TELEVISION VIEWING AND BODY-MASS-INDEX

AMONG   SCHOOL GOING ADOLESCENTS OF

THIRUVANANTHAPURAM CORPORATION, KERALA

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Dissertation submitted in partial fulfillment of the requirements for the

award of the degree of Master of Public Health

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CERTIFICATE

Certified that the dissertation titled **'Television viewing and body-mass-index among school going adolescents of Thiruvananthapuram Corporation, Kerala'** is a bonafide record of original research work undertaken by Dr.Deepti Joy in partial fulfillment of the requirements for the award of the degree of Masters of Public Health under my guidance and supervision.

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DECLARATION

I here by declare that this dissertation titled **'Television viewing and body-mass-index among school going adolescents of Thiruvananthapuram Corporation, Kerala'** is the result of original research and has not been submitted for the award of any degree/diploma at any other university or institution of higher education.

Thiruvananthapuram, Kerala   Deepti Joy

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CONTENTS

APPENDIX

ANNEXURE I (Parent consent forms in English and Malayalam)
ANNEXURE II (Assent forms in English and Malayalam)
ANNEXURE III (Questionnaires In English and Malayalam)

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Background: Childhood obesity is on the rise even in the developing countries and is strongly correlated to adult morbidity and mortality due to cardiovascular risk factors. Role of television as a contributor to childhood and adolescent obesity is being increasingly identified in the West.

Objective: The aim of the present study was to find out whether there is any association between TV viewing, along with computer and video games to the adolescent BMI in Thiruvananthapuram Corporation.

Methodology: Multi stage stratified cluster random sampling of 520 students from 7th to 9th standard. Data collected using self-administered questionnaire. Height and weight were measured using standardized and validated instruments.

Results: Television viewing is significantly associated with adolescent overweight/obesity (O.R. 13.159, 95% CI 7.87-21.99). Increased screen viewing time (television viewing time/day, computer use /day and sedentary video gaming /day) is also associated with overweight/obesity among adolescents (O.R.13.333, 95% CI 7.96-22.33). Routine physical activity is protective against overweight/ obesity in the study population (O.R.0.402, 95% CI 0.187-0.864). Dietary factors did not appear to be different in the overweight/obese students and non-overweight/ non-obese students in the study population.

Conclusion: Increased television viewing, computer use and sedentary video gaming along with reduced physical activity and higher socio economic status contributed to overweight and obesity in the study population. Dietary factors did not appear as significant contributors to overweight and obesity in this study population.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

Overweight and obesity are considered as abnormal or excessive fat accumulation that presents a risk to health and is a major risk factor for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. It has been defined by WHO in adults, in terms of body mass index (BMI), as more than or equal to 25 kg/m^2 as overweight and more than or equal to 30 kg/m^2 as obesity. However a BMI of 21 or more is considered to increase the risk of chronic diseases in populations.

WHO's projections indicate that globally approximately 1.6 billion adults (age 15+) were overweight and at least 400 million adults were obese and atleast 20 million children under the age of 5 years were overweight in 2005.WHO further projects that by 2015, approximately 2.3 billion adults will be overweight and more than 700 million will be obese [1,2].

The fundamental cause of obesity and overweight is considered an energy imbalance between calories consumed on one hand, and calories expended on the other. Globally the factors identified to cause this increase in overweight and obesity have been mainly a shift globally towards consumption of energy dense diet which is low in vitamins, minerals and micronutrients and a trend towards decreased physical activity due to changed life styles[1]

1.1.1 Overweight and obesity in the developing world

The problem of chronic and non-communicable diseases is rising much more rapidly in the developing than in the industrialized countries. Obesity and overweight, which is a major risk factor for this, was once considered a problem of high-income countries, but is now on the rise in low and middle-income countries as well, particularly in the urban settings. The World Health Organization estimates that by the year 2020, non-communicable diseases will account for three quarters of the deaths taking place in the developing world[3].Thus these countries are facing the "double burden" of infectious diseases and malnutrition on one hand and chronic diseases and it's risk factors such as overweight and obesity on the other[2].

1.1.2 Obesity epidemic in India.

There is growing trend of non-communicable diseases in India, which is attributed to growing urbanization, industrialization and changed life style[4].Although the prevalence of overweight and obesity is one of the lowest in India[3], its actual number in view of the very large population it has, is very high and this poses a major economic burden on the country. Also, the actual distribution of prevalence of overweight and obesity is quite variable from state to state. The states with the highest prevalence of adult overweight and obesity being Punjab followed by Kerala according to NFHS 3 data. There is also evidence of urban –rural divide in prevalence of overweight and obesity in adults, with the NFHS 3 data showing the prevalence of overweight and obesity as 28.9%, 22.2%, 8.6% and7.3% in urban women, urban men, rural women and rural men respectively.

1.2 REVIEW OF LITERATURE

1.2.1 The Emerging problem of childhood overweight and obesity

World wide there is an increasing prevalence of childhood obesity [5]. The rise in childhood obesity is a concern since there is an associated increase in the metabolic syndrome, which is a major risk factor for chronic diseases. In the western countries the prevalence of childhood obesity and overweight has more than doubled in the past generation [6,7]. In 2003-2004, 17.1% of US children and adolescents were overweight . Trend analysis showed an increase in the prevalence of overweight in female children and adolescents from 13.8% in 1999-2000 to 16.0% in 2003-2004 and an increase in the prevalence of overweight in male children and adolescents from 14.0% to 18.2% [8]. The rise in prevalence has also been observed in the last twenty years even in the developing countries like India, Mexico, Nigeria [9]. There is an increasing concern about this because there is lot of evidence in literature showing that childhood and adolescent overweight is more strongly correlated than adult overweight to premature death and also to morbidity and mortality due to dyslipidemia, hypertension, Type 2 diabetes mellitus, coronary heart diseases, arthritis and behavioral problems in later life [10,11]. World health report 2002 indicates a disturbing trend in the increase in the prevalence of high BP, obesity, smoking, alcohol and low physical activity in the developing countries [12] which were earlier more prevalent in the developed countries. Thus growing prevalence of childhood obesity has become an important public health concern world over including India [13]. A recent study by Roya Kelishadi points to the escalating trends in the childhood

overweight and obesity in the developing world and a need for uniform criteria to assess the problem inorder to develop primordial and primary prevention to address the problem of chronic diseases in the devloping world [3].

1.2.2 Childhood Overweight and Obesity in India

Although under nutrition is still a problem in the country and most of the national programs in India focus on childhood undernutrition , the problem of childhood overweight and obesity is not alien to us. There is ample literature from different parts of the country suggesting a rising trend of overweight and obesity, thus leaving the country to fight with the double burden of over nutrition and under nutrition. The prevalence is higher in the urban as compared to rural areas. Studies from Punjab, South India, Delhi, Maharashtra showed the prevalence of overweight and obesity to be high (varying from 11% to 29%) [14].These studies used BMI cut off values as per James et al [15]. A study on 1208 school students of Hyderabad in 2003 among 12 to 17 year olds found that 6.1% and 1.6% of boys and 8.2% and 1.0% of girls were overweight and obese respecively and that socio economic status and television viewing were significantly associated [16].The prevalence of overweight and obesity was determined by the definitions by International Obesity Task Force which is as per the charts by TJ Cole et. al [17]. Among the 9 to 15 year old age group of Ludhiana, Punjab the prevalence of overweight and obesity was 11 % and 14% respectively. In Delhi a study on 500 private school children in 2002 from the age 4 to 18 years found the prevalence of obesity to be 29% and in Chennai the prevalence of overweight and obesity was 17% and 3%

respectively. In Chennai children from high, middle and low socioeconomic status were included while at other place children from high socio economic status were only included.In Bangalore, the prevalence of prevalence of obesity and overweight among affluent adolescent girls in the age group nine to eighteen years ws 4.5% and 13.1% respectively in the year 2006 using the US CDC[18] growth charts for determining the cut off BMI[19]. As far as the urban –rural divide is concerned , in Ludhiana, Punjab, among 11 to 17 year adolescents the urban prevalence of overweight was 11.6% and rural prevalence was 4.7%[14],thus suggesting that obesity is more a problem in the urban than in rural areas in India. All these studies used BMI as an indicator of childhood risk and presence of overweight as it is a relatively easy and accurate, however it is more specific and less sensitive for adolescents and children[20].

1.2.3 Obesity and lifestyle

Life style plays a very important role both in the prevention and development of chronic diseases. The rising trend in childhood and adolescent overweight and obesity has been attributed to changed lifestyle like decreased physical activity and increased calorie intake. With increasing industrialization less energy is being expended on activities of daily living and even at work[21,22].A number of factors have been studied which contribute both to increased calorie intake and decreased physical activity. This change in lifestyle is a concern because many of the habits and patterns developed especially in adolescence tend to continue into adulthood and even become worse[9]. Although the chronic diseases associated with physical inactivity occur in middle aged and older

adults, their development starts in childhood and adolescence[23]. Some other factors like family history and weight of parents also influence the weight of the children[24] but it is easier to intervene in the life style factors.

Even reduced sleep has been reported to contribute to increased obesity both via hormonal and other mechanisms. The suggested mechanisms include increased tiredness among people who sleep less and thus decreased physical activity due to increased tiredness. Others include low leptin and increased ghrelin, which contributes to, increased hunger and selection towards high energy expending food [25]. A study on children 8 to 16 years enrolled for third National Health And Nutrition Examination Survey (NHANES) showed that family environment especially parental overweight was related to obesity in children. The overweight youth were less likely to participate in sports teams and exercise programs compared to non-overweight. Another interesting finding was that normal weight females tend to watch less TV and came from larger families and normal weight males belonged to higher income families as compared to overweight counterparts [24].

The nutrition transition has been more in terms of easy availability of refined food, food rich in saturated fat and sugar[26]. This nutrition transition is seen in low and middle-income countries as well. The decrease in physical activity has been in terms of comfortable mode of transport, increased indulgence in sedentary activities. There was a recorded drop in the participation of adolescents in the physical education classes in school. The 1995 Youth Behavior Risk Survey reported that 59.6% of students from 9th

to 12th grade participated in physical education classes, which dropped to 48.8% by the year 1997 [24].The decrease in physical activity has been associated with risk factors for chronic diseases, overweight, skeletal defects and even mental health [27]. Studies have suggested that active life style during childhood and adolescence contributes to optimal growth and development into adulthood [21,28].

1.2.4 Obesity and Media

Although many risk factors for obesity /overweight were identified earlier, the influence of behavioral risk factors like television watching on obesity or overweight has been studied only in the recent years. There have been studies showing influence of television viewing on people's behavior and children's mind; however its role as a risk factor for overweight/obesity was looked into only later and much of the literature comes from the west. Along with television, computing and video gaming are also identified as other popular leisure time activities which are sedentary [29]. Studies on television's role in overweight and obesity are quite scarce from the developing world. There are also studies from the west, which have looked at television viewing as a possible contributor to obesity independent of physical activity [29,30]. These studies found that in the last twenty years there have been not much change in the physical activity levels of the youth but the prevalence of overweight and obesity among them was rising [31,32,33]. In United States and Europe there is evidence of increasing television viewing among the youth [29,34]. From the year 1993 to 2003 there has been an insignificant change in the vigorous physical

activity and inactivity among the high school students in United States but there has been

a trend towards increased TV watching among the youth [32,33]. A study in Finland from

late 1980s to late 1990s also indicated the same trend of small but steady increase in TV

watching among the surveys [34]. There has been an increasing interest to find out any

associations between duration of physical activity i.e. those who watch more TV tend to

involve in less physical activity but studies mostly have proved that there is only a very

small association between both. Increased TV viewing has been found to contribute to

increased snacking on unhealthy food [35] often influenced by advertisements on TV,

which leads to increased energy intake. These studies suggested an association of

television viewing with low fruit and vegetable intake apart from increased intake of food

containing high sugar and high fat [36,37,38].A study on adult females found that females

who weigh within the normal range tend to watch less TV than their overweight parts [39].

1.2.5 Television and Lifestyle

TV viewing is increasingly considered as a significant life style factor, which consumes

time next only to sleep and work [39]. In United States it was found that adolescents spend

more time a year watching TV than the time they spend at school. Also typical adult

averages of TV viewing were found to be four hours per day[39].Dietz and Gortmarker

found that obesity increased with increased TV viewing among 6-11 and 12 to 17 year

olds [40]. Different studies have found different cut off hours for TV viewing which is

significantly associated with increase in prevalence of obesity which is relevant to the

study population like three hours for males, four hours for women and children [41]. A study on adult women found that each 2hour/day increase in TV viewing was associated with 23% increase in obesity and 14% increase in diabetes mellitus type 2.These studies found that TV viewing was significantly associated with obesity and diabetes mellitus type 2 independent of the physical activity [42].

