

# Influence of Physical Activity Body Mass Index on Perceived Physical Self-Concept among Undergraduate Students of Saudi Arabia

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## ABSTRACT

**Background:** Self-concept is one of the important aspect of our personality. Physical self-concept defined as person's perception of themselves in relation to his/her physical skills and outwards appearance. **Objectives:** The objective of this study was to compare and explore the association of physical activity to physical self-concept of undergraduate students at different levels of Body Mass Index (BMI). **Methods:** A group of 140 undergraduate students  $M_{age} 19 \pm 0.70$  years randomly categorized into underweight  $<18.5 \text{ kg/m}^2$  [ $n= 37: 26.4\%$ ]; normal-weight  $18.5\text{-}24.9 \text{ kg/m}^2$  [ $n= 31: 22.1\%$ ]; obese  $\geq 30.00 \text{ kg/m}^2$  [ $n= 37: 26.4\%$ ] and obese class III  $\geq 40.00 \text{ kg/m}^2$  [ $n= 35: 25\%$ ]. Physical self-concept measured using PSDQ-S. Physical activity on the basis of duration per week. **Results:** ANOVA revealed highly significant difference among BMI categories on all the factors of perceived physical self-concept except, health factor ( $p = 0.589$ ). The *post hoc* comparison showed that obese participants had significantly lower scores on coordination ( $p < 0.001$ ), physical activity ( $p < 0.05$ ), sports competence ( $p < 0.01$ ), appearance ( $p < 0.001$ ), flexibility ( $p < 0.001$ ), endurance ( $p < 0.001$ ), global self-esteem ( $p < 0.001$ ) and global physical self-concept ( $p$

$< 0.001$ ). Underweight participants reported significantly lower scores on physical activity ( $p < 0.001$ ), sports competence ( $p < 0.05$ ) and strength ( $p < 0.05$ ). **Conclusion:** Obese category students were having poor self-concept. Normal-weight students perceived higher physical self-concept and global self-esteem than obese and underweight students. Physical activity has strong association with sports competence, strength, appearance and self-esteem. Students engaged more time in physical activity had better physical self-concept.

**Key words:** Body Mass Index, Perceived Physical Self-Concept, Physical Activity, Self-esteem.

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DOI: 10.5530/ijpi.2019.4.39

## INTRODUCTION

Self-concept is one of the most studied psychological constructs and an important aspect of our personality. Self-concept refers to the way people perceive, evaluate and think about themselves. These perceptions are based on experiences and interaction with social environment and the attributions of our own behavior.<sup>1</sup> Self-concept develops from early childhood through adolescence and adulthood,<sup>2</sup> becoming increasingly differentiated with age. It includes the evaluation of abilities, skills, feelings and attitudes in different areas (e.g. social, physical, academic, emotional) considered important to individuals.

Physical self-concept is an important subdomain of overall self-concept that incorporates different components such as self-perceived health, physical appearance and physical abilities.<sup>3</sup> In sports and physical education settings, physical self-concept can be viewed either as a mediating factor that promotes physical activity and acquisition of health-related physical fitness factors as well.<sup>4</sup> A significant association has been consistently demonstrated between physical activity and physical self-concept in children and adolescents.<sup>5</sup>

Physical Activity (PA) is any form of movement involve the large skeletal muscles that causes our body to use energy.<sup>6</sup> PA plays a role in preventing health issues and improves the quality of life,<sup>7</sup> also improves self-esteem, mood, energy levels, concentration and memory.<sup>9</sup> PA aids in an individual's ability for weight management and reduces the risk of morbidity and mortality from various diseases, such as cardiovascular diseases, diabetes and high blood pressure.<sup>10,11</sup> People who take part in competi-

tive and recreational sports activities were observed to improve in their physical appearance and become more socially compatible with others.

The maintenance of adequate levels of physical activity is a critical issue among college students as they learn to cope with a new independent lifestyle. Moreover, fifty percent of the college students report a decrease in PA after high school graduation. Even though students generally have access to resources (i.e., equipment and exercise facilities), are well informed about PA and have a supportive social network.<sup>12,13</sup> The decrease in PA is mainly attributed to their newly independent adult life away from their parents, coupled with their demanding work-study schedule.

