PREVALENCE AND FACTORS ASSOCIATED WITH OVERWEIGHT/OBESITY AMONG YOUNG ADULTS STUDYING IN COLLEGES OF THIRUVANANTHAPURAM DISTRICT, KERALA

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DEDICATION

I dedicate this work to the loving memory of my mother, Indira K A. Her unwavering support has been my pillar of strength throughout my endeavours. To my father Ravindranath A G, who has been the driving force of all my achievements. Last but not the least to my wife Dr Nanda Anandamohan and my daughter Dhana Ananthakrishnan who supported me in completing this work.

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Words are not enough to thank my better-half, Dr Nanda Anandamohan who had been encouraging and supporting me through thick and thin times.

DECLARATION

I hereby declare that this dissertation titled "Prevalence and factors associated with overweight/obesity among young adults studying in colleges of Thiruvananthapuram district, Kerala" is the bonafide of my original research. It has not been submitted to any other University or Institution for the award of any degree or diploma. Information derived from the published or unpublished work of others has been duly acknowledged in the text.

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CERTIFICATE

Certified that the dissertation titled “Prevalence and factors associated with overweight/obesity among young adults studying in colleges of Thiruvananthapuram district, Kerala” is a record of the research work undertaken by Dr Ananthakrishnan K R in partial fulfilment of the requirements for the award of the degree of “Master of Public Health” under my guidance and supervision.

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ABBREVIATIONS

BMI	Body Mass Index
HOD	head of department
ODK	Open Data Kit
GPAQ	Global Physical Activity Questionnaire
IDSP	Integrated Disease Surveillance Programme
NCD	Noncommunicable Diseases
SEP	Socio Economic Position
SES	Socio Economic Status
NFHS	National Family Health Survey
WHO	World Health Organizations
MET	Metabolic Equivalent
CI	Confidence Interval
OR	Odds Ratio
COR	Crude Odds Ratio
AOR	Adjusted Odds Ratio
PI	Principal Investigator
IEC	Institutional Ethics Committee

ABSTRACT

Background

The prevalence of overweight/obesity has reached alarming across the world. According to WHO, the global prevalence of obesity had increased three times between 1975-2016. Weight gain resulting in overweight and obesity had become a leading cause to life threatening non communicable diseases. Since young adulthood represent the next generation of adults, it is important to understand the overweight status of young adults.

Methods

A total of 365 young adults of age 18-24 years were recruited from government and private colleges with equal weightage. The data collection involved using a self-administered questionnaire. Majority of questions were adopted from WHO STEPS Instrument.The questionnaire included questions related to sociodemographic characteristics, dietary patterns, physical activity, behavioural measurements and anthropometric measurements. Subsequently, the data was analysed using R version 4.3.1. The objective of the study was to know the prevalence and factors associated with overweight/obesity among the college students.

Results

The prevalence of overweight/obesity is 24.65 percent (95% CI:20.23% to 29.07%). It was found that students studying in private institutions (AOR:1.81, 95% CI:1.11-2.97), students who use tobacco (AOR:3.56, 95% CI:1.23-10.29) and students who had frequent restaurant food consumption (AOR:1.81, 95% CI:1.11-2.97) were found significantly associated with overweight status (Body Mass Index more than 25).

Conclusions

The prevalence rate of overweight/obesity was high reflecting a significant public health issue that needs targeted interventions. There was significantly higher prevalence of overweight/obesity among students studying in private institutions, those who ate frequently from restaurants and those who use tobacco. The results from the study underscore the need for targeted interventions aimed at life style modification and promotion of healthy dietary habits among young men and women.

CHAPTER-1

INTRODUCTION AND REVIEW OF LITERATURE

1.1 INTRODUCTION:

1.1.1 BACKGROUND

Malnutrition is a very serious public health problem that demands attention all across the world, impacting people of all ages. It primarily defines nutritional deficits or excesses. As a result, it encompasses two major categories of conditions: "undernutrition" and "overnutrition." The effects and problems of malnutrition are affecting many nations with low or medium incomes. Along with undernutrition, a global epidemic of overweight/obesity is sweeping across of the globe. A recent article in Nature has highlighted the global trends, risk factors, and policy implications regarding obesity, denoting its role as one of the major contributors to the burden of disease across the globe and its adverse economic impact on countries.(Malik et al., 2013a)

Among underweight adults globally, India contributes one of the highest shares. However, the number of people who are overweight or obese keeps on increasing in the country. Overweight or obesity has become a serious life-threatening factor globally and millions are estimated to suffer from the serious health disorders that arise from being overweight. Obesity has grown into a global epidemic in many populations, with severe implications for public health due to the increased risk of type 2 diabetes and cardiovascular problems.(Chandalia et al., 1999). Epidemiological studies reveal that Asian Indians who have relocated to western countries and those who live in Indian subcontinent particularly in the metropolitan regions have a greater incidence of coronary heart disease due to increased truncal obesity and insulin resistance. In a study which is related with obesity

among women indicated that food restriction combined with progressive and moderate intensity physical activity can lead to weight loss and lower CVD risk profiles in the obese.(Andersen et al., 1999)

In recent years overweight or obesity become a priority health issue that affects both the younger and older population in India. Kerala ranks second among Indian states with the increased prevalence of obesity in females(Thomas and M, 2019). As observed in many middle-income countries, Kerala is also undergoing both demographic and epidemiological transitions. As a result of this, the state is confronting critical issues related to the rise of non-communicable and the continuing communicable diseases. The challenge is more due to non-communicable diseases when it comes to urban and semi urban areas.

The chances of getting obese or overweight in a person's life starts from the foetal development. According to Baker's hypothesis, the chance of developing obesity, diabetes and other metabolic disorders in adulthood is influenced by the environmental factors during foetal development and early life can have a profound impact on the risk of developing chronic diseases in adulthood. A study in social theory and health explores the connections between the Barker hypothesis and obesity, emphasizing the complex processes that determine health and disease, spanning biology, social positionality, place, and generation.(Scott Yoshizawa, 2012)

The metabolic syndrome—defined by obesity, insulin resistance, dyslipidaemia, and hypertension is more likely to occur in children whose birth weight is low and whose subsequent rapid growth throughout childhood has been shown in multiple animal and human studies.(Calkins and Devaskar, 2011)

Similarly, the transition of adolescence to young adult stage influences the health status of an individual. College going young adults are more vulnerable to overweight and obesity.

This age range typically corresponds to the late adolescence and early adulthood stage. During this period, individuals often experience significant lifestyle changes, including transitions from high school to college, increased independence, changes in dietary habits, changes in physical activity pattern and increased stress. Addressing health concerns during this period are crucial since they have long-term benefits in preventing chronic conditions associated with excess weight.

The probability of becoming obese when compared to a person who is overweight in his young adult age and adolescence is more than that of a person who has normal weight in his young adult age. For a person who is overweight in young adulthood faces a high risk of becoming obese. The World Health Organization (WHO) also notes that global adult obesity has more than doubled since 1990, while teenage obesity has quadrupled. This shows that weight gain practices set in early adulthood can have long-term consequences for health.

It is a critical period of growth and development where habits and behaviours that can significantly affect their entire life is established. Therefore, understanding the issues of overweight and obesity and their associated factors are important since targeted interventions can help to promote healthy life style modifications early on and improve their long-term health outcomes.

1.2 REVIEW OF LITERATURE:

The World health organization defines malnutrition as deficiencies or excesses in nutrient intake, imbalance of essential nutrients, or impaired nutrient utilization. Malnutrition has two primary categories of conditions. 'Undernutrition' refers to a “condition characterized by stunted growth, low body weight in relation to height, being underweight for one's age, and inadequate intake of specific micronutrients”. The other category comprises overweight/obesity, and noncommunicable diseases associated with diet, such as diabetes, cancer, heart disease, and stroke. Based on WHO forecasts, by the year 2025, over 167 million individuals, including both adults and children, will experience a decline in their overall health due to being overweight or obese.(World Obesity Day 2022 – Accelerating action to stop obesity, n.d.). An obesity epidemic is affecting several populations worldwide, leading to significant implications for public health. This elevates the probability of experiencing joint complications, enduring chronic diseases, and encountering infertility in the future, hence augmenting the cost of healthcare. The World Economic Forum analyses the economic impact of obesity on healthcare systems worldwide, encompassing the expenses incurred in treating obesity-related illnesses and the overall societal burden. (Malik et al., 2013b)

1.2.1 Prevalence of overweight/obesity- global scenario:

The prevalence of overweight or obesity has reached alarming across the world. Earlier it was more in developed countries but the pattern has shifted to developing nations like India too in the recent times.

Obesity is a growing health concern in both industrialized and developing nations, including India. It has become more prevalent in recent times. The fifth largest cause of mortality worldwide is being overweight or obese. (Thomas and M, 2019). One of the most

significant public health concerns of our century, particularly among children and adolescents, is the dramatically increased prevalence of obesity. (Mohammadbeigi et al., 2018)

The World Health Organization reports that between 1975 and 2016, there was a three-and-a-half-fold increase in the worldwide prevalence of obesity. This pattern is not limited to affluent individuals, countries by itself as well as the middle-class and low-income nations. The recognition of obesity as a public health concern was first in the United States, eventually spread to Europe, and is currently making its way into underdeveloped nations.(Prentice, 2006; Roth et al., 2004)

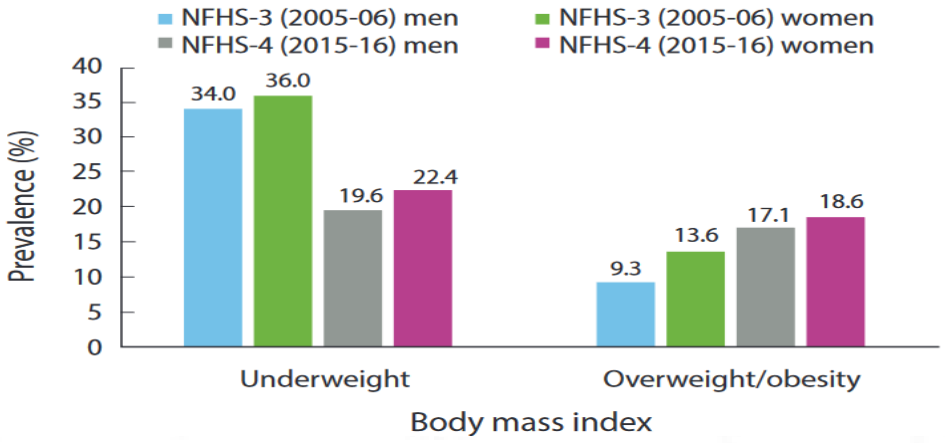
The prevalence of overweight and obesity varies by area, with greater rates in the Middle East, Central and Eastern Europe, and North America.(James et al., 2001). Polynesia and Micronesia have the highest obesity rates of 76.8 percent and 70.3 percent, respectively. In 1998, in several developing countries, there was a noticeable increase in prevalence of overweight/obesity from 2.3 percent to 19.6 percent.(Misra and Khurana, 2008). In the developing countries, a double burden exists, where underweight remains a persistent public health concern, but simultaneously countries like India are experiencing a rapid increase in overweight and obesity. It has been noted that a significant fall in underweight has occurred in countries in South and Southeast Asia with reductions up to 40.5 percentage points in the last three decades. Conversely, in most of these countries including India, the proportion of obesity within the double burden has significantly increased and this rise is also observed among children and adolescents.(*Lancet (London, England)*, 2024)

1.2.2 Prevalence of overweight/obesity- Indian scenario:

Despite of the fact that India has the world's largest percentage of underweight adults, there is an ongoing increase in overweight or obesity day by day.(Dutta et al., 2019) The prevalence of overweight women in India was 13.6 percent and 9.3 percent of overweight

men, according to NFHS -3 (2005). Previous NFHS data shows that the rate of overweight and obesity has been on the rise. While being overweight is widespread among some Indian states including Punjab, Kerala, Goa, Tamil Nadu, and Andhra Pradesh. It is more common among women in these states than men. Adults in the southern part of India, those living in metropolitan areas, and those aged 35–49 had the highest rates of overweight and obesity, according to NFHS-5 (2019–2021). In metropolitan areas, the overweight rate is 25.5 percent, which is three times higher than in rural areas, where it is 7.98 percent.

Figure 1.1 Distribution of underweight and overweight/obesity in India

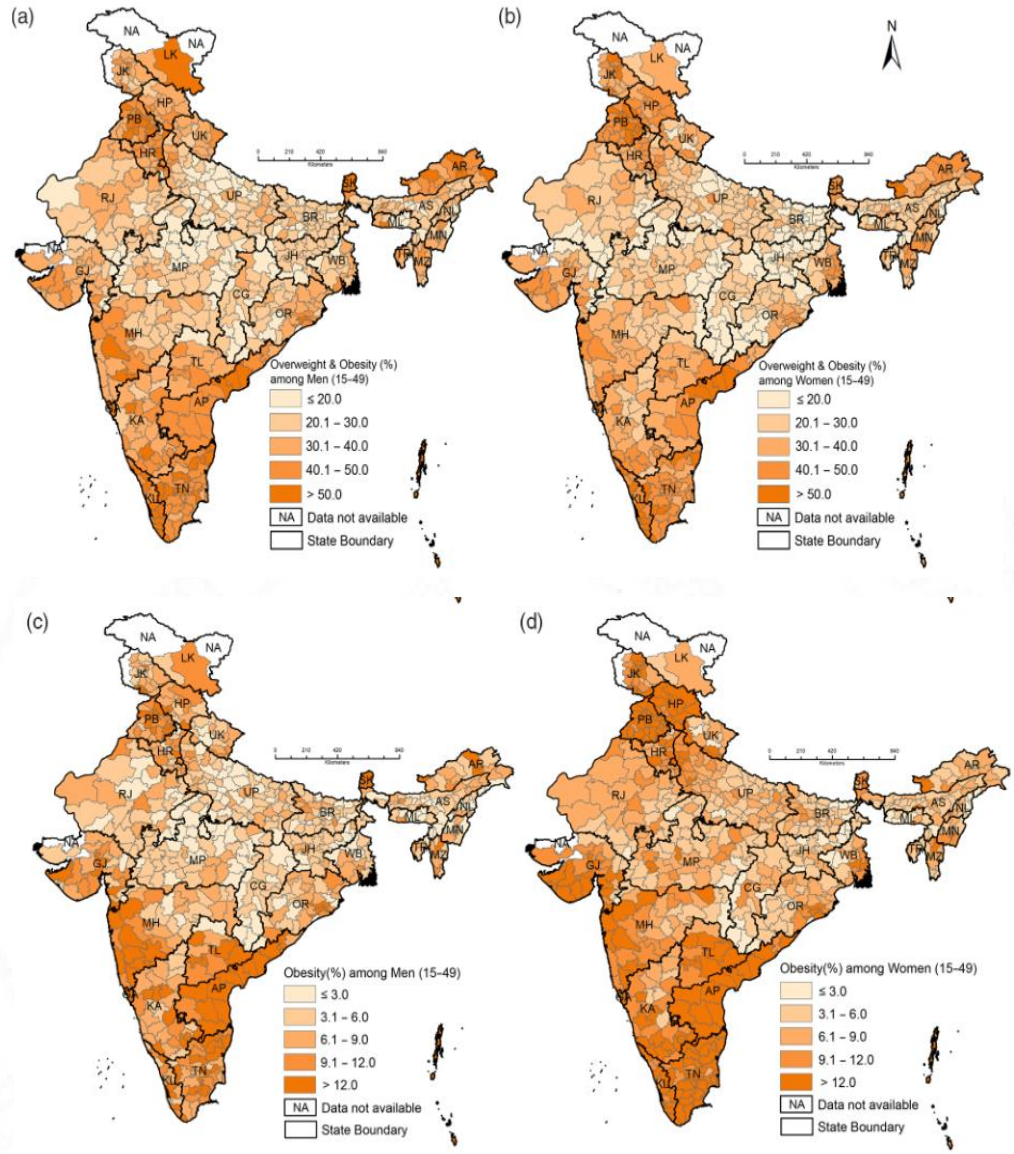


(source- https://doi.org/10.4178/epih.e2019050)

Figure 1.1 shows, based on data from NFHS-3 (2005–2006) and NFHS-4 (2015–2016), the distribution of underweight and overweight/obesity among men and women in India. Between the NFHS-3 and NFHS-4 data sets, there was a decline in the underweight rate for both genders. However, the data unequivocally demonstrates that the prevalence of overweight and obesity has risen among women and men, from 9.3 to 17.1 percent for males and 13.6 to 18.6 percent for women. Regrettably, the National Family Health Survey-5 (2019–2019) results also showed a growing prevalence. The percentage of overweight or obese women had risen to 24 percent, while the percentage of overweight or obese men had increased to 22.9 percent.

