

Original Research Article

The health landscape of central Kerala: insight into adult physical activity, obesity and awareness among rural adults

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ABSTRACT

Background: Body mass index is a widely used index for assessing weight in relation to height, categorizing individuals as underweight, overweight, or obese. Obesity is a pervasive form of malnutrition globally, and Kerala ranks second in India for the highest prevalence of obese individuals, following Punjab. This reflects a growing preference for unhealthy lifestyles, contributing to rising comorbidities and overall ill-health. This study aims to assess the prevalence and relationship between overall physical activity and Body Mass Index among adults in a rural population. It also investigates the attitudes and awareness of the participants regarding obesity and physical activity.

Methods: A sample of 204 individuals aged 18 to 64, from 125 households in the rural area of Kunnackal, participated in this study. Data were collected using a semi-structured questionnaire.

Results: Out of 204 participants, 196 (96.07%) reported adequate physical activity, with 124 of them having a normal BMI. A higher prevalence of obesity was observed in the low physical activity group. Most participants demonstrated an understanding of the causes of obesity and the role of physical activity in maintaining a healthy life.

Conclusions: Our study found that 96.07% of participants had adequate physical activity, and the majority (124) had a normal BMI. No significant association was observed between BMI and age, gender, or occupation. Most participants showed awareness of the causes of obesity and the importance of physical activity in promoting health.

Keywords: Body Mass Index, Obesity, Physical activity, Rural population

INTRODUCTION

Body mass index (BMI), formerly called Quetelet's index, is a measure for indicating nutritional status in adults. BMI ranges are based on the effect of excessive body fat on disease. BMI provides the most useful population-level measure of overweight and obese individuals as it is the same for both sexes and for all ages of adults.¹ A BMI above or equal to 30 kg/m² is Obesity. Today obesity has become the most prevalent form of malnutrition worldwide. Worldwide obesity has tripled between 1975 and 2016.² In 2016, 1.9 million were overweight, and 650

million were obese among adults above 18 years. More than 38 million children under the age of 5 years and 340 million children aged between 5-18 years were obese during that period. Obesity and overweight are the fifth leading risk of global deaths.²

Currently in India, we are facing the double burden of undernutrition as well as overnutrition.³ The prevalence of overweight and obesity in India is increasing faster than the world average.⁴⁻⁶ For instance, the prevalence of overweight increased from 8.4% to 15.5% among women between 1998 and 2015, and the prevalence of obesity increased from 2.2% to 5.1% over the same period.⁴⁻⁶

Kerala has the second-largest prevalence of obese individuals in India following Punjab. As per the 2015-2016 National Family Health survey, 30.5% females and >25% males in Kerala were found to be obese.⁷

The prevalence of obesity is of alarming public health concern as it has been found that obesity is associated with an increased risk of developing hypertension, lipid disorder, Type 2 Diabetes Mellitus, heart disease, stroke, osteoarthritis, Cancers, and early mortality.⁸⁻¹² It has been found that regular physical activity decreases many of the health risks associated with obesity or being overweight and is often targeted for intervention.¹³ Global estimates show that one in four adults and 81% of adolescents do not do enough physical activity.¹⁴ A study conducted among the South Korean population showed a significant inverse relationship between physical activity and the prevalence of obesity using both BMI and WHtR (Waist to Height ratio).¹⁴ According to WHO estimates, there is a prevalence of 13.4% physical inactivity in India among adults aged 18 years and above.¹⁵ Physical activity is considered an important component in long-term weight control, based on a study conducted in an urban population, and adequate levels of activity should be prescribed to combat obesity.¹⁶ Regular physical activity is associated with a decreased risk of coronary heart disease and cardiovascular mortality in middle-aged and older individuals.¹⁷ In the current study, we aim to assess the physical activity levels and its relationship with BMI among adults aged 18-64 in the rural population at Kunnackal, Kerala.

Justification

As there is dearth of studies in this area the relation between BMI and physical activity in the Ernakulam district of Kerala, we undertook this cross-sectional study to assess the same. Many of the adult population lack physical activity leading to sedentary lifestyle and ultimately leads to obesity. Since there is an alarming increase in obesity in adults worldwide, it is high time that we should focus on the problem.

