BMI observation of undergraduate students on watching television and sleeping hours

Submitted By

Sabrina Sultana Punom

16346047

A thesis submitted to the Department of Pharmacy in partial fulfillment of the requirements for the degree of
Bachelor of Pharmacy (Hons.)

Department of Pharmacy
Brac University
January, 2021

Declaration

It is hereby declared that

1. The thesis submitted is my own original work while completing degree at Brac University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material which has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

Student's Full Name & Signature:

Sabrina Sultana Punom
16346047

Approval

The thesis/project titled "BMI perception of undergraduate students on watching television and sleeping hour" submitted by Sabrina Sultana Punom (ID-16346047) of Spring 2020 has been accepted as satisfactory in partial fulfillment of the requirement for the degree of Bachelors of Pharmacy (Hons.) on 10th January, 2021.

Examining Committee:

Supervisor:
(Member)

_____

Dr. Afrina Afrose
Assistant Professor, Department of Pharmacy
Brac University

Program Coordinator:
(Member)

_____

Dr. Hasina Yasmin
Professor, Department of Pharmacy
Brac University

Departmental Head:
(Chair)

_____

Dr. Eva Rahman Kabir
Professor and Chairperson, Department of Pharmacy
Brac University

Ethics Statement

This study does not involve any kind of human and animal trial.

Abstract

One of the leading causes of morbidity and mortality worldwide is obesity. Since being overweight and obese makes a person susceptible to other chronic and life-long disorders that are likely to be associated. Nowadays, it is evident that abnormal BMI is very widespread and needs a great deal of attention from health authorities and all people around the world to prevent or cure obesity and other long-term obesity-related diseases. In order to collect data on their weight, height, duration of watching television and sleeping another required parameters, a well-stated and reviewed questionnaire was distributed among students between 20-28 years of age from different universities. In order to find out any relation between the parameters mentioned and their effects on BMI, this study was conducted. According to our results, it is clear that watching television and sleeping hour are not fairly linked to abnormal BMI, and sideways BMI can have an effect on other factors.

Keywords: BMI, watching television, sleeping hour, undergraduate students.

Dedication

Dedicated to my parents and my dear grandfather who has passed away recently.

Acknowledgement

The grace and blessings bestowed by the most glorious and merciful Almighty Allah is the justification for our strength and courage and which has driven me to go this far and to complete my studies with complete care. I pray and hope that my ambition is expressed in a positive way in this project.

This survey would have been impossible to execute without the support of several people, who are going to be acknowledged here.

First of all, I would like to express my sincere appreciation, gratitude and indebtedness to my supervisor, Dr. Afrina Afrose (Assistant Professor, Department of Pharmacy, University of Brac), without whom I would not be able to complete this survey peacefully. Her continuous encouragement and assistance toward the project has also allowed me to explore various fields that are interlinked with pharmacy. With all her patience, required feedback about my updated works and commitments, she has helped and mentored me to come this far.

I wish to put forward my sincere and intense gratitude to Dr. Md. Shaki Mostaid (Assistant Professor, Department of Pharmacy, Brac University) for his guidance during the project and also for teaching me a new set of applications in IBM SPSS software on the use and input of data. And also for being an inspiration and support to all of us to our honorable chairperson Dr. Eva Rahman Kabir.

Finally, I would also like to express my regards and appreciation to all the participants from various universities including Brac University who have given their valuable time and interest in all respects and helped me to work and complete my project.

Table of Contents **Page Number**

List of Tables **Page Number**

List of Figures **Page Number**

.

List of Acronyms

WHO	World Health Organisation
NIH	National Institute of Health
BMI	Body Mass Index
BP	Blood Pressure
WC	Waist Circumference
MR	Mendelian randomization
WHR	Waist Hip Ratio
HF	Heart Failure
SPSS	Statistical Package for Social Sciences

CHAPTER 1: INTRODUCTION

1.1 Background

The metric tool known as the Body Mass Index (BMI) can access the optimal nutritional value of individuals, and can be used effectively to verify and classify individuals who are underweight, average, overweight or severely obese. A change in the way people drink, eat, drive, sleep has been seen in the past decades, and these changes are found to be related to the c human body and body composition (Popkin et al., 2012). Scientists and researchers have linked many variables with the Body Mass Index, such as dietary habits and meal patterns, sedentary lifestyles, smoking, drinking, and physical activity. Some of the factors, however, work by either decreasing the BMI while others work by increasing the BMI. In people with BMI related to underweight it is important to raise their weight so that factors that increase weight are said to be acceptable and in people with BMI related to overweight and obese needs to decrease weight and therefore factors that decrease weight are said to be acceptable. Despite all these results, BMI measurement is said to be an unknown measure of body fat percentage testing because BMI does not indicate or provide us information about where the body fat is located or even where the percentage of body fat is higher than other locations (Nuttall, 2015).