New research indicates that the percentage of persons in India who are overweight or obese will be doubled by the year 2040, with the highest rates expected in rural areas and among the elderly. (Luhar et al., 2020)

Figure 1.2 Distribution of overweight across districts in India



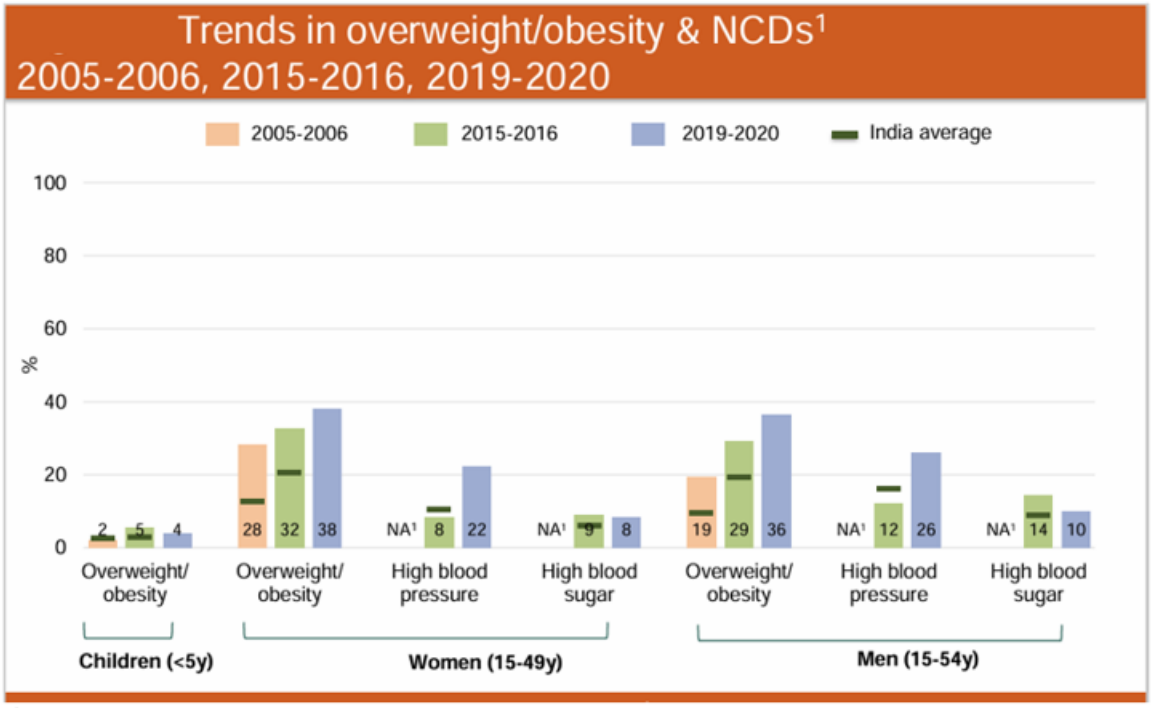
(source- https://doi.org/10.1017/S0021932020000486)

Figure 1.2 depicts the distribution of overweight and obese (15–49 years old) men and women across districts in India in 2015–16, as well as the distribution of obese (15–49 years old) men and women. (Rai et al., 2021)

1.2.3 Prevalence of overweight/obesity- Kerala scenario:

Figure 1.3 displays the trends in overweight/obesity and NCDs according to NFHS-3, NFHS-4, and NFHS-5 data of Kerala state. According to Thomas and M (2019), Kerala ranks second among Indian states with the rising incidence of obesity in females. Data from the National Family Health Survey shows that, similar to the rest of the country, overweight and obesity are on the rise in Kerala.

Figure 1.3 Trends in overweight/obesity and NCD's as per NFHS



(Source: NFHS-3 (2005-2006), NFHS-4 (2015-2016), and NFHS-5 state and district factsheets (2019-2020)

Among men, the prevalence of overweight/obesity had increased from 19 percent to 29 percent. But during the next survey (NFHS-5) again the prevalence was increased to 36 percent which is drastic. Among women, same trend was followed. According to NFHS-3, there were 28 percent of obese women. But the prevalence had increased to 38 percent while taking NFHS-5 data. This clearly denotes that the prevalence of overweight is in increasing trend so that government and health system have to be intervened at the earliest.

1.2.4 Prevalence of overweight/obesity among young adults:

Overweight and obesity are more common among young adults. Generally speaking, this age range represents the late adolescent and early adult stages. Taking care of health issues now could help in the long run by preventing chronic illnesses linked to being overweight. In Victoria, Australia, a Prospective 8-wave cohort research involved tracking 1,520 teenagers starting at age 14 and continuing for ten years. The study's findings indicate that the percentage of overweight people rose from 20 percent in mid-adolescence to 33 percent at the age of 24. From 3.6 percent to 6.7 percent of people were obese. (Patton et al., 2011) For a person who is overweight in young adulthood faces a high risk of becoming obese. The World Health Organization also reports that while teen obesity has doubled since 1990, adult obesity and overweight have increased globally. This demonstrates how weight gain habits developed in early adulthood can have negative long-term effects on health. Based on an article published in The Lancet Diabetes & Endocrinology, young adults aged 18 to 24 years are at the largest risk of being overweight or acquiring obesity in the next decade of their life compared to adults of different age strata, hence obesity prevention initiatives should target this group.(ocf26, 2021)

1.2.5 Prevalence of overweight/obesity among college students in India:

Studies indicate that the prevalence of obesity in India ranges between 10 percent and 50 percent, with a noticeable nutritional change from a traditional carbohydrate diet to high-calorie fast food, which is more popular among college students.(Rekha et al., 2022)

A survey of 350 medical students in 2013 at a medical college in Trivandrum, Kerala, reported that 25.71 percent of the students had obesity (with a 95% Confidence Interval of 21.75-29.83) and 24.57 percent had overweight, as per Asia-Pacific recommendations. This survey reveals a concerning trend: college students are becoming more and more obese. It

emphasizes how important it is to spread knowledge about leading a healthy lifestyle, making nutrient-dense food choices, and getting regular exercise in order to stop the rising rate of obesity and related illnesses.(Manojan et al., 2019)

More than half of Tamilnadu's first-year medical students were overweight or obese, according to a project conducted in 2022 by Rekha and colleagues as per Asia-Pacific norms. This rate is greater than the general population's rate.(Rekha et al., 2022)

According to worldwide Body Mass Index (BMI) norms, there is a significant prevalence of obesity in Kerala, a state in southern India, with 17 percent of medical students being overweight and 3.8 percent being obese. This implies that young people with higher levels of education are likewise impacted by the obesity epidemic.(Manojan et al., 2019) University students in India are becoming more and more overweight/obese, which is a serious public health concern that calls for quick attention and action to stop the trend.

1.2.6 Classifying overweight/obesity

There are various reasons why the graded classification of obesity and overweight is advantageous. It helps identify people and groups who are more likely to experience health problems and pass away. It also makes meaningful comparisons of weight categories between and within various populations possible. Prioritizing treatments at the individual and community levels depends on this data, which is also useful for later evaluations. (WHO Consultation on Obesity (1999: Geneva and Organization, 2000)

1.2.7 Body Mass Index (BMI):

"BMI is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m2)".(*World Health Organization Technical Report Series*, 2000)

$$\text{BMI} = \text{Weight (in kg)} / \text{height (in metres)}^2$$

Table 1.1 The WHO classification of adults based on BMI

Classification	Body Mass Index	Risk of co-morbidities
Underweight	< 18.50	Low(risk of other clinical problems increased)
Normal range	18.50-24.99	Average
Overweight	>=25.0	
Pre obese	25.00-29.00	Increased
Obese class 1	30.00-34.99	Moderate
Obese class 2	35.00-39.99	Severe
Obese class 3	More than 40.00	Very severe

(Source: WHO 2000)

These BMI levels are the same for both sexes and are not affected by aging. The potential risks that come with a rising BMI start with a BMI of more than 25 and are progressive and persistent. The Body Mass Index is a valuable tool for estimating the prevalence and associated risks of overweight and obesity at the population level. It is a basic measure of these conditions. Wide variations in the distribution of fat are not taken into account, and the computed BMI is not associated to the same levels of fatness or related health risk in people and communities.(Home - UNSCN, n.d.). The above WHO BMI cut-off points have been the agreed classification and has been the recommended as the basic benchmark for international comparisons.(Pacific, 2000)

a. Body Mass Index (BMI) for Asian population

The World Health Organization's regional office for the Western Pacific has advised reducing the body mass index (BMI) threshold for Asian individuals. (Thomas and M, 2019). Asian people have lower threshold values for overweight and obesity when compared to Europeans. In Asian populations, the risk of developing diabetes and cardiovascular disorders is observed at lower body mass index (BMI) levels compared to the white population. The higher insulin resistance observed in Asian Indians, although having a slim BMI, can be related to their greater accumulation of visceral adipose tissue. The World Health Organization (WHO) also recommended a reduced threshold for appropriate body mass index (BMI) in Asian Indians, as stated in the WHO report from 2000. Indians exhibit a more concentrated distribution of body fat, characterized by thick skin folds in the trunk area and significantly higher average waist-hip ratios relative to Europids, even when considering the same body mass index (BMI). Moreover, within these individuals, there is a presence of morbidity and mortality even when their body mass indexes (BMIs) and waist circumferences are quite modest.

The obesity related disorders occur at a much lower body mass index (BMI) in ethnic Asian Obesity-related diseases manifest at a significantly lower body mass index (BMI) in ethnic Asian populations compared to ethnic Caucasian populations. Extensive documentation exists about the association between high body fat percentage and increased cardiovascular risks, even at low body mass index levels, particularly among Asian individuals, especially Indians. The reference cited is from Manojan et al. in 2019. For a significant number of Asian communities, the thresholds for taking public health measures have been determined to be a body mass index (BMI) of 23 kg/m^2 or higher, indicating an increased risk, and a BMI of 27.5 kg/m^2 or higher, indicating a high risk. The proposed categories are as follows: those with a body mass index (BMI) less than 18.5 kg/m^2 are classified as underweight;

those with a BMI between 18.5 and 23 kg/m^2 are considered to have a growing but acceptable risk; individuals with a BMI between 23 and 27.5 kg/m^2 are at an elevated risk; and those with a BMI of 27.5 kg/m^2 or more are classified as being at high risk. The consultation highlighted additional potential public health measures (23.0, 27.5, 32.5, and 37.5 kg/m^2) at different places of the BMI scale. It also suggested approaches for countries to determine the thresholds for elevated risk in their populations (WHO Expert Consultation, 2004)(Bell et al., 2002)

Asia specific classification for overweight and obesity: A WHO consultation was established to analyse the findings indicating that Asian populations have a unique association with BMI, fat percentage, and health outcomes. The important observations indicated that Asians encountered heightened vulnerabilities to Type 2 diabetes and cardiovascular ailments at lower body mass indexes (BMIs) compared to the existing World Health Organization threshold for being overweight (>= 25 kg/m^2). Based on the existing data, it was determined that it is not feasible to produce a universally applicable BMI threshold especially for the Asian population. Therefore, no attempts were made to construct unique BMI cut-off points for each community. The consultation also decided to maintain the WHO BMI cut-off values as universal benchmarks for comparison. The year is 2000 in the Pacific.(Pacific, 2000).

Table 1.2 WHO classification of BMI for the Asian population

Classification	**Body Mass Index (BMI)**
Underweight	< 18.5 kg/m^2
Normal weight	18.5 - 22.9 kg/m^2
Overweight	>=23 kg/m^2
Obese	>=25 kg/m^2

(Source-*The Asia Pacific Perspective- Redefining Obesity and Its treatment 2000 Geneva WHO)*

1.2.8 Factors related to overweight/obesity:

a. Age

In developed countries, both men and women see a rise in body weight as they age from 50 to 60 years. Similar situations are prevalent in developing countries; however, the highest rates of overweight occur around the age of 40. A research project in Northern India examines the rate of overweight and obesity among male and females aged 15 to 49 years in rural and urban India, including regional variations, and finds a positive relationship between age and overweight/obesity, as well as a negative relationship with normal and underweight statuses.(Rai et al., 2021)

A study conducted at a Medical College in Vadnagar, Gujarat, discovered that the overall prevalence of obesity was highest among those aged 21 to 24 years (29.64 percent).(Panchal et al., 2019a)

b. Sex

Most of the studies held in India among young adults reveals a significant association between sex and overweight status. The studies done all over the world has shown that number of women who are obese are more when compared to men. But the overweight levels are high among men.(Garg et al., 2010).

A study conducted in Kerala discovered that while males had a higher frequency of overweight than females, females had a higher prevalence of obesity (8%) than males (6%).(1521_pdf.pdf, n.d.). Another study of medical students in Kerala found that while male students had a higher prevalence of overweight/obesity based on BMI, females had a higher prevalence of abdominal obesity based on waist circumference. (Thomas and M, 2019)

c. Marital status

In India, married people are more likely to be overweight or obese. Based on a large-scale survey in India, a higher number of married respondents who are above 30 years found to be overweight and obese compared with the respondents who were single.(*Statista*, n.d.). A study of overweight and obesity among women who reside in an urban area in north India found that the level of obesity was considerably higher in married women, suggesting that married status increases the likelihood of obesity.(Girdhar et al., 2016)

d. Religion

An Indian study on the prevalence of overweight/obesity found that all Sikh sub-populations and Muslim women were more likely to be overweight or obese than the general population, highlighting the significance of cultural factors. (Siddiqui and Donato, 2016). Sikh women in India are 1.57 times more likely to be overweight/obese than Hindu women, according to a 2005 study. (Dalton et al., 2003)

e. Socio economic class

The influence of economic position on overweight/obesity has become a significant factor, especially in developing countries. (Dutta et al., 2019). There is a positive association between the level of education and wealth index and the occurrence of overweight or obesity. A study conducted using seven national datasets evaluated the association between education and wealth in relation to obesity among women in countries with middle incomes. The study concluded that both education and wealth were independently and positively associated with obesity. (Aitsi-Selmi et al., 2014).A study conducted in rural and peri-urban areas of Birbhum district, West Bengal found that males with a high income and

women with a low level of education were more likely to be at risk of obesity. (Majumdar and Gorain, 2024).

f. Type of institution

One of the research projects in Guntur, Andhra Pradesh, discovered that compared to students enrolled in public schools, those attending private schools were far more likely to be overweight or obese. (Gujjarlapudi et al., 2017). In another study it was observed that the occurrence of overweight and obesity was higher among private school students compared to public and government school students.(Varghese et al., 2019).

g. Physical activity

An important and crucial component in preventing overweight or obesity is physical activity. Keeping track of how many calories someone consume in relation to how many calories burns or uses is helpful. More calories are expended during intensive exercise, which can either aid sustain weight reduction or prevent weight gain. (Avenue et al., 2012) Physical activity and body fat were found to be inversely associated in an Indian population research. (Bowen et al., 2015). An additional study conducted in Kolkata among undergraduate medical students reveals a significant association between physical activity and overweight.(Chakraborty et al., 2017).

h. Sedentary lifestyle

A sedentary lifestyle is defined as a substantial decrease in physical activity and the most of one's waking hours being spent in a seated, reclined, or lying down position. The concept of leading a sedentary lifestyle or sedentary behaviour refers to any activity performed while awake, such as leaning or sitting, that involves an energy expenditure of 1.5 metabolic equivalent tasks (MET) or less. (Park et al., 2020). Sedentary activities encompass activities such as reading, engaging in phone conversations, playing computer

video games, using mobile phones for prolonged durations, and listening to music. (Thomas and M, 2019). The study conducted among college students in Gujarat revealed a notable increase in the occurrence of obesity and overweight among those who spent more than two hours daily with a computer or television. Moreover, there is a significant association between the excessive usage of mobile phones and the occurrence of overweight. Research has observed an association between individuals who lead unhealthy lifestyles, characterized by the consumption of fast food and fried snacks, and a higher likelihood of obesity. (Manojan et al., 2019). Students who had a positive family history of obesity, led a sedentary lifestyle, consumed a significant amount of junk food, and followed a high-calorie diet were at a much higher risk of being overweight or obese.(Panchal et al., 2019a).

