ISSN: 2347-467X, Vol. 06, No. (2) 2018, Pg. 404-411

Current Research in Nutrition and Food Science

Journal Website:www.foodandnutritionjournal.org

Risk of Obesity Among Female School Teachers and its Associated Health Problems

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Abstract

Obesity is considered to be a major health problem throughout the world. Factors contributing to obesity include increased intake of calorie dense foods and physical inactivity. Teachers represent one of the most important, large and growing sector of workforce in many countries. The objective of the present study was to determine risk of obesity among female school teachers along with various factors and health problems associated with it. A descriptive cum cross-sectional survey was conducted among 500 female school teachers. Anthropometric measurements such as height, body weight and waist circumference were measured. BMI was calculated and blood pressure was recorded. Results indicated that 43.2% of the teachers had Grade I obesity, 20.4% had Grade II obesity and 6.6% had Grade III obesity thereby indicating obesity as a significant health problem among teachers. Factors such as age, waist circumference, intake of junk foods, physical inactivity and BMI were significantly associated with obesity. In addition, obesity was associated with health issues such as hypertension and arthritis. The study therefore recommends the need to promote healthy lifestyle for school teachers that can be achieved through appropriate health education and interventional measures.

Article History

Received: 11 April 2018
Accepted: 24 May 2018

Keywords

Teachers,
Obesity,
Risk factors,
Health intervention

Introduction

Overweight and obesity is considered to be a major public health problem in both developed and developing countries[1]. World Health Statistics 2012 reports that one in six adults is obese and about 2.8 million individuals die every year due to overweight or obesity[2].In developing countries like India, the prevalence rate of obesity is increasing at an alarming rate with more than 30 million obese individual and is found to be more acute in women[3]. Among mega cities in India, Chennai has the highest (39%) proportion of overweight or obese urban women, followed by Hyderabad (34%), and Kolkata (30%).

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Doi: http://dx.doi.org/10.12944/CRNFSJ.6.2.15

Nowadays women are also employed in various working sectors in order to increase their socio-economic status[4]. Teachers represent one of the most important, large and growing sector of workforce in many countries. They are often overwhelmed with multiple duties such as teaching, curriculum concerns, career development and census enumeration as a result of which they are exposed to stress[5]. Many a times, their health gets affected due to the dual role they play; one is family and the other one at job. Public school teachers are also vulnerable to develop non communicable diseases such as cardiovascular diseases, diabetes and hypertension[6]. Hence the prime objective of the study was to assess risk of obesity among female school teachers along with various factors and health issues associated with it.

Methodology

The present study was a community based descriptive cum cross-sectional survey that was conducted among 500 female school teachers between January 2017 and January 2018 in Chennai, the capital city of Tamil Nadu. Schools were selected based on willingness to participate and enrollment with the goal of identifying population with and without obesity among school teachers. Permission from school authorities as well as approval of study protocol by the Independent Ethics Committee was obtained before the commencement of the study. Data collection comprised of personal interview along with physical and clinical assessments. Information pertaining to occupation details, dietary pattern, health problems and physical activity pattern was obtained using a structured pre-tested questionnaire. Pre-testing of questionnaire was carried out by conducting a pilot study.

Anthropometric Measurements

Anthropometric measurements were measured using standardized techniques[7]. Height (in centimeters) was measured using a wall mounted measuring tape to the nearest 0.1cm (Gadget Hero Stature meter: 200 cms). Body weight (in Kgs) was measured using a portable digital weighing machine that was kept on a flat surface (Omron HBF -375). Both these measurements were taken with subjects wearing minimal clothes and without shoes. Waist circumference (in centimeters) was measured by measuring the distance around the waist half inch above the umbilicus (belly button) using a non-stretchable plastic measuring tape. Waist circumference more than 80 cm indicated abdominal obesity[8]. Body mass index (BMI) was used as a marker for overweight and obesity in the present study and was calculated as weight in kilograms divided by height in meter square. BMI cut offs for Asia pacific guidelines given by WHO (2000) was used in the present study. According to this classification, overweight is defined as BMI > 23 Kg/m^2 with or without abdominal obesity and BMI > 25Kg/m^2 was considered as generalized obesity[9].

Clinical Assessment

Blood pressure was measured using an automated digital electronic device (Rossmax model ®: MJ701) after the subjects had rested for at least 5 minutes in a seated position with the arm rested on a table. Two separate readings were taken and the average was considered as the final reading. Blood pressure was categorized according to the classification given by Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure[10].