However a study on media influence on adolescent eating behavior showed that increased TV viewing did not influence the adolescent's breakfast eating pattern or the snacking pattern but influenced their thought on health when deciding what to eat, which meant that TV viewing made adolescents more health conscious [43]. Also the association of television watching with obesity has not been uniformly consistent and some studies could not find a relationship between the two, thus creating a need for further studies [44,45]

1.2.6 Computer and overweight /obesity

Like television, computer use is also becoming a common sedentary activity among children and adolescents and have reportedly entered the homes and schools around the same time as the rise in prevalence of childhood obesity .One study showed that those children with access to home computers tend to watch less television as compared to the children without access to home computers. However another study reported that there was no difference between the groups because many of the websites gave information on various programs aired on TV and hence the hours of TV viewing may actually increase with access to home computers. An accurate knowledge about the TV and computer use

among the youth population may help to understand the trends in sedentary behavior among them [46].

1.2.7 Video Gaming and overweight/obesity

Another sedentary activity, which could also be contributing to increase in the prevalence of overweight and obesity especially in children could be video gaming. A study shows that TV and video gaming in children contributed to increased fast food eating in children, which also meant that it could be contributing to overweight and obesity through unhealthy eating [47].Video games are available in the Indian market for quite some time now but it's role as a possible contributor to adolescent over weight and obesity is yet to be studied. Video games can be either physically inactive or physically active types. The latter contributes to increased energy expenditure. Thus understanding the role of video games in adolescent body mass index requires the identification of the type of video game used by the adolescent.

1.2.8 Children and Media influence

In the early adolescence there is a steep decline in physical activity [48,49,50] and increase in media exposure and unhealthy dietary behavior [51,52]. All of them or a combination of one or two may be true for a country and the knowledge of these patterns and mechanisms is necessary to design interventions which would be most effective in dealing with childhood obesity.

The American Academy of Pediatrics (AAP) has recommended guidelines for parents, communities, pediatricians and federal government on the television use by children and adolescents[53]. They have recommended on the restriction on total media entertainment among children and adolescents to not more than 1-2 hours per day[53]. Apart from obesity, other identified harmful effects of excessive TV watching have been violence, aggressive behavior, early onset of sexual activity and substance abuse[53]. Another study in United States reported a high prevalence i.e. 65% of the adolescents in the age group 8-18years to have a TV in their bedroom[54]. Not only the adolescents but about one-third of the preschool children in United States below the age of 6yrs had a TV in their own bedroom[55]. However such reports for the developing world are lacking. Neither are there any recommendations for limiting television watching hours both for children and adults.

1.3 RATIONALE FOR THE STUDY

Though India is a country combating the problem of under-nutrition, obesity among children and adolescents is also an emerging problem . Kerala is a state in India with admirable health status in terms of low infant mortality rate, maternal mortality rate and longest life expectancy. However, the last 30yrs has seen a remarkable transition in Kerala and the state is in stage 3 of it's epidemiological transition. It has the highest prevalence of cardiovascular diseases in the country, obesity being one of the very important risk factors for the same6. NFHS 3 data shows that Kerala has second highest prevalence of overweight and obesity among adults in the country, next only to Punjab. The prevalence of overweight and obesity being 40.1%.28%, 30.9% and 26.9%

in urban women, urban men, rural women and rural men respectively. Obesity is also rising among children and adolescents ,although data on that is lacking in the NFHS reports . Life style change is a significant contributor to this rising trend.

The state also has a high prevalence of media exposure of 97% among men and 90% among women respectively as compared to the national averages of only 80% and 65% in men and women respectively. Although this may bring increasing awareness among people, one wonders if this is at the cost of an excessive use of media and trend towards low physical activity. The NFHS 3 data shows prevalence of overweight and obesity only among adults, but figures on adolescent overweight and obesity lacking. In the light of the current knowledge on non- communicable disease, the knowledge of adolescent overweight and obesity may be more important in designing primary and primordial prevention of risk factor in a state which has the highest prevalence of coronary artery disease in the country. Although there are a few studies from different parts of Kerala reporting the prevalence of overweight and obesity across various age groups, none have looked into the effect of media such as television, computer, video games on this growing childhood and adolescent overweight and obesity. Since we know that the media exposure is quite high in the state as compared to the national averages, it would be worth while studying the effect of media in the growing overweight and obesity in the state especially among adolescents. Hence my study which is aimed at looking at the association between time spent on media such as television computer and video games with adolescent overweight and obesity.

Various data from literature review have suggested that the prevalence of overweight and obesity is more in the urban settings in the developing world and also the media exposure is also found more in the urban settings. . Thiruvananthapuram is the capital of Kerala state, and represents the urban population. Though there are no typical villages in the state, but still the urban- rural divide exists as is evident from the NFHS 3 data. Considering the above facts, I chose to restrict my study to Thiruvananthapuram Corporation, which is the true urban area of Thiruvananthapuram district.

1.4 AIMS AND OBJECTIVES

Aim: The aim of the present study was to find out the association of time spent on television viewing and other media like computer and video gaming with adolescent overweight and obesity in Thiruvananthapuram Corporation, Kerala

OBJECTIVES

Major objectives

•To find out whether there is an association between hours of television viewing and BMI (increased TV watching to increased BMI) among 7th to 9th standard school going adolescents of Thiruvananthapuarm Corporation.

•To study the patterns of TV watching in the study population.

•To find out the average hours of TV watching /day that has significant association with subjects in the topmost quartile of BMI distribution of the study population

Minor objective

To find out the patterns of physical activity and diet in the study population with respect to their BMI.

CHAPTER 2

METHODOLOGY

2.1 STUDY DESIGN

2.1.1   Cross sectional survey.

2.1.2   **Study setting**

Study was conducted in schools of Thiruvananthapuram Corporation, Kerala . Thiruvananthapuram is the capital of Kerala state, which includes both urban and rural areas. Since I wanted to study the effect of media such as television, computer and video games on adolescent overweight and obesity, which would be more used by the adolescents in the urban areas, I chose to restrict my study to the Corporation limits of the district which is an urban setting.

2.1.3 Sampling frame

All the adolescents studying in classes 7th, 8th and 9th in the schools in Thiruvananthapuram Corporation were included in the sampling frame. Kerala is a state with the highest literacy rate in the country and almost all the adolescents go to schools. Thus school going adolescents are representative of the adolescent population of the study area

 For my study, I chose to restrict to school going adolescents of 7th to 9th standard for the homogeneity of the sample**.** I excluded standard 10th from my sampling frame since these students are generally under the pressure from both their teachers and parents to study, as they have to appear for various board exams. Therefore these students may be

under forced restriction of physical activity. This could bring a possible bias in the study and may not give a true picture of the adolescent behavior in the area.

2.1.4 Sample Size

Sample size calculation: By assuming a prevalence of overweight/obesity as 10%, precision 40%, sample size needed, calculated using Epi info stat calc 6 was 216. Although an earlier study had found the prevalence of overweight and obesity as 5.5% for adolescents in the district, a higher prevalence was assumed in this study since it was restricted to the urban settings

The sample size was doubled to adjust for the design effect, as it was a cluster sampling. An additional 20% was taken considering some non-response.

Thus final sample size came out to be 520 students

2.1.6 Sample selection procedures

Sample was selected by multistage stratified cluster random sampling

After obtaining permission from the Deputy Director of education, Thiruvananthapuram

.Step 1: List of government, aided and unaided schools of Thiruvananthapuram Corporation was made. All schools with affiliation to state syllabus, CBSE, ICSE were included in the sampling frame. Since the 7th standard came under upper primary and 8th and 9th standard came under high schools in institutions affiliated to the state syllabus, I included both upper primary and high schools in my sampling frame. A list of the

strength of students in each class in various schools was obtained and the schools with strength less than 20 were excluded from the sampling fame.

Step2: Stratified random sampling of schools was done: Schools were taken from government, aided and private. Total of 12 schools were selected.

Step 3: List of all divisions of the classes from 7th to 9th of the selected schools was made.

Step 4: Class divisions were selected in the required number by simple random sampling and students of the selected class divisions were recruited for the study.

Written consent of the parents was obtained after the selection of class divisions and few days prior to conducting the study. Consent forms were sent home with the students, to be signed by their parents /guardians if they are consented to let their ward participate in the study. These forms had to be returned on or prior to the day of study. On the day of the study, a written assent from those students whose guardians also had consented was taken.

2.2 DATA COLLECTION:

Information on television (**TV**) watching, computer use, video gaming, physical activity and diet were obtained through self-administered questionnaire. The questionnaire was pre-tested and translated into Malayalam. Both English and Malayalam questionnaires were used for this study. Height and weight measured using Seca scales for height and

weight (details in section 2.2.2).

2.2.1 Data collection techniques

The institute ethics committee had approved the study protocol prior to the commencement of the study. Verbal consent of the heads of the selected schools were taken and written consent from both parents and student themselves of the selected class divisions were taken. The data was collected from June to September 2008. The principal investigator herself collected the data. The survey was carried out using a pre-tested questionnaire. The questionnaire consisted of six sections. (i) On general information, included personal identification particulars, educational qualification of parents, number of siblings, possessions at home. (ii) Questions on details of TV viewing consisted of hours of TV watched on various days of the week. List of programs they watched on a weekday and weekend, the period of the day when they watch television on most days and the most frequent activity they did while watching TV. (iii) Questions on computer use (iv) Questions on video gaming. (v) Questions on physical activity. (iv)Questions on dietary habit using food frequency questionnaire with a list of 23 items Food items were carefully chosen, based on their local availability and familiarity to students.

2.2.2 Measurement of overweight and obesity:

Body-mass-index (BMI) has been used as an indicator for adolescent and childhood overweight and obesity in most of the studies world over especially for surveys, because of it's relative ease of measurement and fair accuracy. However, it is less

sensitive and more specific for adolescent overweight and obesity. The World Health Organization has recommended the use of age and sex specific, uniform international BMI cut offs for measuring childhood and adolescent overweight and obesity as given by TJ Cole et al, which can be used for surveys.

Hence for this study also BMI cut offs for overweight and obesity as recommended by TJ Cole et al was used. BMI was calculated using the formula {weight (in Kilograms)}/{height (in metre)}^{2}

Height and weight for calculating the BMI were taken using standardized and validated instruments.

- Height (in cms) was measured using stadiometer : SECA Model No.881 1321009 which is up to 0.1 cm accurate.

- Weight (in kgs) was measured using SECA electronic weighing scale no.807 with an accuracy of up to 0.1kg.

2.3 VARIABLES
The following predictor (independent) and outcome (dependent) variables were studied.

2.3.1 Predictor/ independent variables

Television watching hours/day

Patterns of TV watching

Hours of computer use/day

Hours of video gaming/day

Hours of outdoor games /day

Hours of routine physical activity/day

Hours of indoor games /day

Dietary pattern of the student (main food groups)

Total screen viewing time /day

Total outdoor activity/ day

Total physical activity/ day

2.3.2 Dependent / outcome variable

Body mass index (BMI)

2.4 PROCEDURE FOR EACH MEASUREMENT

2.4.1 Anthropometric measurements: height and weight of each student was measured by a trained assistant in the presence of the principal investigator using the standard equipments.

Hieght: was measured after fixing the Seca scale against the wall at a height of 2metres.The student was asked to stand straight against the wall with the feet touching the ground and heels slightly separated. Heel, back and buttocks were in contact with the vertical wall. Head was positioned in such a way that the child looks directly forwards with the Franfurt's plane (the line joining floor of external auditory meatus to the lower

margin of orbit) and biauricular plane is horizontal. The head piece was kept firmly over the vertex to compress hair.

Weight: weight was taken on Seca electronic scale with accuracy up to 0.1kg. Weight was taken after removing the shoes.

2.4.2 Information on the independent variables were obtained from students by means of a self administered questionnaire, which was administered to students after explaining the information to be filled.

TV viewing hours/day: Information on hours of TV viewing was obtained for Sunday, last holiday, Saturday, yesterday and last working day. A list of programs a student watched on Monday and Saturday was obtained to check for the internal consistency of the answers filled and also to obtain information on the kind of programs the students watched..

Patterns of TV watching: Information was obtained regarding the most frequent activity the student does while watching TV and the time slot during which they watched maximum TV on most of the week days

Hours of computer use/day: Information on time spent on computer the previous week along with the most frequent activity they did on computer was obtained. Hours of computer use /day was calculated from the total hours of computer used in the previous week by dividing it by 7.

Hours of video gaming/day: Information on the hours spent on video gaming in the previous week along with the type of game most frequently played that is sedentary or physically active was obtained.

Hours of outdoor games/day: information on time spent on outdoor games was collected.

Hours of indoor games/day: information on time spent on indoor games was collected.

Hours of routine physical activity/ day: Questions regarding whether the students had some sort of routine physical activity and if yes, the type of activity and the duration per day was obtained. A sum of the time spent on all the routine physical activity /day was taken to calculate the total hours of routine physical activity/day.