1.2 Research gap

Most BMI-based studies have been performed on individuals from developed countries, and our analysis primarily focuses on individuals from one of the developing countries who are typically deprived of such research due to tremendous population diversity. However, our study covers one of Bangladesh's many diversities that is the student age group (20-28), who are the most conscious age group in terms of their weight and health. Previously most of the BMI-

based studies and analysis were done primarily among children or teenage groups and working men or groups of women. A very limited study was carried out among university adults aged 20-26 years, as they are typically not subjected to the parameters in developed countries, unlike in developing countries. In addition, due to the rapid change of our country's population, there is also a major question as to whether many age groups are getting the right nutrition, unlike developed countries where each age group has access to the right nutritious food. Additionally, we performed the research focusing specifically on the adults who, while being exposed to the criteria affecting their BMI, are often subject to intense research pressure and hardly have time to sit at home. Therefore, our analysis will also suggest if parameters that have been found to intensively increase or decrease can have a serious impact on BMI of the students who have a busy schedule and rarely get time to be laid off.

1.3 Objectives

The aim of this study is to see how different causal factors among Bangladesh's various university students can affect the BMI of an individual. However, the study's objective was limited to several parameters that have a broad range impact on the BMI. The survey was conducted uniformly among university students in Bangladesh between the age group of 20-28 and to relate the impact of watching TV and sleeping hours on the participant's BMI.

Objective 1 (M1): To check whether the BMI of students who do not watch TV or watch for a long time are affected.

Objective 2 (M2): To check whether the BMI of students who sleep more or less than enough time are affected.

1.4 Significance of the study

In developing countries like Bangladesh, underweight or overweight are almost similarly prevalent, and both conditions are related to increased mortality and morbidity. Thus, productive government and public health initiatives therefore need to be done to identify and mark these circumstances so that preventive steps can be taken as soon as possible. It has been found that Bangladesh has undergone an enormous transformation in epidemiology and demography over the past 20 years, suggesting the increase in levels of various diseases such as cardiovascular diseases, diabetes , cancer, etc. that are somehow interlinked with irregular BMI.

CHAPTER 2: LITERATURE REVIEW

2.1 BMI

An annual study found that there is an obesity epidemic in the United States. The study reveals that one sixth of the children are obese and children are obese or overweight between the ages of 6-19. As a result, it has been reported that comorbid diseases that were once seen only in adults such as diabetes, hypertension, dyslipidemia and cholesterol are now commonly seen in the youth population and pediatrics due to obesity in early adulthood.

Being overweight can mean having excess body fat, excess muscle and bone volume or extra body fluids where being obese means having more than enough body fat. A useful way to calculate whether a person is obese or overweight is by means of the Body Mass Index which is also known as the BMI. It is a common and currently used metric to assess and categorize the characteristics of individuals' anthropometric height / weight into some groups such as underweight, average, overweight, obese (which is further divided into class I, class II and class III).However, it is certain that BMI is a poor and rough method for body fat indication since we cannot capture details about where the tissues of the fat body are more in number or more packed (2015 by Nuttall). People from both developed and developing countries face different health problems related to obesity, and social media use has been reported as one of the major causes of obesity in adolescents and children (Robinson et al., 2017).

Being overweight or obese has significant social effects. Discrimination among youths can be seen which can cause them to be socially and emotionally fractured. Societal discrimination limits job choices and therefore, obese people have minimal work opportunities. Societal marginalization also often impairs a person's ability to interact and discover his or her abilities or other intellectuality; therefore, they remain inferior to others. Likewise, obese people frequently have limited pools of mates because they are not typically selected because of their

unattractiveness and thus they are often required to marry obese people (Katzmarzyk et al., 2002).

The following table reflects the different categories of BMI chart:

Table 1: *Body Mass Index Categorization (according to WHO)*

Underweight	15 – 19.9
Normal Weight	20-24.9
Overweight	25-29.9
Class I obesity	30-34.9
Class II obesity	35-39.9
Class III obesity	≥40

2.2 Body fat deposition and location:

One of the drawbacks and disadvantages of BMI is that it does not give us details regarding the location of the body fat deposition, which is indeed one of the most important variables in evaluating the metabolism and mortality rate impacts of fat accumulation (VAGUE, 1956). The author also said that fat accumulation in the upper part of the body posed higher risks to individuals and made them more vulnerable to diseases such as cancer, gout, coronary heart disease and gallstones whereas individuals with lower body fat accumulation, such complications were not really vulnerable to.