In exercise setting, physical self-concept is considered as significant antecedent of motivation, behavioral engagement and mental health outcomes.<sup>14-16</sup> In simple terms, exercisers who feel good about their physical self are more apt to pursue exercise goals and achieve desired exercise outcomes.<sup>17,15</sup> Much like basic need satisfaction, physical self-concept is deemed essential for realizing human potential<sup>14</sup> and develops by internalizing experiences in one's social environment.<sup>18</sup> The basic psychological needs and physical self-concept are constructs linked to physical activity behaviours;<sup>15,19</sup> to promote mental health, quality of life and psychological well-being independent of physical activity.<sup>14,20</sup>

A national study in Saudi Arabia revealed that overweight and obese population are rising.<sup>21</sup> Another study showed the prevalence of 32% overweight and obesity 15.7% among male college students in Saudi Arabia.<sup>22</sup> In KSA, a recent study documented that 49.8% male undergraduate students were

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either overweight or obese.<sup>23</sup> Therefore, the aim of the present study was to compare and explore the association of physical activity to perceived physical self-concept of undergraduate students at different levels of body mass index.

## METHODOLOGY

### Participants

For the purpose of this study 140 undergraduate students were voluntarily recruited from the King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia. The sample categorized into underweight 37 (26.4%), normal-weight 31 (22.1%), obese 37 (26.4%) and the remaining 35 (25%) were in obese-III students. The age of the students were ranging from 17-21 years with mean (SD) 19 (0.70) years. On the basis of BMI, four categories were formed as underweight <18.5 kg/m<sup>2</sup>, normal weight 18.5-24.9 kg/m<sup>2</sup>, obese ≥30.00 kg/m<sup>2</sup> and obese class III ≥40.00 kg/m<sup>2</sup>.

### Collection of Data

The interested students were asked to provide their general individual information like (name, age, height, weight, course of study, level of exercise per week, place of stay etc); then the students were randomly selected according to their body mass index. The test procedures were explained verbally and queries and doubts if any raised were answered. A total of 152 students were participated in this survey in which 140 questionnaires were found valid and other 12 questionnaires were invalid. Participants who were not staying inside the campus and not involved in any physical activity at least for a month was excluded from the study. A written informed consent was obtained prior to the enrolment for the study and confidentiality was ensured. The data was collected through valid questionnaires which were distributed in the classroom settings. The ethical approval was obtained from the research committee, Deanship of Scientific Research, KFUPM (IN151029).

### Measures

Physical self-concept was measured with short version of the Physical Self-Description Questionnaire (PSDQ-S)<sup>18</sup> which had 40 items that measure nine specific factors of components of physical fitness and competence (i.e., strength, body fat, activity, endurance/fitness, sports competence, co-ordination, health, appearance and flexibility) and two global components (i.e., global physical competence and global self-esteem). Each declarative statement was answered on a six-point scale ranging from *False* (1) to *True* (6). This short form balances brevity and provides robust evidence for the psychometric properties of the PSDQ-S

across diverse populations and physical activity settings. The reversed items on Perceived Self-Description Questionnaire-S (PSDQ-S) were re-coded for the analysis so that higher scores on all items indicated higher perceived competence and more positive self-concept. Physical activity level of the participants were assessed on the basis of total duration of physical activity undertaken in minutes per week.

### Statistical Analyses

Categorical data were summarized using frequency, number and percentage and continuous data were summarized using mean and Standard Deviation (SD). To determine the differences in PSDQ-S factors among BMI categories, Analysis of Variance (ANOVA) was calculated. The *post hoc* pairwise comparison was performed by using Bonferroni correction. A significance level of 0.05 was considered for the statistical tests. The data were analyzed with the SPSS version 24.0.