Dietary pattern of the student: Information on whether the student was a vegetarian or a non- vegetarian and how frequently he or she consumed a list of 23 commonly available food items in the past month and also the how frequently ate lunch or dinner from outside was obtained.

Socio economic status: Certain proxy variables were used for socio economic status like type of school. Information on possession of certain articles like television, computer, video game, DVD player, internet facilities, personal mobile phone and a separate TV in the student's own bed room were also collected which were used as proxy variables for socioeconomic status.

2.5 DATA ENTRY AND ANALYSIS

Data entry and cleaning was done in Epi data 3.1 by the principal investigator herself.

For data analysis SPSS version 15 was used.

For the analysis of each factor the variables were calculated and few new variables created :

TV viewing hours/day: To calculate the average hours of TV watched / day, a mean of the duration of TV watched on Sunday, Saturday, last holiday and last working day was taken.

Hours of computer use/day: Hours of computer use /day was calculated from the total hours of computer used in the previous week by dividing it by 7.

Hours of video gaming/day: Hours of video gaming /day was calculated from the total hours of computer used in the previous week by dividing it by 7.

Hours of outdoor games/day: this was obtained from the hours spent on outdoor games in the previous week and dividing it by 7(for the number of days in the week)

Hours of indoor games/day: this was obtained from the hours spent on indoor games in the previous week and dividing it by 7(for the number of days in the week)

Hours of routine physical activity/ day:. A sum of the time spent on all the routine physical activity /day was taken to calculate the total hours of routine physical activity/day.

Total screen viewing time: This compound variable was created taking the total of the daily TV watching hours along with daily computer hours and daily hours of sedentary computer gaming. Those who did not use any one or all of the particular items were given '00' for that particular component and the compound variable was calculated by taking a sum of the remaining variables.

Total outdoor physical activity/ day: this was calculated by taking the sum of average outdoor games /day and average hours of routine activity /day. Those who did not indulge in any particular item used in the calculation of the variable were given '00' for that particular variable and the compound variable was calculated using the sum of the remaining components

Total physical activity/ day: this was calculated by taking a sum of average hours of outdoor games/ day along with hours of routine activity per day and hours of physically active video gaming/ day. '00' was assigned for those components for which no time was spent and the compound variable was calculated using the remaining components.

Diet was analyzed by giving scores to the frequency of each food item consumed in the list of 23 items in the previous one month. Scores were given from 0 to 7. Zero for food items never consumed in the last one month and 7 for those food items consumed

>6time/day in the previous one month.Scores of I, 2, 3, 4,5, 6 were given for frequencies of occasionally,1-3 times/week, 4-6 times/week, once/day, 2-3 times/day, 4-5times/ day respectively. Information on whether the student is vegetarian or non-vegetarian was collected. Frequency of eating lunch and dinner from outside was also collected in the food frequency questionnaire. Also the frequency of consumption of fruits and vegetables was also included in the food frequency questionnaire.

CHAPTER 3

RESULTS

3.1 SAMPLE CHARACTERISTICS:

3.1.1 The sex, type of school and standard wise distribution of the total sample covered in the present study is given in Table 1.

Table 1. Distribution of the total sample as per sex, type of school, and class

	FREQUENCY	PERCENT
MALE	282	54.2
FEMALE	238	45.8
TOTAL	520	100.0
GOVERNMENT	AIDED	PRIVATE
196(37.7%)	90(17.3%)	234(45%)
7TH STD	8TH STD	9TH STD
83(16%)	207(39.8%)	230(44.2%)

3.1.2 Religion: Of the 520 students covered, 387(74.4%) were Hindus, 89(17.1%) were Christians and 44(8.5%) were Muslims.

3.1.3 Age, Height, Weight and BMI: The mean, median, minimum- maximum for age, height and weight and BMI is given in Table 2.

Table 2.The mean and median age, height, weight and BMI of students

	MIN	MAX	MEAN	MEDIAN
AGE (YRS)	10.67	16.25	13.38 ± 0.93	13.42
HEIGHT (CMS)	130.1	183.5	155.58 ± 8.15	155.2
WEIGHT (KG)	19.2	96.0	46.17 ± 10.67	45.5
BMI (KG/M^2)	11.34	35.64	18.92 ± 3.39	18.48

3.1.4 Educational qualification of parents: Educational qualification of the parents was collected as: up to 10th standard, up to 12th standard, up to graduation, post graduate and professional. Education up to 10th standard included those who are illiterate or those educated less than 10th standard. The frequencies in each of these categories are given in Table 3.

Table 3. Educational qualification of parents

EDUCATION	FATHER	MOTHER
UPTO 10TH	191 (36.7%)	181 (34.8%)
UPTO 12TH	87 (16.7%)	114 (21.9%)
GRADUATION	149 (28.7%)	150 (28.8%)
POST GRADUATE/PROF	93 (17.9%)	75 (14.4%)
	520 (100%)	520 (100%)

3.1.5 Siblings: The number of siblings each student had ranged from 0-7 with a median of 1.

3.1.6 Possessions at home: Table 4. The proportion of students who had television, computer, video games at home. The proportion of students who had an additional TV in their bedroom 6.78% of the total TV possessors. Of the total sample 279 (53.7%) had either a DVD player or a home theatre and 114(21.9%) had their own personal mobile phones.

Table 4: Possessions at home in the total sample.

POSSESSIONS AT HOME					
	TELEVISION		COMPUTER		VIDEO GAME
	TOTAL TV POSSESSORS	TV IN BED ROOM	TOTAL	INTERNET	
YES	501 (96.3%)	34 (6.78%)	202 (38.8%)	105 (52%)	144 (27.7%)
NO	19 (3.7%)	467 (93.2%)	318 (61.2%)	97 (48%)	376 (72.3%)
N	520	501	520	202	520

3.1.7 BMI categorization: BMI was classified using TJ Cole et al's age and sex specific chart to classify the adolescents into obese, overweight and non-overweight/non obese.

The adolescents in each category of BMI are given in Table 5 and the proportion of overweight and obesein both males and females is given in Table 6.

Table 5. Proportion of overweight, obese and non-overweight in the study sample

BMI CATEGORIES(T.J. COLE ET. AL. CHART)		
0VERWEIGHT	**OBESE**	**OTHERS**
87(16.7%)	7(1.3%)	426(81.9%)

Table 6: Proportion of boys and girls who are overweight/obese.

	Boys n=282	**Girls n=238**
Obese/overweight	53(18.8%)	41(17.2%)

3.1.8 Descriptive of various activities in the study population: The descriptive for

various activities in the study population is given Table 7

Table7: The descriptive statistics of various activities in the study population.

ACTIVITY	MIN	MAX	MEAN	MEDIAN
Average hours TV watched /day	0	9.75	2.95$\pm$1.66	2.63
Hours of computer use/day	0	4.86	0.21$\pm$0.43	0.07
Hours of video gaming /day	0	1.43	0.08$\pm$0.19	0
Hours of sleep at night/day	5	11	7.55$\pm$0.99	7.7
Hours of routine physical activity/day	0	9	1.16$\pm$1.34	0.75
Hours of outdoor games /day	0	3.43	0.37$\pm$0.49	0.21
Hours of indoor games /day	0	3.43	0.20$\pm$0.29	0.14
Total screen viewing time /day	0	10.04	3.21+1.78	2.96
Total outdoor physical activity/day	0	10.07	1.53$\pm$1.59	1.05
Total physical activity/day	0	10.07	1.56$\pm$1.62	1.07

3.2 PATTERNS OF TV VIEWING AND OTHER MEDIA

3.2.1 Maximum TV watching hours concentrated in a weekday: In a weekday, the adolescents watched maximum TV after 8pm (figure 1), which was true for both boys and girls. However the second most commonly viewed slot was between 5pm to 8 pm for boys whereas it was just after school till 5pm for girls. The schools here get over by 3.30 pm and the timings are similar across all schools. The most frequent time slots where maximum TV is watched by boys and girls is given in figure 2 and 3 respectively

Figure: 1 Time slot when maximum TV watched by the adolescent in a weekday

maximum TV watching hurs concentrated in a day(N=520)
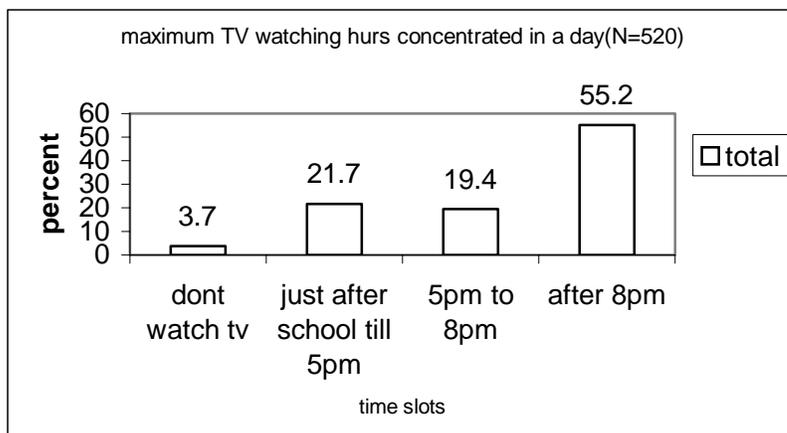
Figure 2: Maximum TV watching hours in a weekday among boys (n=282)
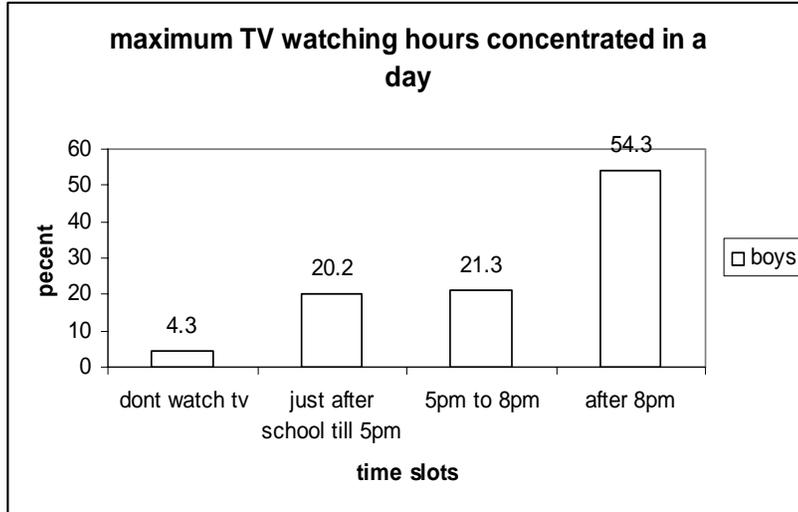
Figure 3: Maximum TV watching hours in a weekday among girls(n=238)
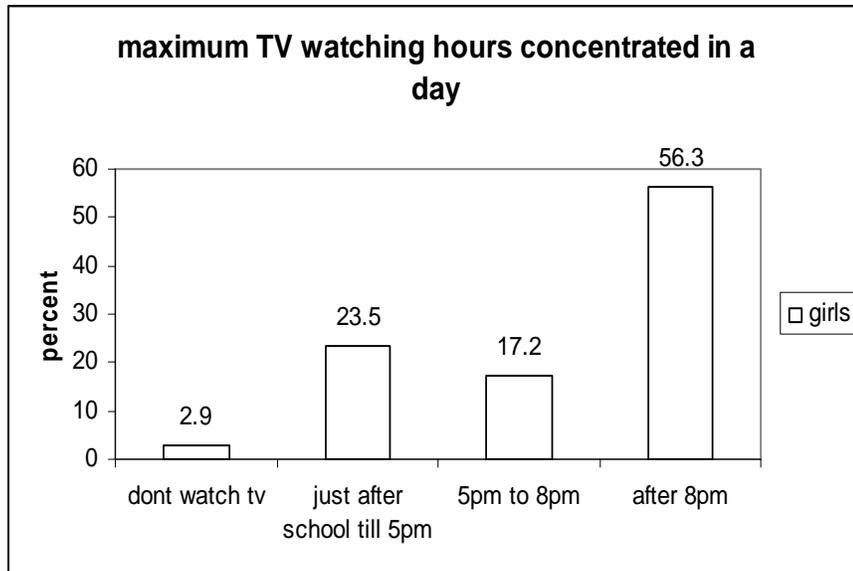
3.2.2 Most frequent activity while watching TV: The most frequent activity while watching TV was 'chatting with family' both boys and girls. Other frequent activities

and their distribution in the adolescents and separately in boys and girls is given in figure 4, 5 and 6 respectively.