Objectives

Objectives were to study the physical activity levels among the adults in the study population, to estimate the prevalence of obesity among adults in the study population, to study the relationship between the physical activity and BMI in the study population and to assess the attitude and awareness of the participants regarding BMI and physical activity.

METHODS

Study design, location, population and duration

Current investigation was a cross sectional study conducted at Rural field practice area of a medical college in Central Kerala. The study was conducted in a block of

500 houses around the RHTC. Situated in Ward VI, of Mazhuvannoor panchayath, Ernakulam district in Kerala. The study was started on February 2022 and completed on March 2022.

Inclusion and exclusion criteria

Inclusion criteria were residents of selected field practice area, aged between 18-64 years and Those who gave consent to participate in the study. People who are unable to respond to the questionnaire were excluded.

Sampling technique

Cluster sampling was used, 21 of them were divided into 10 groups and each group started their survey from preselected household randomly selected from a block of 500 houses.

Ten houses were randomly selected as a starting point of each cluster. Each survey team collected the data using the questionnaire. Each group were assigned to survey 20 participants.

Sample size

Sample size was obtained from a similar study conducted in Karolinska university hospital, Sweden that reported prevalence of 68% using formula;¹⁸

$$n = 4pq/l^2$$

where p=68, q=(100-68)=32, l=10/100*68=6.8, thus n=188.23.

Study tool

The rural population who enrolled in the study were given a questionnaire including questions relating to physical activity, sociodemographic variables, questions to assess attitude and awareness about physical inactivity and related health problems.

Method of data collection

The rural population who enrolled in the study were given a questionnaire asking about various socio-demographic variables and variables regarding their weekly physical activity. We interviewed them and supervised in the filling of the questionnaire. All residents of the area were filtered based on our inclusion and exclusion criteria. Verbal consent was received before every interview.

Statistical analysis

Descriptive statistics was used to describe the data, frequencies, and percentage for categorical variables. Chi-square test was used for analysing categorical data.

RESULTS

A total of 204 individuals aged between 18-64 years in 125 houses were studied. The demographic particulars of the study population are given in (Table 1). Majority of participants (46.56%) belonged to the age group 51-64

years. Lowest number of participants (15.68%) were in the 18-30 years age group. Body Mass Indices calculated from 204 participants. Among them, 127 (62%) were having normal BMI, 57 (28%) were overweight and 20 (10%) were obese (Figure 1).

Table 1: Age and gender wise distribution of the study population.

Sex	Age groups (years), N (%)			Total
	18-30	31-50	51-64	
Male	13 (40.6)	37 (48.21)	44 (46.3)	94
Female	19 (59.4)	40 (51.9)	51 (53.7)	110
Total	32	77	95	204

Table 2: Distribution of BMI among different age groups.

Age groups (years)	BMI, N (%)			Total	Significance
	Normal	Overweight	Obese		
Below 30	21 (65.6)	9 (28.1)	2 (6.3)	32	$\chi^2=4.75$, df=4, p=0.31
31-50	44 (57.1)	21 (27.3)	12 (15.6)	77	
Above 50	62 (65.3)	27 (28.4)	6 (6.3)	95	
Total	127	57	20	204	

Table 3: Gender wise distribution of BMI.

Gender	BMI, N (%)			Total	Significance
	Normal	Overweight	Obese		
Males	64 (68.1)	23 (24.5)	7 (7.4)	94	$\chi^2=2.69$, df=2, p=0.260
Females	63 (57.3)	34 (30.9)	13 (11.8)	110	
Total	127	57	20	204	

Table 4: Distribution of BMI based on employment status.

Employment status	BMI, N (%)			Total	Significance
	Normal	Overweight	Obese		
Housewife	27 (54.0)	15 (30.0)	8 (16.0)	50	$\chi^2=5.10$, df=4, p=0.276
Unemployed/students	32 (72.7)	9 (20.5)	3 (6.8)	44	
Employed	68 (61.8)	33 (30.0)	9 (8.2)	110	
Total	127	57	20	204	

Table 5: Distribution of BMI based on employed participants.

Employment	BMI, N (%)		Total	Significance
	Normal	Overweight/Obese		
Unskilled/semiskilled	16 (61.5)	10 (38.4)	26	$\chi^2=10.63$, df=3
Skilled	19 (86.3)	3 (13.7)	22	
Clerical	9 (39.1)	14 (60.9)	23	
Professional	24 (61.5)	15 (38.5)	39	
Total	68	42	110	

Table 6: Distribution of BMI based on levels of physical activity.

