


Relationship between self-evaluative components and moderating contextual factors among university student gymnasium exercisers

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ABSTRACT

Regular physical activity (PA) is known to improve psychological traits such as self-esteem (SE), body image (BI) and body satisfaction (BS). However, there are apparent mixed reports about the role of PA in promoting psychosocial wellbeing and moderating factors. This study investigated the relationship between SE, BI and BS of gym exercisers at a university and contextual factors of exercise principles; frequency, duration and types of activity, and participants' demographics variables. Rosenberg self-esteem scale, Body image questionnaire and Body satisfaction Scale were administered among randomly selected gym exercisers ($n = 92$); 60(65.2%) males and 32(34.8 %) females, aged between 15 and 30 years. Self-esteem showed significant correlations with BS ($r = 0.237, p = .023$) and with BI ($r = 0.287, p = .006$). Body satisfaction mean scores were significantly different across duration of exercise sessions ($F=3.672, p=.008$) in favour of 1.5-hour gym sessions compared to longer or shorter ones. Substantial differences were also observed in BI across favourite physical activities ($F= 3.224, p = .026$) with post hoc showing Zumba scoring highest. Regression analyses showed significant influence of exercise type (*Adjusted R Squared* = .040, *Beta* = .239, $p = .023$) and gender (*Adjusted R Squared* = .054, *Beta* = .239, $p = .023$) on BI scores. Type and duration of exercise and gender have moderating effects on self-evaluative components. Gym instructors and stakeholders should consider duration for each type of exercise in fitness programmes to optimise participants' wellbeing. Exercise counselling regarding participants' self-evaluative components and how these could affect their mental health and overall quality of life in different social-cultural settings need to be explored in future studies.

Keywords: Physical education, Body-cathexis, Body image, Body satisfaction, Physical activity participation, Self-esteem.

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INTRODUCTION

Regular physical activity leads to mental as well as physical health for diverse groups of people. However, anecdotal evidence indicates that many university students do not meet the requirements for the recommended daily physical activity (Kljajevic et al., 2022). In an effort to ensure that university students and staff are physically active and to reduce cases of psychosocial maladjustments, coupled with the fitness boom of the 1980s, many training studios and centres were established in universities. Kenyatta University being a leading institution in physical education and sports related programmes in the East African region has been operating a gymnasium since 1970s after inheriting a gymnasium complex from colonial time military barracks (Kamenju et al., 2016). The institution is a public university with the highest number of student enrolment in East African region (Kamer, 2023). The gym has undergone subsequent refurbishment over the years as a training facility for exercise and sports related academic programme as well as a health and fitness centre. However, there are limited studies on the psychological benefits of an active lifestyle among university students in African cultures. Moreover, the reported effects of physical activity (PA) on self-esteem (SE), body image (BI) and body satisfaction (BS) is not consistent among the studies. Thus, there was need to explore these self-evaluative components as some of the possible psychological benefits of physical activities among people from more diverse cultural background, and possible moderating factors. The present study investigated the relationships between SE, BI, BS, and PA among gym users at Kenyatta University, Nairobi, Kenya, and selected possible moderating contextual factors.

Self-Esteem and physical activity

Self-esteem (SE) can be defined as a trait-like (dispositional) evaluative attitude that people have towards themselves in reference to their own value, importance and self-worth, or a state-like construct that fluctuates from moment to moment in response to situational circumstances and events (Gotwals et al., 2003). Researchers have reported that a powerful positive relationship exists between participation in organised physical activity (PA) and SE (Bowker, 2006; Koyuncu et al., 2010; McAuley et al., 2000; Tremblay et al., 2000; Whitehead & Corbin, 1997). Fox and Corbin (1989) compared exercisers and non-exercisers on self-esteem and found that for both female and male groups exercising is a predictor of increasing self-esteem. Tiggerman and Williamson (2000) found that the relationship between exercise activity and SE was positive for men but not significant for women and even negative for women under 21 years. Other studies have shown no effect or negative relationship between PA and SE (Richman & Shaffer, 2000; Walters & Martins, 2000). For example, Richman and Shaffer (2000) found a weak link between sport participation and global self-esteem or even a negative relationship. But it is possible that lower levels of SE where self-concept and self-worth are devalued, the associated lower level of self-confidence leads to decreased motivation to engage in healthy behaviours such as exercise and sports which could enhance SE, thus precipitating a negative loop to further perpetuate inactivity. Therefore, it is of interest to this study to investigate the status of SE of gym exercisers and the possible moderating effects of selected contextual exercise and demographic factors.