It's also found that both girls and boys stay slim until they hit puberty age. Girls have fat deposition near the peripelvic and thigh regions, in comparison to boys. And besides that,

during puberty age, boys develop lean mass (muscle and bone), rather than fat tissue. The metric method, BMI recognizes and represents those changes (Silbert et al., 1983).A research performed showed that WHR (Waist Hip Ratio) is related to the endocrinological reproductive status of females and other associated health risks. The research was conducted to investigate whether humans have a cognitive and sensory use of WHR to access the characteristics of female appearance, youthfulness, attractiveness and reproductive potential. It's said all over the world to believe that women with low WHR are more beautiful and look good. It also justifies them for having more reproductive ability than those with a higher WHR ratio (Singh, 1993).

2.3 Maintaining a healthy and normal BMI:

It is crucial for all of us to maintain a safe and adequate weight and BMI and to avoid getting into the loop of various health-related diseases, as we now know that one disease may be connected to another. For example, having diabetes or high sugar levels can lead to hypertension, which can further contribute to more serious cases and cause heart disease and strokes. People are at a higher likelihood of developing such diseases if they are overweight or obese, for instance, high blood pressure, respiratory disorders, gallstones, type 2 diabetes and even various cancers. Therefore, to remain fit and healthy, we should look forward to maintaining a balanced lifestyle.

2.4 Factors affecting BMI:

2.4.1 Genetic Predisposition

Children born with pediatric obesity have increased risk chances due to hereditary obesity and abdominal adiposity. Families with a history of obesity in their families are at highest risk, so

contacting and communicating with them for prevention of obesity and other complications is important. (2008, Plominet al.).

2.4.2 Social media and technology

All the young millennials in this blooming new age devote much of their time to discovering new gadgets and innovations on phones and other electronic devices. As well as the negative impacts of these diverse innovations are growing with the rapid developments and growth in technology. Furthermore, it has been found that the screen time and exposure to such devices is substantially greater in the case of younger generations and even infants who do not fall below the minimum age for children under 18 months provided by the American Academy of Pediatrics. Surveys and studies show that early excessive media exposure is interconnected with sleep disturbance, obesity and unwanted BMI, and also causes delay in children's development. It is likely and well-established that the young population is more prone to increased screen time resulting in numerous health issues including unhealthy eating habits contributing to obesity (Sourtiji et al . , 2018).

In addition, different groups of people conducted a study to demonstrate the impact of using social media compared to those who sit on computers rather than using cell phones. The study found that persons with increased exposure to social media and using a computer in free time had substantially higher sitting times and the highest on non-workdays (Alley et al., 2017).

Numerous other studies have identified associations and connections between exposure to social media and increased chances of obesity.

Controlled trials were randomized in an experiment conducted which showed that the lower exposure to screen time substantially decreases children's weight gain, further highlighting the

cause-effect relationship between increased screen time and weight gain. (Robinson et al., 2017).

2.4.3 Ethnicity

A study performed dictated that the percentage of children obese in Hispanic children is even higher than in the children of United States. This study out cast the fact that in Hispanic children the time used by the children for sedentary activities is higher than in United States or non-Hispanic white children (Barlow, 2007). Whether the local home environment actually plays a role in the obesity gap between Hispanic children by encouraging sedentary habits is, however, unclear (Barlow, 2007).

2.4.4 Sedentary activities

Researchers concluded and ended with few behavioral trends leading to obesity that involves more and more sedentary behaviors, unhealthy eating habits along with enhanced snacking time while watching movies or playing games and lacking proper sleeping habits (Barlow, 2007). Children with higher sedentary habits and increased sitting time have greater risk of diabetes type 2, cardiovascular disease, obesity, and poor and distorted mental health status. A study found that more than 8 hours a day in Australia about 70 percent of people over the age of 20 sits for browsing net. The study also showed the growing usage of social media sites like Snapchat, Twitter, Instagram and Facebook. But the inter link between using this social media platform with the body mass index (BMI) and sitting time has not yet been explored. Children that become obese at a very young age are at a greater risk of severe and life-threatening health problems such as high cholesterol, diabetes, hypertension and cardiovascular disease that may exaggerate in adulthood and even contribute to early death (Corneel et al., 2016).

2.4.5 Television watching time

Recent studies have found that children spend more of their time playing games in computers, cell phones and tablets, watching cartoons thus bringing to light the fact that the risks posed by television have been overtaken by the other available gadgets (Corneel et al., 2016). Given the rapid introduction of new sources and technologies to the kids, we can't be quite sure whether the new sources are also related to obesity and other undesirable results.