Figure 4: Most frequent activity while watching TV among adolescents (N=520)
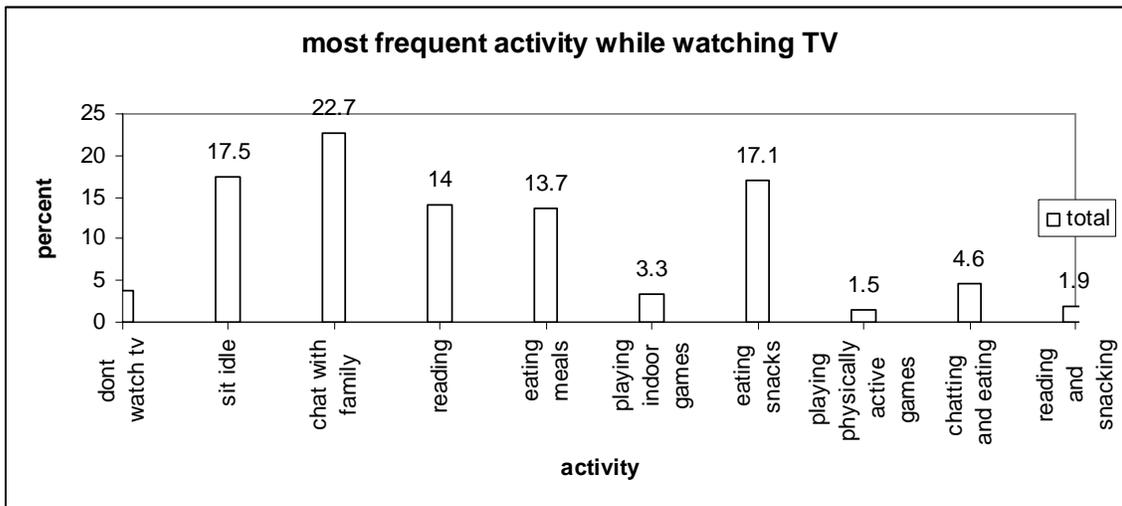
Figure 5: Most frequent activity while watching TV among boys(n=282)
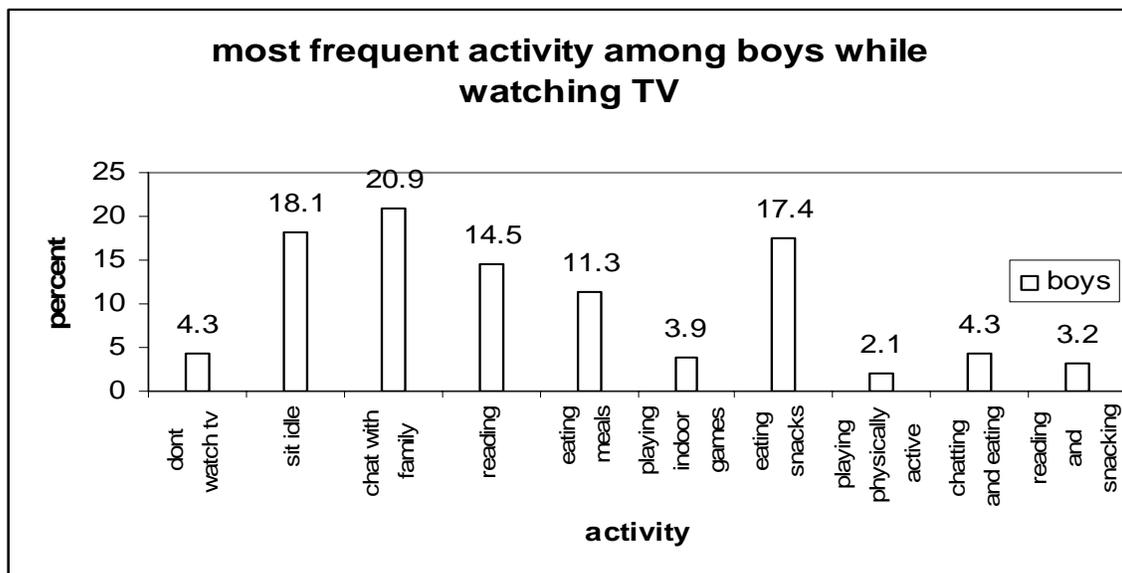
Figure 6:Most frequent activity while watching TV among girls (n=238)

Most frequent activity while watching TV
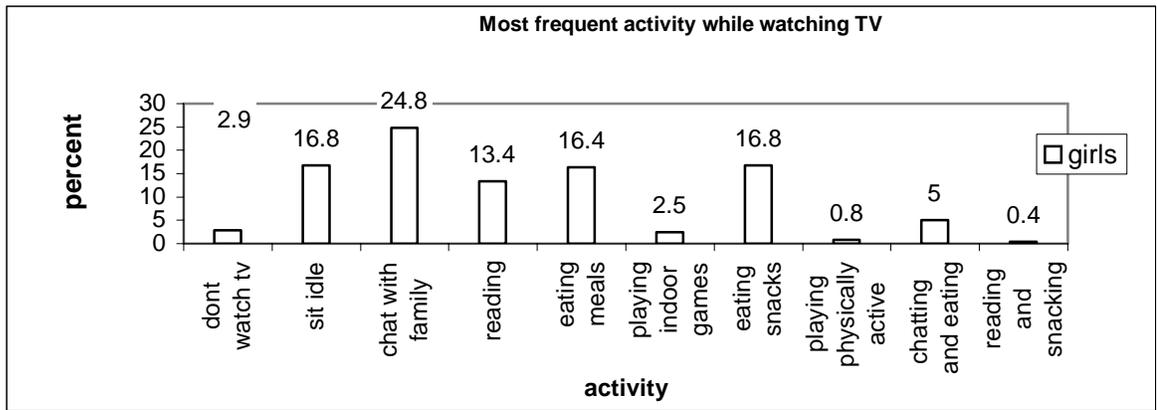
3.2.3 Programs watched on weekday and weekend: The percentage of various categories of programs viewed by adolescents on TV on a weekday (Monday) and weekend (Saturday) is given in figure 7. The other popular categories of programs included reality shows and sports.

Figure 7: Percentage of adolescents viewing each of the categories of the programs on a Saturday and Monday (N=520).
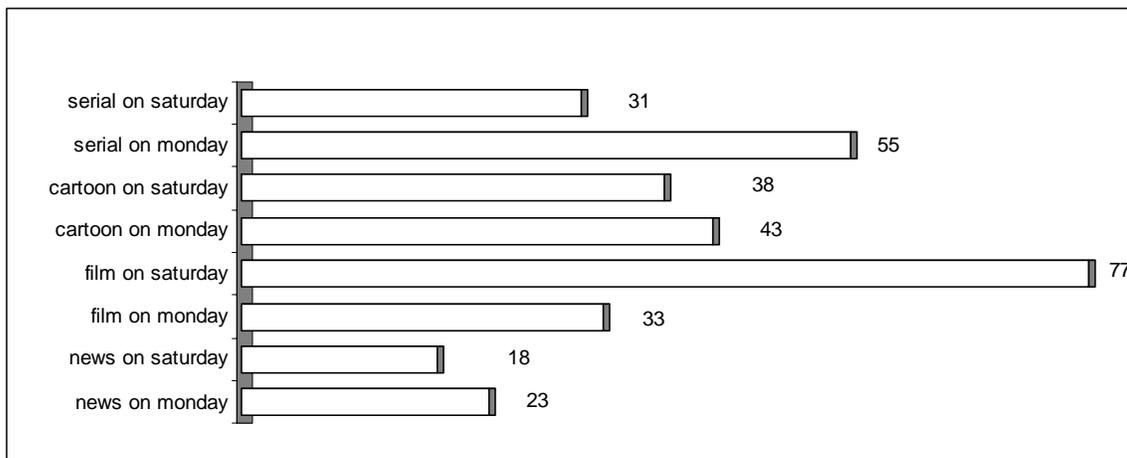
3.2.4 Patterns of computer use:

Types of computer use in the study population and in boys and girls is given in Table8.

Table 8:Types of computer activity in total study population, boys and girls respectively

	Total(N= 520)	Boys(%)(n=282)	Girls(%)(n=238)
no computer use	222(42.7%)	43.6	41.6
games	216(41.5%)	36.5	47.5
surf net	52(10%)	9.6	10.5
classes/others	30(5.8%)	10.3	0.4
Total	520(100%)	**100**	**100**

3.2.5 Patterns of video gaming

The most frequent types of video gaming done in the total study sample and in boys and girls is given in table 9

Table 9.Types of video gaming among adolescents, boys and girls respectively.

type of video games	Total % (n=520)	Boys % (n=282)	Girls% (n=238)
no video gaming	70.2	63.5	78.2
physically active	10	12.8	6.7
physically inactive	19.8	23.8	15.1

3.3 BIVARIATE ANALYSIS

3.3.1 SOCIO- ECONOMIC STATUS: Since assessment of income from adolescents would have been difficult and inaccurate, proxy variables for socio economic status like school type, possessing TV and computer at home were used in bivariate analysis. The analysis of school category with BMI is given in Table 10. Analysis of possession of TV or computer at home and the BMI categories is given in Table 11. The OR of being overweight or obese among computer possessors Vs non-possessors is also calculated.

Table10: comparison of BMI of students studying in government and aided vs. private schools

BMI WITH SCHOOL CATEGORY (p=. 044*)		
	GOVT/AIDED	PRIVATE
N	286	234
MIN-MAX	11.343-35.649	12.148-33.454
MEAN	18.654 (SD3.307)	19.256 (SD3.479)
MEDIAN	18.224	19.014

Table 11: the proportion of overweight/obese among TV and computer possessors and non-possessors.

Possession	Yes		No		O.R (95% CI)
	n	Owt[+]/obese	n	Owt[+]/obese	
computer	202	54 (26.7%)	318	40 (12.6%)	2.54 (1.61-3.99)
television	407	94(18.8%)	19	0(0%)	

'[+]Owt' is overweight in the study population

3.3.2 Mother's education and BMI: Mother's education was re-categorized into those mothers educated up to 12th standard and those mothers educated more than 12th standard which included graduates, post graduates and professionals. The proportion of overweight and obesity among the adolescents with mothers having higher education was compared with those mothers who had lower education. Results are given in Table12.

Table 12. Mother's education and BMI categorization

VARIABLE NAME	12th standard and below		Graduation and above		O.R (95% CI)
	n	Obese/ Owt[+]	n	Obese/owt[+]	
Mother's education	295	41(13.9%)	225	53(23.6%)	1.909 (1.216- 2.998)

[+] Owt= 0verweight

3.3.3Various possible predictors of overweight and obeisty: Various predictor variables for overweight/obesity were identified and divided into quartiles and the students in the topmost quartile for each predictor variable were compared with students in the lower three quartiles of the distribution for their BMI categories. The ORs for

overweight /obesity in the topmost quartile of the predictor variable to the lower three quartiles were calculated. The results are given in Table 13.

Table 13: proportion of overweight/obese Vs non-overweight in the topmost and lower three quartiles of predictor variables

ACTIVITY	TOPMOST QUARTILE		LOWER 3 QUARTILES		O.R (95%CI)
	n	Obese/Owt[+]	n	Obese/Owt[+]	
Average TV hrs/day	127	65 (51.2%)	393	29 (7.4%)	13.159 (7.87-21.99)
Computer hrs /day	144	44 (30.6%)	376	50 (13.3%)	2.87 (1.81-4.56)
Hrs of routine Physical activity/day	88	8 (9.1%)	432	86 (19.9%)	.402 (.187-.864)
Hrs of outdoor games/day	126	18 (14.3%)	394	76 (19.3%)	.697 (.399-1.219
Hrs of indoor games /day	162	36 (22.2%)	358	58 (16.2%)	1.478 (.928-2.353)
Hrs of sleep at night /day	109	17 (15.6%)	411	77 (18.7%)	.802 (.452-1.423)
Total screen viewing time/ day	130	66 (50.8%)	390	28 (7.2%)	13.333 (7.96-22.33)
Total outdoor Physical activity/day	130	12 (9.2%)	390	82 (21%)	.382 (.201-.726)
Hrs of Total Physical activity/day	130	13 (10%)	390	81 (20.8%)	.424 (.227-.790)

+   owt = overweight

3.3.4 *FURTHER BIVARIATE ANALYSIS*: Further bivariate analysis was done dividing BMI of the study population into quartiles and comparing the topmost quartile of BMI distribution to the lower three quartiles for each of the predictor variables. Results of the analysis are given in Table 14.

Table 14: Comparison of median values of each variables between the topmost and lower three quartiles of BMI in the study population.