i. Sleep

Nowadays, more and more adults are getting frustrated about their sleep and restricting back on the quality of sleep they get. Numerous epidemiological research and experimental studies have established a connection between obesity risk and insufficient sleep duration. Significant public health concerns would be raised by the possibility of a causal relationship between sleep disturbances and obesity, given the increasing incidence of chronic sleep loss.(Beccuti and Pannain, 2011).

j. Behavioural measurements

The most important risk factors, together with a family history of the disease and smoking, were far more prevalent among male participants.(Yin et al., 2021). Researchers in Ireland looked at adults to see whether there was an association between obesity and alcohol use. The study confirmed the association between alcohol use and obesity even after accounting for potential confounds.(AlKalbani and Murrin, 2023).

k. Dietary patterns

Overweight and obesity are conditions that are largely caused and controlled by dietary choices. In diets, they refer to the different foods, their amounts, proportions, and combinations of nutrients, as well as how often they are utilized. The normal diet of carbohydrates has given way to high-calorie fast food, which is especially bad for young adults eating habits. (Thomas and M, 2019). Consuming fast food may raise one's risk of obesity and diseases associated with it, which is a serious public health concern.(Mohammadbeigi et al., 2018). It has been noted that people who have unhealthy lifestyles, which include consuming fast food and fried snacks, are more likely to be obese. (Manojan et al., 2019). With a family history that was supportive of obesity, a sedentary lifestyle, high junk food consumption, and a high-calorie diet, students were much more likely to be overweight or obese. (Panchal et al., 2019b)

1.3 Rationale for the study

Baker's theory states that an individual's predisposition to become obese or overweight begins during foetal development. The crucial ages of late adolescence and early adulthood are when a person is most likely to become overweight if they are unaware of how important it is to maintain an ideal weight for their height. They are more susceptible to overweight and obesity as a result of their shift from childhood to young adulthood from independent living, which is brought on by a sedentary lifestyle, a high wealth index, a lack of physical activity, elevated stress levels, and altered eating habits. Focusing on young adults in the 18–24 age range identifies a crucial group for comprehending the early beginnings of obesity and overweight. If a person is overweight in their young adult or teenage years, their chances of becoming obesity are higher than those of a person who is of normal weight during those same years. Kerala is the state in India with the second-highest rate of overweight and obesity among

women. There has been a sharp rise in overweight and obesity in India, according to the National Family Health Surveys III, IV and V. Should this trend continue? Millions of people are susceptible to preventable illness and death. Thus, given the current state of affairs, obesity and overweight, especially in the youth, demand immediate attention as a public health concern. Since there isn't much information on this subject available in the Indian context, this study is being put forward with an objective to understand the pattern and determinants of overweight/obesity among college going young adults.

1.4 Objectives of the study

a. MAJOR OBJECTIVES

- To assess the prevalence of overweight/obesity among young adults studying in colleges of Thiruvananthapuram district, Kerala.

b. MINOR OBJECTIVES

- To study the factors associated with overweight/obesity among young adults studying in colleges of Thiruvananthapuram district, Kerala.

CHAPTER 2

METHODOLOGY

2.1 Study design:

The study is a Cross-sectional survey of college-going young adults in Thiruvananthapuram District.

2.2 Study setting:

The current research was conducted at Thiruvananthapuram district.

2.3 Sample frame:

College students in the age group 18-24 years from all genders and of all professional and arts colleges (government, private- aided and unaided) except special colleges for disabled students in Thiruvananthapuram district. Data regarding all the colleges were obtained from all Kerala higher education survey report. Among 155 total colleges in the district, eight colleges were included in the study.

2.4 Sample size:

Sample size was calculated using the formula $n = 3.84pq/d^2$

n= sample size (the proposed number of participants)

p = prevalence, q=1-p and d the desired precision.

According to NFHS-5 (National Family Health Survey, 2019-21 data), taking the highest prevalence of overweight and obesity of 24 percent, precision of 5 percent over 95 percent confidence interval with a design effect of 1.3, sample size was calculated as 365. Expecting the possible non-response cases, the sample size was rounded of to 400.

2.5 Sample Selection:

The sample was selected using a multi-stage cluster sampling procedure. The Trivandrum district had a grand number of 155 colleges. A distinct list was created for both government and private institutions, and four colleges were chosen at random from each category. Data was obtained from a total of 400 students from these eight selected colleges. Students were chosen from each college departments based on their availability during free class periods. A total of 50 students were randomly picked from each college from their department registers. Upon obtaining authorization from the principle, a mutually agreeable time period was scheduled for data collection in collaboration with the college union members and the individual department heads. The majority of surveys were conducted during the lunch break. During the data collecting process, the Principal Investigator (PI) delivered a concise overview of the study to the participants. The participants were given information sheets that offered details about the investigation, and written consent was obtained from them. The information sheets were available in both English and Malayalam languages. The Principal Investigator addressed any questions or inquiries from the participants during the data collection process.

Figure 2.1 Sample selection procedure

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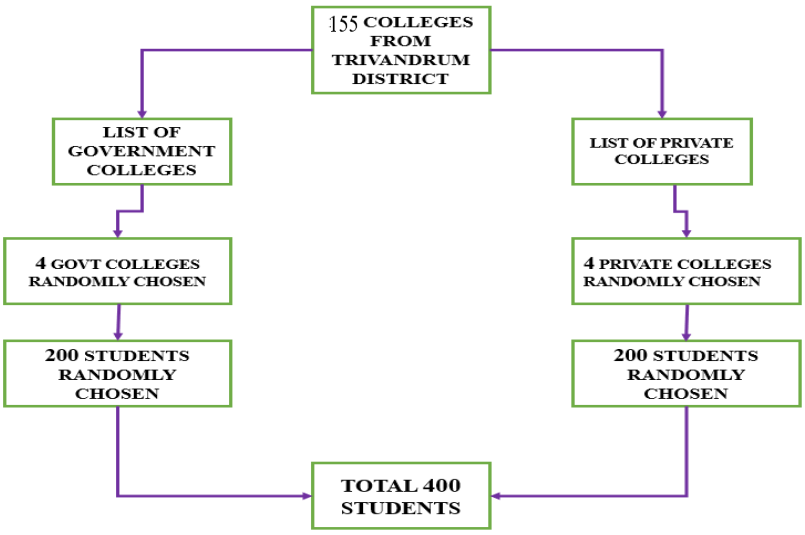


2.6 Study Participation:

2.6.1 Inclusion criteria:

- College students from all genders aged 18 – 24 years studying in the selected colleges and present on the date of data collection.

2.6.2 Exclusion criteria:

- Students who were physically challenged.
- Students who were suffering from any acute illness.
- Pregnant women.

2.7 Data Collection Techniques:

Pretested self-administered questionnaires were distributed among the students. The principal investigator itself had cleared all the queries or doubts raised by the participants regarding the questionnaire.

ODK links were provided for the students for filling the questionnaire. Printed copies of the questionnaire were provided in colleges where smart phones are restricted. For convenience of the participants, ODK barcode were also shared with the respondents in the colleges where mobile usage was not restricted. Information related with socio-demographic details, physical activity (measured using GPAQ questionnaire), dietary patterns (few questions were adopted from STEPS and IDSP-NCD survey questionnaire), behavioural measurements (STEPS questionnaire) were recorded.

The principal investigator measured each student's height and weight at the same time. Using a common three-piece anthropometric rod that was adjusted up to one millimetre in the classroom, the height of every student was measured. After instructing students to stand straight up against a wall with their heels contacting the wall and their chin held

horizontally to align their eyes and tragus in a straight line, then the rod was adjusted and the height in centimetres was measured. Student's weight was recorded on bathroom scales calibrated by the Legal Metrology department and corrected with a lever balance up to 0.5 kg, and calibrated daily to ensure zero error. While the measurement was being taken, students were instructed to stand straight, barefoot, on the weighing machine. It took an average of fifteen to twenty minutes for each participant to complete the survey.

2.8 Data Storage:

Along with the data collection, the data was entered in the Windows Excel and then imported to R version 4.3.1 for analysis purpose. The hard copies of the interview schedule were stored in a locked chamber under the vigilance of the principal investigator. The privacy and the confidentiality were strictly maintained.

2.9 Data Analysis and Statistical Methods

The data was entered into Microsoft Excel on a Windows operating system. Subsequently, it was imported into R version 4.3.1 for analysis. The baseline data were analysed using descriptive statistical methods to determine the mean age, religion, education, and occupation of the head of the family, besides other factors. The independent variables were analysed for association with the dependent variable using cross tabulation followed by Chi square test. Strength of association was analysed using Binary logistic regression. A multivariate analysis was conducted to account for any interaction and confounding factors in order to create a final best model. An association was deemed statistically significant if the computed p-value was below 0.05. Only the results having a strong association and a significant or nearly significant p-value in the bivariate analysis were included for the final modelling.

2.10 Introducing the variables in the study:

a. Dependent variable:

Overweight {Body Mass Index (BMI) greater than or equal to 25 kg/m^2} and obesity {Body Mass Index (BMI) greater than or equal to 30 kg/m^2}

Definition of the dependent variable:

Body Mass Index (BMI): The World Health Organization (WHO) defines overweight as a BMI ≥ 25 kg/m^2 and obesity as a BMI ≥ 30 kg/m^2.(Haam et al., 2023)

b. Independent variables:

Demographic variables:

Age group, sex, religion, type of institution, marital status.

Socioeconomic variables:

Education and occupation of the respondent's head of the family, Socio economic status.

Physical activity variables:

The physical activity was captured in three domains namely activity at work, travel to and from places and recreational activities. The activities were classified into vigorous and moderate activities.

Diet variables:

The number of consumption of items like vegetables, fruits, meat, fast food, restaurant food, processed food, fried local food, red meat, chicken, egg, fish, aerated soda or sugar, sweetened drinks, pizza or burgers or French fries, cakes, pastries or other bakery items, samosa, chips and meat were asked.

2.11 Operationalising variables

a. Age

Age was recorded in completed years of life and rounded to the nearest year. The young adult age is taken from the range 18-24 years. According to age group the study participant were grouped into two groups as 18-20 years and 21-24 years to see the prevalence with increase in age.

b. Religion

Previous research has established an association between religion and being overweight. (Bharmal et al., 2018). The participants were required to choose among four religions: Hinduism, Islam, Christianity, and other self-reported religions.

c. Marital Status:

The marital status was asked to find out the association with overweight since it is found as factor associated in the studies done previously.(Rai et al., 2021). It was categorized currently as single (unmarried, widowed, divorced) and married for further analysis.

d. Socio economic class

Previous research has indicated that in low-income nations such as India, higher socioeconomic categories tend to have greater rates of overweight and obesity. The study was published in BMJ Open. Based on the scores obtained, the respondents were classified into different socio-economic status categories, including upper class, middle class, lower middle class, upper lower class, and lower class, according to the Kuppuswamy socio-economic status scale 2023.

e. Type of institution

Equal number of participants were randomly selected from the Government and private colleges of Trivandrum district.

f. Physical Activity:

The study considered the physical activity associated with work, transportation, and leisure. The participants were classified into four categories: those who engage in vigorous-intensity activities for 90 minutes or more per week, those who engage in moderate-intensity activities for 150 minutes or more per week, those who engage in both types of activities, and those who do not engage in any leisure-time activities. Regarding sedentary behaviour, participants were classified into two groups: those who spend more than two hours in a seated or reclined position, and those who spend less than two hours in a seated or reclined position every day. Another classification of the participants was based on their usage of smart phones, specifically those who use them for more than one hour and less than one hour every day. The participants were categorized based on their sleep duration, with sleeping fewer than seven hours and sleeping more than seven hours.

g. Diet:

The studies done in India have revealed that diet pattern is significantly associated with overweight and obesity.(Satija et al., 2015). Hence the variable was included. The diet pattern, fruits, vegetables, meat consumption pattern and consumption of other food items were asked. The number of servings of the food items were recorded in weeks.

h. Behavioural measurements:

The variables tobacco use and alcohol use were included.

i. Others:

Questions on height and weight were asked and taken using standard three-piece anthropometric rod and standard weighing machine.

2.12 Ethical considerations:

Ethical clearance was obtained from the Institute Ethical Committee (IEC), Sree Chitra Tirunal Institute for Science and Technology, Trivandrum, Kerala prior to data collection. Informed consent was collected from the willing participants in the IEC approved informed consent form. (Annexure V)

The respondents were allowed to accept or refuse to participate, and withdraw participation at any time during the study without any explanation or consequence. Respondents were informed regarding the voluntary nature of the participation, study objectives, and the potential benefits and risks of the participation. Utmost priority was given to protect the privacy and confidentiality of the respondents. At no stage identity of the participant was revealed and for this purpose.

CHAPTER 3

RESULTS

This chapter describes about the outcomes of the data analysis in accordance with the objectives. The data was analysed through R version 4.3.1 after data cleaning. At first, the baseline characteristics of the sample population was identified, followed by the prevalence of overweight or obesity. Subsequently, the associations of various independent variables with the dependent variable (overweight and obesity) were examined one by one. Finally, a regression equation was fitted to identify the predictors of overweight/obesity. The findings are presented in a structured format detailing about the sample characteristics, outcomes of the bivariate analysis and outcomes of the multivariate analysis.

3.1. Sample Characteristics:

In this part, the study sample is described in great depth. Thus, delineating various aspects including socio-economic and demographic factors, dietary patterns, physical activity, behavioural measurements and anthropometric measurements of the respondents.

3.1.1. Baseline Characters of the Sample Population:

Total number of participants were 400. However, the data entered through ODK tool by 35 students had to be deleted since it could not retrieve. Thus, the data was taken from a total of 365 students. The mean age of the sample population is 20.69±1.633years. 45.47 percent of the population belonged to 18-20 years of age group and the remaining 54.53 belonged to 21-24 years of age. In the total sample, 39.45 percent were males and 60.54 percent were females. The mean age for male was 20.79 and female was 20.62. Among them, 69.58 percent of the respondents belongs to the Hindu religion, 20.27 percent were Christians, 8.49 percent were Muslims and the remaining were from other religion. Almost all the

respondents were single 97.26 percent and the remaining 2.73 percent were married. The sample population was selected from private and government colleges with equal weightage.

Table 3.1 Demographic characteristics of the sample population

Variable	Number (%)
Age group	
18-20 years	166 (45.47)
21-24 years	199 (54.52)
Sex	
Male	144 (39.45)
Female	221 (60.54)
Religion	
Hindu	254 (69.58)
Christian	74 (20.27)
Muslim	31 (8.49)
Others	6 (1.64)
Marital status	
Single	355 (97.26)
Married	10 (2.73)
Type of college	
Private	183 (50.1)
Government	182 (49.9)

3.1.2 Socio-economic characteristics

The socio-economic characteristics were based on modified Kuppuswamy socioeconomic status scale for the year 2023. It's the most widely used scale in India among all the SES. The families were categorized into five classes, from upper to lower class according to the total score obtained by the Kuppuswamy scale which ranges from 3-29. The total score of a family depends upon the monthly income of the family, occupation of the head of the family and education of the head of the family.

There were 5.47 percent of the respondents who's family income was greater than or equal to 249044 rupees per month, 4.38 percent who had family income between the range of 124489-249043 rupees per month, 11.78 percent had family income between the range of 93381-124488 rupees per month, 10.41 percent who had family income between the range of 62273-93380 rupees per month, 18.35 percent had family income between the range 37325-62272 rupees per month, 26.30 percent had family income between the range 12445-37324 rupees per month and 23.28 percent had family income less than or equal to 12444 rupees per month. About 9.86 percent of respondents whose occupation of the head of the family comes under Legislators, Senior Officers & Managers, 15.34 percent of respondents whose occupation of the head of the family was professionals, 9.31 percent of respondents whose occupation of the head of the family comes under technicians and associate professionals, 6.02 percent occupation comes under clerks, 18.63 percent of respondents whose occupation of the head of the family comes under the category of skilled workers and shop and market sales workers, 7.12 percent occupation comes under Skilled Agricultural & Fishery Workers, 2.46 percent of respondents whose occupation of the head of the family comes under the category of craft and related trade works, 2.19 percent comes under the category plant and mine operators.