## RESULTS

### Description of physical characteristics of the sample

One-hundred and forty students, aged between 17 to 21 years with mean (SD) of 19 (0.70) years, were participated in this study. The sample categorized into underweight 37 (26.4%), normal-weight 31 (22.1%), obese 37 (26.4%) and the remaining 35 (25%) were in obese-III students. The BMI of each category was 17.26 kg/m<sup>2</sup>, 21.51 kg/m<sup>2</sup>, 36.35 kg/m<sup>2</sup> and 43.86 kg/m<sup>2</sup> respectively. In Table 1 physical activity data revealed that normal weight students engaged more hours in physical activity and very few obese students are engaged in PA more than 120 min.

In Table 2, the reversed items on PSDQ-S (health and body fat) factors were re-coded for the analysis so that higher scores on all items indicating higher perceived competence and more positive self-concept. The normal weight category students exhibited higher mean scores for most of the PSDQ-S factors. The results of ANOVA revealed highly significant difference among four BMI categories on in all the subscales of perceived physical self-concept with the exception of the health subscale ( $p = 0.589$ ). The largest difference was observed in the body fat (Figure 1;  $p$ -value<0.0001).

When the highly significant differences were found between perceived physical self-concept between BMI categories, a *post hoc* pairwise comparison was performed by using Bonferroni correction presented in the Table 3.

Table 3 explains the results of *post hoc* pairwise comparison (with Bonferroni correction) of Perceived Physical Self-concept factors between BMI categories. *Post hoc* pairwise comparison analysis showed that obese-III participants had significantly lower scores on the factors: coordination

**Table 1: Summary of Physical Characteristics of Participants.**

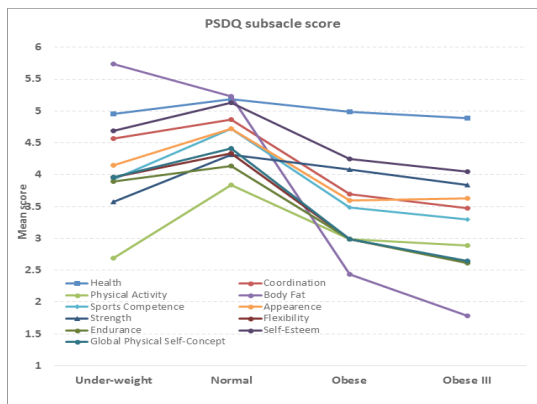
Variables	Under-weight (N=37)	Normal (N=31)	Obese (N=37)	Obese-III (N=35)	p-value
Age (years)	19 (1)	19 (1)	18 (1)	19 (1)	0.001
Weight(kgs)	51.78 (4.46)	64.84 (12.25)	111.59 (12)	131.14 (14.31)	<0.001
Height (cms)	173 (7)	173 (8)	175 (8)	173 (8)	0.582
BMI (kg/m <sup>2</sup> )	17.26 (0.87)	21.51 (3.05)	36.35 (2.02)	43.86 (3.38)	<0.001
PA per Week (in minutes)*					
60 min.	17 (45.9%)	2 (6.5%)	19 (51.4%)	17 (48.6%)	<0.001
90 min.	11 (29.7%)	8 (25.8%)	8 (21.6%)	8 (22.9%)	
120 min.	4 (10.8%)	9 (29%)	6 (16.2%)	8 (22.9%)	
150 min.	5 (13.5%)	12 (38.7%)	4 (10.8%)	2 (5.7%)	

\*Reported as number (% within each BMI levels)