Comparison of topmost quartile of BMI with lower 3quartiles

Activity	Lower 3 quartiles (n=390)		Topmost quartile (n=130)	
	median	mean $\pm$ sd	median	mean $\pm$sd
Average TV hrs/day	2.31	2.57$\pm$1.49	4.06	4.11$\pm$1.6
Hrs of Routine PA /day	1	1.26$\pm$1.41	0.5	0.88$\pm$1.1
Hrs of outdoor games/day	0.21	0.39$\pm$0.53	0.14	0.27$\pm$0.34
Hrs of indoor games/day	0.14	0.19$\pm$0.26	0.14	0.24$\pm$0.38
Hrs of sleep at night /day	7.7	7.62$\pm$0.98	7.15	7.34$\pm$1.0
Hrs of computer use/ day	0.04	0.17 $\pm$0.33	0.14	0.34+0.60
Hrs of video gaming /day	0	0.08 $\pm$0.18	0	0.08$\pm$0.19
Total hrs of screen viewing time/day	2.54	2.79 $\pm$1.56	4.44	4.51$\pm$1.77
Total outdoor PA/day	1.14	1.66$\pm$1.68	0.80	1.49$\pm$1.2
Total PA/day	1.14	1.69$\pm$1.71	0.80	1.16$\pm$1.3

3.3.5 Diet and BMI: Out of the total study population 96.2%(500) were non-vegetarians and 3.8%(20) were vegetarians. Food frequency for various food items were given scores from 1 to 7 and the median scores for each food item was compared between the topmost quartile of BMI distribution with the lower three quartiles. The comparison of median frequencies for few of the commonly consumed food items across the two BMI groups is given in Table 15

Table 15:comparison of the topmost and lower three quartiles of BMI of the study population for median frequency of consumption of various food items

Comparison of the topmost and lower 3 quartiles of BMI for median frequencies of various food items. (The frequency value of each score is given in the key.)

Food items	Lower 3 quartiles		Topmost quartile		Key
	median	range	median	range	0=never
					1=occasionally
Fish curry	3	(0-7)	4	(0-5)	2=1-3time/wk
					3=4-6time/wk
Fish fry	2	(0-7)	3	(0-5)	4=once/day
Fruits	3	(0-7)	4	(0-7)	5=2-3time/day
					6=4-5time/day
Vegetables	4	(0-7)	4	(0-7)	7=6 or more time /day

3.4 MULTIVARIATE ANALYSIS:

Further multivariate analysis: Since BMI is a continuous variable we did a stepwise linear regression using the variables: average hours of TV watched per day, total hours of routine physical activity per day, possession of computer at home, hours of sleep at night and sex of the student to create a model. The R square was .319 and adjusted R square was.313. The ANOVA table for the same is given in Table 16.The regression table is given in Table 17.Most of the variation in the BMI can be explained by the average hours of TV watched/day. The standardized beta for average hours of TV watched/day is 0.480 when compared to other variables. Diet was not included in the model as the frequencies for most food items were similar for both obese/overweight Vs non-overweight /non obese.

Table 16.ANOVA table

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	1912.32	5	382.46	48.25	.000
	Residual	4074.53	514	7.93		
	Total	5986.86	519			

Table 17:Regression table for the final model

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	**Std. Error**	Beta	B	Std. Error
(Constant)	**20.48**	**.99**		20.75	.000
Average hours of TV watched per day	**0.98**	**0.08**	0.480	13.10	.000
Total hours of routine physical activity per day	**-0.35**	**0.10**	-0.139	-3.68	.000
Possession of computer at home	**1.06**	**0.26**	0.152	4.12	.000
Hours of sleep at night per day	**-0.53**	**0.13**	-0.154	-4.19	.000
Sex of the student	**-0.86**	**0.26**	-0.126	-3.33	.001

a Dependent Variable: Body mass index

CHAPTER 4

DISCUSSION AND CONCLUSION

4.1 DISCUSSION

The prevalence of overweight among adolescents of 7th to 9th standard was 16.7% and that of obesity was 1.3% in the corporation limits of Thiruvananthapuram district using the BMI cut off points as per TJ Cole et al's chart, which is age and sex specific adult BMI equivalents of $25kg/m^2$ and $30kg/m^2$ (used to classify overweight and obesity respectively) .The proportion of overweight and obesity was marginally higher among boys than girls with 18.8% of the boys and 17.2% of the girls being either overweight or obese.

Although there were no specific variables to indicate the socio economic status, certain proxy variables like type of school or the possession of a computer at home which are indicators of higher socio economic status were significantly associated with higher BMI. Mother's education educational status was also significantly associated with overweight or obesity among adolescents. Mothers who were graduates, post graduates and professionals were more likely to have overweight and obese adolescents than mothers who were educated up to 12th standard. This suggested that mother's education had a role to play in the adolescent's body –mass –index. Though a data on parent's occupation was not collected, this could be a reflection of educated mothers going out for work and hence not able to spend enough time with her child. The compensation for the same may

be done with various unhealthy foods. This could also be a mere reflection of higher socio economic status.

TV watching was found to be significantly associated with overweight and obesity. While comparing adolescents who watched > 3.875 hours of television /day with the adolescents who watched <=3.875 hours of television /day (these are the topmost and the lower three quartiles respectively of hours of television viewing), the chances of being overweight /obese was more in the group which watched more television (O.R.13.159, 95% CI 7.87-21.99). The average hours of TV watched /day was 4.06 in the topmost quartile of the distribution for BMI as compared to 2.31 hours in the lower three quartiles of the BMI in the study population.

While looking into the patterns of television viewing, 3.7% of the total study population did not watch TV. Among boys, 4.3% did not watch TV while 2.9% of the girls did not watch TV. Out of the total TV possessors, 6.78% had a separate TV in their own bedroom. The majority of the adolescents (55.2%) watched television after 8 pm. Both boys and girls watched maximum television after 8 pm. However the second most frequent TV watching slot happened to be between 5-8 pm for boys and 'just after school till 5 pm' for girls. Among boys the difference in TV watching between '5pm -8pm' slot and 'just after school till 8pm' was quite marginal. The most frequent activity the adolescents engaged in while watching TV was chatting with family members. This was true both for boys and girls. However, more girls (24.8%) than boys (20.9%) spent time

chatting with family members while watching TV. The most frequent program watched on Monday (weekday) was serial with 56% of the total study sample watching a serial on a weekday. The most frequently watched program on Saturday (weekend) was a film. However not much gender differences were observed in the patterns of TV watching in the study population.

Although only 38.8% of the adolescents in the study population had a computer at home, 57.3% of the total study population used computers. This is because they either had computer classes in school or they visited internet cafes to surf the net. Of the total computer possessors, 52% had an internet connection at home. The most frequent activity on computer among the adolescents who used computers was playing games. More proportion of girls spent time on computer, playing games than boys.

Only 29.8% of the study population had video games at home. Among the video game users the most common form of video gaming was sedentary, both in boys and girls. However more proportion of boys than girls played physically active video games. Those who were in the topmost quartile of computer use /day were 2.87(95% CI 1.81-4.56) times more likely to be overweight/obese as compared to computer users in the lower three quartiles of hours of computer use.

Those who were in the topmost quartile of the hours of routine physical activity/day(routine physical activity of more than 2hours /day) were less likely to be overweight /obese as compared to those in the lower three quartiles (< 2hours)of routine physical

activity (O.R. 0.402, 95% CI 0.187-0.864). Those adolescents who slept 8 or more hours /day at night (topmost quartile of the duration of sleep) in the study population were less likely to be overweight /obese as compared to the adolescents who slept less than 8 hours every night.

The total screen viewing time (sum of average time spent watching TV /day , hours of computer use/day and time spent playing sedentary video games /day) was significantly associated with overweight/obesity among adolescents(O.R. 13.33, 95% CI 7.96-22.33). The total physical activity /day was a sum of total routine physical activity/day, time spent on outdoor games /day and time spent on playing physically active video games /day. The more time spent on total physical activity/day was associated with lesser risk of developing overweight/obesity among adolescents (O.R 0.42, 95% CI .23-.79).

 Comparing the various predictor variables across the topmost and lower three quartiles of BMI distribution, the median TV watching hours/day and hours of computer use/day was higher in the topmost quartile of the BMI distribution. The median value for the total screen viewing time was 4.44 hours in the topmost quartile of the BMI distribution as compared to 2.54 hours in the lower three quartiles. The median value for the hours spent on outdoor games/day, hours on routine physical activity/day was lower in the topmost quartile of BMI distribution as compared to the lower three quartiles. The median hours of total physical activity in the topmost quartile of BMI distribution was 0.80 hours as

compared to 1.14 hours in the lower three quartiles. The time spent on physical activity in this study population was very low as compared to their TV viewing hours.

Comparing the dietary behavior of the adolescents in the topmost and the lower three quartiles of the BMI distribution, the median scores of the frequency of intake of most of the food items appeared similar except for fish curry, fish fry and fruits. The median frequency of fish fry consumption was 4-6 times/week in the topmost quartile as compared to 1-3 times/week in the lower three quartiles. The median frequency of consumption of fish curry and fruits was once /day in the topmost quartile of the study population as compared to 4-6 times/day in the lower three quartiles. There was no difference in the median frequency of consumption of vegetables between the two groups. The median frequency of vegetable intake in the population was once /day. The median frequencies of most of the food items were not much different in both groups. The higher frequency of fruit intake in the group with higher BMI could actually be just a reflection of higher socio economic status. Since fruits are costlier they may be more consumed in richer families. Another possibility is that those who consume more of other unhealthy food items also tend to consume more fruits and vegetables as is reflected in some other studies.

Finally, a multivariate model was created using stepwise linear regression with BMI as a continuous outcome variable and average hours of TV watched per day, total hours of routine physical activity per day, possession of computer at home, hours of sleep at

night and sex of the student as independent variables. This showed that average hours of TV watched/day and possession of computer at home were positively associated with BMI. The other factors such as hours of sleep at night, total hours of routine physical activity were negatively associated with BMI. Male sex was protective for BMI after adjusting for all other variables included in the model. The R square was 0.319and the adjusted R square was 0.313. Thus 32% of the variability in BMI can be explained by this model. The other 68% may be due to factors like family history, genetics or some other factors not captured in this study. Diet was not included in the model as the frequencies for most food items were similar for both obese/overweight Vs non-overweight /non obese.

4.2 CONCLUSION

The prevalence of overweight/obesity is 18.1% in the study population. The overall level of physical activity in the study population is quite low. Television viewing hours is significantly associated with adolescent overweight and obesity (O.R.13.16, 95% CI 7.87-21.99). Total screen viewing time (includes average hours of TV watched /day, average hours of computer used/day and average hours sedentary video gaming /day) of more than 4.24 hours (corresponds to the top most quartile of distribution) increases the risk of overweight and obesity (O.R 13.33, 95% CI 7.96-22.33).

Routine physical activity of more than 2 hours per day protects against overweight and obesity (O.R 0.40, 95% CI 0 .19-0.86). Total hours of physical activity/day (sum of routine physical activity/day, hours of outdoor games/day and hours of physically active

video games /day) of more than 2.35 hours /day(topmost quartile of it's distribution) is protective for overweight and obesity(O.R..42, 95% CI0 .23-0.79). Diet doesn't seem to be a significant factor contributing to overweight and obesity in this study population.

Limitations of the study:

- The information from students was collected using a self-administered questionnaire, except the measurement; hence there could be a reporting bias especially about diet.
- Since it's cross sectional study, we are not sure of the temporality. In other words whether less activity leads to obesity or reverse.

Strengths of the study:

- This is one of the earliest study in this part of the country in which community based adolescent behavior pattern has been studied especially with respect to TV watching.
- This study has also looked into computer gaming and both sedentary and physically active video gaming apart from television viewing not done in any previous studies from this part of the country.
- A single team carried out the entire study. Thus the inter observer bias is removed.
- Samples included students from all the socio economic strata.

4.3 RECOMMENDATIONS:

This study finds that there is a very strong association between television use, computer use and sedentary video gaming with overweight and obesity in the adolescents. Thus there is a very strong need to develop guidelines to restrict screen viewing time among adolescents especially television watching as has been done in western countries like America.

There is also a trend towards very low physical activity, which should be dealt at the earliest. Physical activity, more so, routine physical activity should be encouraged both at schools and at homes for adolescents.

Parental awareness and support, along with government policies and recommendations are needed to increase adolescent physical activity both at home and school respectively.

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<p style="text-align: center;">**Informed Consent Form**</p>
Achutha Menon Centre For Health Science Studies
Sree Chitra Tirunal Institut for Medical Sciences And Technology

<div style="text-align: right;">Date_____</div>

Dear Parent/ Guardian

 I am Dr. Deepti Joy, currently doing Master of Public Health (MPH) at Sree Chitra Tirunal Institute for Medical Sciences and Technology. I am doing a study on "Television viewing and body- mass index among school going adolescents Of Thiruvananthapuram" as a part of the course requirement.

The objective of my study is to find whether there is any association between increased television watching and increased body mass index i.e. to see if there is any relationship between the number of hours one spends watching TV and the chances of his/her being overweight or obese as calculated from ones body mass index.

 I would like to ask your son/ daughter regarding questions on their TV viewing habits along with some questions on diet and physical activity. I would also like to take their height and weight in order to calculate their Body Mass Index (BMI). The whole procedure may take 30-45 mins of your child along with his/her other classmates. There may be no direct benefit to your ward from this study but the information obtained from this study may help the adolescents as a whole. The information given by your ward will be kept confidential and will be used for research purpose only. The information will not be disclosed to anyone under any circumstance.