Majority of the respondents whose occupation of the head of the family came under the category of elementary occupation that is 21.91 percent and 7.12 percent of respondents head of the family were unemployed. Among the participants, 7.39 percent of respondents head of the family were having professional degree or honours, 34.24 percent of respondents head of the family were graduates, 14.52 percent had intermediate or diploma, 36.16 percent of respondents head of the families educational qualification was high school certificate and that was majority, 4.93 percent had middle school certificate, 2.19 percent had primary school certificate and 0.54 percent of the respondents head of the family were illiterate.

Table 3.2 Socio-economic characteristics of the sample population

Variables	**Number (%)**
Monthly income of the family	
≥249044	20 (5.47)
124489-249043	16 (4.38)
93381-124488	43 (11.78)
62273-93380	38 (10.41)
37325-62272	67 (18.35)
12445-37324	96 (26.30)
≤12444	85 (23.28)
Occupation of the head of the family	
Legislators, Senior Officers & Managers	36 (9.86)
Professionals	56 (15.34)
Technicians & Associate Professionals	34 (9.31)
Clerks	22 (6.02)

Skilled Workers and Shop & Market Sales Workers	68 (18.63)
Skilled Agricultural & Fishery Workers	26 (7.12)
Craft & Related Trade Workers	9 (2.46)
Plant & Machine Operators and Assemblers	8 (2.19)
Elementary Occupation	80 (21.91)
Unemployed	26 (7.12)
Education of the Head	
Profession or Honours	27 (7.39)
Graduate	125 (34.24)
Intermediate or Diploma	53 (14.52)
High School Certificate	132 (36.16)
Middle School Certificate	18 (4.93)
Primary School Certificate	8 (2.19)
Illiterate	2 (0.54)

Table 3.3 Kuppuswamy socio-economic status scale 2023

Score	**Socio-economic class**	**Number (%)**
26-29	Upper (1)	22 (6.02%)
16-25	Upper middle (11)	123 (33.69%)
11-15	Lower middle (111)	96 (26.30%)
5-10	Upper lower (1V)	124 (33.97%)
<5	Lower (V)	0

According to Kuppuswamy socio-economic status scale 2023 as per the scores, 6.02 percent of the respondents belongs to upper class, 33.69 percent of the respondents belongs to upper middle class, 26.30 percent of the respondents belongs to lower middle, 33.97 percent belongs to upper lower class and no respondent belongs to lower class.

3.2. Physical activity of the study population

Among the study population, 10.95 percent does vigorous-intensity activities, 9.58 percent does moderate-intensity activities and 6.02 percent does both the activities during their leisure time. About 55.89 percent of them use bicycle or walking while travelling from place to place. About the sedentary behaviour, 83.28 percent of the respondents usually spend time sitting or reclining for more than two hours a day. Almost all respondents spend more than one hour with smartphones (90.95%). About sleep, 80.54 percent of the respondents had less than seven hours of sleep for the past one month. The remaining 19.45 percent only had a sleep for more than seven hours.

Adults should get at least 600 MET-minutes of exercise each week, which is defined as 150 minutes of moderate-intensity physical activity, 75 minutes of vigorous-intensity physical activity, or a mix of the two. This recommendation comes from the World Health Organization (WHO).

Based on the STEPS questionnaire, the information was collected on three domains, “the vigorous-intensity physical activity and moderate-intensity physical activity during work (college hours), during transport and leisure time throughout a week”. (q-by-q-steps-instrument-v3-2.pdf, n.d.). Thus, the physical activity was categorized into four for doing the calculations.

Table 3.4 Physical activity

Variables	**Number (%)**
Physical activity	
Vigorous intensity (>75 mins/week)	76 (20.82)
Moderate intensity (>150 mins/week)	58 (15.89)
Vigorous activity + moderate activity	42 (11.50)
No activity	189 (51.78)
Hours spend on sitting per day	
More than 2 hours	304 (83.28)
Less than 2 hours	61 (16.71)
Smartphone use	
More than 1 hour	332 (90.95)
Less than 1 hour	25 (6.84)
Bicycle use	
Don't use	161 (44.1)
Use bicycle	204 (55.89)
Sleep hours	
Less than 7 hours	294 (80.54)
More than 7 hours	71 (19.45)

Table 3.5 Mean sedentary time per day

TYPE OF ACTIVITY	MEAN±SD	MINIMUM	MAXIMUM
Hours spend on sitting (sedentary activity)	3.48±2.77 hours per day	30 minutes	11 hours

3.3. Details of the dietary activities:

About 96.16 percent of the respondents were non vegetarians, only 3.83 percent prefer vegetarian diet. Nearly 88.76 percent of the population consumes fruits less than ten servings per week while 10.68 percent of the population consumes fruits more than ten servings. Surprisingly there were no respondents who consumes fruits at least 35 servings per week as recommended by WHO. There were only 6.02 percent of the population who consumed vegetables for at least 35 servings per week. Respondents who consumed meat (excluding fish) for more than five servings per week were 34.79 percent and who consumed meat for less than five servings were 65.2 percent.

Nearly 40 percent of the population had the habit of having food from small hotels and restaurants. About 36.15 percent of the respondents have fast food at least once or twice in a week. Those respondents who have food from the restaurants at least once or twice in a week are 34.79 percent. Majority of the population had fried local foods and packaged salty snacks and bakery items. About 55.61 percent of the respondents had packaged salty snacks and bakery items at least once or twice in a week. Nearly 50 percent of the population had fried local foods at least once in a week. There was only about 23.28 percent of the respondents who had red meat at least once in a week. More than 70 percent of the population consumes red meat only occasionally. More than 70 percent of the population consumes eggs once or twice per week. About 67.66 percent consumes chicken at least once in a week. About 43.56 percent consumes fish daily. Nearly 50 percent of the respondents consumes aerated soda or sugar for at least once in a week. The case is similar with the sweetened drinks also. Nearly 50 percent consumes it at least once a week. More than 30 percent of the participants consumes cakes, pastries, other bakery items like samosa, chips at least once per week. About 24.65 percent of population consumes pizza, burgers or French fries occasionally or once in a month.

Table 3.6 Diet pattern among the study population:

Variables	**Number (%)**
Diet preference	
Non-vegetarian	351 (96.16)
Vegetarian	14 (3.83)
Fruit consumption	
<10 servings/week	324 (88.76)
>=10 servings/week	39 (10.68)
Vegetable consumption	
<35servings/week	343 (93.97)
>= 35 servings/week	22 (6.02)
Meat consumption	
>=5 servings/week	127 (34.79)
<5 servings/week	238 (65.2)
Fast food consumption	
More than three times in a week	37 (10.13)
Once or twice in a week	95 (26.02)
Occasionally	233 (63.83)
Restaurant food consumption	
More than three	36 (9.86)
Once or twice in a week	91 (24.93)
Occasionally	238 (65.2)

Packaged salty snacks, bakery items	
More than three	104 (28.49)
Once or twice in a week	99 (27.12)
Occasionally	162 (44.38)
Fried local foods	
Daily	35 (9.58)
At least once in a week	144 (39.45)
Once a month	26 (7.12)
Occasionally or rarely	139 (38.08)
Never	21 (5.75)
Red meat consumption	
At least once in a week	85 (23.28)
Once a month	70 (19.17)
Occasionally or rarely	129 (35.34)
Never	79 (21.64)
Egg consumption	
Daily	57 (15.61)
At least once in a week	224 (61.36)
Once a month	21 (5.75)
Occasionally or rarely	51 (13.97)
Never	10 (2.73)
Chicken consumption	
Daily	13 (3.56)
At least once in a week	234 (64.1)

Once a month	57 (15.61)
Occasionally or rarely	46 (12.6)
Never	14 (3.83)
Fish consumption	
Daily	159 (43.56)
At least once in a week	134 (36.71)
Occasionally or rarely	48 (13.15)
Never	23 (6.3)
Aerated Soda or sugar	
Daily	70 (19.17)
At least once in a week	114 (31.23)
Once a month	41 (11.23)
Occasionally or rarely	107 (29.31)
Never	32 (8.76)
Sweetened drinks	
Daily	46 (12.6)
At least once in a week	132 (36.16)
Once a month	47 (12.87)
Occasionally or rarely	119 (36.6)
Never	19 (5.2)
Pizza or burgers or French fries	
At least once in a week	26 (7.12)
Once a month	64 (17.53)
Occasionally or rarely	197 (53.97)

Never	78 (21.36)
Cakes, Pastries or other bakery items	
Daily	14 (3.83)
At least once in a week	107 (29.31)
Once a month	68 (18.63)
Occasionally or rarely	161 (44.1)
Never	14 (3.83)
Samosa, Chips etc	
Daily	32 (8.76)
At least once in a week	155 (42.46)
Once a month	53 (14.52)
Occasionally or rarely	112 (30.68)
Never	9 (2.46)

3.4. Behavioural measurements of the study population

Among the study population, only 4.11 percent of the total respondents are having tobacco use presently. About 10.68 percent had used tobacco during the past. The respondents who consume alcohol presently are 38.08 percent and those who had consumed alcohol within the past twelve months are 27.67 percent.

Table 3.7 Anthropometric measurements

Variable	**Mean ± SD**
Height (in cm)	162.63 ± 9.253
Weight (in kg)	59.54 ± 13.616

3.5 Prevalence of overweight/obesity:

According to WHO classification, the prevalence of overweight (BMI>= 25 kg/m^2) was found to be 24.65 percent (95% CI:20.23% to 29.07%). Among them, obesity (BMI>=30 kg/m^2) level is 2.46 percent (95% CI:1.2% to 4.79%). Prevalence of overweight/obesity was significantly more among males (30.55%) than in females (22.25%). While splitting, the prevalence of pre-obesity (BMI = 25.0–29.9 kg/m^2) was found to be 22.19 percent and obesity (BMI>=30 kg/m^2) 2.46 percent. The prevalence of pre-obesity among males was 28.47 percent and obesity were 2.08 percent. Among females, the prevalence of pre-obesity and obesity was found to be 18.09 percent and 2.71 percent. Obesity among females were slightly more than that of males.

Table 3.8 Descriptive Statistics of BMI for the study sample

Variable	Mean ± SD	Median (IQR)	Minimum	Maximum
BMI (Weight in kg/height in m^2)	22.35 ± 3.94	22 (5.3)	12.6	37.9

Table 3.9 Distribution of the sample by Body Mass Index (BMI category)

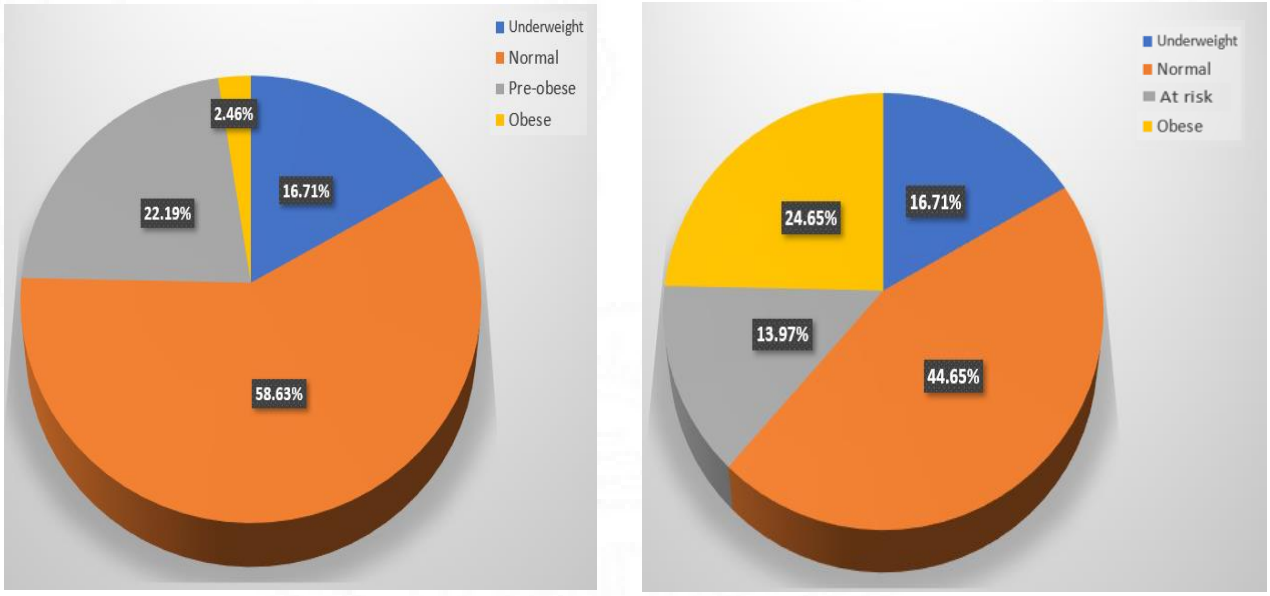
BMI	Number (%)	Females (%)	Males (%)
Underweight (<18.5 kg/m^2)	61 (16.71)	45 (20.36)	16 (11.11)
Normal (18.5-24.9 kg/m^2)	214 (58.63)	130 (58.82)	84 (58.33)
Overweight (>=25 kg/$m^{2)}$	90 (24.65)	46 (20.8)	44 (30.55)
Pre-obese (25-29.9 kg/m^2)	81 (22.19)	40 (18.09)	41 (28.47)
Obese (>=30 kg/m^2)	9 (2.46)	6 (2.71)	3 (2.08)

According to the Western Pacific regional office of the World Health Organization (WHO) has recommended lower BMI cut off values for Asian people.(Thomas and M, 2019). In Asians, the cut-offs for overweight are greater than or equal to 23.0 kg/m^2 and obesity greater than or equal to 25.0 kg/m^2.

Table 3.10 Proposed classification of weight by BMI in adult Asians

BMI	Number (%)	Females (%)	Males (%)
Underweight (<18.5 kg/m^2)	61 (16.71)	45 (20.36)	16 (11.11)
Normal (18.5-22.9 kg/m^2)	163 (44.65)	106 (47.96)	57 (39.58)
Overweight (>=23 kg/m^2)	141 (38.62)	70 (31.65)	71 (49.3)
At risk (23-24.9 kg/m^2)	51 (13.97)	24 (10.85)	27 (18.75)
Obesity (>=25 kg/m^2)	90 (24.65)	46 (20.8)	44 (30.55)

Figure 3.1



As per international BMI classification **As per Asian BMI classification**

Figure 3.1 Distribution of BMI according to international classification and classification for Asian population

Figure 3.1 shows the classification of participants according to international BMI cut-off values and cut-offs of BMI for Asian population according to the Western pacific regional office (WHO). Only 2.46 percent of respondents comes under obese category as per international cut-off, whereas 24.65 percent are obese as per cut-offs of BMI for Asian population.

Table 3.11 Distribution of the sample with BMI and age group

BMI category	Age group		Total (%)
	18-20 years N (%)	21-24 years N (%)	
Underweight	35 (21.08)	26 (13.06)	61 (16.71)
Normal	100 (60.24)	114 (57.28)	214(58.63)
Pre-obese	27 (16.26)	54 (27.13)	81 (22.19)
Obese	4 (2.40)	5 (2.51)	9 (2.46)
Total	166	199	365

The prevalence of overweight and obesity was more among the respondents of the age category 21-24 years. The overall prevalence of overweight or obesity was 29.64 percent among the age group 21-24 years and 18.66 percent among the age group 18-20 years.

3.6 Bivariate analysis- for overweight/obesity

Bivariate analysis has been done to find the association between the independent variables and the dependent variable overweight and obesity. Bivariate analysis for each variable estimating the unadjusted odds ratio with 95 percent confidence interval and p value were noted. Those independent variables with p value less than 0.05 were found to be significant and with strong association were considered for the multivariate analysis.

Table 3.12 Bivariate analysis of overweight or obesity with the Socio-economic and demographic factors

Variables		Overweight (%)	Unadjusted OR (95 % C.I)	p value
Sex	Female	20.81	1	**0.03**
	Male	30.55	1.67 (1.03-2.7)	
Age group	18-20	18.67	1	**0.01**
	21-24	29.64	1.84 (1.12-3.01)	
Marital status	Single	23.94	1	0.14
	Married	50	0.31 (0.08-1.11)	
Religion	Hindu	21.65	1	0.06
	Others	31.53	0.6 (0.36-0.98)	
Socio economic class	Upper middle	24.82	1	
	Lower middle	27.08	0.88 (0.46-1.59)	0.69
	Upper lower	22.58	1.13 (0.64-1.99)	0.66
Type of institution	Government	19.78	1	**0.03**
	Private	29.5	1.69 (1.04-2.75)	

Among the socioeconomic and demographic variables considered, sex, age group and type of institution were found to be significantly associated with overweight and obesity status with a p value less than 0.05. Results from the binary logistic regression reveals that male (OR=1.67, 95% C.I:1.03-2.7) had an increased odds of being overweight than females, students of higher age group (OR=1.84, 95% C.I:1.12-3.01) have nearly two times odds of developing overweight than the lower age group. Students studying in private colleges (OR=1.69, 95% C.I:1.04-2.75) have a higher odd of having overweight than the students from government institutions.