Level of physical activity	BMI, N (%)		Total	Significance
	Normal	Overweight/Obese		
Inadequate	3 (37.5)	5 (62.5)	8	$\chi^2=1.2$, df=1
Adequate	124 (63.2)	72 (36.8)	196	
Total	127	77	204	

Classification of occupation of the participants

Most of the individuals participated in the study were housewives (50). Unemployed and students formed the second largest group (44). The rest (110) belonged to employed group. Under the employed group there was distribution based on skilled (22), clerical (23), semi-skilled (22), unskilled (5) and professional (38).

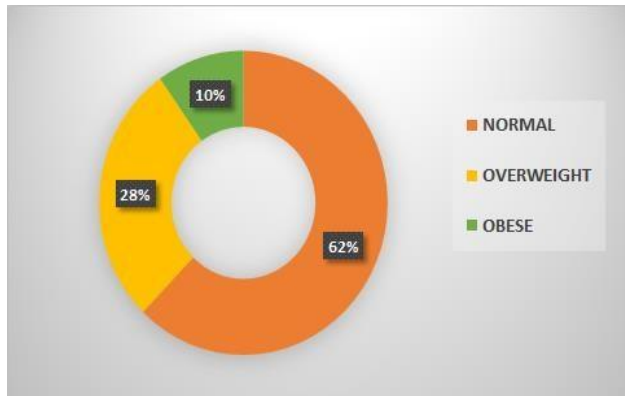


Figure 1: Prevalence of overweight and obesity among the study participants.

Classification of participants among different age group

Distribution of body mass index among different age groups are given in (Table 2) and higher rate obesity is observed in the age group 31 to 50, but it is not significant.

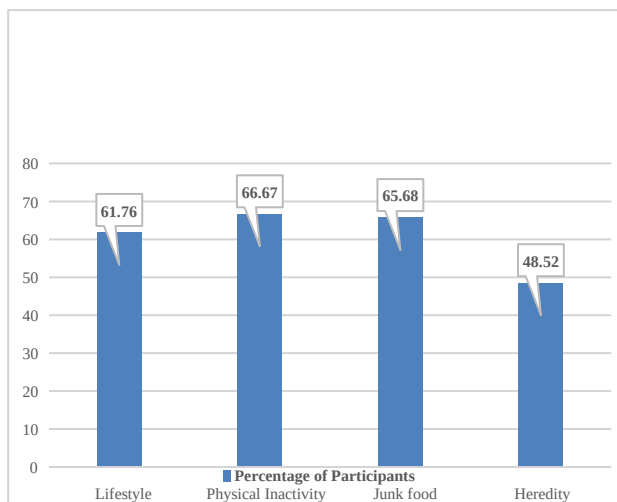


Figure 2: Opinion of the participants on the causes of obesity.

Gender wise distribution of body mass index

Gender wise distribution of body mass index are given in (Table 3). Higher rate obesity and overweight is observed among female, but it is not significant.

Distribution of body mass index based on employment status

Distribution of body mass index based on employment status are given in (Table 4). Higher prevalence of obesity (16%) and overweight (30%) is observed among housewives in comparison with employed persons. Although no significant difference was observed among the groups.

Distribution of body mass index of employed participants

Distribution of Body Mass Index of employed participants are given in (Table 5). 61.8% of the employed participants had normal BMI. Majority of participants who were obese or overweight belonged to clerical and professional group. Significant association between body mass index level of employed participants and type of employment were observed.

Distribution of body mass index based on levels of physical activity

Distribution of Body mass index based on levels of physical activity are given in (Table 6). Higher prevalence of obesity & overweight was observed among the inadequate physical activity group, however there is no significant difference observed (p value=0.27).

Distribution of body mass index based on attempt of participants to lose weight

Distribution of body mass index based on attempt of participants to lose weight are given in (Table 7). Out of 204 participants, only 39 participants have attempted to lose weight out of which majority belonged to normal BMI range.