Body image and physical activity

The term body image (BI) has been defined as a person's perceptions, thoughts, and feelings about his or her body (outer appearance) (Grogan, 1999; Thompson et al., 1999). De Panfilis et al. (2003) defined BI as a person's mental image and evaluation of his/her physical appearance and the effect of these perceptions and attitudes on behaviour. Therefore, BI encompasses how one thinks, feels, and behaves about their body regarding appearance, shape, and size (Cash & Prazinsky, 2002) and how close a person's actual shape is to their ideal shape (Furnham et al., 2002; Koyuncu et al., 2010). A positive BI is essential in one's life as it impacts confidence while a negative body image is a significant public health concern due to its association with symptoms of disordered eating and low psychological well-being (Bornioli et al., 2020). Many studies

have shown that participation in PA is related to BI (Ginis et al., 2014; Greenleaf & McGreer, 2006; Hausenblas & Fallon, 2007; Henry et al., 2006; Minton, 2018). For example, Hausenblas and Fallon (2007) examined exercise and body image and reported that exercisers had a more positive body image than non-exercisers. In a related study, Henry et al. (2006) analysed the effects of aerobic and interval circuit training programmes on body image and found that both aerobic and circuit exercise groups experienced improved fitness scores, with the greatest enhancements on all BI related variables reported for the interval circuit training group. Therefore, it appears that an interval training programme may be more beneficial in improving body image than aerobic exercise. However, in Ginis et al. (2014) study, aerobic exercise participants experienced greater reductions in social physique anxiety (SPA) and improvement of appearance evaluations compared to those engaged in strength training. Similarly, Minton (2018) examined the effects of strength, aerobic and stretch-based group exercise interventions on BI and levels of SPA in college-aged individuals and found significant differences in BI scores among different exercise conditions by class type but not by time. Therefore, it was of interest to this study to investigate the status of BI of gym exercisers and the moderating effects of selected exercise conditions such as type of physical activity and duration.

Body satisfaction and physical activity

Body satisfaction (BS) has been defined as the contentment that an individual has with an aspect of the body whether a part of the body or whole body in general (Thompson et al., 1999). In the same regard, Jourard and Secord (1955) perceived BS as body-cathexis which reflects how satisfied people are with specific aspects of their bodies. Studies on the nexus between participation in PA and BS have yielded mixed findings. On one hand, there is compelling evidence that BS increases with exercise (Ford et al., 1991; Williams & Cash, 2001). For example, Williams and Cash (2001) found that at the end of the 6-week programme, the weight training group of college students had an improved evaluation of their appearance, BS, and physical self-efficacy in addition to reductions in SPA. On the other hand, some studies have reported no or negative relationship between exercise activity and BS (Tiggerman & Williamson, 2000). This is interesting considering that BS has been associated with aspects of psychological well-being, such as self-esteem (McCabe & Ricciardelli, 2004). Simultaneously, low BS has been associated with low SE, elevated depressive moods (Paxton et al., 2006), anxiety and increased negative perceptions (Makri-Botsari, 2009). With the above bipolar findings on the nexus between SE, BI, BS, and PA, it was apt to establish the relationship among the three concepts.

