Original Research Article

A study to assess body mass index and pattern of physical activity among the government employees working at different organizations of Gwalior city

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ABSTRACT

Background: The obesity can be defined simply as the disease in which excess body fat has accumulated to such an extent that health may be adversely affected. Physical activity is a key determinant of energy expenditure, and thus is fundamental to energy balance and weight control. Aims and objectives was to assess the BMI and physical activity among government employees working in different organizations of Gwalior city.
Methods: The present study was a cross sectional study. Five different government organizations were selected and from each organization 60 participants were selected randomly. A pre-designed, pre-tested, semi-structured interview based questionnaire was used for data collection from different participants. WHO BMI classification was used to classify participants.
Results: In the present study 44% of the study participants were overweight/ pre-obese while 8.33% and 1.33% were in Obese Class I and Obese Class II respectively. 40.67% were doing physical exercise. The most common type of physical exercise was walking or jogging 72.13%.
Conclusions: It was concluded that despite the known fact that obesity could have negative impact on the work capacity and physical fitness, only 40.67% were doing some physical exercise. Employees should be motivated to do daily exercise for the duration of at least 30 minutes.

Keywords: BMI, Government, Physical activity, Obesity, Overweight

INTRODUCTION

The obesity can be defined simply as the disease in which excess body fat has accumulated to such an extent that health may be adversely affected. This excessive fat build up results from an imbalance between calories consumed on one hand and calories expended on the other hand.[1] Obese individuals are therefore predisposed to adverse health conditions such as cardiovascular diseases, type 2 diabetes mellitus, osteoarthritis and cancers.[2,3]

Physical activity is a key determinant of energy expenditure, and thus is fundamental to energy balance and weight control.[4] Physical activity levels have declined globally in recent decades.[5] Regular physical activity decreases many of the health risks associated with obesity or being overweight.[6] Leisure time physical activity has a major impact on the occurrence of coronary heart diseases and overall mortality.[7] There is also a graded inverse relationship between the total physical activity and mortality.[8] The beneficial effects of physical activity on the metabolic syndrome are mediated by

mechanisms beyond controlling excess body weight. For example, physical activity reduces blood pressure, improves the level of high density lipoprotein cholesterol, improves control blood glucose in overweight people, even without significant weight loss, and reduces the risk of colon cancer and breast cancer among women.[4]

Recalling the World Health Report 2002, which indicates that mortality, morbidity and disability attributed to the major non-communicable diseases currently account for about 60% of all deaths and 47% of the global burden of disease, which figures are expected to rise to 73% and 60%, respectively, by 2020.[9]

Noting that 60% of the deaths attributed to non-communicable diseases occurs in developing countries where those affected are on average younger than in developed countries.

Recognizing the existing knowledge and public health potential, the need to reduce the level of exposure to the major risks resulting from unhealthy diet and physical inactivity and largely preventable nature of the consequent diseases.[4]

Aim and objectives was to assess the body mass index (BMI) of government employees working in various organizations of Gwalior city and to assess the pattern of physical activity among government employees and its correlation with BMI.

METHODS

The present study was a cross sectional study which was done in various employees working in different government organizations of Gwalior city.

The list of various organizations in Gwalior city was prepared and from this list five government organizations namely medical and health institutes, educational institutes, government banks, government telecom offices, post offices were selected randomly. From these selected government organizations, the list of total working units of each government organization from the respective department was selected.

Then one or more unit (s) was chosen randomly from each group. The list of all the employees from the selected organizations was obtained from the head of the institution. 60 individuals from each institution were randomly selected from the list and a total of 300 participants were taken in the study.

Verbal consent from the head/in-charge of the respective organization was taken after explaining the type and purpose of the study. The informed consent from each of the participant was taken regarding the participation in the study before asking the questions of the questionnaire and for performing necessary measurements for assessing the obesity.

A pre-designed, pre-tested, semi-structured interview based questionnaire was used for data collection from different participants. Information regarding socio demographic profile-age, sex, education, marital status, type of family, physical activity its pattern and frequency were enquired and necessary anthropometric measurements i.e. height and weight were taken to calculate body mass index by formula weight (kg)/height (m²).

WHO BMI classification was used to categorize the participants as underweight (BMI = Less than 18.50), Normal weight (BMI = 18.50-24.99), overweight/ pre-obese (BMI = 25.00-29.99), obese class I (BMI = 30.00-34.99), obese class II (BMI = 35.00-39.99) and obese class III (BMI = 40.00 and above).

After collecting the required information from all the participants it was compiled and analysed. Confidentiality of the participants was ensured throughout the study.