**Table 2: Mean (SD) and ANOVA scores of Perceived Physical Self (PSDQ-S factors).**

PSDQ-S factors	Under-weight (N=37)	Normal (N=31)	Obese (N=37)	Obese-III (N=35)	p-value
Health	4.95 (0.95)	5.19 (0.84)	4.99 (0.96)	4.89 (0.96)	0.589
Coordination	4.57 (0.71)	4.87 (0.77)	3.7 (0.7)	3.47 (1.05)	<0.001
Physical Activity	2.69 (1.09)	3.84 (1.24)	2.99 (0.99)	2.89 (1.06)	<0.001
Body Fat	5.74 (0.42)	5.23 (1.06)	2.44 (0.64)	1.78 (0.85)	<0.0001
Sports Competence	3.93 (1.27)	4.72 (1.06)	3.48 (1.19)	3.3 (1.13)	<0.001
Appearance	4.15 (1.15)	4.72 (0.87)	3.6 (0.96)	3.63 (1.3)	<0.001
Strength	3.57 (1.1)	4.31 (1.06)	4.08 (0.93)	3.84 (1.06)	<0.023
Flexibility	3.96 (0.93)	4.34 (0.97)	2.99 (0.96)	2.62 (1.01)	<0.001
Endurance	3.89 (0.99)	4.14 (1.3)	2.99 (1.07)	2.61 (1.16)	<0.001
Global Self-Esteem	4.69 (0.8)	5.13 (0.66)	4.25 (0.99)	4.05 (0.96)	<0.001
Global Physical Self-Concept	3.96 (1.31)	4.41 (1.12)	2.99 (1.12)	2.65 (1.26)	<0.001

Significant at 0.05 levels



**Figure 1: Mean score for Perceived Physical Self-concept factors over BMI categories.**

( $p < 0.001$ ), physical activity ( $p < 0.01$ ), body fat ( $p < 0.001$ ), sports competence ( $p < 0.01$ ), appearance ( $p < 0.001$ ), flexibility ( $p < 0.001$ ), endurance ( $p < 0.001$ ), global self-esteem ( $p < 0.001$ ) and global physical self-concept ( $p < 0.001$ ) compared to their normal-weight peers. Obese participants reported significantly lower scores on the factors coordination ( $p < 0.001$ ), physical activity ( $p < 0.05$ ), body fat ( $p < 0.001$ ), sports competence ( $p < 0.01$ ), appearance ( $p < 0.001$ ), flexibility ( $p < 0.001$ ), endurance ( $p < 0.001$ ), global self-esteem ( $p < 0.001$ ) and global physical self-concept ( $p < 0.001$ ) than their normal-weight peers. Underweight participants reported significantly lower scores on the factors physical

**Table 3: Post hoc pairwise comparison (with Bonferroni correction) of Perceived Physical Self-concept factors between BMI categories (A - underweight, B - normal-weight, C - obese and D - obese-III).**

PSDQ-S factors	Under Weight (A)	Normal Weight (B)	Obese (C)	Obese III (D)
Coordination	C(.001) D(.001)	C(.001) D(.001)		
Physical Activity		A(.001) C(.010) D(.003)		
Body Fat	B(.039) C(.001) D(.001)	C(.001) D(.001)	D(.002)	
Sports Competence		A(.037) C(.001) D(.001)		
Appearance		C(.001) D(.001)		
Strength		A(.022)		
Flexibility	C(.001) D(.001)	C(.001) D(.001)		
Endurance	C(.005) D(.001)	C(.001) D(.001)		
Global Self-Esteem	D(.013)	C(.001) D(.001)		
Global Physical Self-Concept	C(.004) D(.001)	C(.001) D(.001)		

The results are based on two-sided test assuming equal variances. For each significant pair, the key of the smaller category appears in the category with larger mean.

Significant at 0.05 levels

**Table 4: Perceived Physical Self-concept (PSDQ-S) factors and physical activity per week.**

PSDQ-S Factors	Duration of physical activity per week		p-value
	<90 min	>90 mins	
Health	4.89 (1.08)	5.2 (0.53)	>0.05
Coordination	3.96 (1.02)	4.45 (0.87)	0.005
Physical Activity	2.71 (1.02)	3.73 (1.11)	<0.001
Body Fat	3.6 (1.93)	4.06 (1.76)	>0.05
Sports Competence	3.57 (1.32)	4.29 (1.04)	0.001
Appearance	3.83 (1.22)	4.32 (0.98)	0.016
Strength	3.77 (1.08)	4.24 (0.97)	0.011
Flexibility	3.21 (1.18)	3.89 (1.06)	0.001
Endurance	3.14 (1.19)	3.83 (1.33)	0.002
Self-Esteem	4.33 (0.99)	4.84 (0.78)	0.002
Global Physical Self-Concept	3.36 (1.49)	3.69 (1.16)	>0.005

activity ( $p < 0.001$ ), sports competence ( $p < 0.05$ ) and strength ( $p < 0.05$ ) than their normal-weight peers. Moreover, underweight participants had higher scores on body fat ( $p < 0.001$ ) indicates higher perceived positive self-concept, coordination ( $p < 0.001$ ), flexibility ( $p < 0.001$ ), endurance ( $p < 0.01$ ), global self-esteem ( $p < 0.05$ ) and global physical self-concept ( $p < 0.05$ ) compared to obese or obese-III BMI categories.