Majority of the participants, 124 (60.7%) of them had the opinion that the ideal screen time for home maker is one hour or less. 55 (26.9%) of them opined that it may be extended to two hours. Regarding daily exercise time required by a student, majority (87) opined that it should be between half an hour and one hour, whereas 69 said it should be more than one hour. Rest (48) said that it should be around 0.5 hours. Majority of participants (86%) has opinion that there is relationship between lack of physical activity and lifestyle diseases and most of participants 171 (84%) had an opinion that physical activity has a role in reducing mental stress. Regarding the cause of obesity, 136 (66.67%) opined that the cause of obesity as lack of physical activity, 134 (65.68%) as junk food consumption, 126 (61.76%) as lifestyle and 99 (48.52%) as heredity (Figure 2). Majority (69.31%) of the participants were interested in doing regular exercise and most of the participants (105,51%) encouraged their family members in sports activities, but they (136, 67%) do not encourage their family do regular exercise.

Table 7: Distribution of BMI based on attempt of participants to lose weight.

Attempt of participants to lose weight	BMI, N (%)			Total
	Normal	Overweight	Obese	
Yes	19 (48.7)	14 (35.8)	6 (15.3)	39
No	108 (65.5)	43 (26.0)	14 (8.48)	165
Total	127	57	20	204

DISCUSSION

In our study, Higher rate of obesity was observed in the age group 31 to 50, the difference was not that significant. Higher rates of obesity were observed in participants with inadequate physical activity that is not significant. Shavinder Singh in an urban population observed a higher prevalence of overweight and obesity among individuals with low levels of physical activity as compared to those with high levels of physical activity.¹⁶

There was no significant association between the gender of participants and Body Mass Index. These results agree with studies conducted in Burwood, Victoria, Australia in this aspect.¹⁷ In overall, 10% are obese, and 28% are overweight. The rates are lower in comparison with the study conducted by Anil S Bindhu at Trivandrum.¹⁸ The proportion of obesity and overweight is higher in the older age group in comparison with the younger population, but no significant association was observed in our study.

Higher prevalence of obesity and overweight is observed among housewives in comparison with employed persons. No significant difference was observed among the groups. When Body Mass Index categories are compared among employed participants, significantly higher rates of obesity and physical activity were observed among clerical and professional groups in comparison with others. The majority of participants in our study had the opinion that one hour is the recommendable time span for a homemaker to spend on the screen. The awareness of the rural population regarding the screen time can be considered as a healthy trend. Further studies in this regard are recommended.

Only 20% of our participants have attempted to lose weight as a part of their regular lifestyle. Most of those who attempted to reduce weight were in the normal Body Mass Index range. In this aspect, a matter of concern is that the participants who are in the at-risk range of noncommunicable diseases are showing less concern about their overweight and obesity. The majority of participants opined regarding the daily exercise time required by a student must be between half an hour and one hour. About one fourth of the participants feel that the ideal time that is to be spent by children for daily exercise is less than half an hour. This is a matter of concern and to be explored further.

Most of the participants (86%) are aware of the relationship between lack of physical activity and lifestyle diseases. Further, on assessing the opinion on the cause of obesity, 66.67% stated it as lack of physical activity. 65.68% stated it as junk food consumption. 61.76% stated it as a lifestyle, and 48.52% stated it as hereditary. Awareness about the causes of the non-communicable diseases is good in the studied population. The awareness level of the population regarding physical activity can be considered at par with a similar study conducted by Sanaee Nasab H in 2009 in Iran to assess the knowledge, attitude, and practice towards physical activity among medical science personnel.¹⁹ This aspect needs to be explored by further studies. Regarding the practice of the participants in doing regular exercise, about two-thirds of them were interested in doing regular exercise. More than half of them encourage family members for participating in exercise. This also shows the level of practice regarding physical activities is also in the surveyed community.

Limitations

This study has limitations including potential sampling bias, a relatively small sample size, a cross-sectional design preventing causal inferences, and the possibility of unmeasured confounders. The study's scope may not encompass all determinants of obesity. Concerns about recall, reliability, loss to follow-up, and social desirability bias exist. Geographical specificity could also affect the findings applicability.

CONCLUSION

Current study found that 96.07% of participants had adequate physical activity, and the majority (124) had a normal BMI. No significant association was observed between BMI and age, gender, or occupation. Most participants showed awareness of the causes of obesity and the importance of physical activity in promoting health.

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