Statistical Analysis

All data analysis were performed using SPSS (version 15.0). Completeness and consistency of data were checked by running frequency for each variable individually. Descriptive statistics such as frequency, percentage, mean and standard deviation were used. Chi-square test was used to compare two categorical variables. In addition, binomial logistic regression analysis was carried out for further evaluation of variables and its impact on obesity. Odds ratio (OR) along with its respective 95% confidence interval was also reported.

Results and Discussion

From the above table, it is clear that the age of the teachers who participated in the study ranged between 21-58 years with 34.6 percent of them belonging to the age group 35-45 years. Socioeconomic status refers to a person´s social status relative to other members in their society. In the present study, the income level of the teachers was measured as the total annual income of all family members using the classification given by National Council of Applied Economics and Research[11]. According to this classification, a greater percentage of the teachers (70.6%) belonged to the middle class category with annual family income of Rs.2, 00,000-10,000,000.

With regard to educational qualification, since teachers were chosen as the target group, all of them were graduates. Majority of the teachers (60.8%) were post-graduates and the remaining were under-graduates. It is seen that about 35.8 percent of the teachers took classes for high and higher secondary school students while 20.2 percent of them were in-charge of handling classes for the middle school children. 47.2 percent of the teachers reported taking special classes after school hours. With regard to teaching experience, 30 percent of the teachers had minimum 3 years of teaching experience while 13.6 percent of them reported that they were in teaching profession for more than 15 years.

It is clear that teachers had a higher mean of anthropometric measurements like BMI and waist circumference when compared to the normal cut off values. The mean Body Mass Index and mean waist circumference was found to be 27.38± 4.49 Kg/m^2 and 85.68±10.75 cm respectively (Table 2). Blood pressure was categorized according to the classification given by Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure. Based on this classification 70.8 percent of teachers had normal systolic blood pressure (<120 mmHg) and 79.63 percent had normal diastolic blood pressure (<80 mmHg). 10.4 percent had a systolic blood pressure from 120-129 mmHg indicating that the teachers were pre-hypertensive. 18.8 percent of them were in stage I hypertension (>130 mmHg). Based on diastolic blood pressure levels 14.4 percent were found to be in pre-hypertensive stage (80-89 mmHg) and 6 percent were identified to in stage I hypertension (>90 mmHg).

An individual's weight depends on various factors such as genetic, behavioral, ethnic and socio-economic factors. Excess body weight is an independent risk factor for numerous health problems. More the body weight, greater is the BMI; and an increase in BMI increases the risk of overweight and obesity. In the present study the prevalence rate of obesity among female school teachers was found to be 70.2% (Fig1) with 43.2% of them having Grade I obesity, 20.4% with Grade II obesity and only a small percent (6.6%) came under Grade III obesity category. Rocha *et al.,*[12] reported the prevalence rate of overweight/ obesity to be 47.2% among teachers indicating obesity as a major health problem among school teachers. Misra *et al.,*[13] reported that in countries like India, several factors such as urbanization, increased consumption of junk and processed foods along with little or no physical activity increases the risk of being obese. Being overweight (BMI 23-24.9 Kg/m^2) or obese (BMI $\geq$25 Kg/m^2) is considered to be an independent risk factor for several chronic disease conditions including coronary heart disease, hypertension, elevated cholesterol, and diabetes. The prevalence of these conditions increases as BMI increases[14,15]. Hence screening for obesity and maintaining adequate body weight is necessary to prevent the onset of chronic illnesses.

Findings of the study indicates that age along with other modifiable lifestyle determinants such as waist circumference, BMI, intake of junk foods and physical activity was significantly associated with obesity (Table 4). As age increases, the risk of developing several non-communicable diseases such as diabetes, hypertension, cardiovascular diseases and obesity also increases. With globalization, the consumption of junk foods is becoming popular and a significant association was noted between junk food consumption and obesity ($p<0.05$). A combined analysis of the Nurses' Health Study and Health Professionals Follow-Up Study showed that French fried potatoes, processed meats, and unprocessed meats, all usual components of typical western-style food fare resulted in weight gain thereby leading to obesity[16].

Another two main factors that was associated with obesity in the present study was waist circumference and increased BMI. BMI is not only linked with obesity but previous studies indicate that BMI is a risk factor for pre-diabetes and diabetes[17,18]. In the present study it is clear that 6.6% of obese school teachers had diabetes (Table 6). Results of the present study is in par with findings of Abtahi *et al.,*[19] who reported a strong relationship between increased BMI and risk of developing pre-diabetes or diabetes among school teachers.