Table 3.13 Association between BMI Categories and Health risk behaviours of the respondents

Variables		Overweight/obesity (%)	Unadjusted OR (95% C.I)	p value
Physical activity	No activity	25.09	1	
	Vigorous intensity (>75 mins/week)	30	0.78 (0.37-1.62)	0.51
	Moderate intensity (>150 mins/week)	22.85	1.13 (0.48-2.61)	0.93
	Vigorous moderate	22.72	1.13 (0.40-3.21)	0.99
Hours spend on Sitting	Less than 2 hours	19.67	1	0.32
	More than or equal to 2 hours	25.62	1.40 (0.71-2.78)	
Bicycle use	Yes	22.05	1	0.24
	No	27.95	1.37 (0.85-2.21)	
Smartphone use	Less than one hour	8	1	**0.04**
	More than one hour	25.9	4.02 (1.07-25.69)	
Sleep hours	Less than 7 hours	25.85	1	0.35
	More than 7 hours	19.71	1.41 (0.74-2.69)	
Tobacco use	Yes	23.42	1	**0.02**
	No	53.33	3.73 (1.31-10.61)	
Alcohol use	Yes	24.24	1	0.87
	No	25.74	1.08 (0.63-1.83)	

Among the health risk behaviours considered, tobacco use and smartphone use had found to be significantly associated with overweight/obesity with a p value less than 0.05. Students who spend more time on smartphones and those who use tobacco presently had an increased odds of developing overweight/obesity.

Table 3.14 Association between BMI Categories and dietary behaviours of the respondents

Variables		Overweight/obesity (%)	Unadjusted OR (95% C.I)	p value
Diet preference	Vegetarian	7.14	1	0.21
	Non vegetarian	25.35	4.41 (0.56-34.23)	
Fruit consumption	<10 servings per week	24.07	1	0.47
	>=10 servings per week	30.76	0.71 (0.34-1.47)	
Vegetable consumption	<14 servings/week	27.21	1	0.38
	>=14 servings/week	22.7	1.27 (0.78-2.05)	
Meat consumption	Less than 5 servings	22.68	1	0.28
	More than or equal to 5 servings	28.34	1.34 (0.82-2.20)	
Fast food consumption	Occasionally	21.88	1	0.13
	Once or twice in a week	29.54	1.49 (0.92-2.43)	
Restaurant food consumption	Occasionally	20.58	1	**0.01**
	Once or twice in a week	32.28	1.83 (1.13-2.99)	
Processed food consumption	Occasionally	22.83	1	0.55
	Once or twice in a week	26.10	1.19 (0.73-1.93)	
Fried local food consumption	Occasionally or rarely	23.11	1	0.56
	At least once in a week	26.25	1.18 (0.73-1.90)	
Red meat consumption	Occasionally or rarely	22.59	1	0.07
	At least once in a week	32.94	1.68 (0.98-2.87)	

Egg consumption	Occasionally or rarely	26.82	1	0.73
	At least once in a week	24.19	0.87 (0.49-1.52)	
Chicken consumption	Occasionally or rarely	21.36	1	0.37
	At least once in a week	26.31	1.31 (0.77-2.22)	
Fish consumption	Occasionally or rarely	22.53	1	0.74
	At least once in a week	25.25	1.16 (0.62-2.15)	
Aerated Soda or sugar	Occasionally or rarely	18.75	1	**0.01**
	At least once in a week	30.97	1.94 (1.91-3.17)	
Sweetened drinks	Occasionally or rarely	23.24	1	0.56
	At least once in a week	26.40	1.18 (0.73-1.90)	
Pizza or burgers or French fries	Occasionally or rarely	24.48	1	0.96
	At least once in a week	26.92	1.13 (0.46-2.79)	
Cakes, Pastries or other bakery items	Occasionally or rarely	23.45	1	0.42
	At least once in a week	27.27	1.22 (0.74-2.01)	
Samosa, Chips etc	Occasionally or rarely	23.56	1	0.64
	At least once in a week	26.20	1.15 (0.71-1.85)	

Among the health dietary behaviours considered, restaurant food consumption and aerated soda or sugar consumption had found to be significantly associated with overweight and obesity status with a p value less than 0.05. Study showed increased odds of developing overweight/obesity among the students who consumed large amounts of carbonated soft drinks and ate out from restaurants frequently.

3.7 Multivariate analysis

Multiple logistic regression was conducted to estimate the predictors associated with overweight or obesity, as outlined in the table 3.15. This analysis aims to understand how changes in one independent variable impact the variations in the dependant variable while adjusting for other independent variables in the model. Essentially, exploring the individual and combined importance of these independent variables in explaining the variation observed in the dependent variable. The net effect of different independent variables is expressed in terms of Odds ratio (OR).

The analysis was done by R version 4.3.1. The independent variables that showed high strength of association and significant p value in bivariate analysis were considered for the multivariate analysis.

Thus, the following variables were remained to be significantly associated with overweight/obesity.

- **Type of Institution**: Those students who studies at private institutions have 1.71 times higher odds of being overweight compared to students from government colleges with p value of 0.03 suggesting a significant association.
- **Tobacco use**: Students who use tobacco have 3.56 times higher odds of developing overweight/obesity when compared to students who are non-smokers. A p value of 0.02 shows a significant association with the outcome variable.
- **Restaurant food consumption:** Those students who ate from restaurants more frequently have 1.81 times higher odds of developing overweight/obesity when compared to students who ate less frequently. The p value of 0.01 suggest a strong significant association of the independent variable with overweight/obesity,

Table 3.15 Significant independent variables for overweight/obesity found in multivariate analysis

Variables		Adjusted OR	AOR (95% C.I)		p-value
			Lower limit	Upper limit	
Restaurant food consumption	Occasionally	Reference			**0.01**
	Once or twice in a week	1.81	1.11	2.97	
Tobacco use	No	Reference			**0.02**
	Yes	3.56	1.23	10.29	
Type of institution	Government	Reference			**0.03**
	Private	1.71	1.05	2.81	

CHAPTER- 4

DISCUSSION AND CONCLUSION

4.1 DISCUSSION

The objective of the study was to find out the prevalence of overweight/obesity among college students of Thiruvananthapuram district and to examine the factors associated with it. This chapter discusses the major findings in the light of the existing literature. It is organised under three sections namely: sample characteristics, prevalence of overweight or obesity and review of factors associated with overweigh and obesity.

4.1.1 Sample characteristics

The study included 365 respondents. Majority were females of about 60.54 percent. About 54.52 percent of students were from the age group 21-24 years. The mean age of the population is 20.69±1.633 years. As per the Kuppuswamy socio-economic status scale 2023 scores, 6.02 percent of the respondents belonged to upper class, 33.69 percent of the respondents belonged to upper middle class, 26.30 percent of the respondents belonged to lower middle, 33.97 percent belonged to upper lower class and there were no respondents in the lower class.

4.1.2 Prevalence of overweight:

The prevalence of overweight/obesity in the study population was 24.65 percent. The prevalence of overweight/obesity among male students were 30.55 percent and female students were 20.8 percent respectively.

A study done among the medical and allied science students of Karnataka reported a prevalence of overweight and obesity of 23.4 percent and 5.2 percent among the students.

Their prevalence rates among male students was 28.7 percent of overweight and 18.6 percent among female students which is comparable from this study.(Parajuli et al., 2019)

In a cross-sectional study which was conducted among undergraduate medical students aged 17–24 years in a private medical college in Chennai, combined prevalence of overweight and obesity was 53.2 percent which is higher than the overall prevalence obtained in this study. Around 22.9 percent belonged to the overweight category and 30.3 percent were obese both of which are much higher than obtained from this study.(Rekha et al., 2022)

When the BMI is reclassified according to the suggested classification of BMI for Asian populations(WHO Expert Consultation, 2004), which is greater than or equal to 23.0kg/m^2 for overweight and greater than or equal to 25.0 kg/m^2 for obesity , the prevalence of overweight/obesity among college students was 38.62 percent. Among them, prevalence of obesity is 24.65 percent which is comparatively high. In a study done among medical students in Kerala based on Asia-Pacific guidelines, where the prevalence of overweight was 24.57 percent and the prevalence of obesity was 25.71 percent.(Manojan et al., 2019). The prevalence of overweight in this study was higher, however the prevalence of obesity was similar. Since Asians have a higher predisposition to diabetes and cardiovascular diseases at a lower level of BMI, public health action is warranted among young people to prevent avoidable morbidity and mortality.

In another study done among 330 medical students in government medical college, Kottayam, based on Asia-Pacific guidelines, the overall prevalence of overweight and obesity obtained was 30.6 percent which is lesser than the overall prevalence of 38.62 percent from this study. (Thomas and M, 2019).

4.1.3 Factors related to overweight:

a. Socio-demographic characters:

In the study held in Karnataka among the college students, among females, 18.6 percent were overweight and 5 percent were obese. Out of 439 males, 28.7 percent were overweight and 5.5 percent were obese. There was significant association between BMI and sex which shows the similarities with this study on the association between overweight and sex.(Parajuli et al., 2019)

Prevalence of overweight was significantly more among males from a study done at Kottayam medical college which is similar to this study where the prevalence is more among males. (Thomas and M, 2019).

In this study, the prevalence of obesity and overweight was significantly higher in the higher age categories and the combined prevalence of obesity was found to be highest (29.64%) among the 21-24 years age group which is comparable to the prevalence of highest prevalence of overweight in the 21-24year age group in a study held at GMERS Medical College, Vadnagar, Gujarat.(Panchal et al., 2019b). However, the prevalence of overweight was only 15.8% in that study.

In a study done in India where the students studying in private and government school were compared, the study reported a higher prevalence of overweight/obesity among students in private schools compared to those in government schools.(Patnaik et al., 2015)

b. Dietary pattern:

The study revealed that there was a significant association of the prevalence of overweight with the dietary patterns of the students. That the students who consume high energy

restaurant food more frequently showed a significant association with overweight and obesity. The same observation has been reported by a study done in a private medical college in Thiruvananthapuram, Kerala wherein the habit of consumption of high energy foods (fast foods) were found to be influencing significant factor affecting obesity. (George et al., 2012)

A community-based study among adolescents in Madhya Pradesh also showed a positive association between the prevalence of overweight and obesity and an increased frequency of consumption of carbonated soft drinks, non-vegetarian food, and less consumption of fruits and vegetables(Seifu et al., 2021). This trend is also observed in this study too, that the respondents who consumed higher quantity of aerated soda or sugar were more likely to get obesity when compared with the students who consumed lesser quantity of aerated soda or sugar showing a significant association with overweight and obesity.

c. Behavioural measurements

The results of analysis showed that smoking among adolescents was a significant predictor of overweight and obesity. Similar finding has been reported by a study among medical students of South-East Europe which found that lifestyle factors such as tobacco use was associated with overweight and obesity among young people, (Ilić et al., 2024). Another study on tobacco users among adolescents from 23 low-income and middle-income countries had also reported a significant association between weight categories and tobacco.(Wang, 2021)

c. Physical activity and sedentary lifestyle:

In this study, there was no significant association between physical activity and overweight. However, it may be due to the fact that detailed metabolic equivalents could not be captured due to time constraints and only surrogate measures of physical activity was used. A study

done under graduate medical students at Kolkata has reported that there was a significant association between physical activity and overweight.(Chakraborty et al., 2017)

The current study finding is that sedentary behaviour can influence overweight. The prevalence of overweight was associated with over use of smart phones which is comparable with the study done among the college students of Gujarat where the prevalence of obesity and overweight was significantly higher in the group of students who spent more than 2 hours daily in front of television or computers. (Panchal et al., 2019b) A study published in BMC Public Health investigated the relationship between excessive smartphone use and weight status among youth in India and found that excessive smartphone use is associated with higher weight status and BMI.(Brodersen et al., 2023). A research article that examined the association between obesity and problematic smartphone use among school-age children and adolescents in Shangai, also highlighted that problematic smartphone use is positively associated with obesity status.(Ma et al., 2021)

4.2 Strength of the study

- This is one of the few studies focused on young adults aged 18-24 years which is a critical demographic group for targeted interventions to prevent overweight or obesity.
- Standardized Instrument: Used a questionnaire adopted from the WHO STEPS Instrument which is a standardized and validated tool.
- All the anthropometric measurements were taken by the principal investigator to avoid observer bias.

4.3 Limitations of the study:

- Self-Administered Questionnaire: Self-reporting can introduce bias, as participants may not accurately recall or may underreport/overreport certain behaviors.

4.4 Conclusion

The overall prevalence of overweight/obesity is comparable to studies among students of similar age groups in Kerala. However when the suggested classification of BMI for Asian populations (WHO Expert Consultation, 2004) is used, the prevalence rate of overweight (39%) and obesity (25%) was high reflecting a significant public health issue that needs targeted interventions. Prevalence of overweight was significantly associated with sex where prevalence was significantly more among males than females. Prevalence of overweight/obesity was highest in the 21-24 years of age group. Students studying in private colleges were more obese and overweight than students in government colleges, possibly indicating life style differences along socioeconomic lines. There was significantly higher prevalence of overweight/obesity among those who reported frequent consumption of restaurant food and aerated soda or sugar. Similarly, students who spent more time on mobile phone use had a higher prevalence of overweight than those who used them for less hours. Tobacco use was another factor that was significantly associated with obesity and overweight. The results from the study underscore the need for targeted interventions aimed at life style modification and promotion of healthy behaviours among young men and women.

4.5 Recommendations

The study results emphasize the need for interventions specifically aimed at life style modifications, promotion of healthy dietary habits and healthy behaviors among young adults. These interventions must be based promoting healthy dietary habits among young

men and women in the society. Comprehensive life style modification programs in colleges, physical activity and prevention of health risk behaviours such as smoking and alcohol would be helpful. Initiatives to promote sports and games and physical activity through walking and cycling in colleges and reduction in sedentary activities like mobile phone use also needs to be promoted.

Policy Implications: The transition from undernutrition to overweight in developing countries like India calls for a change in public health policies, particularly among the young. There is a scope to address the rising trend of overweight and obesity among the young through interventions within educational settings. Preventive strategies focusing on lifestyle modification should be a priority.