2.4.6 Consumption of carbonated drinks

They also found that weight gain was observed in those who drank a can of soda a day and that soda accounted for 10 a cent of the calorie intake of adolescents. A study conducted found people who consumed sweetened sugar and carbonated beverages were more vulnerable to the weight gain and obesity epidemic due to high added sugar content and inadequate total energy. As per current figures, Americans have an average intake or consumption of sugar that provides them with 15.8% of total energy and it has been observed that most of these sugars are non-diet drinks that typically have higher sweetening agents than healthy beverages (Guthrie & Morton, 2000). Adjacent to the soda intake increase is the consumption of fruit juices and drinks, frequently sweetened to improve children's taste, and equally consumed by children and babies in higher quantities, rendering them obese from a very early age (Popkin& Nielsen, 2003).

2.4.7 Smoking

It has been found that smoking rates have declined tremendously in the last few decades, especially in developing countries, and also that BMI has expanded significantly in people from developed countries, showing evidence that smoking decreases or prevents weight gain and also that smoking cessation has an impact on individuals by having them gain weight. It was

proposed that nicotine in cigarettes be decreased by increasing energy intake and also by suppressing appetite (McGovern & Benowitz, 2011). Therefore it is also found that people who smoke have either a regular BMI or a BMI that is underweight.

2.4.8 Tea

Tea was the second most consumed drink after water obtained from the plant Camellia sinensis steep leaves. It's known to be high in polyphenols and caffeine compounds (Tijburg et al . , 1997).Numerous studies and laboratory experiments in human intervention have indicated that tea polyphenols can be effective in preventing metabolic syndromes and also obesity (Hursel et al., 2009).

2.4.9 Regular exercise

Multiple studies have shown important interlinkages between low BMI and high health and physical activity (Rowland, 1991). Physical activity was measured, and steps taken per day and percentage of body fat were found to be inversely proportional as well as BMI (Tudor-Locke et al., 2001). Results are not yet established as involving other factors such as social, personal and other physical activity (smoking, alcohol consumption, sugar intake, etc.), so daily exercise alone was not responsible for reducing body fat or BMI.

2.5 Health consequences of obesity

Occurrence rates for being overweight or obese have shown substantial growth over the past decades and are of great concern as they are associated with high-risk chronic diseases like diabetes, CVD, cancer, etc. Therefore, some or more successful recommendations and measures have now become important to make and enforce not only to manage excess body fat or weight but also to avoid it (NIH (National Institute of Health)).

2.5.1 Diabetes

Type II diabetes was reported to have a significant link to weight or obesity out of all the chronic life hazards. Increased BMI and WC have been found to be significantly linked to type II diabetes in both males and females. As described by BMI, Obesity had the strongest link with the development of this form of diabetes relative to other comorbidities present and in question. The risk factors were found to be 6.75 in males (average) and 12.41 in females (Anis et al., 2009).

2.5.2 Cardiovascular Disease

Furthermore, having more than average weight or being obese can also cause a person to have multiple CVDs that include dyslipidemia, hypertension, and heart disease like ischemia or stroke (Anis et al., 2009). In a study evaluating the relation between risk factors for CVD, subclinical vascular disease and obesity, it was observed that higher or obese BMI was correlated with higher levels of BP, fastening concentration of glucose, lipoproteins, and greater probability of hypertension (2008, Carnethon et al.).

2.5.3 Cancer

Additionally, multiple studies have also linked obesity to cancer. The relative risk in males was found to be between 1.05-2.29 and in females between 1.13-3.22. (Anis et al., September 2009).The World Cancer Research Fund and the American Institute for Cancer Research published a 2007 study providing ample compelling evidence that showed obesity or overweight significantly raises the risk of cancer in certain organs like pancreas, rectum, colon, breast, endometrium and esophagus. The study also provided evidence to support the fact that

individuals with more abdominal fat were more likely to develop colon cancer, which in turn may have increased their risk of endometrium and breast cancer in women.

2.5.4 Others

There are also reports and research showing that other illnesses or conditions are also associated with being obese or overweight, including chronic kidney diseases , respiratory conditions, gastrointestinal and hepatic disorders, musculoskeletal disorders, and even psychological issues.

CHAPTER 3: METHODOLOGY

3.1 Methodology

3.1.1 Research Design

This descriptive study was conducted in the year 2020 in the Department of Pharmacy, Brac University, Dhaka. The project included participants of both genders (male and female). Around 300 undergraduate students from the 20-28 age group from various universities of Bangladesh participated in this project. This survey was conducted solely with the intention of finding out any correlation between the parameters listed and the BMI of the participant.

