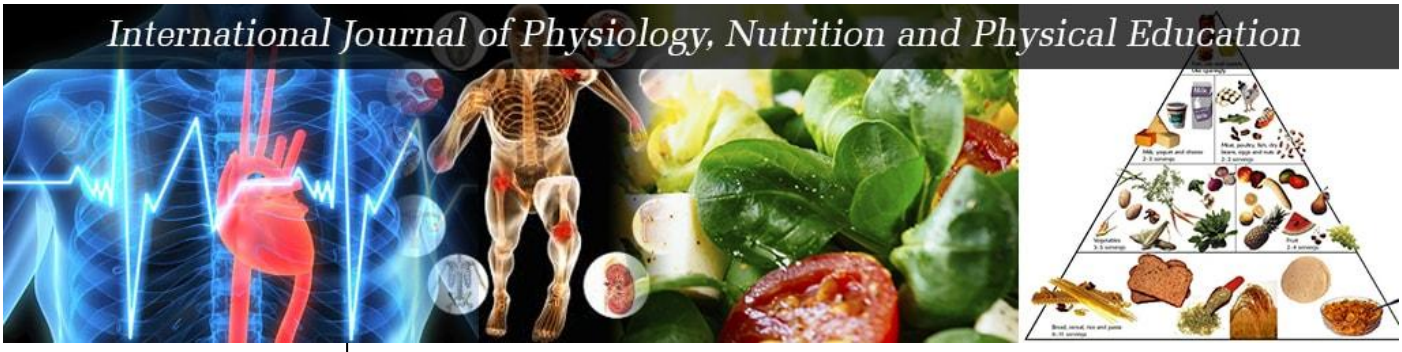

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Association of physical activity level with the eating attitude and body composition among female college teachers

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Abstract
The study attempts to investigate the relationship of physical activity level with eating attitude, anthropometric characteristics and body composition among female college teachers. Total 300 female college teachers from different colleges of Malwa Region of Punjab were selected thorough purposive sampling technique. The age of subjects ranged between 31 to 60 years. Height was measured by using the standard anthropometric rod. Body weight of the subjects was measured with a portable weighing machine. Body mass index was then calculated using the formula weight (kg)/height^2 (m). The skinfolds thicknesses of body parts of the subjects were taken with Harpenden skinfold caliper. Percentage body fat as estimated from the sum of skinfolds was calculated using standardized equations. Physical activity level of the subjects was evaluated with the help of International Physical Activity Questionnaire (IPAQ). Eating attitude of the college teachers was assessed with the help of the questionnaire, 26 items eating attitude test (26-EAT). The results of the study revealed that 31 % of female college teachers were physically inactive, 56% were moderately active and 13% were highly physically active. It was shown from results that 38% of female college teachers had normal weight, 51.67% were overweight and 10% were reported to be obese. It was reported that 47.67 % of female college teachers had normal eating attitude and 52.33 % were reported to have disordered eating habits. The physical activity level of female college teachers was found to have significantly negative relationship with height (p<0.05), weight (p<0.05), BMI (p<0.05), fat percent (p<0.05) and lean body mass (p<0.05) and eating attitude (p<0.05). It is concluded that the physical activity level had significant effect on eating habits and body composition among the college teachers.

Keywords: physical activity, lean body mass, disordered eating, inactivity, college teachers

1. Introduction
Physical activity is the key strategy for reducing risk of chronic diseases. Regular physical activity helps to build and maintain healthy bones and muscles, reduces the risk of developing obesity, reduces feelings of depression and anxiety and promotes psychological well-being. Moreover adequate levels of physical activity will decrease the risk of a hip or vertebral fracture and help control weight. Exercise is a planned physical activity which should be performed repetitively to develop or maintain fitness. Regular physical exercise is also regarded as an important healthy lifestyle in which a large number of people can participate in order to impact significantly on their health status.[1] Physical activity is linked to positive outcomes and proposed as a treatment method for individuals with eating disorders [2]. The association between physical activity and many positive outcomes such as decreased risk of obesity, chronic diseases and improved psychological health is documented.[3] A positive relationship between increased obsession about physical activity and eating disorders has been found, especially among athletes [4, 5, 6]. Physical inactivity is one of the main causes of the increase in body fat [7]. In environments of health and fitness, the main interest is the acquisition of knowledge regarding the relative amount of body mass in relation to fat-free mass and the distribution of fat in the human body, with the additional interest in the changes in these components [8, 9, 10]. Eating is vital in life and a major determinant of health. Eating disorders are defined as a group of serious conditions caused by preoccupation with food and weight that might threaten individual's health and quality of life.