Self-evaluative components, physical activity, and contextual factors

A number of studies have been carried out to unearth the effects of participation in physical activities on SE, BI and BS across diverse contextual factors (Abwani & Strauss, 2002; Di Corrado et al., 2021; Franzoi et al., 2012; Staurowsky et al., 2009; Yadav & Srivastava, 2019). For example, it has been suggested that women who participate in sports at elite levels feel a good sense of empowerment and increased BI and SE (Staurowsky et al., 2009) compared to non-athletes who scored higher in drive for thinness and showed signs of anorexia and bulimia. In a related study, Franzoi et al. (2012) found that women were more likely to compare their physical appearance with similar or those better than them (upward social comparison) and criticized themselves negatively. In contrast, men compared their bodies with what they want to look like in the future, were more satisfied and hopeful than women. Therefore, it appears that gender differences come from the societal roles and cultural expectations that women play social attractiveness and beauties and were judged by how their bodies measured up. This corroborates assertions that the phenomenon of BI and BS affect women and girls more than men (Abwani & Strauss, 2002). Frost and McKelvie (2005) measured global SE, BS and body build of elementary, high school and university students classified as high or low exercisers and found that high exercisers had greater SE than low exercisers. This implies that the positive relationship between exercise activity and SE could exist across sex and age. Studies have been carried out on BI, SE,

and BS among students in different levels of education with conflicting findings. In a high school study, Bowker et al. (2003) found no significant relationship between exercise and global SE for senior high school students. In a similar study, Koyuncu et al. (2010) examined the relationship between SPA, BI satisfaction, SE and body fat ratio in female exercisers and non-exercisers. They found that for the exercise group, there were lower levels of SPA, but higher BI satisfaction and SE scores compared to the non-exercising group, thus concluding that there was a moderating effect between exercise behaviour and these variables. Based on the above studies it is apparent that physical exercise could positively affect SE, BI, and BS, with possible moderating effects of certain demographic and exercise factors. Moreover, most of the existing literature is focused on populations in western countries, thus paucity of information about non-Western contexts.

Purpose of the present study

The purpose of this study was to explore the status and relationships between self-evaluative components of SE, BI and BS of university students attending gym sessions at Kenyatta University, Nairobi, Kenya, and the moderating effects of selected demographic and exercise factors. Findings of the study have practical applications for university administrators, fitness/gymnasium instructors and medical personnel in delivering effective programmes. Thus, the objectives of the study were to determine the status of perceived SE, BI and BS of university students attending gym, the relationships between the three psychological constructs, and the differences between the participants' SE, BI and BS scores across age category, gender and level of study, type and duration of exercise. It was postulated that SE, BI and BS scores are not moderated by the participants' age category, gender and level of study, type, and duration of favourite exercise.

The study was based on the concept of body cathexis which relates to the degree of satisfaction or dissatisfaction one feels towards various parts and aspects of their own body (Jourard & Secord, 1955). It is a self-evaluative dimension which is dependent on a person's investment of mental and emotional energy in body size, parts, shape, processes, and functions, and is integral to one's sense of self-concept (Secord & Jourard, 1953). In this regard, the study aimed to explore on how it is moderated by the demographic factors of participants' age category, gender and level of study, and physical activity parameters of frequency, duration, and type of favourite exercise.

METHODS

Research design and study sample

A correlational research design (Bhandari, 2021) was used to investigate relationships between measures of body cathexis and physical activity variables among 300 university students attending gym sessions at Kenyatta University, Nairobi, Kenya in the year 2022. Random sampling procedures were used to select 92 study participants: 60 (65.22%) males and 32 (34.78%) females. The sample size was considered adequate as it is more than the minimum 84 recommended for correlation studies. According to Bujang and Baharum (2016), correlation coefficient of 0.3 is considered sizeable and a minimum sample size of 84 is needed to achieve correlation coefficient of at least 0.3 with the generally recommended power of 80%. Study variables measured were perceived SE, BI and BS (dependent) while age category, gender, year of study, type of exercise (Weight training, Dance fitness, Zumba aerobics and Cardio machine exercises) and duration of exercise were taken as moderating variables for exercise (independent variable) outcomes.