Table 4 results showed that participants doing physical activity more than 90 min had significantly higher scores on the subscales coordination ( $p < 0.01$ ), physical activity ( $p < 0.001$ ), sports competence ( $p < 0.01$ ), appearance ( $p < 0.05$ ), strength ( $p < 0.05$ ), flexibility ( $p < 0.01$ ), endurance ( $p < 0.01$ ) and overall self-esteem ( $p < 0.01$ ) compared to the other groups doing physical activity less than 90 min.

## DISCUSSION

The present findings demonstrate that normal weight students had better perceived physical-concept than obese and underweight category students. The common belief is that an obese or underweight lack vigor, fitness and is more prone to diseases, which is reflected in the responses of perceived physical self-concept factors. The results have shown small declines in the scores of all the factors of physical self-concept in the obese and obese class III weight categories which in concurrence with the previous research outcome of self-concept.<sup>24,25</sup>

The physical self-concept is an important mediator in physical activity as well as is a valuable outcome in itself. Self-concept becomes increasingly complex (multifaceted and differentiated) as humans develop from childhood to adulthood. The results observed that physical self-concept was highly significant among BMI categories in physical activity, sports competence, appearance and strength. These findings are consistent with the results of other studies that confirm physical self-concept intimately associated with physical self-concept factors.<sup>26,27</sup> Obesity proved to have adverse effects on both motor performance and physical self-perception.<sup>28</sup>

Global esteem is a good evidence for better physical self-concept; and the present study demonstrated normal weight students have high self-esteem than obese groups and underweight students. Marsh (2002)<sup>3</sup> found a relationship that increased weight status perceived low self-esteem. Evidence indicated that self-concept is protective against depression and obesity.<sup>29</sup> Present findings also supported the notion that students with better competence are likely to experience increase in physical self-concept, leading to enhanced global self-esteem.<sup>30</sup>

It is widely assumed that obesity is becoming increasingly predominant in many nations, including Saudi Arabia. The university has sufficient infrastructural facilities for physical activity and sports, but students are not optimizing it to their advantage. We suggested the University to provide different physical activity programs in the campus especially to the obese category of students, they will improve their physical concept factors, self-esteem and overall health. Separate clubs for obese may be created and awareness programs like eating disorders, weight management, nutrition and other activities related to obesity should be organized separately to improve their perceived physical self-concept and total health. These programs will definitely help them to improve their physical self-concept and overcome their poor body image and self-esteem which is also a barrier to their social skills. The results observed that physical self-concept very strongly linked between physical activity, sports competence, appearance, sports competence and strength. Low levels of physical activity have been linked to poor health and obesity, heart disease, eating disorders and depression. These findings are also consistent with the results of other studies that confirm physical self-concept intimately associated with physical activity and other related factors of physical self-concept.<sup>28,26,25</sup>

## CONCLUSION

Study concluded that obese category students were having poor self-concept. Normal-weight students perceived higher physical self-concept and global self-esteem than obese and underweight students. Physical activity has strong association with sports competence, strength, appearance and self-esteem. Students engaged more time in physical activity had better physical self-concept.

## ACKNOWLEDGEMENT

The authors would like thank the support provided by the Deanship of Scientific Research (DSR) at King Fahd University of Petroleum and Minerals, Dhahran for funding this work through Research Grant (IN151029).

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## ABBREVIATIONS

A-underweight, B-Normal weight, C-Obese and D-Obese-III.

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**Cite this article:** Antony VC , Azeem K. Influence of Physical Activity Body Mass Index on Perceived Physical Self-Concept among Undergraduate Students of Saudi Arabia. *Int. J. Pharm. Investigation.* 2019;9(4):210-4.