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PREVALENCE AND FACTORS ASSOCIATED WITH OVERWEIGHT/OBESITY AMONG YOUNG ADULTS STUDYING IN COLLEGES OF THIRUVANANTHAPURAM DISTRICT, KERALA

INTERVIEW SCHEDULE

SL NO	QUESTIONS	CODING CRITERION	CODE OPTION	VARIABLES
A	IDENTIFICATION OF PARTICIPANT			
1	Participant id:			
2	Name of college:			
	Type of institution			
B	DEMOGRAPHIC INFORMATION			
3	Age of the participant:	Completed age as on 01.01.2024		AGE
4	Sex of the participant:	☐ Male ☐ Female ☐ Transgender	0 1 2	GENDER
5	Educational status: (Highest level attained so far)	☐ Plus two ☐ Diploma ☐ Graduation ☐ Post- Graduation	0 1 2 3	EDU
6	What is your marital status?	☐ Single ☐ Married ☐ Separated ☐ Divorced	0 1 2 3	MARITAL

7	Religion or Belief System	☐ Hindu ☐ Muslim ☐ Christian ☐ Others	0 1 2 Please specify	RELIGION
	MODIFIED KUPPUSWAMY SOCIOECONOMIC STATUS SCALE (2023)			
8	Monthly income of the family	☐ ≥ 249044 ☐ 124489 – 249043 ☐ 93381 – 124488 ☐ 62273 – 93380 ☐ 37325 – 62272 ☐ 12445 – 37324 ☐ ≤12444	0 1 2 3 4 5 6	INCOME
9	Occupation of the head of the family	☐ Legislators, Senior Officers & Managers ☐ Professionals ☐ Technicians & Associate Professionals ☐ Clerks ☐ Skilled Workers and Shop & Market Sales Workers ☐ Skilled Agricultural % Fishery Workers ☐ Craft & Related Trade Workers	0 1 2 3 4 5 6	OCCUPATIONHD

		☐ Plant & Machine Operators and Assemblers ☐ Elementary Occupation ☐ Unemployed	7 8 9	
10	Education of the head of the family	☐ Profession or Honours ☐ Graduate ☐ Intermediate or Diploma ☐ High School Certificate ☐ Middle School Certificate ☐ Primary School Certificate ☐ Illiterate	0 1 2 3 4 5 6	EDUCATIONHD
C	DIETARY HABITS:			
11	What is your diet preference?	☐ Vegan ☐ Vegetarian ☐ Non- vegetarian ☐ Vegetarian +egg	0 1 2 3	VEGNONVEG
12	How many meals do you typically eat in a day? (meals include breakfast, lunch and dinner)	☐ One ☐ Two ☐ Three ☐ More than three	0 1 2 3	MEALS
13	Have you ever followed a specific meal plan or dieting to address your weight gain or loss?	☐ No ☐ Yes	0 1	PLAN
14	If yes, what was the need target if specific meal pan or dieting was done?	☐ Weight loss ☐ Weight gain	0 1	WGT

15	In a typical week, on how many days do you eat fruit?	Number of days		FRUITS
16	How many servings of fruit do you eat on one of those days? (servings means number of times)	Number of servings		FRUITSERV
17	In a typical week, on how many days do you eat vegetables?	Number of days		VEG
18	How many servings of vegetables do you eat on one of those days? (servings means number of times)	Number of servings		VEGESERVE
19	If you are a non-vegetarian how many days do you eat meat in a typical week?	Number of days		NVEG
20	How many servings of meat do you eat on one of those days? (servings means number of times)	Number of servings		NVEGSERVE
21	How often do you have fast food? (fast food- food prepared and served quickly and inexpensively eg: pizza, burgur, French fries etc)	☐ Occasionally ☐ Once/twice in a week ☐ More than thrice ☐ Daily ☐ Never	0 1 2 3 4	FASTFOOD
22	How often do you have restaurant food ie, food that is prepared and served for immediate consumption?	☐ Occasionally ☐ Once/twice in a week ☐ More than thrice ☐ Daily ☐ Never	0 1 2 3 4	RESTFOOD

23	How often do you eat processed food like packaged salty snacks, bakery items	☐ Occasionally ☐ Once/twice in a week ☐ More than thrice ☐ Almost Daily ☐ Never	0 1 2 3 4	BAKERY
24	Do you eat in response to stress or emotions?	☐ Eat more quantity ☐ Eat less quantity ☐ No change	0 1 2	STRESS
25	How often do you consume each of the following? (USE CODE: DAILY-I; ATLEAST ONCE IN A WEEK-2; ONCE A MONTH-3 OCASSIONALLY OR RARELY-4 NEVER-5) NOT APPLICABLE-8) Enter I or 2 or 3 or 4 or 5 against the appropriate response	☐ Fried local foods ☐ Red meat ☐ Eggs ☐ Chicken ☐ Fish ☐ Aerated Soda or sugar ☐ Sweetened drinks ☐ Pizza/burgers/ French fries ☐ Cakes, Pastries or other bakery items ☐ Samosa, Kachori, Chips Narnkeen, etc	1 1 3 4 5 6 7 8 9 10	FOOD
D	**PHYSICAL ACTIVITY**			
26	Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football,] for at least 10 minutes Continuously?	☐ No ☐ Yes	0 1	FITNESS
27	In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities?	Number of days		FITNESSTIME

28	How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours: minutes	0 1 2	FITHOURS
	Think of one day you can recall easily. Consider the total amount of time doing vigorous recreational activities for periods of 10 minutes or more. Probe very high responses (over 4hrs)			
29	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause small increases in breathing or heart rate such as brisk walking (cycling, swimming, volleyball etc.) for at least 10 minutes continuously?	☐ No ☐ Yes	0 1	MODRECREATN
	Activities are regarded as moderate intensity if they cause a small increase in breathing and/heart rate			
30	In a typical week, on how many days do you do moderate-intensity sports, fitness, or recreational activity?	Number of days		DAYMODREC
31	How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?	Hours: minutes		HOURSMODREC
	Sedentary behaviour : The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent [sitting at a desk, sitting with friends, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping.			
32	How much time do you usually spend sitting or reclining on a typical day?	Hours: minutes		SEDENTARY
33	Do you walk or use a bicycle *(pedal cycle)* to get to and from places?	☐ No ☐ Yes	0 1	CYCLE
34	In a typical week, on how many days do you walk or bicycle to get to and from places? "Typical week" means a week when the participant is engaged	Number of days		BICYCLEDAYS

	in his/her usual activities. Valid responses range from 1-7.			
35	How much time do you spend walking or bicycling for travel on a typical day?	Hours: minutes		BICYCLEHOUR
36	Do you spend your leisure time with smartphones?	☐ No ☐ Yes	0 1	PHN
37	If yes, how many hours do you spend?	☐ <1 hour ☐ 1 to 3 hours ☐ >3 hours	0 1 2	PHNHOURS
	PITTSBURGH SLEEP QUALITY INDEX			
38	During the past month, what time have you usually gone to bed at night?.....	TIME:		BEDTIME
39	During the past month, how long (in minutes) has it usually takes you to fall asleep each night?	☐ < 15 minutes ☐ 16-30 minutes ☐ 31-60 minutes ☐ > 60 minutes	0 1 2 3	SLEEPLATENCY
40	During the past month, what time have you usually gotten up in the morning?	TIME		WAKEUPTIME
41	During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed).	☐ > 7 hours ☐ 5-6 hours ☐ 6-7 hours ☐ < 5 hours	0 1 2 3	SLEEPDURATION

F	**BEHAVIOURAL MEASUREMENTS**			
	SMOKING/TOBACCO USE			
42	Do you currently smoke any tobacco products, such as cigarettes, cigars or pipes?	☐ No ☐ Yes	0 1	CURRENTSMOKE
43	In the past, did you ever smoke any tobacco products such as cigarettes, cigars or pipes?	☐ No ☐ Yes	0 1	PASTSMOKE
G	**ALCOHOL CONSUMPTION**			
44	Have you ever consumed any alcohol such as beer, wine, spirits	☐ No ☐ Yes	0 1	ALCOHOL
45	Have you consumed any alcohol within the past 12 months?	☐ No ☐ Yes	0 1	PASTALCOHOL
E	**ANTHROPOMETRIC MEASUREMENTS**			
46	Height (in cms)			
47	Weight (in kg)			

തിരുവനന്തപുരം ജില്ലയിലെ കോളേജുകളിൽ പഠിക്കുന്ന വിദ്യാർത്ഥികളുടെ അമിതഭാരവുമായി/അമിതവണ്ണവുമായി ബന്ധപ്പെട്ട വ്യാപനവും അതുമായി ബന്ധപ്പെട്ട ഘടകങ്ങളും

ഇന്റർവ്യൂ ഷെഡ്യൂൾ

SL NO	ചോദ്യങ്ങൾ	കോഡിംഗ് മാനദണ്ഡം	കോഡ് ഓപ്ഷൻ	വേരിയബിളുകൾ
A	പങ്കെടുക്കുന്നയാളുടെ തിരിച്ചറിയൽ			
1	പങ്കെടുക്കുന്നയാളുടെ ID			
2	കോളേജിന്റെ പേര്:			
	സ്ഥാപനത്തിന്റെ തരം			
B	ഡെമോഗ്രാഫിക് വിവരങ്ങൾ			
3	പങ്കെടുക്കുന്നയാളുടെ പ്രായം:	വയസ്സ്:		AGE
4	പങ്കെടുക്കുന്നയാളുടെ ലിംഗഭേദം:	☐ പുരുഷൻ ☐ സ്ത്രീ ☐ ട്രാൻസ്ജെൻഡർ	0 1 2	GENDER
5	വിദ്യാഭ്യാസ നില: (ഇതുവരെ നേടിയ ഏറ്റവും ഉയർന്ന നില)	☐ പ്ലസ് ടു ☐ ഡിപ്ലോമ ☐ ബിരുദം ☐ ബിരുദാനന്തര ബിരുദം	0 1 2 3	EDU
6	താങ്കളുടെ വൈവാഹിക നില എന്താണ്?	☐ അവിവാഹിതൻ/ അവിവാഹിത ☐ വിവാഹിതൻ/വിവാഹിത ☐ വേർപിരിഞ്ഞു നിൽക്കുന്നു ☐ വിവാഹമോചനം നേടി	0 1 2 3	MARITAL

7	മതം അല്ലെങ്കിൽ വിശ്വാസ സംവിധാനം	☐ ഹിന്ദു ☐ മുസ്ലീം ☐ ക്രിസ്ത്യൻ ☐ മറ്റുള്ളവ	0 1 2 ദയവായി വ്യക്തമാക്കുക	RELIGION
	സാമൂഹിക സാമ്പത്തിക സ്ഥിതി സ്കെയിൽ (2023)			
8	കുടുംബത്തിന്റെ പ്രതിമാസ വരുമാനം	☐ ≥ 249044 ☐ 124489 – 249043 ☐ 93381 – 124488 ☐ 62273 – 93380 ☐ 37325 – 62272 ☐ 12445 – 37324 ☐ ≤12444	0 1 2 3 4 5 6	INCOME
9	കുടുംബനാഥന്റെ തൊഴിൽ	☐ നിയമസഭാംഗങ്ങൾ,സീനിയർ ഉദ്യോഗസ്ഥർ ☐ പ്രൊഫഷണലുകൾ ☐ സാങ്കേതിക വിദഗ്ധർ ☐ ഗുമസ്തന്മാർ ☐ വിദഗ്ധ തൊഴിലാളികളും കട നടത്തുന്നവർ ☐ നൈപുണ്യമുള്ള കാർഷിക അല്ലെങ്കിൽ മത്സ്യബന്ധന തൊഴിലാളികൾ ☐ കരകൗശലവും അനുബന്ധ വ്യാപാര തൊഴിലാളികളും ☐ പ്ലാന്റ് ആൻഡ് മെഷീൻ ഓപ്പറേറ്റർമാരും അസംബ്ലർമാരും ☐ പ്രാഥമിക തൊഴിൽ ☐	0 1 2 3 4 5 6 7 8	OCCUPATIONHD

		തൊഴിൽരഹിതൻ	9	
10	കുടുംബനാഥന്റെ വിദ്യാഭ്യാസം	☐ തൊഴിൽ അല്ലെങ്കിൽ ബഹുമതികൾ ☐ ബിരുദധാരി ☐ ഇന്റർമീഡിയറ്റ് അല്ലെങ്കിൽ ഡിപ്ലോമ ☐ ഹൈസ്കൂൾ സർട്ടിഫിക്കറ്റ് ☐ മിഡിൽ സ്കൂൾ സർട്ടിഫിക്കറ്റ് ☐ പ്രൈമറി സ്കൂൾ സർട്ടിഫിക്കറ്റ് ☐ നിരക്ഷരൻ	0 1 2 3 4 5 6	EDUCATIONHD
C	ഭക്ഷണ ശീലങ്ങൾ:			
11	നിങ്ങളുടെ ഭക്ഷണക്രമം എന്താണ്?	☐ സസ്യാഹാരം ☐ വെജിറ്റേറിയൻ ☐ നോൺ വെജിറ്റേറിയൻ ☐ വെജിറ്റേറിയൻ+ മുട്ട	0 1 2 3	VEGNONVEG
12	ഒരു ദിവസം നിങ്ങൾ സാധാരണയായി എത്ര തവണ ഭക്ഷണം കഴിക്കും?	☐ ഒന്ന് ☐ രണ്ട് ☐ മൂന്ന് ☐ മൂന്നിൽ കൂടുതൽ	0 1 2 3	MEALS
13	നിങ്ങളുടെ ശരീരഭാരം കൂട്ടുവാനോ കുറക്കുവാനോ നിങ്ങൾ എപ്പോഴെങ്കിലും ഒരു പ്രത്യേക ഭക്ഷണ പദ്ധതിയോ ഭക്ഷണക്രമമോ പാലിച്ചിട്ടുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	PLAN
14	ഉണ്ടെങ്കിൽ, എന്തായിരുന്നു ആവശ്യം	☐ ശരീരഭാരം കൂട്ടാൻ ☐ ശരീരഭാരം കുറക്കാൻ	0 1	WGT
15	ഒരു സാധാരണ ആഴ്ചയിൽ, എത്ര ദിവസങ്ങളിലാണ് നിങ്ങൾ പഴങ്ങൾ കഴിക്കുന്നത്?	ദിവസങ്ങളുടെ എണ്ണം		FRUITS

16	ആ ദിവസങ്ങളിലൊന്നിൽ നിങ്ങൾ എത്ര തവണ പഴം കഴിക്കും?	തവണകളുടെ എണ്ണം		FRUITSERV
17	ഒരു ആഴ്ചയിൽ സാധാരണ എത്ര ദിവസങ്ങളിൽ നിങ്ങൾ പച്ചക്കറികൾ കഴിക്കും?	ദിവസങ്ങളുടെ എണ്ണം		VEG
18	ആ ദിവസങ്ങളിലൊന്നിൽ നിങ്ങൾ എത്ര തവണ പച്ചക്കറികൾ കഴിക്കും?	തവണകളുടെ എണ്ണം		VEGESERVE
19	നിങ്ങൾ ഒരു നോൺ വെജിറ്റേറിയൻ ആണെങ്കിൽ ഒരു ആഴ്ചയിൽ സാധാരണ എത്ര ദിവസം മാംസം കഴിക്കും?	ദിവസങ്ങളുടെ എണ്ണം		NVEG
20	ആ ദിവസങ്ങളിലൊന്നിൽ നിങ്ങൾ എത്ര തവണ മാംസം കഴിക്കും?	തവണകളുടെ എണ്ണം		NVEGSERVE
21	നിങ്ങൾക്ക് എത്ര തവണ ഫാസ്റ്റ് ഫുഡ്?	☐ ഇടയ്ക്കിടെ ☐ ആഴ്ചയിൽ ഒരിക്കൽ/രണ്ട് തവണ ☐ മൂന്നിലധികം തവണ ☐ ദിവസേന ☐ ഒരിക്കലുമില്ല	0 1 2 3 4	FASTFOOD
22	നിങ്ങൾക്ക് എത്ര തവണ റെസ്റ്റോറന്റ് ഭക്ഷണം(ഉടനടി ഉപയോഗത്തിനായി തയ്യാറാക്കി വിളമ്പുന്ന ഭക്ഷണം) കഴിക്കാറുണ്ട്?	☐ ഇടയ്ക്കിടെ ☐ ആഴ്ചയിൽ ഒരിക്കൽ/രണ്ട് തവണ ☐ മൂന്നിലധികം തവണ ☐ ദിവസേന ☐ ഒരിക്കലുമില്ല	0 1 2 3 4	RESTFOOD
23	പാക്കേജുചെയ്ത ഉപ്പിട്ട ലഘുഭക്ഷണങ്ങൾ, ബേക്കറി ഇനങ്ങൾ തുടങ്ങിയ സംസ്കരിച്ച ഭക്ഷണം നിങ്ങൾ എത്ര തവണ കഴിക്കാറുണ്ട്?	☐ ഇടയ്ക്കിടെ ☐ ആഴ്ചയിൽ ഒരിക്കൽ/രണ്ട് തവണ ☐ മൂന്നിലധികം തവണ ☐ ദിവസേന ☐ ഒരിക്കലുമില്ല	0 1 2 3 4	BAKERY