Variables measurements

Self-esteem was measured with the Rosenberg self-esteem scale (RSE) (Rosenberg, 1965). The RSE is a ten-item uni-dimensional self-report measure of global self-esteem using a 5-point Likert scale responses format ranging from strongly agree to strongly disagree with higher scores indicating higher self-esteem

(Gray-Little et al., 1997). The RSE has been shown to have high test-retest reliability (.82) in a college sample (Gray-Little et al., 1997). The RSE has also been reported to have a high test-retest reliability (.88) and low social desirability (.22), indicating an honest reporting in a community sample (Robins et al., 2001). Body satisfaction was assessed using Body Satisfaction Scale (BSS) which had 20 items (reflecting dissatisfaction or otherwise with different body parts) weighted on a 7-point scale (i.e., very unsatisfied, unsatisfied, somewhat unsatisfied, neutral, somewhat satisfied, satisfied and very satisfied). The scale has been validated in previous research (Lutter et al., 1990; Rodrigues et al., 2021; Slade et al., 1990). Acceptable reliability estimates using Cronbach's α have been reported for the BSS, ranging from .66 to .82 and .74 to .84 for women and men respectively (Frederick et al., 2014). The instrument used for body image assessment had 17 items modified from the 19-item Body Image Questionnaire – BIQ (Bruchon-Schweitzer, 1987), which were weighted on a 5-point Likert scale, ranging from very low, low, and neutral to high and very high. Validation studies for the BIQ included that of Koleck et al. (2002), which reported an average of 0.67 test-retest (10-day interval) reliability coefficients for the 19 items based on data collected from 89 male and female students.

Procedures and ethical considerations

The regular gym attendees were requested to participate in the study as they were signing in for training. The purpose of the study was explained to potential participants and those who agreed to take part in the study gave signed informed consent. Throughout the study, ethical principles of anonymity, confidentiality, and voluntary participation were observed in line with established guidelines (Comstock, 2013). Data were collected over a period of one month after participants' gym workouts based on their availability.

This work meets most guidelines for Transparency and Openness Promotion (TOP) in Journal Policies and Practices as outlined by Patarčić and Stojanovski, (2022). All materials used in the research have been cited in the text and listed in the reference section. The references items include Digital Object Identifier (DOI) details where they are available. Methods and analyses used in the research have been clearly identified and the procedures used are replicable. Authors will make data, methods used in the analysis, and/or materials used to conduct the research available upon reasonable request to the corresponding author. Preregistration was not done as this practice is yet to be established in the research locality.

Data analysis

Data were coded and analysed using IBM SPSS Version 26. The Likert scale data were transformed to linear percentage of maximum possible (POMP) scores as recommended by Cohen et al. (1999). Shapiro-Wilk tests of normality showed that the data distribution met the assumption of normality for parametric statistical analyses for most variables ($p > .05$). Descriptive (means, standard deviations) were computed to summarise scores. Inferential analyses included Pearson Correlation Coefficient to establish relationships between the tree self-evaluative components, t-test, and one-way analysis of variance – ANOVA with Tukey HSD post hoc test for comparisons purposes, and Linear Regression to determine the influence of exercise and demographic variables on the self-evaluative scores. For all inferential statistics, alpha level of $p < .05$ was taken to indicate significance.

RESULTS

Study participants

The study involved 92 randomly sampled university students who were regularly attending gym sessions at Kenyatta University, Nairobi, Kenya. The composition of the participants included 60 (65.2 %) males and 32 (34.8 %) females, majority of whom were aged between 21 and 25 years (66; 71.7%), followed by those

aged between 15 and 20 years (23; 25.0%). The distribution of the participants per year of study was: 19 (20.7%) each in year one and two, 29 (31.5%) in year three, 20 (21.5%) in year four, and 5 (5.4%) in year five. In terms of exercise frequency, 33 (35.9%) participants exercised three times, 27 (29.3%) twice, 17 (18.5%) four times, 7 (7.6%) five times, 5 (5.4%) once, and 3 (3.3%) more than 5 times per week. In terms of duration of exercise sessions, majority (62; 67.4%) exercised for one hour, 14 (15.2%) for 1.5 hours, 8 (8.7%) for 2 hours, 4 (4.3%) for 30 mins while other 4 (4.3%) exercised for more than 2 hours. Majority of the participants (65; 70.7%) were involved in other organised PA programmes outside the gym while 27 (29.3%) were not.