In the current study, physical activity levels of the teachers were assessed using the physical activity index score given by Sharkey and Gaskell[20]. According to this tool as the intensity, duration and frequency of exercise increases, the fitness also increases and a score of 40 is an indicator that the individual is actively involved in regular physical activity. On analyzing the scores obtained, it was found that majority of them obtained a physical activity index score below 40 thereby indicating that the teachers led a sedentary type of life. The result indicated that being physically inactive was significantly associated with obesity ($p<0.01$).Several studies have demonstrated that leading a sedentary lifestyle, independent from overall physical activity levels, is adversely associated with metabolic and atherogenic risk factors[21].

Table 5 shows the results of binomial logistic regression analysis. For this analysis, obesity was taken as the dependent variable and various risk factors such as age, waist circumference, physical inactivity and intake of junk foods were considered as independent variables. Risk factors such as increased waist circumference, physical inactivity and junk food consumption was significantly associated with obesity ($p<0.05$).

Excess weight has reached epidemic proportions globally. Results of the present study indicate that obesity was found to be significantly associated with health problems such as hypertension and arthritis (Table 6). Obesity is widely accepted as the leading risk factor for osteoarthritis, especially knee osteoarthritis[22]. Also accumulating evidence suggests that the risk increases with increase in BMI throughout adulthood. Obese individuals have significantly more severe joint degeneration in the knees when compared to individuals with normal weight. Data from a case–control study indicated a strong association between increase in BMI and surgical replacement of hip and knee joints[23]. In addition, obesity in particular central obesity have been constantly associated with hypertension and increased risk of cardiovascular diseases.

Similarly Mahamood Ali *et al.,* [24] also reported that being obese was strongly associated with the risk of hypertension in school teachers. However the results showed that male teachers were found to be at a greater risk than female teachers. Based on population studies, it is estimated that at least two-thirds of the prevalence of hypertension is directly attributed to obesity[25]. Apart from hypertension, abdominal adiposity has also been implicated in the pathogenesis of coronary artery disease, sleep apnea, stroke and congestive heart failure, dyslipidemia and type 2 diabetes[26,27].On the other hand, effective lifestyle interventions are effective in bringing about weight reduction and decrease the risk of developing chronic illnesses[28].

Table 1: Distribution of teachers based on occupational details

	Particulars	Frequency	Percent
Age (years)	< 25	34	6.8
	25 – 35	123	24.6
	35 – 45	173	34.6
	45 – 55	142	28.4
	> 55	28	5.6
Annual Income (Rupees)	< 90,000	5	1.0
	90,000 - 2,00,000	123	24.6
	2,00,000 - 10,00,000	353	70.6
	> 10,00,000	19	3.8
Educational qualification	Under graduates	196	39.2
	Post graduates	304	60.8
Class handled	Primary	220	44.0
	Middle	101	20.2

	High and higher secondary	179	35.8
Special class	Yes	236	47.2
	No	264	52.8
Teaching experience	1 – 5	150	30.0
	6 – 10	127	25.4
	11 – 15	75	15.0
	15 – 20	68	13.6
	21 – 25	47	9.4
	> 25	33	6.6

Table 2: Mean anthropometric and blood pressure measurements

Anthropometric Measurements	Height (cm)	156.58±6.24	
	Body weight (Kgs)	67.31± 11.90	
	Body Mass Index (Kg/m^2)	27.38± 4.49	
	Waist circumference (cm)	<80 cm	28.2(141)
	Mean =85.68±10.75	>80 cm	71.8(359)
Blood pressure	Systolic blood pressure	Normal	70.8 (354)
	(mmHg)	Pre-hypertension	10.4(52)
	Mean=115.50± 17.92	Hypertension	18.8(94)
	Diastolic blood pressure	Normal	79.6(398)
	(mmHg)	Pre-hypertension	14.4(72)
	Mean= 73.02± 11.15	Hypertension	6 (30)

