Syed, T., De Jong, M., Stewart, D. W., Provencher, M. D., & Furer, P. (2014). A national survey of student extended health insurance programs in postsecondary institutions in Canada: Limited support for students with mental health problems. *Canadian Psychology, 55*(2), 101.
- Odunaiya, N. A., Ayodele, O. A., & Oguntibeju, O. O. (2010). Physical activity levels of senior secondary school students in Ibadan, western Nigeria. *The West Indian Medical Journal, 59*(5), 529–534.
- Oliffe, J. L., & Greaves, L. (2012). *Designing and conducting gender, sex, and health research*. Sage.

- Oyeyemi, A. L., Oyeyemi, A. Y., Jidda, Z. A., & Babagana, F. (2013). Prevalence of physical activity among adults in a metropolitan Nigerian city: A cross-sectional study. *Journal of Epidemiology*, *23*(3), 169–177. <https://doi.org/10.2188/jea.je20120116>
- Oyeyemi, A. L., Bello, U. M., Philemon, S. T., Aliyu, H. N., Majidadi, R. W., & Oyeyemi, A. Y. (2014). Examining the reliability and validity of a modified version of the International Physical Activity Questionnaire, long form (IPAQ-LF) in Nigeria: A cross-sectional study. *BMJ open*, *4*(12), e005820. <https://doi.org/10.1136/bmjopen-2014-005820>
- Oyeyemi, A. L., Ishaku, C. M., Oyekola, J., Wakawa, H. D., Lawan, A., Yakubu, S., & Oyeyemi, A. Y. (2016). Patterns and associated factors of physical activity among adolescents in Nigeria. *PloS one*, *11*(2), e0150142. <https://doi.org/10.1371/journal.pone.0150142>
- Pagoto, S. L., Schneider, K. L., Oleski, J. L., Luciani, J. M., Bodenlos, J. S., & Whited, M. C. (2012). Male inclusion in randomized controlled trials of lifestyle weight loss interventions. *Obesity*, *20*, 1234–1239.
- Pratt, M., Macera, C. A., Sallis, J. F., O'Donnell, M., & Frank, L. D. (2004). Economic interventions to promote physical activity: Application of the SLOTH model. *American Journal of Preventive Medicine*, *27*(3 Suppl), 136–145. <https://doi.org/10.1016/j.amepre.2004.06.015>
- Rääsk, T., Mäestu, J., Lätt, E., Jürimäe, J., Jürimäe, T., Vainik, U., & Konstabel, K. (2017). Comparison of IPAQ-SF and two other physical activity questionnaires with accelerometer in adolescent boys. *PloS one*, *12*(1), e0169527. <https://doi.org/10.1371/journal.pone.0169527>
- Rowley, N., Mann, S., Steele, J., Horton, E., & Jimenez, A. (2018). The effects of exercise referral schemes in the United Kingdom in those with cardiovascular, mental health, and musculoskeletal disorders: A preliminary systematic review. *BMC public health*, *18*(1), 949. <https://doi.org/10.1186/s12889-018-5868-9>
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development and well-being. *American Psychologist*, *55*, 68–78.
- Ryff, C. D. (1989). Beyond Ponce de Leon and life satisfaction: New directions in quest of successful ageing. *International Journal of Behavioral Development*, *12*(1), 35–55. <https://doi.org/10.1177/016502548901200102>
- Ryff, C. D. (2013). Eudaimonic well-being and health: Mapping consequences of self-realization In A. S. Waterman (Ed.), *The best within us: Positive psychology perspectives on eudaimonia* (pp. 77–98). American Psychological Association.
- Ryff, C. D. (2014). Psychological well-being revisited: Advances in the science and practice of eudaimonia. *Psychotherapy and Psychosomatics*, *83*(1), 10–28. <https://doi.org/10.1159/000353263>
- Ryff, C. D., & Keyes, C. L. (1995). The structure of psychological well-being revisited. *Journal of Personality and Social Psychology*, *69*(4), 719–727. <https://doi.org/10.1037//0022-3514.69.4.719>
- Ryff, C. D., Keyes, C. L., & Hughes, D. L. (2003). Status inequalities, perceived discrimination, and eudaimonic wellbeing: Do the challenges of minority life hone purpose and growth? *Journal of Health and Social Behavior*, *44*, 275–291.
- Ryff, C. D., & Singer, B. H. (2008). Know thyself and become what you are: A eudaimonic approach to psychological well-being. *Journal of Happiness Studies*, *9*, 13–39. <https://doi.org/10.1007/s10902-006-9019-0>
- Sallis, J. F., & Owen, N. (1999). *Physical activity and behavioral medicine*. Sage.