I have sought the permission of the school authorities for conducting the study. However participation in this study is purely voluntary. You are free to refuse the participation of your ward in the study.
Please tick your response:
☐ Yes, I am willing to let my ward participate in the above-mentioned study.
☐ No, I am not willing to let my ward participate in the above-mentioned study.

Signature of the parent/ guardian_____
Relationship with the child_____   Date _____

Incase of any queries, you may contact:
1.Dr. Deepti Joy, MPH Scholar, Achutha Menon Centre For Health Science Studies,
Sree Chitra Tirunal Institute For Medical Sciences and Technology,
Thiruvananthapuram. Phone no. 9947910566

2. Dr. Anoop Kumar Thekkuveettil, Member-Secretary
 Institutional Ethical Committee ,Sree Chitra Tirunal Institute of Medical Science and Technology, Thiruvananthapuram, Phone number 0471-2520256

Thank you.

<div align="center">സമ്മതപത്രം</div>

<div align="center">അച്യുതമേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്</div>

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി

തീയ്യതി:

പ്രിയപ്പെട്ട രക്ഷകർത്താവ്/മാതാപിതാക്കളെ

ഞാൻ ഡോ. ദീപ്തി ജോയ്, ഇപ്പോൾ മാസ്റ്റർ ഓഫ് പബ്ലിക് ഹെൽത്ത് കോഴ്സിന് പഠിക്കുന്നു. കോഴ്സിൻറ ആവശ്യത്തിലേയ്ക്കായി തിരുവനന്തപുരം നഗരസഭയിലെ സ്ക്കൂളിൽ പോകുന്ന കൗമാരക്കാരിലെ ടെലിവിഷൻ കാണുന്നതിനെ കുറിച്ചും ബോഡി മാസ്സ് ഇൻഡക്സിനെ കുറിച്ചുമുള്ള ഒരു പഠനം നടത്തുകയാണ്.

കൂടുതലായി ടി.വി കാണുന്നതും ഉയർന്ന ബോഡി മാസ്സ് ഇൻഡക്സും തമ്മിൽ ഏതെങ്കിലും ബന്ധമുണ്ടോ എന്നതാണ് പഠനലക്ഷ്യം. അതായത് ടി വി കാണുന്ന ദൈർഘ്യവും അമിതഭാരവും തമ്മിൽ ബന്ധമുണ്ടോ എന്ന് പരിശോധിയ്ക്കാനാണ്.

നിങ്ങളുടെ മകൻ/മകളോട് ടി.വി കാണുന്നതിനെ കുറിച്ചും, ഭക്ഷണശൈലിയെ കുറിച്ചും ശാരീരികാദ്ധ്വാനത്തെ കുറിച്ചും ചില ചോദ്യങ്ങൾ ചോദിക്കാൻ ആഗ്രഹിയ്ക്കുന്നു. ബോഡി മാസ്സ് ഇൻഡക്സ് കണക്കാക്കുന്നതിനായി ഉയരവും ഭാരവും കൂടി എടുക്കേണ്ടതായുണ്ട്. ഇത് പൂർത്തിയാക്കുന്നതിനായി ഏകദേശം മുപ്പത് മിനിറ്റ് മുതൽ നാല്പത് മിനിറ്റോളം എടുക്കും. ഈ പഠനത്തിൽ പങ്കെടുക്കുന്നത് കൊണ്ട് നേരിട്ട് ഒരു പ്രയോജനവും ലഭിക്കുന്നില്ല എന്നാൽ കൗമാരക്കാരിൽ മൊത്തം പ്രയോജനം ലഭിക്കുന്നതാണ്. നിങ്ങളുടെ കുട്ടി തരുന്ന വിവരങ്ങൾ തികച്ചും രഹസ്യമായി സൂക്ഷിക്കുന്നതും ഗവേഷണാവശ്യത്തിന് വേണ്ടി മാത്രം ഉപയോഗിക്കുന്നതുമാണ്. മറ്റാർക്കും തന്നെ വിവരങ്ങൾ കൈമാറ്റം ചെയ്യപ്പെടുന്നതുമല്ല.

സ്ക്കൂൾ അധികൃതരിൽ നിന്നും സമ്മതം വാങ്ങിയിട്ടുണ്ട്. ഈ പഠനത്തിൽ പങ്കെടുക്കുവാനോ പങ്കെടുക്കാതിരിക്കാനോ ഉള്ള സ്വാതന്ത്ര്യം നിങ്ങൾക്കുണ്ട്.

നിങ്ങളുടെ പ്രതികരണം രേഖപ്പെടുത്തുക.

☐ മുകളിൽ പറഞ്ഞിരിയ്ക്കുന്ന പഠനത്തിൽ എൻറ കുട്ടിയെ പങ്കെടുപ്പിക്കാൻ എനിക്ക് സമ്മതമാണ്.

☐ മുകളിൽ പറഞ്ഞിരിയ്ക്കുന്ന പഠനത്തിൽ എൻറ കുട്ടിയെ പങ്കെടുപ്പിക്കാൻ എനിക്ക് സമ്മതമല്ല.

മാതാപിതാക്കളുടെ /രക്ഷകർത്താവിൻറ ഒപ്പ് :

കുട്ടിയുമായുള്ള ബന്ധം   :   തീയ്യതി :

പഠനത്തെ സംബന്ധിച്ച് നിങ്ങൾക്ക് എന്തെങ്കിലും സംശയമുണ്ടെങ്കിൽ താഴെ പറയുന്നവരുമായി ബന്ധപ്പെടാവുന്നതാണ്.

1. ഡോ. ദീപ്തി ജോയി, എം.പി.ഹെച്ച് സ്റ്റുഡൻറ്, ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി, തിരുവനന്തപുരം, ഫോൺ: 99479910566

2. ഡോ. അനൂപ് കുമാർ തെക്കേവീട്ടിൽ, മെമ്പർ സെക്രട്ടറി, ഐ. ഇ. സി, ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി, തിരുവനന്തപുരം, ഫോൺ: 0471-2520256

<div align="center">നന്ദി</div>

<div align="center">

Informed Consent
</div>

Achutha Menon Centre For Health Science Studies
Sree Chitra Tirunal Institute for Medical Sciences And Technology

Good morning,

I am Dr. Deepti Joy, currently doing my Master of Public Health (MPH) at Sree Chitra Tirunal Institute for Medical Sciences and Technology. I am doing a study on "Television viewing and body-mass index among school going adolescents of Thiruvananthapuram" as a part of the requirement of the course.

The objective of my study is to find whether there is any association between increased television watching and increased body mass index i.e . to see if there is any relationship between the number of hours you spend watching TV and your chances of being overweight or obese as calculated from your body mass index. For this, I would like to ask you regarding your TV viewing habits along with your diet and physical activity. I would also like to take your height and weight, which will be used to calculate your Body Mass Index (BMI), which is a requirement of the study. The whole procedure may take 30-45mins along with other classmates of yours. There may be no direct benefit to you from the study but the information collected from you may help adolescents
 in the community as a whole. The information given by you will be kept confidential and will be used for research purpose only. The information will not be disclosed to anyone under any circumstance.

I have taken the consent of your parents to let you participate in the study. However participation in the study is purely voluntary. You may choose not to participate in the study if you don't want to. You may also withdraw from the study at any time after joining.
Please tick your response
☐ Yes, I am willing to participate in the above-mentioned study.
☐ No, I am not willing to participate in the above-mentioned study
Signature of the student_____   Date_____

Incase of any queries, you may contact:
1.Dr. Deepti Joy, MPH Scholar, Achutha Menon Centre For Health Science Studies,
Sree Chitra Tirunal Institute For Medical Sciences and Technology,
Thiruvananthapuram. Phone no. 9947910566

2.Dr. Anoop Kumar Thekkuveettil
 Member-Secretary
 Institutional Ethical Committee
Sree Chitra Tirunal Institute For Medical Science and Technology
Thiruvananthapuram
 Phone number 0471-2520256

Thank you.

അച്യുതമേനോൻ സെൻറർ ഫോർ ഹെൽത്ത് സയൻസ് സ്റ്റഡീസ്

ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി

സുപ്രഭാതം

ഞാൻ ഡോ. ദീപ്തി ജോയ്, ഇപ്പോൾ മാസ്റ്റർ ഓഫ് പബ്ലിക് ഹെൽത്ത് കോഴ്സിന് പഠിക്കുന്നു. കോഴ്സിൻറ ആവശ്യത്തിലേയ്ക്കായി തിരുവനന്തപുരം നഗരസഭയിലെ സ്ക്കൂളിൽ പോകുന്ന കൗമാരക്കാരിലെ ടെലിവിഷൻ കാണുന്നതിനെ കുറിച്ചും ബോഡി മാസ്സ് ഇൻഡക്സിനെ കുറിച്ചുമുള്ള ഒരു പഠനം നടത്തുകയാണ്.

കൂടുതലായി ടി.വി കാണുന്നതും ഉയർന്ന ബോഡി മാസ്സ് ഇൻഡ്ക്സും തമ്മിൽ ഏതെങ്കിലും ബന്ധമുണ്ടോ എന്നതാണ് പഠനലക്ഷ്യം. അതായത് ടി വി കാണുന്ന ദൈർഘ്യവും അമിതഭാരവും തമ്മിൽ ബന്ധമുണ്ടോ എന്ന് പരിശോധിയ്ക്കാനാണ്.

നിങ്ങൾ ടി.വി കാണുന്നതിനെ കുറിച്ചും, ഭക്ഷണശൈലിയെ കുറിച്ചും ശാരീരികാദ്ധ്യാനത്തെ കുറിച്ചും ചില ചോദ്യങ്ങൾ ചോദിക്കാൻ ആഗ്രഹിയ്ക്കുന്നു. ബോഡി മാസ്സ് ഇൻഡക്സ് കണക്കാക്കുന്നതിനായി ഉയരവും ഭാരവും കൂടി എടുക്കേണ്ടതായുണ്ട്. ഇത് പൂർത്തിയാക്കുന്നതിനായി ഏകദേശം മുപ്പത് മിനിറ്റ് മുതൽ നാല്പത് മിനിറ്റോളം എടുക്കും. ഈ പഠനത്തിൽ പങ്കെടുക്കുന്നത് കൊണ്ട് നേരിട്ട് ഒരു പ്രയോജനവും ലഭിക്കുന്നില്ല എന്നാൽ കൗമാരക്കാരിൽ മൊത്തം പ്രയോജനം ലഭിക്കുന്നതാണ്. നിങ്ങൾ തരുന്ന വിവരങ്ങൾ തികച്ചും രഹസ്യമായി സൂക്ഷിക്കുന്നതും ഗവേഷണാവശ്യത്തിന് വേണ്ടി മാത്രം ഉപയോഗിക്കുന്നതുമാണ്. മറ്റാർക്കും തന്നെ വിവരങ്ങൾ കൈമാറ്റം ചെയ്യപ്പെടുന്നതുമല്ല.

നിങ്ങളുടെ രക്ഷകർത്താക്കൾ/മാതാപിതാക്കളിൽ നിന്നും സമ്മതം വാങ്ങിയിട്ടുണ്ട്. ഈ പഠനത്തിൽ പങ്കെടുക്കുവാനോ പങ്കെടുക്കാതിരിക്കാനോ ഉള്ള സ്വാതന്ത്ര്യം നിങ്ങൾക്കുണ്ട്. ഈ പഠനത്തിൽ നിന്നും എപ്പോൾ വേണമെങ്കിലും നിങ്ങൾക്ക് പിന്മാറാവുന്നതാണ്.

നിങ്ങളുടെ പ്രതികരണം രേഖപ്പെടുത്തുക.

☐ മുകളിൽ പറഞ്ഞിരിയ്ക്കുന്ന പഠനത്തിൽ പങ്കെടുക്കാൻ എനിക്ക് സമ്മതമാണ്.

☐ മുകളിൽ പറഞ്ഞിരിയ്ക്കുന്ന പഠനത്തിൽ പങ്കെടുക്കാൻ എനിക്ക് സമ്മതമല്ല.

കുട്ടിയുടെ ഒപ്പ് :

തീയ്യതി :

പഠനത്തെ സംബന്ധിച്ച് നിങ്ങൾക്ക് എന്തെങ്കിലും സംശയമുണ്ടെങ്കിൽ താഴെ പറയുന്നവരുമായി ബന്ധപ്പെടാവുന്നതാണ്.