Descriptive summaries

The means and standard deviations of the student measures of self-esteem, body satisfaction and body image are presented in Table 1.

Table 1. Descriptive data on students' self-esteem, body satisfaction and body image ($n = 92$).

Variables	Min	Max	Mean	Std. Dev.
SE average Likert score	3.10	4.90	4.00	0.41
SE POMP score [%]	52.5	97.50	75.11	10.36
BS Average Likert score	4.00	7.00	5.98	0.87
BS POMP score [%]	50	100	82.98	14.55
BI Average Likert score	2.82	5.00	4.10	0.47
BI POMP score [%]	45.59	100	77.45	11.78

Abbreviations: BI = body image; BS = body satisfaction; POMP = percent of maximum possible; SE = self-esteem.

Results in Table 1 show that the participants had high scores on the BS, BI and SE scales ($\bar{x} > 75\%$). The participants mean POMP scores were higher in BS (82.98 ± 14.55), followed by BI (77.45 ± 11.78) and SE (75.11 ± 10.36).

Comparisons

The means, standard deviations and t-test results on gender are presented in Table 2.

Table 2. Descriptive statistics and t-test results on body satisfaction variables POMP score and gender ($n = 92$).

Variables	Gender	n	\bar{x}	SD	t	df	Sign
Self-esteem	Male	60	74.29	10.55	-1.037	90	.303
	Female	32	76.64	9.97			
Body Satisfaction	Male	60	83.72	14.28	.668	90	.506
	Female	32	81.59	15.18			
Body Image	Male	60	75.32	11.66	-2.435	90	.017*
	Female	32	81.43	11.12			

Note. * $p < .05$.

The results in Table 2 indicate that female students had higher scores on SE and BI than their male peers who were more satisfied with their bodies. However, t-test results indicated that differences were not significant ($p > .05$), except for BI in favour of females ($p = .017$). Analyses to establish whether the variables differ based on age category, year of study, favourite PA, frequency, and duration of exercise was computed using one-way Analyses of Variance (ANOVA). Results showed no significant differences ($p > .05$) in SE, BS and BI based on the respondents age, year of study and frequency of exercise per week. However, significant

differences were found in BS across the respondents' duration of exercise ($p = .008$) (Table 3) and in BI across favourite physical activity ($p = .022$) (Table 4).

Table 3. Means, standard deviations and F-ratios of SE, BS and BI on duration of exercise.

Variables		<i>n</i>	\bar{x}	<i>SD</i>	<i>F</i>	<i>df</i>	<i>Sign</i>
Self-esteem	30 min	4	72.50	19.15	1.334	4.87	.264
	1 hour	62	76.61	8.77			
	1.5 hours	14	73.75	12.74			
	2 hours	8	70.94	12.24			
	> 2 hours	4	67.50	9.13			
	Total	92	75.11	10.36			
Body Satisfaction	30 min	4	68.33	11.81	3.672	4.87	.008**
	1 hour	62	84.13	13.95			
	1.5 hours	14	89.94	12.63			
	2 hours	8	71.25	16.41			
	> 2 hours	4	78.99	8.89			
	Total	92	82.98	14.55			
Body Image	30 min	4	78.68	10.01	0.312	4.87	.869
	1 hour	62	78.23	12.10			
	1.5 hours	14	74.48	13.86			
	2 hours	8	76.47	7.74			
	> 2 hours	4	76.47	10.05			
	Total	92	77.45	11.78			

Note. ** $p < .01$.

Table 4. The means, standard deviations and F-ratios of SE, BS and BI on favourite physical activities.