24	സമ്മർദമോ മാനസികപിരിമുറുക്കാമോ കാരണംനിങ്ങൾ ഭക്ഷണം കഴിക്കാറുണ്ടോ? ഉണ്ടെങ്കിൽ അത് എങ്ങനെ നിങ്ങളെ സ്വാധീനിക്കുന്നു?	☐ കൂടുതൽ അളവിൽ കഴിക്കും ☐ കുറഞ്ഞ അളവിൽ കഴിക്കും ☐ മാറ്റമില്ല	0 1 2	STRESS
25	ഇനിപ്പറയുന്നവയിൽ ഓരോന്നും നിങ്ങൾ എത്ര തവണ ഉപയോഗിക്കുന്നു? (കോഡ് ഉപയോഗിക്കുക: ദിവസേന-I; ആഴ്ചയിൽ ഒരിക്കലെങ്കിലും-2; മാസത്തിലൊരിക്കൽ-3 വല്ലപ്പോഴും അല്ലെങ്കിൽ അപൂർവ്വമായി-4 ഒരിക്കലും-5) ബാധകമല്ല-8) ഉചിതമായ പ്രതികരണത്തിനെതിരെ I അല്ലെങ്കിൽ 2 അല്ലെങ്കിൽ 3 അല്ലെങ്കിൽ 4 അല്ലെങ്കിൽ 5 നൽകുക	☐ വറുത്ത നാടൻ ഭക്ഷണങ്ങൾ ☐ ചുവന്ന മാംസം ☐ മുട്ടകൾ ☐ ചിക്കൻ ☐ മത്സ്യം ☐ എയറേറ്റഡ് സോഡ അല്ലെങ്കിൽ പഞ്ചസാര ☐ മധുരമുള്ള പാനീയങ്ങൾ ☐ പിസ്സ/ബർഗറുകൾ/ ഫ്രഞ്ച് ഫ്രൈകൾ ☐ കേക്കുകൾ, പേസ്ട്രികൾ അല്ലെങ്കിൽ മറ്റെന്തെങ്കിലും ബേക്കറി ഇനങ്ങൾ ☐ സമൂസ, കച്ചോരി, ചിപ്സ്	1 2 3 4 5 6 7 8 9 10	FOOD
D	**ശാരീരിക പ്രവർത്തനങ്ങൾ, വ്യായാമം**			
26	കുറഞ്ഞത് 10 മിനിറ്റെങ്കിലും തുടർച്ചയായി [ഓട്ടം അല്ലെങ്കിൽ ഫുട്ബോൾ,] പോലുള്ള ശ്വസനത്തിലോ ഹൃദയമിടിപ്പിലോ വലിയ വർദ്ധനവിന് കാരണമാകുന്ന ഏതെങ്കിലും ഊർജ്ജസ്വലമായ സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (വിശ്രമ) പ്രവർത്തനങ്ങൾ നിങ്ങൾ ചെയ്യുന്നുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	FITNESS
27	ഒരു ആഴ്ചയിൽ, സാധാരണ എത്ര ദിവസങ്ങളിലാണ് നിങ്ങൾ ഊർജസ്വലമായ സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (വിശ്രമ) പ്രവർത്തനങ്ങൾ ചെയ്യുന്നത്?	ദിവസങ്ങളുടെ എണ്ണം		FITNESSTIME
28	ഒരു ദിവസത്തിൽ ഊർജ്ജസ്വലമായ സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ പ്രവർത്തനങ്ങൾ എന്നിവയ്ക്കായി നിങ്ങൾ എത്ര സമയം ചെലവഴിക്കുന്നു?	മണിക്കൂർ: മിനിറ്റ്	0 1 2	FITHOURS
	നിങ്ങൾക്ക് എളുപ്പത്തിൽ ഓർക്കാൻ കഴിയുന്ന ഒരു ദിവസത്തെക്കുറിച്ച് ചിന്തിക്കുക. 10 മിനിറ്റോ അതിൽ കൂടുതലോ സമയത്തേക്ക് ഊർജ്ജസ്വലമായ വിനോദ പ്രവർത്തനങ്ങൾ ചെയ്യുന്ന ആകെ സമയം പരിഗണിക്കുക. വളരെ ഉയർന്ന പ്രതികരണങ്ങൾ അന്വേഷിക്കുക (4 മണിക്കൂറിൽ കൂടുതൽ)			

29	കുറഞ്ഞത് 10 മിനിറ്റെങ്കിലും വേഗത്തിലുള്ള നടത്തം (സൈക്ലിംഗ്, നീന്തൽ, വോളിബോൾ മുതലായവ) ശ്വസനം അല്ലെങ്കിൽ ഹൃദയമിടിപ്പിൽ ചെറിയ വർദ്ധനവിന് കാരണമാകുന്ന മിതമായ തീവ്രതയുള്ള സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (വിശ്രമ) പ്രവർത്തനങ്ങൾ നിങ്ങൾ തുടർച്ചയായി ചെയ്യുന്നുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	MODRECREATN
	ശ്വസനത്തിലും/ഹൃദയമിടിപ്പിലും ചെറിയ വർദ്ധന വരുത്തുന്ന പ്രവർത്തനങ്ങൾ മിതമായ തീവ്രതയായി കണക്കാക്കപ്പെടുന്നു			
30	ഒരു ആഴ്ചയിൽ, സാധാരണ എത്ര ദിവസങ്ങളിലാണ് നിങ്ങൾ മിതമായ തീവ്രതയുള്ള സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ പ്രവർത്തനങ്ങൾ ചെയ്യുന്നത്?	ദിവസങ്ങളുടെ എണ്ണം		DAYMODREC
31	ഒരു സാധാരണ ദിവസത്തിൽ മിതമായ തീവ്രതയുള്ള സ്പോർട്സ്, ഫിറ്റ്നസ് അല്ലെങ്കിൽ വിനോദ (വിശ്രമ) പ്രവർത്തനങ്ങൾ ചെയ്യാൻ നിങ്ങൾ എത്ര സമയം ചെലവഴിക്കുന്നു?	മണിക്കൂർ: മിനിറ്റ്		HOURSMODREC
	താഴെപ്പറയുന്ന ചോദ്യം ജോലിസ്ഥലത്തോ വീട്ടിലോ ഇരിക്കുകയോ ചാരികിടക്കുകയോ, കൂട്ടുകാരുടെ കൂടെ സമയം ചിലവഴിക്കുകയോ ചെയ്യുന്നതിനെ കുറിച്ചാണ്(കാറിലോ, ബസിലോ,ട്രെയിനിലോ സഞ്ചരിക്കുന്നത്, പുസ്തകം വായന,ടീവീ കാണുന്നത്) എന്നാൽ ഉറങ്ങാൻ ചെലവഴിച്ച സമയം ഉൾപ്പെടുത്തരുത്.			
32	ഒരു ദിവസത്തിൽ നിങ്ങൾ സാധാരണയായി എത്ര സമയം ഇരിക്കുകയോ ചാരിയിരിക്കുകയോ ചെയ്യുന്നു?	മണിക്കൂർ: മിനിറ്റ്		SEDENTARY
33	ഏതെങ്കിലും സ്ഥലങ്ങളിലേക്ക് പോകാനും തിരിച്ചു വരാനും നിങ്ങൾ നടക്കുകയോ സൈക്കിൾ (പെഡൽ സൈക്കിൾ) ഉപയോഗിക്കുകയോ ചെയ്യാറുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	CYCLE
34	ഒരു സാധാരണ ആഴ്ചയിൽ, എത്ര ദിവസങ്ങളിലാണ് നിങ്ങൾ സ്ഥലങ്ങളിലേക്കും തിരിച്ചും നടക്കാനോ സൈക്കിളിലോ നടക്കുന്നത്? "സാധാരണ ആഴ്ച" എന്നാൽ പങ്കെടുക്കുന്നയാൾ അവന്റെ/അവളുടെ സാധാരണ പ്രവർത്തനങ്ങളിൽ ഏർപ്പെട്ടിരിക്കുന്ന ഒരു ആഴ്ച എന്നാണ് അർത്ഥമാക്കുന്നത്. സാധുവായ പ്രതികരണങ്ങൾ 1-7 വരെയാണ്.	ദിവസങ്ങളുടെ എണ്ണം		BICYCLEDAYS
35	സാധാരണ ഒരു ദിവസത്തിൽ യാത്രയ്ക്കായി നിങ്ങൾ എത്ര സമയം നടക്കുകയോ സൈക്കിൾ ചവിട്ടുകയോ ചെയ്യുന്നു?	മണിക്കൂർ: മിനിറ്റ്		BICYCLEHOUR
36	നിങ്ങളുടെ ഒഴിവു സമയം സ്മാർട്ട്ഫോണുകൾക്കൊപ്പം ചിലവഴിക്കാറുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	PHN

37	ഉണ്ടെങ്കിൽ, നിങ്ങൾ എത്ര മണിക്കൂർ ചിലവഴിക്കും?	☐ 1 മണിക്കൂറിൽ കുറവ് ☐ 1 to 3 മണിക്കൂറുകൾ ☐ 3 മണിക്കൂറിൽ കൂടുതൽ	0 1 2	PHNHOURS
	പിറ്റ്സ്ബർഗ് സ്ലീപ്പ് ക്വാളിറ്റി ഇൻഡക്സ്			
38	കഴിഞ്ഞ ഒരു മാസത്തിനിടെ, നിങ്ങൾ സാധാരണയായി രാത്രി എത്ര മണിക്കാണ് ഉറങ്ങാൻ പോയത്?.....	സമയം:		BEDTIME
39	കഴിഞ്ഞ മാസത്തിൽ, ഓരോ രാത്രിയും ഉറങ്ങാൻ നിങ്ങൾ സാധാരണയായി എത്ര സമയം (മിനിറ്റുകൾക്കുള്ളിൽ) എടുക്കും?	☐ 15 മിനുട്ടിൽ കുറവ് ☐ 16-30 മിനുട്സ് ☐ 31-60 മിനുട്സ് ☐ 60 മിനുട്ടിൽ കൂടുതൽ	0 1 2 3	SLEEPLATENCY
40	കഴിഞ്ഞ മാസത്തിൽ, നിങ്ങൾ സാധാരണയായി രാവിലെ എത്ര മണിക്കാണ് എഴുന്നേറ്റത്?	സമയം:		WAKEUPTIME
41	കഴിഞ്ഞ മാസത്തിൽ, രാത്രിയിൽ നിങ്ങൾക്ക് എത്ര മണിക്കൂർ യഥാർത്ഥ ഉറക്കം ലഭിച്ചു? (നിങ്ങൾ കിടക്കയിൽ ചെലവഴിച്ച മണിക്കൂറുകളുടെ എണ്ണത്തേക്കാൾ ഇത് വ്യത്യസ്തമായിരിക്കാം).	☐ 7 മണിക്കൂറിൽ കുറവ് ☐ 5-6 മണിക്കൂറുകൾ ☐ 6-7 മണിക്കൂറുകൾ ☐ 7 മണിക്കൂറിൽ കൂടുതൽ	0 1 2 3	SLEEPDURATION
F	**പെരുമാറ്റ അളവുകൾ**			
	പുകവലി/പുകയില ഉപയോഗം			
42	നിങ്ങൾ നിലവിൽ സിഗരറ്റ്, ചുരുട്ട് അല്ലെങ്കിൽ പൈപ്പുകൾ പോലുള്ള ഏതെങ്കിലും പുകയില ഉൽപ്പന്നങ്ങൾ വലിക്കുന്നുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	CURRENTSMOKE

43	പണ്ട്, നിങ്ങൾ എപ്പോഴെങ്കിലും സിഗരറ്റ്, ചുരുട്ട്, പൈപ്പ് തുടങ്ങിയ പുകയില ഉൽപന്നങ്ങൾ വലിച്ചിട്ടുണ്ടോ ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	PASTSMOKE
G	**മദ്യ ഉപഭോഗം**			
44	ബിയർ, വൈൻ, സ്പിരിറ്റ് തുടങ്ങിയ ഏതെങ്കിലും മദ്യം നിങ്ങൾ എപ്പോഴെങ്കിലും കഴിച്ചിട്ടുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	ALCOHOL
45	കഴിഞ്ഞ 12 മാസത്തിനുള്ളിൽ നിങ്ങൾ ഏതെങ്കിലും മദ്യം കഴിച്ചിട്ടുണ്ടോ?	☐ ഇല്ല ☐ ഉണ്ട്	0 1	PASTALCOHOL
E	**ആന്ത്രോപോമെട്രിക് അളവുകൾ**			
46	ഉയരം (സെ.മീ.)			
47	ഭാരം (കിലോയിൽ)			

Achutha Menon Centre for Health Science Studies (AMCHSS)

Sree Chitra Tirunal Institute for Medical Sciences & Technology (SCTIMST) Trivandrum- 11

Participant Information Sheet

- I am Dr Ananthakrishnan K.R, currently pursuing Master of Public Health (MPH) at Achutha Menon Centre for Health Science Studies (AMCHSS), Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala. I am doing a study on "**Prevalence and Factors Associated with overweight/obesity among young adults studying in colleges of Thiruvananthapuram district, Kerala**" as a part of my course work, under the guidance of Dr Manju Nair R, Scientist 'C' and co-guide Prof Sankara Sarma P at AMCHSS.

Purpose of the study

The purpose of this study is to assess the prevalence of overweight/obesity among young adults studying in colleges of Thiruvananthapuram district and to study the factors associated with it.

Procedure

If you are willing to participate in the study, you will be asked to complete an interview schedule which will include questions focusing on demographic information, dietary habits, physical activities, behavioural measurements and measurements of your height and weight will be taken. The interview will take approximately 15-20 minutes of your valuable time.

Potential risks and discomforts

Participating in the study imposes no risk to your health.

Possible benefits

Your participation in the study will not give any direct benefit to you now other than knowing the weight and height measurements. However, the results of the study will be helpful for understanding the prevalence of overweight/obesity among young adults.

Cost and financial benefit

There is no cost for participation in this study. Participation is completely voluntary and no payment will be provided.

Confidentiality

Information obtained in this study will be kept strictly confidential. A participant identification number will be assigned to each participant which will help to maintain the strict confidentiality of the data collected. Your name will not be used in reporting information in publications or reports.

Withdrawal from the study

Your participation in the study will be completely voluntary. You are free and have the right to withdraw during the study at any time. There will be no penalty for withdrawal or not participating in the study.

Contact information

If you have any research-related questions or you would like to verify my credentials, you may contact me or member secretary of our institute's ethics committee at the following address:

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Principal Investigator
MPH 2022, AMCHSS, SCTIMST
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പങ്കെടുക്കുന്നയാൾക്കുള്ള വിവരങ്ങൾ അടങ്ങിയ ഷീറ്റ്

ഞാൻ ഡോ. അനന്തകൃഷ്ണൻ കെ ആർ. ,തിരുവനന്തപുരത്തെ ശ്രീചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻഡ് ടെക്നോളജിയിലെ അച്യുതമേനോൻ സെന്റർ ഫോർ ഹെൽത്ത് സയൻസസ് സ്റ്റഡീസിൽ (എഎംസിഎച്ച്എസ്എസ്) മാസ്റ്റർ ഓഫ് പബ്ലിക് ഹെൽത്ത് കോഴ്സ് പഠിക്കുകയാണ്. എന്റെ അക്കാദമിക് ഗവേഷണത്തിന്റെ ഭാഗമായി, ഞാൻ ഇപ്പോൾ തിരുവനന്തപുരം ജില്ലയിലെ കോളേജുകളിൽ പഠിക്കുന്ന വിദ്യാർത്ഥികളുടെ ആരോഗ്യവുമായി ബന്ധപ്പെട്ട അമിതഭാരം എന്ന തലക്കെട്ടിൽ ഒരു സർവേ നടത്തുകയാണ്: ഒരു ക്രോസ്-സെക്ഷണൽ പഠനം.

ഈ ഗവേഷണ പഠനത്തിൽ പങ്കെടുക്കാൻ നിങ്ങളെ ക്ഷണിക്കുന്നു. ഈ പഠനത്തിൽ പങ്കെടുക്കണമോ വേണ്ടയോ എന്ന് നിങ്ങൾ തീരുമാനിക്കുന്നതിന് മുമ്പ്, എന്തുകൊണ്ടാണ് ഗവേഷണം നടക്കുന്നതെന്നും അതിൽ എന്താണ് ഉൾപ്പെടുകയെന്നും നിങ്ങൾ മനസ്സിലാക്കേണ്ടത് പ്രധാനമാണ്. ഈ വിവര ഷീറ്റും സമ്മത ഫോമും ശ്രദ്ധാപൂർവ്വം വായിക്കുക/കേൾക്കുക, നിങ്ങൾക്ക് ഉണ്ടായേക്കാവുന്ന വിശദീകരണം ചോദിക്കാൻ മടിക്കേണ്ടതില്ല

പഠനത്തിന്റെ ഉദ്ദേശം

തിരുവനന്തപുരം ജില്ലയിലെ കോളേജുകളിൽ പഠിക്കുന്ന യുവതീയുവാക്കൾക്കിടയിലെ അമിതഭാരത്തിന്റെയും അമിതവണ്ണത്തിന്റെയും വ്യാപനം വിലയിരുത്തുകയും അതുമായി ബന്ധപ്പെട്ട ഘടകങ്ങൾ പഠിക്കുകയുമാണ് ഈ പഠനത്തിന്റെ ലക്ഷ്യം.