Criteria for selection

Inclusion criteria

- Participants working at their current position for 12 months or more.
- Those participants who gave consent to be participated in the study.

Exclusion criteria

- Participants working at their current position for less than 12 months.
- Organizations, where Senior Authorities did not gave consent for carrying out the study.
- Those Study groups, who would not be ready to give the consent for participation in the study.

RESULTS

As shown in Table 1, the maximum number of the study respondents were of 51-60 years of age group i.e. 115 (38.33%) and minimum of >60 years age group i.e. 05(1.67%). Gender wise maximum number of study respondents were males i.e. 223 (74.33%) whereas 77 (25.67%) were females. According to their educational status majority of them were graduate i.e. 96 (32%) and only 16 (5.33%) had studied up to high school. 290 (96.67%) study participants were married and 161 (53.67%) were living in nuclear family.

Table 2 shows the body mass index according to WHO classification of different government employees working in different organizations. It shows that 132 (44%) of the study respondents were pre-obese. While 25 (8.33%) and 4 (1.33%) were in obese class I and Obese class II respectively.

Table 1: Age, sex wise and socio-demographic distribution of government employees working in different organizations.

Variables	Place of employment					
	Medical College n=60 No. (%)	Hospital n=60 No. (%)	Bank n=60 No. (%)	Post office n=60 No. (%)	Telecom office n=60 No. (%)	Total n=300 No. (%)
Age (Years)						
21-30	08(13.33)	02(3.33)	09(15.00)	10(16.67)	03(5.00)	31(10.33)
31-40	24(40.00)	34(56.67)	23(38.33)	05(8.33)	12(20.00)	98(32.67)
41-50	13(21.67)	06(10.00)	10(16.67)	15(25.00)	05(8.33)	51(17.00)
51-60	14(23.33)	16(26.67)	16(26.67)	29(48.33)	40(66.67)	115(38.33)
>60	01(1.67)	02(3.33)	02(3.33)	01(1.67)	00(0.00)	05(1.67)
Sex						
Male	46(76.67)	42(70.00)	37(61.67)	47(78.33)	51(85.00)	223(74.33)
Female	14(23.33)	18(30.00)	23(38.33)	13(21.67)	09(15.00)	77(25.67)
Education						
Primary	06 (10.00)	06(10.00)	01(1.67)	00(0.00)	07(11.67)	20(6.67)
Middle	04 (6.67)	05(08.33)	01(1.67)	04(6.67)	04(6.67)	18(6.00)
High school	02(3.33)	01(1.67)	03(5.00)	04(6.67)	06(10.00)	16(05.33)
Higher-secondary	06(10.00)	11(18.33)	10(16.67)	22(36.67)	14(23.33)	63(21.00)
Graduate	17(28.33)	18(30.00)	17(28.33)	23(38.33)	21(35.00)	96(32.00)
Post-graduate	25(41.67)	19(31.67)	28(46.67)	07(11.67)	08(13.33)	87(29.00)
Marital Status						
Married	57(95.00)	57(95.00)	57(95.00)	59(98.33)	60(100.00)	290(96.67)
Unmarried	03(05.00)	03(5.00)	03(5.00)	01(1.67)	00(0.00)	10(3.33)
Type of Family						
Single	03(5.00)	01(1.67)	03(5.00)	01(1.67)	00(0.00)	08(2.67)
Nuclear	33(55.00)	32(53.33)	36(60.00)	29(48.33)	31(51.67)	161(53.67)

Table 2: Body mass index according to WHO* BMI classification of government employees working in different organizations.**

Class of BMI**	Place of employment					
	Medical college n=60 No. (%)	Hospital n=60 No. (%)	Bank n=60 No. (%)	Post office n=60 No. (%)	Telecom office n=60 No. (%)	Total n=300 No. (%)
I (Underweight)	05(8.33)	04(6.67)	02(3.33)	02(3.33)	03(5.00)	16(5.33)
II (Normal weight)	27(45.00)	23(38.33)	25(41.67)	29(48.33)	18(30.00)	122(40.67)
III (Overweight/Pre-obese)	22(36.67)	28(46.67)	27(45.00)	24(40.00)	31(51.67)	132(44.00)
IV (Obese Class I)	04(6.67)	05(8.33)	04(6.67)	05(8.33)	07(11.67)	25(8.33)
V (Obese Class II)	02(3.33)	00(0.00)	02(3.33)	00(0.00)	00(0.00)	04(1.33)
VI (Obese Class III)	00(0.00)	00(0.00)	00(0.00)	0(0.00)	01(1.67)	01(0.33)

*World Health Organization, ** Body Mass Index

Figure 1 shows that among the participants with normal BMI, pre-obese and obese, majority were not doing any physical exercise.