1. ഡോ. ദീപ്തി ജോയി, എം.പി.ഹെച്ച് സ്റ്റുഡൻറ്, ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി, തിരുവനന്തപുരം, ഫോൺ: 99479910566

2. ഡോ. അനൂപ് കുമാർ തെക്കേവീട്ടിൽ, മെമ്പർ സെക്രട്ടറി, ഐ. ഇ. സി, ശ്രീ ചിത്ര തിരുനാൾ ഇൻസ്റ്റിറ്റ്യൂട്ട് ഫോർ മെഡിക്കൽ സയൻസസ് ആൻറ് ടെക്നോളജി, തിരുവനന്തപുരം, ഫോൺ: 0471-2520256

നന്ദി

TELEVISION (TV)VIEWING AND BODY-MASS INDEX(BMI) AMONG SCHOOL GOING ADOLESCENTS OF THIRUVANANTHAPURAM CORPORATION

ID CODE_ _ _ _ _ _ _ _ _
SCHOOL CODE_ _ _ _ _
DATE_ _/_ _/_ _ _ _
DAY: MON/ ANYOTHER

SECTION A: GENERAL INFORMATION

1.	NAME	_ _	
2.	SEX	☐ 1. Male ☐ 2. Female	
3.	DATE OF BIRTH	_ _ / _ _ /_ _ _ _ (d d /mm/ year)	
4.	CLASS	☐ 1. 7th ☐ 2. 8th ☐ 3. 9th	
5.	DIVISION/SECTION	_ _ _ _ _	
6.	ADDRESS	_ _ _ _	
7.	PHONE NUMBER	_ _ _ _ _ _ _ _ _ _ _	
8.	RELIGION	☐ 1. HINDU ☐ 2. MUSLIM ☐ 3. CHRISTIAN ☐ 4. OTHERS_ _ _ _ _ _ (specify)	
8.1	COMMUNITY	☐1.SC ☐ 2.ST ☐ 3.OBC ☐4.OTHERS	

9.1	EDUCATIONAL QUALIFICATION OF: FATHER (please tick the box applicable to you)	☐ 1) UPTO 10TH STANDARD ☐ 2) UPTO 12TH STANDARD ☐ 3) GRADUATION ☐ 4) POST GRADUATION/PROFESSIONAL	
9.2	EDUCATIONAL QUALIFICATION OF MOTHER: (please tick the one applicable to you)	☐ 1) UPTO 10TH STANDARD ☐ 2) UPTO 12TH STANDARD ☐ 3) GRADUATION ☐ 4) POST GRADUATION/PROFESSIONAL	
10.	HOW MANY SIBLINGS DO YOU HAVE?	_ _	
11.	ON WEEKDAYS AT WHAT TIME DO YOU GET UP IN THE MORNING?	_ _ : _ _ am	
12.	ON WEEKDAYS AT WHAT TIME DO YOU GO TO BED AT NIGHT?	_ _ : _ _ pm	
13-18	DO YOU HAVE THE FOLLOWING ITEM(s) IN YOUR HOUSE? (please put 1= yes or 2=no in the appropriate boxes)	☐ 13) TELEVISION ☐ 14) COMPUTER ☐ 15) INTERNET ☐ 16) VIDEO GAME ☐ 17) DVD PLAYER/HOME THEATRE ☐ 18) MOBILE (YOUR PERSONAL)	

SECTION B. DETAILS ON TV VIEWING

(please include movies or programs seen on DVD/home theatre also)

19.	DO YOU HAVE ANOTHER TV IN YOUR HOUSE WHICH IS PLACED IN YOUR OWN BEDROOM?	☐ 1) YES ☐ 2) NO	

20.	ABOUT HOW MANY HOURS OF TV DID YOU WATCH YESTERDAY?	_ _ HOURS <u>or</u> _ _ _ MINUTES	
21	ABOUT HOW MANY HOURS OF TV DID YOU WATCH ON SUNDAY?	_ _ HOURS or _ _ _ MINUTES	
22.	ABOUT HOW MANY HOURS OF TV DID YOU WATCH ON LAST HOLIDAY?	_ _ HOURS or _ _ _ MINUTES	
23.	ABOUT HOW MANY HOURS OF TV DID YOU WATCH ON SATURDAY?	_ _ HOURS <u>or</u> _ _ _ MINUTES	
24.	ABOUT HOW MANY HOURS OF TV DID YOU WATCH ON LAST WORKING DAY?	_ _ HOURS <u>or</u> _ _ _ MINUTES	
25.	WHAT ARE THE PROGRAMS YOU WATCH ON MONDAY?	1)_ _ _ _ _ _ _ _ _ _ _ _ _ 2)_ _ _ _ _ _ _ _ _ _ _ _ _ 3)_ _ _ _ _ _ _ _ _ _ _ _ _ 4)_ _ _ _ _ _ _ _ _ _ _ _ _ 5)_ _ _ _ _ _ _ _ _ _ _ _ _ 6)_ _	
26.	WHAT ARE THE PROGRAMS YOU WATCH ON SATURDAY?	1)_ _ _ _ _ _ _ _ _ _ _ _ _ 2)_ _ _ _ _ _ _ _ _ _ _ _ _ 3)_ _ _ _ _ _ _ _ _ _ _ _ _ 4)_ _ _ _ _ _ _ _ _ _ _ _ _ 5)_ _ _ _ _ _ _ _ _ _ _ _ _ 6)_ _	
27.	WHEN IS YOUR MAXIMUM TV WATCHING HOURS CONCENTRATED IN A WEEKDAY?	☐ 1) JUST AFTER SCHOOL TILL 5PM ☐ 2) 5 PM TO 8 PM ☐ 3) AFTER 8 PM (please TICK only ONE ,that which is applicable to you)	

- 3 –
5688

| 28. | WHICH IS THE MOST FREQUENT ACTIVITY YOU DO WHILE WATCHING TV? | ☐1) SIT IDLE
☐2) CHAT WITH FAMILY MEMBERS
☐3) READING/ STUDYING
☐4) EATING ANY OF THE MAJOR MEALS
☐5) PLAYING INDOOR PHYSICALLY INACTIVE GAMES
☐6) EATING SNACKS
☐7) EXERCISING/PLAYING PHYSICALLY ACTIVE GAMES
☐ 8) CHATTING AND SNACKING
☐ 9) READING AND SNACKING | |

SECTION C. DETAILS ON COMPUTER USE

29.	ABOUT HOW MANY HOURS LAST WEEK DID YOU SPEND USING YOUR COMPUTER?	_ _ _ HOURS or _ _ _ _ MINUTES (add the number of hours you spent on each day in the week and write the total. If you haven't used the computer write 00 in both the blanks)	
30.	WHICH IS THE MOST FREQUENT ACTIVITY YOU DO ON YOUR COMPUER?	☐1) SURF THE NET ☐2) PLAY PHYSICALLY INACTIVE GAMES ☐3) CLASSES /OTHERS (need not answer ,if you haven't used the computer)	

SECTION D. DETAILS ON VIDEO GAMING

(skip this section, if you don't use video games)

31.	ABOUT HOW HOURS DID YOU SPEND LAST WEEK ON VIDEO GAMES?	_ _ _ HOURS or _ _ _ _ MINUTES (please add up the hours/ minutes you spent on video games on the days of the week and write the total)	
32.	WHICH IS THE MOST FREQUENT TYPE OF VIDEO GAME YOU PLAY?	☐1)PHYSICALLY **IN**ACTIVE GAMES ☐2)PHYSICALLY ACTIVE GAMES	

SECTION E. DETAILS ON PHYSICAL ACTIVITY

(please add up the duration for each day for each of the categories of activities and make sum of the duration for each category for the whole week)

33.	LAST WEEK, ABOUT HOW MANY HOURS/MINUTES DID YOU SPEND DOING OUT-DOOR SPORTS AND GAMES? **{Eg. basket ball, football, volley ball, badminton, shuttle cock, lawn shuttle, cricket, golf, lawn tennis, swimming etc}** (please write 00 if you haven't done any activity of this level in the whole week)	_ _ _ HOURS or _ _ _ MINUTES	
34.	LAST WEEK, ABOUT HOW MANY HOURS /MINUTES DID YOU SPEND DOING INDOOR SPORTS AND GAMES? **{Eg. chess, caroms, snake and ladder etc.}**	_ _ _ HOURS or _ _ _ MINUTES (please write 00 if you haven't done any activity of this level in the whole week)	
35.	ARE YOU DOING ANY PHYSICAL ACTIVITY ROUTINELY?(please TICK the one applicable to you)	☐1. YES ☐2. NO	
36-40	IF YES, WHAT EXERCISE(s) AND IT'S DURATION? (HOURS OR MINUTES PER DAY)		
36.	WALKING	_ _ _ _ HOURS or _ _ _ _ MINUTES	
37.	JOGGING	_ _ _ _ HOURS or _ _ _ _ MINUTES	
38.	RUNNING	_ _ _ _ HOURS or _ _ _ _ MINUTES	
39.	CYCLING	_ _ _ _ HOURS or _ _ _ _ MINUTES	
40.	MORE THAN ONE EXERCISES	_ _ _ _ HOURS or _ _ _ _ MINUTES	

41.	ARE YOU A VEGETARIAN/ NON VEGEARIAN?(PLEASE PUT 1= VEGETARIAN OR 2= NON-VEGETARIAN)	☐	

42.FOOD FREQUENCY TABLE: HOW OFTEN DID YOU EAT THE FOLLOWING FOOD ITEM(s) IN THE LAST 1 MONTH?(please TICK in the appropriate column. Only 1 entry per food item is allowed)

SN	Food item	A Never	B Occassionally	C 1-3 times /week	D 4-6 Times /week	E Once /day	F 2-3 Times /day	G 4-5 Times /day	H 6 or more Times /day
1	Fruit juices								
2	Soft drinks								
3	papad								
4	Any fried chips								
5	Mixture/ namkeen/wafers								
6	Puffs (veg/egg)								
7	Puffs (chicken/mutton/beef)								
8	Burger/pizzas/noodles								
9	Cakes/ pastries/ jams								
10	Ice creams								
11	Sweets/ chocolates								
12	Payasam								
13	Fish curry								
14	Chicken curry								
15	Fish fry								
16	Chicken fry								
17	Mutton								
18	Beef								
19	Pork								

SN	Food item	A Never	B Occassionally	C 1-3 times /week	D 4-6 Times /week	E Once /day	F 2-3 Times /day	G 4-5 Times /day	H 6 or more Times /day
	Food frequency table continued..								
20	Any fried rice								
21	Any biryani rice								
22.	Fruits								
23	Vegetables								
24	Lunch/dinner from hotel/ restaurant								

SECTION G. ANTHROPOMETRY
(TO BE FILLED BY THE INVESTIGATOR)

43.	HEIGHT (IN CENTIMETRES)		
44.	WEIGHT (IN KILOGRAMS)		
45.	BMI(IN KG/M^2)	_ _ ._ _	

തിരുവനന്തപുരം നഗരസഭയിലെ സ്ക്കൂളിൽ പോകുന്ന കൗമാരക്കാരിലെ ടെലിവിഷൻ കാണുന്നതിനെ കുറിച്ചും ബോഡി മാസ്സ് ഇൻഡക്സിനെ കുറിച്ചുമുള്ള ചോദ്യാവലി

തിരിച്ചറിയൽ നമ്പർ:.............

സ്ക്കൂൾ കോഡ്: :..............

തീയ്യതി	
ദിവസം: തിങ്കൾ/മറ്റുള്ള ദിവസം	

എ വിഭാഗം പൊതുവിവരങ്ങൾ		
1. പേര്:		
2. ലിംഗം:	1. ആൺ 2. പെൺ	
3. ജനനതീയ്യതി		
4. ക്ലാസ്സ്	1.ഏഴാം ക്ലാസ്സ് 2. എട്ടാം ക്ലാസ്സ് 3. ഒൻപതാം ക്ലാസ്സ്	
5. ഡിവിഷൻ/വിഭാഗം:		
6. വിലാസം		
7. ഫോൺ നമ്പർ:		
8. മതം:	1. ഹിന്ദു 2. മുസ്ലീം 3. ക്രിസ്ത്യൻ 4. മറ്റുള്ളവർ	
8.1ജാതി:	1. എസ്.സി 2. എസ്.റ്റി 3. ഒ.ബി.സി 4. മറ്റുള്ളവർ	
9.1 അച്ഛൻെറ വിദ്യാഭ്യാസയോഗ്യത:	1. പത്താംക്ലാസ്സ് വരെ 2. പന്ത്രണ്ടാംക്ലാസ്സ് വരെ 3. ബിരുദം 4. ബിരുദാനന്തബിരുദം/പ്രൊഫഷണൽ	
9.2 അമ്മയുടെ വിദ്യാഭ്യാസയോഗ്യത	1. പത്താംക്ലാസ്സ് വരെ 2. പന്ത്രണ്ടാംക്ലാസ്സ് വരെ 3. ബിരുദം 4. ബിരുദാനന്തബിരുദം/പ്രൊഫഷണൽ	
10. നിങ്ങൾക്ക് എത്ര കൂടെപിറപ്പുകളുണ്ട്?		
11. സാധാരണ പ്രവർത്തി		