- Sallis, J. F., Owen, N., & Fotheringham, M. J. (2000). Behavioral epidemiology: A systematic framework to classify phases of research on health promotion and disease prevention. *Annals of Behavioral Medicine: A publication of the Society of Behavioral Medicine*, *22*(4), 294–298. <https://doi.org/10.1007/BF02895665>
- Schulz, K. H., Meyer, A., & Langguth, N. (2012). Exercise and psychological well-being. *Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz*, *55*(1), 55–65. <https://doi.org/10.1007/s00103-011-1387-x>
- Senbanjo, I. O., & Oshikoya, K. A. (2010). Physical activity and body mass index of school children and adolescents in Abeokuta, Southwest Nigeria. *World Journal of Pediatrics*, *6*, 217–222. <https://doi.org/10.1007/s12519-010-0209-9>
- Sirard, J. R., & Pate, R. R. (2001). Physical activity assessment in children and adolescents. *Sports Medicine*, *31*(6), 439–454. <https://doi.org/10.2165/00007256-200131060-00004>
- Stewart-Brown, S. (2013). The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS): Performance in Different Cultural and Geographical Groups. In: C. L. M. Keyes (Ed.), *Mental well-being: International contributions to the study of positive mental health*. Springer, pp. 133–150.
- Stranges, S., Samaraweera, P. C., Taggart, F., Kandala, N. B., & Stewart-Brown, S. (2014). Major health-related behaviours and mental well-being in the general population: The Health Survey for England. *BMJ open*, *4*(9), e005878. <https://doi.org/10.1136/bmjopen-2014-005878>
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. Pearson.
- Taggart, F., Stewart-Brown, S., & Parkinson, J. (2016). *Warwick-Edinburgh mental wellbeing scale (WEMWBS). User guide (version 2)*. NHS Health Scotland, Warwick Medical School, University of Warwick.
- Tennant, R., Hiller, L., Fishwick, R., Platt, S., Joseph, S., Weich, S., Parkinson, J., Secker, J., & Stewart-Brown, S. (2007). The Warwick-Edinburgh Mental Well-being Scale (WEMWBS): Development and UK validation. *Health and Quality of Life Outcomes*, *5*, 63. <https://doi.org/10.1186/1477-7525-5-63>
- The IPAQ group (2014). *International physical activity questionnaire*. <http://www.ipaq.ki.se/scoring.pdf>
- Vaillant, G. E. (2012). Positive mental health: Is there a cross-cultural definition? *World Psychiatry*, *11*(2), 93–99. <https://doi.org/10.1016/j.wpsyc.2012.05.006>
- Vandenbroucke, J. P., Von Elm, E., Altman, D. G., Gøtzsche, P. C., Mulrow, C. D., Pocock, S. J., & Egger, M. (2007). Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): Explanation and elaboration.

- Annals of Internal Medicine*, 147(8), W-163–W-194. <https://doi.org/10.7326/0003-4819-147-8-200710160-00010-w1>
- Welk, G. J., Corbin, C. B., & Dale, D. (2000). Measurement issues in the assessment of physical activity in children. *Research Quarterly for Exercise and Sport*, 71(2 Suppl), S59–S73.
- World Health Organization. (1995). *Expert Committee on Physical Status: The use and interpretation of Anthropometry Physical status: The use and interpretation of anthropometry: Report of a WHO expert committee*. World Health Organization: WHO (Technical report series; 854).
- World Health Organization. (2000). *Obesity: Preventing and managing the global epidemic*. http://www.who.int/nutrition/publications/obesity/WHO_TRS_894/en/
- World Health Organization. (2001). *Mental health: New understanding, new hope*. The World Health Report. WHO.
- World Health Organization. (2003) *Joint WHO/FAO expert consultation on diet, nutrition and the prevention of chronic diseases*. (Technical report series) Author. 28 January–1 February 2002.
- World Health Organization. (2004). *Promoting mental health: Concepts, emerging evidence, practice (Summary Report)*. World Health Organization.
- World Health Organization. (2010). *Global recommendations on physical activity for health*. WHO. http://apps.who.int/iris/bitstream/10665/44399/1/9789241599979_eng.pdf
- World Health Organization. (2018). *Mental health: Strengthening our response. Fact sheet*. <https://www.who.int/en/news-room/fact-sheets/detail/mentalhealth-strengthening-our-response>