The central features of eating disorders are severe body image disturbances, overcontrol or undercontrol of eating, and extreme behaviors to control weight [11, 12]. There are many social, cultural, and psychological factors associated with eating attitudes and behaviors. Cultural transition, social changes, westernization, family environment, exposure to mass media, and globalization all have a significant impact on eating attitudes and behaviors, especially among young people [13]. The prevalence of eating disorders has increased markedly during the recent decades in both developing and developed countries, especially among young people.

Eating disorders are associated with a number of psychological and health problems. Disordered eating attitudes seem to have an important impact on physical health, psychosocial health and sports performance in athletes.[14] Krause *et al*. [15] point out that "a sense of depression, loss and helplessness is often associated with eating disorders. Unhealthy eating behaviors are related to abnormal attitudes associated with maintaining or changing one's body weight [16]. The present study aims to study the eating attitude and physical activity level and examine the relationship of physical activity level with the eating attitude and body composition among female college teachers.

2. Methodology

A descriptive survey type study carried out to ascertain the relationship of physical activity level with the eating attitudes, self-esteem and body composition among the college teachers of Malwa region of Punjab. To obtain the required data with regard to anthropometric measurements, physical activity level, eating attitude, female college teachers of different colleges of Malwa region of Punjab were approached. The subjects were assessed for anthropometric measurements and distributed questionnaires to gather information with regard to physical activity level and self-esteem. The study was conducted on three hundred (N=300) female college teachers from different colleges. The age of the subjects was ranged between 31 to 60 years. The purposive sampling technique was applied for the selection of subjects.

2.1 International Physical Activity Questionnaire (IPAQ)

The International Physical Activity Questionnaire (IPAQ) long scale developed by Craig *et al*. [17] was used to assess the physical activity level of subjects (Appendix-). The International Physical Activity Questionnaire is applicable on both genders i.e. male and female of age ranged from 15-69 years. The questionnaire defined physical activity performed during the past seven days. The long form of IPAQ contained 27 questions in detail about walking, moderate intensity and vigorous intensity physical activity in each of the four domains:

Part 1: Work domain
Part 2: Transportation domain
Part 3: Domestic & garden domain
Part 4: Sport, and Leisure-time domain

All questions were asked of every sample severally of whether that sample considered him/herself physically active or not. The International Physical Activity Questionnaire estimates frequency (days/week) and duration (minutes/week) of different intensity physical activities (moderate and vigorous), including walking activity during the previous seven days. Physical activity level of the subjects was measured in quantitative terms by calculating MET value i.e. metabolic equivalent of task. Data collected with the IPAQ long form is reported as a continuous measure. Continuous variables were the minutes/week or MET-minutes/week of moderate to vigorous physical activity. All continuous scores were expressed in MET-minutes/week. The following criterion was applied to classify the levels of physical activity:

- Inactive - < 600 MET-min/week
- Moderately Active - 600 MET-min/week to 3000 MET-min/week
- Highly Active - > 3000 MET-min/week

2.1 Eating Attitudes

Eating attitude of the college teachers was evaluated by using the questionnaire Eating Attitude Test (26-EAT) given by Garner *et al*. [18] (1982). The Eating Attitude Test (EAT) is the most widely used standardized screening tool to measure eating disordered attitudes and behaviour. The EAT-26 Test contained 26 question items and for each item the respondent has to indicate how often he/she was engaged in the behavior which was described using a 6pt. likert scale, ranging from "Always to Never". The range of the total score was 0-78. A total score of 20 or more indicated at risk of eating disorders. We defined EAT $\geq$ 20 as positive to disordered eating attitudes.

2.3 Anthropometric Measurements

Height of the subjects was measured using the standard anthropometric rod to the nearest 0.5 cm (HG-72, Nexgen ergonomics, Canada). Body weight of the subjects was measured with a portable weighing machine to the nearest 0.5 kg. Body mass index was then calculated using the formula weight (kg)/height2 (m). The skinfolds thicknesses of body parts of the subjects were taken with Harpenden skinfold caliper.