നടപടിക്രമം

നിങ്ങൾ പഠനത്തിൽ പങ്കെടുക്കാൻ തയ്യാറാണെങ്കിൽ, ജനസംഖ്യാപരമായ വിവരങ്ങൾ, ഭക്ഷണ ശീലങ്ങൾ, ശാരീരിക പ്രവർത്തനങ്ങൾ, പെരുമാറ്റ അളവുകൾ, നിങ്ങളുടെ ഉയരവും ഭാരവും എന്നിവയുടെ അളവുകൾ എന്നിവയിൽ ശ്രദ്ധ കേന്ദ്രീകരിക്കുന്ന ചോദ്യങ്ങൾ ഉൾപ്പെടുന്ന ഒരു അഭിമുഖ ഷെഡ്യൂൾ പൂർത്തിയാക്കാൻ നിങ്ങളോട് ആവശ്യപ്പെടും. അഭിമുഖത്തിന് നിങ്ങളുടെ വിലയേറിയ സമയത്തിന്റെ ഏകദേശം 15-20 മിനിറ്റ് എടുക്കും.

സാധ്യതയുള്ള അപകടങ്ങളും അസ്വാസ്ഥ്യങ്ങളും

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്നത് നിങ്ങളുടെ ആരോഗ്യത്തിന് ഒരു അപകടവും ഉണ്ടാക്കുന്നില്ല. എന്നിരുന്നാലും, നിങ്ങളുടെ വിലയേറിയ സമയത്തിൽ നിന്ന് 15-20 മിനിറ്റ് എടുക്കുന്നത് അസ്വസ്ഥതയുണ്ടാക്കാം. ചോദ്യങ്ങൾ ചോദിക്കുമ്പോൾ തടസ്സപ്പെടുത്താൻ നിങ്ങൾക്ക് സ്വാതന്ത്ര്യമുണ്ട് കൂടാതെ നിങ്ങൾക്ക് സൗകര്യപ്രദമായ മറ്റൊരു ദിവസത്തേക്ക് സർവേ ഷെഡ്യൂൾ ചെയ്യാം.

നിങ്ങൾക്ക് പിന്നീട് ചോദ്യങ്ങളുണ്ടെങ്കിൽ, ഒന്നുകിൽ എന്നോട് ചോദിക്കാം അല്ലെങ്കിൽ ഇൻസ്റ്റിറ്റ്യൂഷൻ എത്തിക്സ് കമ്മിറ്റിയുടെ മെമ്പർ സെക്രട്ടറിയെ ബന്ധപ്പെടുക.

ആനുകൂല്യങ്ങൾ

നിങ്ങൾക്ക് ഉടനടി നേരിട്ടുള്ള നേട്ടമൊന്നും ഉണ്ടാകില്ല, എന്നാൽ നിങ്ങളുടെ പങ്കാളിത്തം നിലവിലെ ആരോഗ്യ നിലയെക്കുറിച്ചും ഇതുമായി ബന്ധപ്പെട്ട ഘടകങ്ങളെക്കുറിച്ചും പൊതു പ്രൊഫഷണലുകളെ അറിയിക്കാൻ എന്നെ സഹായിക്കും

ചിലവും സാമ്പത്തിക നേട്ടവും

ഈ പഠനത്തിൽ പങ്കെടുക്കുന്നതിന് യാതൊരു ചിലവും ഇല്ല. പങ്കാളിത്തം പൂർണ്ണമായും സ്വമേധയാ ഉള്ളതാണ്, പേയ്മെന്റ് നൽകില്ല.

രഹസ്യാത്മകത

നിങ്ങളെക്കുറിച്ചുള്ള വിവരങ്ങൾ ഞാൻ മറ്റാരുമായും പങ്കിടില്ല. ഈ ഗവേഷണ സർവേ പ്രവർത്തനത്തിൽ നിന്ന് ഞാൻ ശേഖരിക്കുന്ന വിവരങ്ങൾ സ്വകാര്യമായി സൂക്ഷിക്കും. നിങ്ങളെക്കുറിച്ചുള്ള ഏത് വിവരത്തിനും നിങ്ങളുടെ പേരിന് പകരം ഒരു നമ്പർ ഉണ്ടായിരിക്കും.

പഠനത്തിൽ നിന്ന് പിന്മാറൽ

പഠനത്തിൽ നിങ്ങളുടെ പങ്കാളിത്തം പൂർണ്ണമായും സ്വമേധയാ ഉള്ളതായിരിക്കും. നിങ്ങൾക്ക് സ്വതന്ത്രമാണ്, പഠന സമയത്ത് എപ്പോൾ വേണമെങ്കിലും പിൻവലിക്കാനുള്ള അവകാശമുണ്ട്. പഠനത്തിൽ നിന്ന് പിന്മാറുകയോ പങ്കെടുക്കാതിരിക്കുകയോ ചെയ്താൽ പിഴ ഈടാക്കില്ല.

ബന്ധപ്പെടാനുള്ള വിവരങ്ങൾ

നിങ്ങൾക്ക് എന്തെങ്കിലും ചോദ്യങ്ങളുണ്ടെങ്കിൽ, ഇപ്പോൾ അല്ലെങ്കിൽ പിന്നീട് ചോദിക്കാം.

നിങ്ങൾക്ക് പിന്നീട് ചോദ്യങ്ങൾ ചോദിക്കാൻ താൽപ്പര്യമുണ്ടെങ്കിൽ, ഇനിപ്പറയുന്നവയിൽ ഏതെങ്കിലുമൊന്ന് നിങ്ങൾക്ക് ബന്ധപ്പെടാം

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Dr Ananthakrishnan K R

Principal investigator

MPH 2022, E code: 50157

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Dr Srinivas G, Member Secretary, I E C, SCTIMST,

& Scientist - G

Department of Biochemistry, SCTIMST

Email: iec.mem.sec@sctimst.ac.in)

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Informed Consent Form

I confirm that I have read/ heard and understood the information regarding the study "**Prevalence and Factors Associated with overweight/obesity among young adults studying in colleges of Thiruvananthapuram district, Kerala**" as provided in the participant information sheet. All of my questions concerning this study have been answered and all the possible harms, discomforts, and benefits (if any) of this study have been explained to me. I also understand that my identity and personal information will be kept confidential. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without consequences.

By signing this form, I agree to participate in this study. A copy of this form has been given to me.

Date:
Place:

Name of the participant

Signature/Thumb impression

_____

Principal Investigator

_____

Signature

അറിവോടെയുള്ള സമ്മതപത്രം

"തിരുവനന്തപുരം ജില്ലയിലെ കോളേജുകളിൽ പഠിക്കുന്ന വിദ്യാർത്ഥികളുടെ അമിതഭാരവുമായി ബന്ധപ്പെട്ട വ്യാപനവും അതുമായി ബന്ധപ്പെട്ട ഘടകങ്ങളും" എന്ന തലക്കെട്ടിലുള്ള ഗവേഷണത്തിൽ പങ്കെടുക്കാൻ എന്നെ ക്ഷണിച്ചു.

പഠനവുമായി ബന്ധപ്പെട്ട് നൽകിയിരിക്കുന്ന വിവരങ്ങൾ ഞാൻ വായിച്ചിട്ടുണ്ട്, അല്ലെങ്കിൽ അത് എനിക്ക് വായിച്ചുതന്നിട്ടുണ്ട്. അതിനെക്കുറിച്ച് ചോദ്യങ്ങൾ ചോദിക്കാൻ എനിക്ക് അവസരം ലഭിച്ചിട്ടുണ്ട്, എന്നോട് ചോദിച്ച ചോദ്യങ്ങൾക്ക് എനിക്ക് തൃപ്തികരമായ ഉത്തരം ലഭിച്ചു.

പഠനത്തിൽ പങ്കെടുക്കുന്നതിൽ കുറഞ്ഞ അപകടസാധ്യത മാത്രമേയുള്ളൂ എന്ന് എനിക്കറിയാം. പഠനത്തിൽ നേരിട്ടുള്ള ഒരു പ്രയോജനവും ഇല്ലെന്ന് ഞാൻ മനസ്സിലാക്കുന്നു.

പങ്കെടുക്കാൻ പ്രോത്സാഹനം നൽകിയിട്ടില്ല എനിക്കറിയാം.

എന്റെ സ്വകാര്യ വിവരങ്ങൾ രഹസ്യമായി തുടരുമെന്ന് ഞാൻ മനസ്സിലാക്കുന്നു.

പഠനത്തിന്റെ ഏത് ഘട്ടത്തിലും എനിക്ക് എന്റെ സമ്മതം പിൻവലിക്കാൻ കഴിയുമെന്ന് എനിക്കറിയാം

ഈ പഠനത്തിൽ പങ്കാളിയാകാൻ ഞാൻ സ്വമേധയാ സമ്മതിക്കുന്നു.

പങ്കെടുക്കുന്നയാളുടെ ഐഡി:

പങ്കെടുക്കുന്നയാളുടെ പേര്:

സ്ഥലം:

തീയതി:

പങ്കെടുക്കുന്നയാളെ പഠനത്തെ കുറിച്ച് ചോദ്യങ്ങൾ ചോദിക്കാൻ അനുവദിച്ചിട്ടുണ്ടെന്ന് ഞാൻ സ്ഥിരീകരിക്കുന്നു, പങ്കെടുക്കുന്നയാൾ ചോദിച്ച എല്ലാ ചോദ്യങ്ങൾക്കും കൃത്യമായും എന്റെ കഴിവിന്റെ പരമാവധിയിലും ഉത്തരം നൽകിയിട്ടുണ്ട്. സമ്മതം നൽകാൻ വ്യക്തിയെ നിർബന്ധിച്ചിട്ടില്ലെന്നും സമ്മതം സ്വതന്ത്രമായും സ്വമേധയാ നൽകിയിട്ടുണ്ടെന്നും ഞാൻ സ്ഥിരീകരിക്കുന്നു.

ഗവേഷകന്റെ പേര്.....

തീയതി.....

श्री चित्रा तिरुनाल आयुर्विज्ञान और प्रौद्योगिकी संस्थान, त्रिवेन्द्रम
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Institutional Ethics Committee

CDSCO Registration No: ECR/189/Inst/KL/2013/RR-21
DHR Registration No: EC/NEW/INST/2022/2775

SCT/IEC/2184/DECEMBER-2023 09.01.2024

Dr. Ananthakrishnan KR
MPH Student, AMCHSS
SCTIMST, Thiruvananathapuram

Dear Dr. Ananthakrishnan,

The project proposal with the title "**PREVALENCE AND FACTORS ASSOCIATED WITH MALNUTRITION AMONG YOUNG ADULTS STUDYING IN COLLEGES OF THIRUVANANTHAPURAM DISTRICT, KERALA**" submitted to Institutional Ethics Committee (IEC) has been reviewed in the IEC Meeting held on 30th December, 2023 and assigned number as IEC/2184.

Principal Investigator	Dr Ananthakrishnan K R, MPH Student, AMCHSS, SCTIMST
Co-Principal Investigator(s)	Dr Manju Nair R, Scientist 'D' at AMCHSS, SCTIMST Prof Sankara Sarma P, Professor (Senior Grade), AMCHSS, SCTIMST

List of documents submitted:

1. Checklist Form
2. Covering letter addressed to the Chairman, IEC, SCTIMST dated 02.12.2023
3. Responses/Amendments made based on the Reviewer's comments
4. IEC Application Form
5. Declaration Form
6. Research Proposal
7. Participant Information Sheet and Informed Consent Form in English and Malayalam
8. Study Tool in English and Malayalam
9. CV of Principal Investigator and Co-PIs
10. SRC Recommendation Letter

IEC Recommendations

Please submit a revised proposal after incorporating answers to the following:

1. What is the rationale for the age range 19-24?
2. The only physical measures collected by the investigators are height and weight. Are these sufficient to assess malnutrition?
3. If the investigators are planning to focus on obesity, rather than undernutrition, it is better to modify the title accordingly. It may not be able to characterize undernutrition using height, weight and BMI alone
4. Very lengthy questionnaire.
5. The suggestions/comments from the SRC need to be taken seriously. A thorough rework of the proposal, by including updated references, is suggested. 6. Probably limiting the study objective to explore overweight/obesity rather than the whole spectrum of malnutrition will be a good idea to refine the proposal. 7. PI is asked to modify the title of the study to suite the objectives.

One set of all the documents including those revised may be submitted. The covering letter should indicate the revisions made.

Sincerely,

Dr. G.Srinivas
Member Secretary, IEC

SREE CHITRA TIRUNAL INSTITUTE FOR MEDICAL SCIENCES & TECHNOLOGY • INSTITUTIONAL ETHICS COMMITTEE (IEC) SCTIMST THIRUVANANTHAPURAM

The following documents were reviewed:

Original submission

1. *Checklist Form*
2. *Covering letter addressed to the Chairman, IEC, SCTIMST dated 02.12.2023*
3. *Responses/Amendments made based on the Reviewer's comments*
4. *IEC Application Form*
5. *Declaration Form*
6. *Research Proposal*
7. *Participant Information Sheet and Informed Consent Form in English and Malayalam*
8. *Study Tool in English and Malayalam*
9. *CV of Principal Investigator and Co-PIs*
10. *SRC Recommendation Letter*

Revised submission

1. *Checklist Form*
2. *Covering letter addressed to the Chairman, IEC, SCTIMST dated 11.01.2024*
3. *Responses/Amendments made based on the Reviewer's comments*
4. *Copy of IEC Recommendation letter dated 09.01.2024*
5. *Responses/Amendments made based on the Reviewer's comments*
6. *IEC Application Form*
7. *Declaration Form*
8. *Research Proposal*
9. *Participant Information Sheet and Informed Consent Form in English and Malayalam*
10. *Study Tool in English and Malayalam*
11. *CV of Principal Investigator and Co-PIs*

IEC Decision
The IEC approved the conduct of the study in the present form.

Remarks:
The Institutional Ethics Committee expects to be informed about the progress of the study, any SAE occurring in the course of the study, any changes in the protocol and patient information/informed consent and asks to be provided a copy of the final report.

There was no member of the study team / Guide who participated in voting / decision making process. The ethics committee is organized and operated according to the requirements of Good Clinical Practice and the requirements of the Indian Council of Medical Research (ICMR).

Sincerely,

Dr. G. Srinivas
Member Secretary, IEC

MEMBER SECRETARY
INSTITUTIONAL ETHICS COMMITTEE (IEC)
SCTIMST, THIRUVANANTHAPURAM

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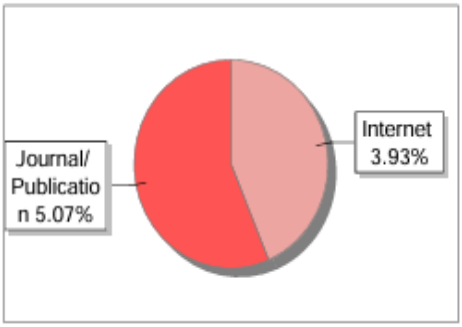
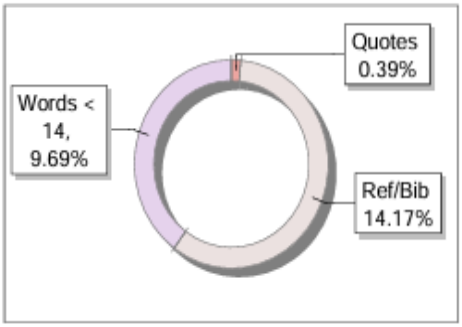
Submission Information

Author Name	Ananthakrishnan KR
Title	Prevalence of overweight and obesity among college going young adults in Trivandrum district,Kerala
Paper/Submission ID	1729107
Submitted by	manjun@sctimst.ac.in
Submission Date	2024-05-02 10:27:20
Total Pages	58
Document type	Thesis

Result Information

Similarity **9 %**





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Quotes	Excluded
References/Bibliography	Not Excluded
Sources: Less than 14 Words %	Not Excluded
Excluded Source	**16 %**
Excluded Phrases	Not Excluded

Database Selection

Language	English
Student Papers	Yes
Journals & publishers	Yes
Internet or Web	Yes
Institution Repository	Yes

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