Variables		<i>n</i>	\bar{x}	<i>SD</i>	<i>F</i>	<i>df</i>	<i>Sign</i>
Self-esteem	Weight training	31	73.71	10.82	.337	88.3	.799
	Dance fitness	32	76.25	9.53			
	Zumba aerobics	13	74.81	9.27			
	Cardio	16	75.78	12.37			
	Total	92	75.11	10.36			
Body Satisfaction	Weight training	31	83.15	15.86	1.691	88.3	.175
	Dance fitness	32	82.43	13.23			
	Zumba aerobics	13	76.80	14.43			
	Cardio	16	88.80	13.51			
	Total	92	82.98	14.55			
Body Image	Weight training	31	73.20	13.06	3.224	88.3	.026*
	Dance fitness	32	77.94	12.36			
	Zumba aerobics	13	84.50	7.34			
	Cardio	16	78.95	7.64			
	Total	92	77.45	11.78			

Note. ** $p < .05$.

Results in Table 3 show that the body satisfaction mean POMP score were significantly different across duration of exercise sessions ($F = 3.672$, $p = .008$). In this regard participants who exercised 1.5 hours had the highest mean followed by those who exercised for one hour, and those who exercised more than 2 hours

and for 30 minutes. Tukey HSD post hoc tests showed that participants who exercised 1.5 hours had significantly higher BS mean score than those who exercised 2 hours ($p = .024$) for and those who exercised for 30 minutes ($p = .050$).

Results in Table 4 reveal that there were significant differences ($F = 3.224, p = .026$) in BI across favourite physical activities. In this case those who engaged in Zumba activities had the highest means followed by the participants in cardio activities, dance fitness and weight training in declining order. Tukey HSD post hoc tests showed that participants whose favourite gym exercise is weight training had significantly lower BI mean score ($p = .026$) than those who favoured Zumba activities.

It was of interest for this study to establish whether there were significant relationships between the three self-evaluative concepts. This was assessed through Pearson Correlation Coefficient analyses between Self-esteem, Body Satisfaction and Body Image ($n = 92$). The results showed significant correlations between SE and BS ($r = 0.237, p = .023$) as well as between SE and BI ($r = 0.287, p = .006$), while correlations between BS and BI were not significant ($p > .05$). Regression analyses were used to establish the moderating effect/influence of exercise and demographic variables on each of the three self-evaluative components. Only BI appeared to be significantly influenced by the selected exercise and demographic variables (Tables 5 and 6).

Table 5. Coefficients of linear regression model for exercise variables on Body Image (BI) scores $n = 92$.

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig.	95.0% Confidence Interval for B	
	<i>B</i>	Std. Error	<i>Beta</i>			Lower Bound	Upper Bound
1 (Constant)	71.757	4.861		14.762	.000	62.097	81.418
Exercise frequency	1.372	1.226	.133	1.119	.266	-1.064	3.808
Exercise duration	-1.691	1.591	-.126	-1.063	.291	-4.852	1.470
Favourite PA	2.606	1.128	.239	2.310	.023*	.364	4.848

Note. ** $p < .05$.

Table 6. Coefficients of linear regression model for demographic variables on Body Image (BI) scores $n = 92$.

Model	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig.	95.0% Confidence Interval for B	
	<i>B</i>	Std. Error	<i>Beta</i>			Lower Bound	Upper Bound
1 (Constant)	84.687	15.835		5.348	.000	53.219	116.154
Age [yrs.]	-.951	.783	-.171	-1.214	.228	-2.507	.606
Gender [F or M]	5.890	2.553	.239	2.307	.023*	.817	10.963
Year of study	2.066	1.387	.207	1.489	.140	-.691	4.822

Note. ** $p < .05$.

Although the overall regression model for exercise variables on BI scores was not significant (*Adjusted R Squared* = .040, $p = .085$), the results showed significant influence of exercise type (*Beta* = .239, $p = .023$). The overall regression model for participants demographic variables on BI scores was significant (*Adjusted R Squared* = .054, $p = .048$), with gender showing significant influence (*Beta* = .239, $p = .023$).