2.4 Body Composition

Percentage body fat as estimated from the sum of skinfolds was calculated using equations of Siri [19] and Durnin and Womersley [20]. The regression equations for the prediction of body density from the log of the sum of skinfold thickness at four sites in mm are as following:

30 to 39 years age group:
Body Density (gm/cc) = 1.1423-0.0632 (X)
40 to 49 years age group:
Body Density (gm/cc) = 1.1333-0.0612 (X)
> 50 years age group:
Body Density (gm/cc) = 1.1339-0.0645 (X)
Where
X = log (biceps + triceps + subscapular + suprailliac).
Percent Body Fat = [4.95/ body density-4.5] x 100 (Siri [19])
Total Body Fat (kg) = (%body fat/100) x body mass (kg)
Lean Body Mass (kg) = body mass (kg) – total body fat (kg)

2.5 Statistical Analysis

Statistical analysis was performed using SPSS version 16.0 for windows (SPSS Inc, Chicago, IL, USA). Descriptive statistics such as mean, standard deviation, maximum value, minimum value, percentages etc were carried out of physical activity levels, self-esteem and anthropometric and body composition scores among female college teachers. The Karl Pearson Product Moment coefficient of correlation analysis was used to identify the associations of physical activity levels with self-esteem, anthropometric and body composition scores among female college teachers. The level of the significance was set at 0.05 to test the hypotheses.

3. Results

Table 1: Descriptive statistics for physical activity level, eating attitude, anthropometric and body composition characteristics among the female college teachers.

Variables	N	Mean	SD	Maximum	Minimum
Height (cm)	300	161.14	4.27	171.00	149.00
Weight (kg)	300	67.42	8.97	86.00	45.00
Body Mass Index (kg/m^2)	300	25.91	2.91	31.25	18.03
Percent Body Fat (%)	300	26.62	3.22	34.27	18.64
Total Body Fat (kg)	300	18.19	4.35	28.13	8.85
Lean Body Mass (kg)	300	49.23	4.97	59.89	36.10
Eating Attitude	300	20.17	4.04	30.00	12.00
Physical Activity Level (MET Minutes/week)	300	1452.22	1004.14	3468.00	00.00

Table 2: Classification on the basis of body mass index among the female college teachers.

Body Mass Index Categories	Frequency	Percentage (%)	Cumulative Percentage
Under Weight	01	0.33	0.33
Normal Weight	114	38.00	38.33
Over Weight	155	51.67	90.00
Obese	30	10.00	100.00
Total	300	100.00	

Table 3: Classification on the basis of physical activity level among the female college teachers.

Physical Activity Level	Frequency	Percentage (%)	Cumulative Percentage
Physically Inactive	93	31.00	31.00
Moderately Active	168	56.00	87.00
Highly Active	39	13.00	100.00
Total	300	100.00	

Table 4: Classification on the basis of eating attitude among the female college teachers.

Eating Attitude	Frequency	Percentage (%)	Cumulative Percentage
Normal Eating Attitude	143	47.67	47.67
Disordered Eating	157	52.33	100.00
Total	300	100.00	

The descriptive statistics for the physical activity level, eating attitude, anthropometric measurements and body composition components among the female college teachers are shown in table 1. Table 2 presents classification on the basis of body mass index among the female college teachers. Out of total female teachers, 0.33 % of female college teachers were found to be under weight, 38.00% were found to have normal weight and 51.67% female college teachers were reported to have over weight. Whereas, 10.00% female college teacher were observed to have obesity. Table 3 presents the physical activity status of the female college teachers. Out of total female teachers, 31 % of female college teachers were found to be physically inactive, 56 % were found to be moderately active and only 13 % female college teachers were reported to be highly physically active. Table 4 presents the eating attitude among the female college teachers. Out of total female college teachers, 47.67 % of female college teachers were found to have normal eating attitude. On the other hand, 52.33 % female college teachers were reported to have disordered eating habits.

Table 5: Relationship of physical activity level with eating attitude, anthropometric and body composition characteristics among the female college teachers.

Variables	N	Pearson Correlation Coefficient (r-value)	p-value (Sig.)
Height (cm)	300	-0.152*	0.009
Weight (kg)	300	-0.775*	0.000
Body Mass Index (kg/m^2)	300	-0.848*	0.000
Percent Body Fat (%)	300	-0.837*	0.000
Total Body Fat (kg)	300	-0.833*	0.000
Lean Body Mass (kg)	300	-0.670*	0.000
Eating Attitude	300	-0.718*	0.000

* Indicates significant at 0.05 level

The correlation analyses of eating attitude, anthropometric and body composition characteristics with physical activity level of the female college teachers are depicted in table 5. The results of correlation analyses revealed a significant association of physical activity level with height (r=-0.152, p=0.009) among female college teachers. Similarly, a significant negative association of weight (r=-0.775, p=0.000) with the physical activity level was reported among the female college teachers. The body mass index among female college teachers also demonstrated significant negative association (r=-0.804, p=0.000) with the physical activity level. Among the body composition components, a significant negative relationship of percent body fat (r=-0.837, p=0.000) with physical activity level was reported among female college teachers. The total body fat was also demonstrated significant negative association (r=-0.833, p=0.000) with the physical activity level among female college teachers. The lean body mass (r=-0.670, p=0.000) was observed to be significantly associated with the physical activity level in the female college teachers. The results of correlation analyses also revealed a significant negative association of physical activity level with eating attitude (r=-0.718, p=0.000) among female college teachers.