Figure in parentheses indicates frequency

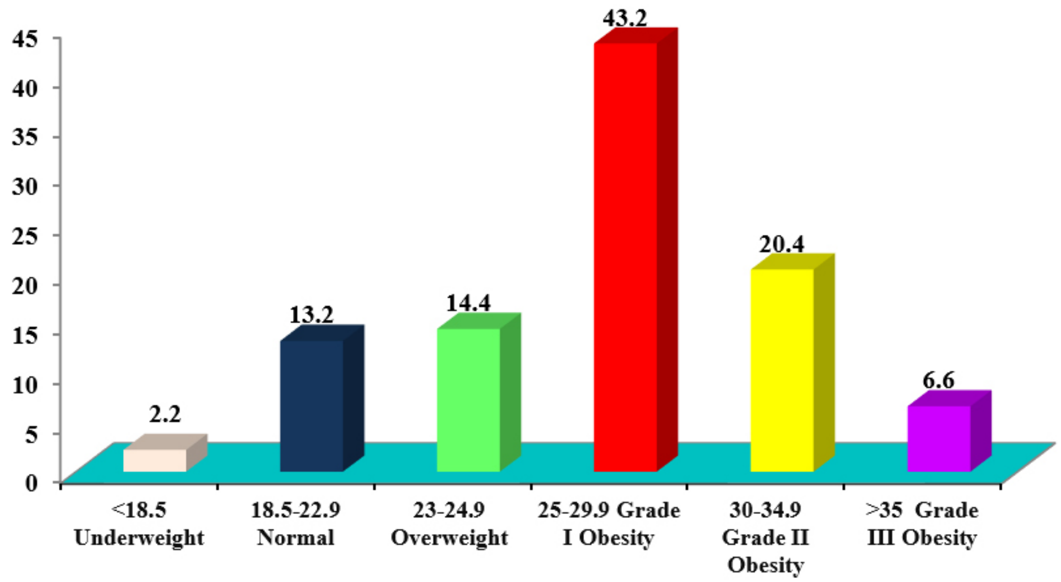

Fig.1: Prevalence rate of obesity among female school teachers

Table 3: Risk factors associated with obesity

Risk factors		Obesity Yes	Obesity No	p value
Age (years)	< 25	8	26	0.000**
	25 – 35	81	42	
	35 – 45	124	49	
	45 – 55	120	22	
	> 55	18	10	
Waist circumference (cm)	<80	38	103	0.000**
	>80	313	46	
Annual income (Rupees)	< 90,000	3	2	0.612NS
	90,000 - 2,00,000	82	41	
	2,00,000 - 10,00,000	251	102	
	> 10,00,000	15	4	
Body Mass Index (BMI) Kg/m^2	<18.5	0	11	
	18.5 - 22.9	0	66	0.000**
	23 - 24.9	0	72	
	25 - 29.9	216	0	
	30 - 34.9	102	0	
	> 35	33	0	
Junk food consumption	Yes	133	75	0.010*
	No	218	74	
Physical Activity	Yes	303	113	0.006**
	No	48	36	
Type of diet	Vegetarian	65	30	0.91NS
	Non-Vegetarian	281	117	
	Ovo- Vegetarian	5	2	
Intake of salty foods	Yes	311	129	0.52NS
	No	40	20	

** Significant at p<0.01
* Significant at p<0.05
NS – Not significant

Table 4: Logistic regression analysis

Risk factors	Odds ratio (OR)	95% confidence interval Lower	95% confidence interval Upper	p value
Age	0.978	0.947	1.010	0.176NS
Waist circumference	1.314	1.246	1.386	0.000**
Physical inactivity	0.474	0.266	0.844	0.011*
Junk food consumption	3.366	1.654	6.848	0.001**

*Significant at p<0.05
** Significant at p<0.01
NS – Not significant

Table 5: Health problems associated with obesity

Health issues		**Obesity**		**p value**
		No	**Yes**	
Diabetes Mellitus	No	138	318	0.466NS
	Yes	11	33	
Hypertension	No	139	292	0.003**
	Yes	10	59	
Dyslipidemia	No	147	338	0.157NS
	Yes	2	13	
Arthritis	No	142	308	0.010*
	Yes	7	43	

** Significant at p<0.01
 * Significant at p<0.05
NS – Not significant

Conclusion

The prevalence rate of obesity is high among the teachers thereby indicating an urgent need for health and nutrition education programs that focuses on various aspects of leading a healthy life. These activities could be incorporated in schools and schools can be used as a place for promoting health education in such a way that it helps to drastically reduce the risk of chronic diseases and its co-morbidities in this population.

Acknowledgement

The authors wish to acknowledge all the school principals and teachers who gave their consent to be a part of this study.

Funding Source: Nil

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