DISCUSSION

The purpose of this study was to investigate the relationship between self-esteem, body image and body satisfaction of university students attending gyms in a Kenyan public university, and the possible moderating effects of age, year of study, frequency of exercise, duration of exercise and favourite PA. This was apt as attending gyms is attributed to different reasons and the anticipated outcomes are diverse. The findings indicate that most of the participants (66; 71.7%) were aged between 21 and 25 years, with close to 50% in their third or fourth year of study. It appears that these have settled down on campus and have the time to go to the gym. Furthermore, the students at this level could be concerned about their SE, BS and BI as they start to think about their future after impending exit from the university after their four-year course programmes. Most of the participants went to the gym thrice and twice a week. Seemingly, they were able to strike a balance between attending classes, co-curricular activities and going to the gym. They went to the gym for one hour, probably because the aerobic sessions are offered for one hour. A majority of the participants were also involved in other PA outside the gym, such as sports and games, martial arts, and dancing.

The study participants had high mean scores on BS, followed by BI and SE. This is supported by studies which have reported that exercisers had more positive BI (Henry et al., 2006; Minton, 2018) and previous research which has reported that BS increases with exercise (Ford et al., 1991; Williams & Cash, 2001). However, this contradicts the results of studies which have reported no effect or negative relationship between PA and SE (Richman & Shaffer, 2000; Walters & Martins, 2000).

Studies have shown that girls report higher negative BI than boys and are at higher risk for negative BI than their male counterparts (Elgin & Pritchard, 2006; Eisenberg et al., 2006; Wang et al., 2005). It has been contended that negative BI arises primarily from socio-cultural pressures to be thin and physical deviation for the current thin-ideal espoused for women and the lean and muscular appearance expected of men (Thompson et al, 1999). In our study, females had high scores on SE and BI than males who had comparatively higher scores on BS. However, t-test results revealed significant differences between males and females on BI in favour of females, with gender influence on BI scores confirmed by the results of regression analyses. Similarly, Staurowsky et al. (2009) found that active women had increased their BI and SE. However, Tiggerman and Williamson (2000) found that the relationship between PA level and SE was positive for men but not women aged 18 years on average. The differences could be attributed to different reasons for which people chose to exercise and which are expected to be moderated by cultural, gender, and age differences in the study populations. Tiggerman and Williamson (2000) found that women did exercise more for weight control and tone reasons than men and exercising for these reasons being associated with lower body satisfaction. It is possible then that the exponential body growth associated with younger women of adolescent age can result to frustrations (thus low SE) when the skinny, slim body shape idealised in westernised cultures and influenced by female models and celebrities (Dawson-Andoh et al., 2011; Foley et al., 2023) is not attained despite exercising hard for this purpose. Conversely, African preferred larger curvy body shape (Foley et al., 2023; Furnham & Alibhai, 1983) may be favoured by the exponential body growth of younger women of adolescent age -especially around the particular body parts associated with the widely acclaimed and enduring hourglass body shape (Singh, 2006).

The current study found that there were no significant differences on SE, BS and BI based on the respondents' age and year of study. With regards to age and SE, studies have shown that the relationship between PA and SE was positive for men, but not for women and even negative for women under 21 years (Tiggerman & Williamson, 2000). In terms of frequency of exercise among university students, studies have

shown that more frequent exercisers had better self-esteem than less frequent exercisers (Frost & McKelvie, 2005). However, there were significant differences in duration of exercise and favourite PA. Concerning duration of exercise and BS, findings showed that students who exercised for one and half hours differed from those who did for two hours in BS scores. This is supported by studies which indicated that BS increases with physical exercise (Ford et al., 1991; Williams & Cash, 2001). From regression analyses, exercise type /favourite PA showed significant influence on BI scores, with comparison analyses indicating that participants whose favourite physical activity was Zumba had higher scores on BI than those of other favourite physical activities, with Weight training scoring the least. This appear to be in line with Ginis et al. (2014) who reported that participants in the aerobic group experienced greater reductions in SPA and greater improvement of appearance evaluations compared to those in the strength training group. However, Hausenblas and Fallen (2007) found that both aerobic and anaerobic (circuit and interval training) groups experienced improved BI measures, with people engaging in both aerobic and anaerobic exercise registering larger effect sizes compared to those engaging in only one mode of exercise. The current study addressed favourite PA as opposed to exclusive participation in the mentioned types of exercise but focused on more specific exercise characterisation in line with training principles.