4. Discussion

The present study attempts to assess the status of eating attitude and physical activity level and associations between physical activity, eating attitude and body composition among the college teachers. The results of the study reported that 52.33 % female college teachers had disordered eating habits. The prevalence of disordered eating attitudes in the present study was higher compared with other studies in Arabic countries as it was 31.8 and 33.6% among men and women in Kuwait [21] and ranged from 13.8 to 47.3% among men, and from 16.2 to 42.7% among women in seven Arab countries [22]. Also, the rate was higher compared with rates recorded in more developed countries such as Singapore: 10.5% [23], Turkey: 45.2% [24] and Spain: 7.8% [25].

However, Kiran *et al*. [26] in a study on university girls reported 73.94% girls had disordered eating attitudes. The prevalence of disordered eating attitudes in the current study was high as our country is less socioeconomically developed compared with these countries. In addition, over-reporting in self-administered tests cannot be excluded.

The results of the study reported that 31% of female college teachers were physically inactive, 56% were moderately active and 13% were highly physically active. However, Indian Council of Medical Research-India Diabetes [27] demonstrated that 54.4% subjects were inactive, 31.9% subjects

were moderately active whereas 13.7% subjects were highly active. The region-wise prevalence of physical inactivity was as follows; Chandigarh-66.8%, Tamilnadu-60.0%, Maharashtra- 55.2% and Jharkhand-34.9%. Similarly, Vaidya and Krettek [28] reported the prevalence of inactivity among 41.7% peri-urban Nepalese population. Patil *et al*. [29] conducted a study on adults in Nagpur, Maharashtra and observed that 59% adults were having a sedentary lifestyle, 27% were having a moderately active lifestyle and 14% were having a vigorously active lifestyle. Studies by Agrawal *et al*. [30] and Azevedo *et al*. [31] demonstrated the prevalence of inactivity as 86.42%, and 57.1% respectively. A survey by integrated disease surveillance project-NCD [32] in Maharashtra reported that the physical inactivity levels are as high as 81.65%. Atan *et al*. [33] in a study on teachers and health professionals from Turkey reported that the 27.5% teachers were inactive, 61.5% were low active, 11% were adequately active and among health professionals 27% were inactive, 51.5% were low active and 21.5% were adequately active. In another study, physical education teacher's physical activity levels were; 41.6 % inactive, 41.6% moderate and 16.8% high active, respectively [34]. In a study conducted by Brito *et al*. [35] on teachers from the Brazil, 46.3% teachers were physically inactive, 42.7% had moderate level of physical activity and only 11% teachers had high physical activity levels. These results indicate that, physical activity levels are generally not adequate in different occupational groups. The teachers were more active as compared to the general population and might be due to the reason that the education was found to be the factor which contributes to enhance the physical activity [36]. This prevalence of high inactivity oriented lifestyle has to be tackled by educating the population regarding positive benefits of higher levels of physical activity in the daily routine so that it helps them for a longer and healthier life.

It is shown from results of present study that physical activity level of college teachers had significant association with eating attitude, height, weight, BMI and body composition components. Many previous studies by Helena *et al*. [37], Vaidya and Krettek [28], Bergman *et al*. [38] and Hallal *et al*. [39] found a significant association between the physical activity levels and obesity status. Patil *et al*. [29] in his study on adults in Nagpur, Maharashtra reported significant association between physical activity levels and obesity. In another study Ara *et al*. [40] determine the relationship between physical activity levels and adiposity among children revealed that the level of physical activity had a significant effect on obesity. This was in concordance with our study. Sullivan *et al*. [41] and Sibai *et al*. [42] did not find any association between obesity and physical activity levels.

5. Conclusion

On the basis of the results of the study, it was concluded that 31% teachers were physically inactive, 56% were moderately active and 13% were highly physically active. It was reported that 47.67 % of female college teachers had normal eating attitude and 52.33 % were reported to have disordered eating habits. It was shown from results that 38% teachers had normal weight, 51.67% were overweight and 10% were reported to be obese. It was also concluded that physical activity level was significantly negatively associated with height, weight, BMI, body composition components and eating attitude.

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