Table 3 shows that the most common type of physical exercise was walking or jogging 72.13% followed by cycling (50.81%) and yoga (49.19%).

Table 4 depicted that 41.80% participants with normal BMI, 45.45% pre-obese and 36.67% obese participants were doing physical exercise of any type. Most common type of physical activity reported was walking and/or jogging followed by yoga. This difference among all three groups was statistically significant only for yoga (p = 0.0058).

DISCUSSION

In the present study a total of 300 employees working in different organizations were chosen in which the maximum number of the study participants were of 51-60 years of age group i.e. 115 (38.33%) followed by the age

group of 31-40 years i.e. 98 (32.67%). In which 223 (74.33%) were males whereas 77 (25.67%) were females. According to their educational status majority of them were graduate i.e. 96 (32%) and only 16 (5.33%) had

studied up to high school. 290 (96.67%) study respondents were married and 161 (53.67%) were living in nuclear family.
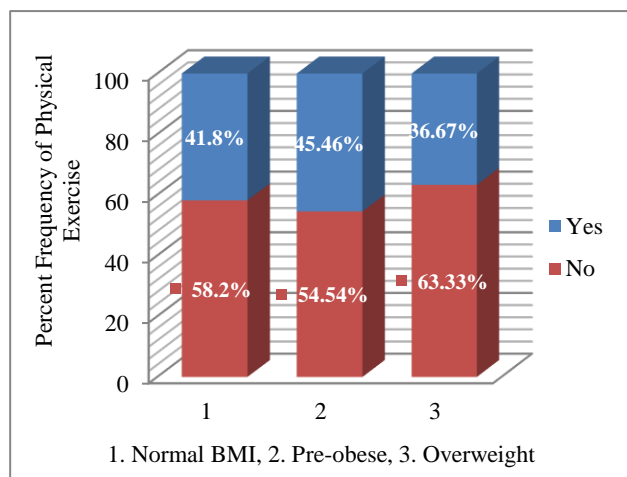
Table 3: Pattern of physical activity among government employees working in different organizations.

Variable	Sub-Variable	Place of employment					
		Medical College n=60, No. (%)	Hospital n=60 No. (%)	Bank n=60 No. (%)	Post office n=60 No. (%)	Telecom office n=60 No. (%)	Total n=300 No. (%)
Physical Exercise	Yes	38(63.33)	29(48.33)	22(36.63)	16(26.66)	17(28.33)	122(40.67)
	No	22(36.67)	31(51.67)	38(63.33)	44(73.33)	43(71.67)	178(59.33)
Walking /jogging	Yes	18(47.37)	20(68.97)	21(95.45)	15(93.75)	14(82.35)	88(72.13)
	No	20(52.63)	09(31.03)	01(4.55)	01(6.25)	03(17.65)	34(27.87)
	Daily	11(61.11)	13(65.00)	13(61.90)	11(73.33)	09(64.28)	57(64.77)
	Weekly	02(11.11)	05(25.00)	03(14.29)	02(13.33)	02(14.29)	14(15.91)
	Occasionally	05(27.78)	02(10.00)	05(23.81)	02(13.33)	03(21.43)	17(19.32)
Outdoor games	Yes	07(18.20)	04(13.79)	05(22.72)	03(18.75)	04(23.53)	23(18.85)
	No	31(81.80)	25(86.21)	17(77.18)	13(81.25)	13(76.47)	99(81.15)
	Daily	01(14.29)	01(25.00)	01(20.00)	02(66.67)	00(0.00)	05(21.74)
	Weekly	01(14.29)	01(25.00)	02(40.00)	01(33.33)	01(25.00)	06(26.09)
	Occasionally	05(71.42)	02(50.00)	02(40.00)	00(0.00)	03(75.00)	12(52.17)
Cycling	Yes	18(47.37)	07(24.14)	12(54.55)	15(93.75)	10(58.82)	62(50.81)
	No	20(52.63)	22(75.86)	10(45.45)	01(6.25)	07(41.18)	60(49.19)
	Daily	12(66.66)	03(42.86)	07(58.33)	11(61.11)	06(60.00)	39(60.00)
	Weekly	01(05.56)	01(14.29)	00(0.00)	01(5.56)	02(20.00)	05(7.69)
	Occasionally	05(27.78)	03(42.85)	05(41.67)	06(33.33)	02(20.00)	21(32.31)
Yoga	Yes	09(23.68)	11(37.93)	15(68.18)	15(93.75)	10(58.82)	60(49.19)
	No	29(76.32)	18(62.07)	07(31.82)	01(6.25)	07(41.18)	62(50.81)
	Daily	08(88.89)	07(63.64)	08(53.33)	13(72.22)	05(50.00)	41(65.08)
	Weekly	01(11.11)	03(27.27)	05(33.33)	02(11.11)	04(40.00)	15(23.81)
	Occasionally	00(0.00)	01(9.09)	02(13.33)	03(16.67)	01(10.00)	07(11.11)
Swimming	Yes	02(5.26)	03(10.34)	01(4.55)	0(0.00)	0(0.00)	06(4.91)
	No	36(94.74)	26(89.66)	21(95.45)	0(0.00)	0(0.00)	116(95.09)
	Daily	00(0.00)	01(33.33)	00(0.00)	00(0.00)	00(0.00)	01(16.67)
	Weekly	00(0.00)	00(0.00)	00(0.00)	00(0.00)	00(0.00)	00(0.00)
	Occasionally	02(100.0)	02(66.67)	01(100.0)	00(0.00)	00(0.00)	05(83.33)