The present study findings revealed significant positive relationships between SE and BS as well as between SE and BI, but no significant correlation between BS and BI. This finding partially contradicts that of studies which indicated that exercisers had more positive BI (Richman & Shaffer, 2000; Walters & Martins, 2000) that could lead to desirable BS which in turn promotes better SE (Bowker, 2006; Greenleaf & McGreer, 2006). The current study findings are in line with Frost & McKelvie (2004) who reported a significant positive relationship between SE and BI. Similarly, negative BI has been linked to low SE and higher social physique anxiety that is associated with decreased participation in physical activities at adolescent age (Eklund & Bianco, 2000). The decreased PA in turn will most likely lead to lower BI, and thus a negative cycle ensuing. It therefore important to have programmes that deliberately target BI within and outside gym setting to enhance the overall psychological wellbeing of the population.

Limitations

As this was a correlational study, we did not have control over duration and intensity of PA and its influence on SE, BS and BI. Secondly, we couldn't control the students' self-selection of their favourite PA and it was not feasible to randomly categorise them based on this attribute. Also, the study did not compare the PA participants and non-participants on these measures. Therefore, generalisation of the study findings may be constrained. Moreover, we did not cater for the influence of personality traits that may influence the study parameters. To address these shortcomings, future studies should adopt quasi-experimental and longitudinal designs, and include explanatory styles or one's locus of control as it relates to an individual's perceived control over their PA participation, SE, BI and BS. Finally, the small sample size from which data were collected may not be representative. Despite these limitations, the study provides baseline information on the relationships between self-evaluative components, PA participation, and moderating factors among university students.

CONCLUSIONS

The gymnasium exercisers who participated in this study had high scores on SE, BS and BI, with males being more satisfied with their bodies and females having more favourable BI. Gender and favourite physical activities influenced BI, with participants in Zumba aerobics having the highest means. Duration of exercise may lead to substantial difference in BS. There are significant correlations between SE and BS as well as between SE and BI, but non-significant between BS and BI, meaning that self-esteem relates to both body

satisfaction and body image, and that concepts of body satisfaction and body image are not necessarily interconnected. Cultural and age factors need to be considered in exercise programs as they may determine outcomes based on reasons for exercise.

Recommendations

Gym instructors and stakeholders should consider type and duration of exercise and gender in developing and conducting fitness programmes to enhance participants' wellbeing. Future studies need to explore exercise counselling regarding participants' BS, BI and SE and how these could affect their mental health and overall quality of life across diverse cultures. Longitudinal designs should be considered to investigate the long-term effects of PA and demographic factors on participants' psychological characteristics.

AUTHOR CONTRIBUTIONS

Francis M. Mwangi - Conceptualization; Project administration; Data curation. Investigation; Methodology; Formal analysis; Resources; Writing original draft; Revising & editing manuscript drafts; Copyediting. Elijah G. Rintaugu - Conceptualization; Project supervision; Investigation; Methodology; Resources; Validation; Writing original draft; Revising & editing. Abel L. Toriola - Investigation; Methodology; Resources; Supervision; Validation; Revising & editing manuscript drafts - Johnathan Rotich. Conceptualization; Investigation; Methodology; Project administration; Resources; Revising & editing manuscript drafts. Michael Wilson - Investigation; Methodology; Resources; Validation; Writing original draft; Revising & editing manuscript drafts. Xiaojie Tian - Investigation; Methodology; Validation; Resources; Writing original draft; Revising & editing manuscript drafts - Kohske Takahashi. Formal analysis; Investigation; Methodology; Resources; Validation; Writing original draft; Revising & editing manuscript drafts.

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No potential conflict of interest was reported by the authors.

DATA AVAILABILITY STATEMENT

Data for this work will be shared upon reasonable request to the corresponding author.

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