ദിവസം രാവിലെ നിങ്ങൾ എത്ര മണിയ്ക്ക് എഴുന്നേല്ക്കും?	………………………Am	
12. സാധാരണ പ്രവർത്തി ദിവസം രാത്രി എത്ര മണിയ്ക്ക് കിടക്കും?	………………………Pm	
13. താഴെ പറയുന്നവ നിങ്ങളുടെ വീട്ടിൽ ലഭ്യമാണോ?	13. ടെലിവിഷൻ 14. കമ്പ്യൂട്ടർ 15. ഇൻറർനെറ്റ് 16. വീഡിയോഗെയിം 17. ഡി.വി.ഡി പ്ലേയർ/ഹോംതീയറ്റർ 18. മൊബൈൽ (സ്വന്തം)	

ബി വിഭാഗം ടി.വി കാണുന്നതിനെ കുറിച്ച്

19. നിങ്ങൾ കിടക്കുന്ന മുറിയിൽ ടി.വി. ഉണ്ടോ?	☐ ഉണ്ട് ☐ ഇല്ല	
20. ഇന്നലെ എത്ര മണിക്കൂർ നിങ്ങൾ ടെലിവിഷൻ കാണുന്നതിനായി ചിലവഴിച്ചു?	……………മണിക്കൂർ ………………മിനിറ്റ്	
21. ഞായറാഴ്ച്ചകളിൽ എത്ര സമയം ടി.വി കാണുന്നതിനായി ചിലവഴിച്ചു?	……………മണിക്കൂർ ………………മിനിറ്റ്	
22. കഴിഞ്ഞ അവധി ദിവസം നിങ്ങൾ ടെലിവിഷൻ കാണുന്നതിനായി എത്ര സമയം ചിലവഴിച്ചു	……………മണിക്കൂർ ………………മിനിറ്റ്	
23. ശനിയാഴ്ച്ചകളിൽ എത്ര		

സമയം ടി.വി കാണുന്നതിനായി ചിലവഴിയ്ക്കും	..............മണിക്കൂർ ....മിനിറ്റ്	
24. കഴിഞ്ഞ പ്രവർത്തിദിവസം ദിവസം നിങ്ങൾ ടെലിവിഷൻ കാണുന്നതി നായി എത്ര സമയം ചിലവഴിച്ചു	..............മണിക്കൂർ ....മിനിറ്റ്	
25. തിങ്കളാഴ്ച്ചകളിൽ കാണുന്ന പരിപാടികളുടെ പേരെഴുതുക?	1. 2. 3. 4. 5. 6.	
26. ശനിയാഴ്ച്ചകളിൽ കാണുന്ന പരിപാടികളുടെ പേരെഴുതുക?	1. 2. 3. 4. 5. 6.	
27. ഒരു പ്രവർത്തി ദിവസം എപ്പോഴാണ് നിങ്ങൾ ടി.വി കാണുന്നത്	1 സ്ക്കൂൾ വിട്ട് വൈകുന്നേരം അഞ്ച് മണി വരെ 2. അഞ്ച് മുതൽ എട്ട് മണി വരെ 3. എട്ട് മണിക്ക് ശേഷം	
28. ടി.വി കാണുമ്പോൾ നിങ്ങൾ സാധാരണ ചെയ്യുന്ന പ്രവർത്തികൾ എന്താണ്?	1. വെറുതെ ഇരിയ്ക്കും 2. കുടുംബാംഗങ്ങളുമായി സംസാരിയ്ക്കും 3. വായിയ്ക്കും/പഠിയ്ക്കും 4. ഭക്ഷണം കഴിയ്ക്കും 5. ശാരീരികാദ്ധ്വാനമാവശ്യമില്ലാത്ത കളികളിൽ ഏർപ്പെടും 6. ലഘുഭക്ഷണം കഴിയ്ക്കും	

	7. വ്യായാമം/ശാരീരികാദ്ധ്വാനമാവശ്യ മുള്ള കളികളിൽ ഏർപ്പെടും
	8. സംസാരിയ്ക്കുകയും ഒപ്പം ലഘുഭക്ഷണം കഴിയ്ക്കുകയും ചെയ്യും
	9. വായിയ്ക്കുകയും ഒപ്പം പഠിയ്ക്കുകയും ചെയ്യും
സി.വിഭാഗം കമ്പ്യൂട്ടർ ഉപയോഗത്തെ കുറിച്ച്	
29. കഴിഞ്ഞ ആഴ്ച്ചയിൽ എത്ര സമയം കമ്പ്യൂട്ടർ ഉപയോഗിയ്ക്കുന്നതിനായി ചിലവഴിച്ചു?	..............മണിക്കൂർ /........................മിനിറ്റ് (നിങ്ങൾ കമ്പ്യൂട്ടർ ഉപയോഗിച്ചിട്ടില്ലെങ്കിൽ 00 എന്നും ഉപയോഗിച്ചിട്ടുണ്ടെങ്കിൽ ഒരു ദിവസം എത്ര മാത്രം ഉപയോഗിച്ചിട്ടുണ്ടെന്നും അങ്ങനെ ഒരാഴ്ച എത്ര മാത്രമുപയോഗിച്ചെന്നും കൂട്ടിയെഴുതുക.)
30. കമ്പ്യൂട്ടറിൽ സാധാരണ നിങ്ങൾ എന്താണ് ചെയ്യുന്നത്? (നിങ്ങൾ കമ്പ്യൂട്ടർ ഉപയോഗിച്ചിട്ടില്ലെങ്കിൽ ഉത്തരം എഴുതേണ്ടതില്ല.)	1. ഇന്റർനെറ്റ് 2. ശാരീരികാദ്ധ്വാനം ആവശ്യമില്ലാത്ത കളികളിൽ ഏർപ്പെടും 3. കമ്പ്യൂട്ടർ ക്ലാസ്സ്, മറ്റുള്ളവ (വിശദമാക്കുക)
സി വിഭാഗം വീഡിയോ ഗെയിം ഉപയോഗത്തെ കുറിച്ച്	
(നിങ്ങൾ വീഡിയോ ഗെയിം ഉപയോഗിയ്ക്കുന്നില്ലെങ്കിൽ അടുത്ത വിഭാഗത്തിലേയ്ക്ക് പോകുക)	
31. കഴിഞ്ഞ ആഴ്ച്ചയിൽ നിങ്ങൾ എത്ര സമയം വീഡിയോ ഗെയിം ഉപയോഗിയ്ക്കുന്നതിനായി ചിലവഴിച്ചു?	..............മണിക്കൂർ /........................മിനിറ്റ് (ഒരു ദിവസം എത്ര സമയം ഉപയോഗിച്ചെന്നും അങ്ങനെ ഒരാഴ്ച്ച് എത്ര സമയം ഉപയോഗിച്ചെന്നും കൂട്ടി എഴുതുക)

32. വീഡിയോ ഗെയിം ഉപയോഗിയ്ക്കുമ്പോൾ സാധാരണ എങ്ങനെയുള്ള കളികളിലാണ് ഏർപ്പെടാറുള്ളത്?	1. ശാരീരികാദ്ധ്വാനം ആവശ്യമില്ലാത്ത കളികളിൽ ഏർപ്പെടും 2. ശാരീരികാദ്ധ്വാനം ആവശ്യമുള്ള കളികളിൽ ഏർപ്പെടും	
ഇ വിഭാഗം ശാരീരികാദ്ധ്വാനത്തെ കുറിച്ച് (ഓരോ ദിവസവും ശാരീരികാദ്ധ്വാനത്തിനായി എത്ര സമയം ചിലവഴിച്ചുവെന്നും കൂട്ടിയെഴുതുക)		
33. കഴിഞ്ഞ ആഴ്ച്ചയിൽ പുറമെയുള്ള കളികൾക്കായി എത്ര സമയം ചിലവഴിച്ചു? (ഉദാ: ടെന്നീസ്, സോക്കർ, ഫുട്ബോൾ, ബാസ്ക്കറ്റ് ബോൾ, ബാഡ്മിൻറൻ കബഡി, ഖോ– ഖോ തുടങ്ങിയവ)	..............മണിക്കൂർ. / ....മിനിറ്റ്	
34. കഴിഞ്ഞ ആഴ്ച്ചയിൽ അകത്തുള്ള കളികൾക്കായി എത്ര സമയം ചിലവഴിച്ചു? (ഉദാ: ചെസ്സ്, ക്യാരംസ്, പാമ്പും കട്ടയും മുതലായവ)	..............മണിക്കൂർ. / ....മിനിറ്റ്	
35. സാധാരണയായി നിങ്ങൾ ശാരീരികാദ്ധ്വാനത്തിൽ ഏർപ്പെടാറുണ്ടോ?	☐ ഉണ്ട് ☐ ഇല്ല	
ശാരീരികാദ്ധ്വാനത്തിൽ ഏർപ്പെടാറുണ്ടെങ്കിൽ ഏത് തരത്തിലുള്ള വ്യായാമത്തിലാണ് പങ്കെടുക്കുന്നതെന്നും അതിന് വേണ്ടി എത്ര സമയം ചിലവഴിയ്ക്കുമെന്നും എഴുതുക? 36. നടക്കുക	..............മണിക്കൂർ. / ....മിനിറ്റ്	

37. ജോഗ്ഗിംഗ്	.............മണിക്കൂർ. / ....മിനിറ്റ്	
38. ഓടുക	.............മണിക്കൂർ. / ....മിനിറ്റ്	
39. സൈക്ലിംഗ്	.............മണിക്കൂർ. / ....മിനിറ്റ്	
40. ഒന്നിൽ കൂടുതൽ വ്യായാമം ചെയ്യും	.............മണിക്കൂർ. / ....മിനിറ്റ്	
എഫ് വിഭാഗം ഭക്ഷണശൈലി		
40. നിങ്ങളുടെ ഭക്ഷണശൈലി ഏത് തരമാണ്?	1. സസ്യാഹാരി 2. മാംസാഹാരി	

41. താഴെ പറയുന്ന ഭക്ഷണപദാർത്ഥങ്ങൾ കഴിഞ്ഞ ഒരു മാസത്തിനുള്ളിൽ എത്ര മാത്രം ഉപയോഗിച്ചിട്ടുണ്ട്

ക്രമ നമ്പർ	ആഹാര പദാർത്ഥം	ഒരിയ്ക്കലുമില്ല	വല്ലപ്പോഴും	ആഴ്ച്ചയിൽ ഒന്ന് മുതൽ മൂന്ന് തവണ	ആഴ്ച്ചയിൽ നാലു മുതൽ ആറ് തവണ	ദിവസത്തി ലൊരിക്കൽ	ദിവസത്തിൽ രണ്ട് മൂന്ന് തവണ	ദിവസത്തിൽ നാലഞ്ച് തവണ	ദിവസത്തിൽ ആറോ അതിലധികമാ തവണ
1	പഴച്ചാറുകൾ								
2	സോഫ്റ്റ് ഡ്രിംഗ്സ്								
3	പർപ്പടകം								
4	വറുത്ത ചിപ്സ്								
5	മിക്സ്ച്ചർ/വേഫഴ്സ്/								
6	പഫ്സ് (മുട്ട, സസ്യം)								
7	പഫ്സ് (ചിക്കൻ , മട്ടൻ, ബീഫ്)								
8	ബർഗർ, പിസ്സാ, ന്യൂഡിൽസ്								

ക്രമ നമ്പർ	ആഹാര പദാർത്ഥം	ഒരിയ്ക്കലുമില്ല	വല്ലപ്പോഴും	ആഴ്ച്ചയിൽ ഒന്ന് മുതൽ മൂന്ന് തവണ	ആഴ്ച്ചയിൽ നാലു മുതൽ ആറ് തവണ	ദിവസത്തിലൊരിക്കൽ	ദിവസത്തിൽ രണ്ട് മൂന്ന് തവണ	ദിവസത്തിൽ നാലഞ്ച് തവണ	ദിവസത്തിൽ ആറോ അതിലധികമാ തവണ
9	കേക്ക്/പേസ്റ്ററീസ്/ജാം								
10	ഐസ്ക്രീം								
11	മിഠായി/ ചോക്ലേറ്റ്								
12	പായസം								
13	മീൻ കറി								
14	ചിക്കൻ കറി								
15	മീൻ വറുത്തത്								
16	ചിക്കൻ വറുത്തത്								
17	മട്ടൻ								
18	ബീഫ്								
19	പന്നിയിറച്ചി								
20	ഫ്രൈഡ് റൈസ്								
21	ബിരിയാണി								
22	പഴവർഗ്ഗങ്ങൾ								
23	പച്ചക്കറി								
24	ഹോട്ടലിൽ നിന്നോ റെസ്റ്റോറൻറിൽ നിന്നോ ഉള്ള ഉച്ചഭക്ഷണം /അത്താഴം								

ജി വിഭാഗം ശാരീരികയളവുകൾ (ചോദ്യകർത്താവ് പൂരിപ്പിക്കേണ്ടവ)		
42. ഉയരം	.... സെ..മി	
43. ഭാരം	................കി.ഗ്രാം	
44. ബോഡി മാസ്സ് ഇൻഡ്ക്സ്	....	