*The sub total would not match as the participant has given multiple options.

Table 4: Co-relation of physical activity with BMI among study participants.

Variable	Sub-variable	Normal BMI (18.5-24.9) (N=122)	Pre-obese BMI (25-29.9) (N=132)	Obese BMI (≥30) (N=30)	Chi square (χ^2) and p value
Physical exercise	Yes	51 (41.80%)	60 (45.45%)	11 (36.67%)	$\chi^2 = 0.887$
	No	71 (58.20%)	72 (54.54%)	19 (63.33%)	p = 0.6417, df = 2
Pattern of Physical Exercise Reported		**Among Participants with Normal BMI (N=51)**	**Among Overweight/ Pre-obese Participants (N=60)**	**Among Obese Participants (N = 11)**	**Chi square (χ^2) and p value**
Walking / jogging	Yes	38 (74.50%)	42 (70.00%)	08 (72.72%)	$\chi^2 = 0.185$
	No	13 (25.49%)	18 (30.00%)	03 (27.27%)	p = 0.911, df = 2
Outdoor games	Yes	07 (13.72%)	14 (23.33%)	00 (0.00%)	$\chi^2 = 2.641$
	No	44 (86.27%)	46 (76.67%)	11 (100.00%)	p = 0.2670, df = 2
Cycling	Yes	27 (52.94%)	23 (38.33%)	02 (18.18%)	$\chi^2 = 3.892$
	No	24 (47.05%)	37 (61.67%)	09 (81.81%)	p = 0.1428, df = 2
Yoga	Yes	14 (27.45%)	35 (58.33%)	07 (63.63%)	$\chi^2 = 10.289$
	No	37 (72.55%)	25 (41.67%)	04 (36.36%)	p = 0.005, df = 2
Swimming	Yes	03 (5.88%)	03 (5.00%)	00 (0.00%)	$\chi^2 = 0.076$
	No	48 (94.12%)	57 (95.00%)	11 (100.00%)	p = 0.9627, df = 2

1. Normal BMI, 2. Pre-obese, 3. Overweight

Figure 1: Percent frequency of physical exercise among study participants.

In this study the prevalence of underweight, overweight and obesity was 5.33%, 44% and 10% respectively. Sahebi R et al, in her study reported prevalence of underweight 5.5%, overweight 27.8% and obesity 7%.[10]

Khan A et al, found that among the employees of universities, health and research institutions of Pakistan, the overall prevalence of underweight, overweight and obesity was 5.4%, 29.6 and 8% respectively.[11] Findings shown in the both the studies quoted above were quite similar to the present study.

In the present study, reported prevalence of overweight and obesity among bank employees were 45% and 10% respectively. Addo et al, reported the overall prevalence of obesity and overweight among the bank workers was 55.6 % (17.8 % obese and 37.8 % overweight). The high prevalence of obesity and overweight among the bank employees could be attributed to less physical activity due to the sedentary nature of their work resulting in weight gain.[12]

CONCLUSION

Findings of our study concluded that 44% participants had BMI 25-29.99 Kg/m^2 and 10% belongs to BMI level 30Kg/m^2 and above, among the government employees working in different organizations of Gwalior city. Only 40.67% employees were doing some kind of physical exercise despite the known fact that obesity could have negative impact on the work capacity and physical fitness.

Recommendations

Considering the present study the following measures could be recommended:

- The individuals engage in adequate levels throughout their lives. Different type and amount of physical activity was required for different health outcomes.
- Muscle strengthening and balance training can reduce falls and increase functional status among older adults. More activity may be required for weight control.
- Yoga could be taken as a regular physical activity.
- Leisure time at individual work places could be utilized for measures for physical activity.

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