3.1.2 Data Collection

A standardized and well-reviewed questionnaire was prepared and distributed through online among the diverse community of students willing to participate in the project. The questionnaires were designed to collect and keep a track of information records about the gender of the participant, age, height weight, living status, marital status, time spent on social media, time spent on physical exercise, sleeping time, time spent on watching TV, consumption of tea and carbonated drinks, fast food intake, number of cigarette intake per day and other necessary data on history of insomnia or other mental illness were also asked. After that, an individual's BMI was later calculated using the formula defined in WHO (weight (in kilogram)/height ^{2}(in meter)). However, attachment in the appendix section is a preview of the questionnaire.

3.1.3 Data Analysis

Sample size formula:

$$ss = \frac{Z^2 * (p) * (1-p)}{c^2}$$

Where:

Z = Z value (1.96 for 95% confidence level)
p = percentage picking a choice, expressed as decimal
(.5 used for sample size needed)
c = confidence interval, expressed as decimal =5.7

Therefore, Sample size (ss)=295

The statistical analysis based on the data was done using IBM SPSS version 23, after proper and equal collection of all the necessary data and information about the participants. So first, by using IBM SPSS, we calculated whether the BMI of the participants were normally distributed or not, which will allow us to figure out whether we should go for parametric tests or non-parametric tests. We found that the BMI of our selected generation was normally distributed after proper inputs, and therefore we had to go for non-parametric tests. We did Mann – Whitney tests between various groups according to our available data to see whether the results were significant or not significant. In certain cases, we had to pick those two groups for doing Mann – Whitney and eliminate the third group before evaluating, as Mann – Whitney can only be done between two groups only. As stated, we have done several tests by grouping the parameters in different ways, such as among the different time duration of watching TV and sleeping hours to evaluate the impact of these parameters on the participants' BMI.

CHAPTER 4: RESULTS AND DISCUSSION

4.1 Results

Different parameters were inspected on an individual basis and also the different parameters were correlated to evaluate for any relation between the parameters. From different universities of Bangladesh, the survey was carried out between 300 individuals of different sex (Male and Female.

4.2 Participant's overall data

We had to figure out before analyzing the data if our participants' BMI was normally distributed or not normally distributed, which would further allow us to conduct non-parametric tests or parametric tests, respectively. The following figure shows the BMI distribution of our participants across the best fit line and we can conclude that our BMI information is normally distributed, so we are going to go for non-parametric tests.

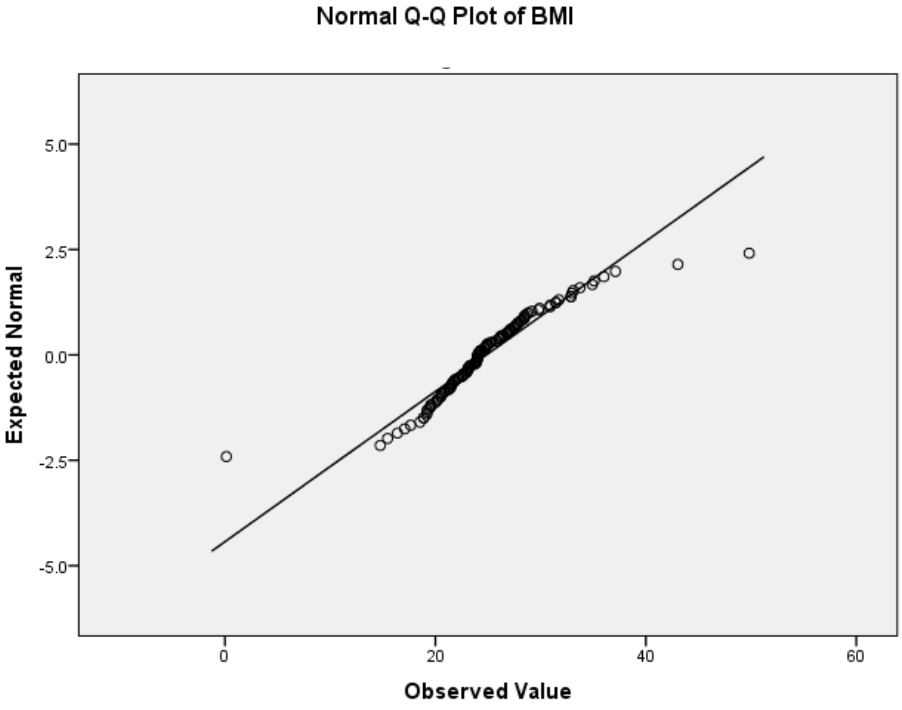

Figure 1: *Normal Q-Q Plot for BMI*

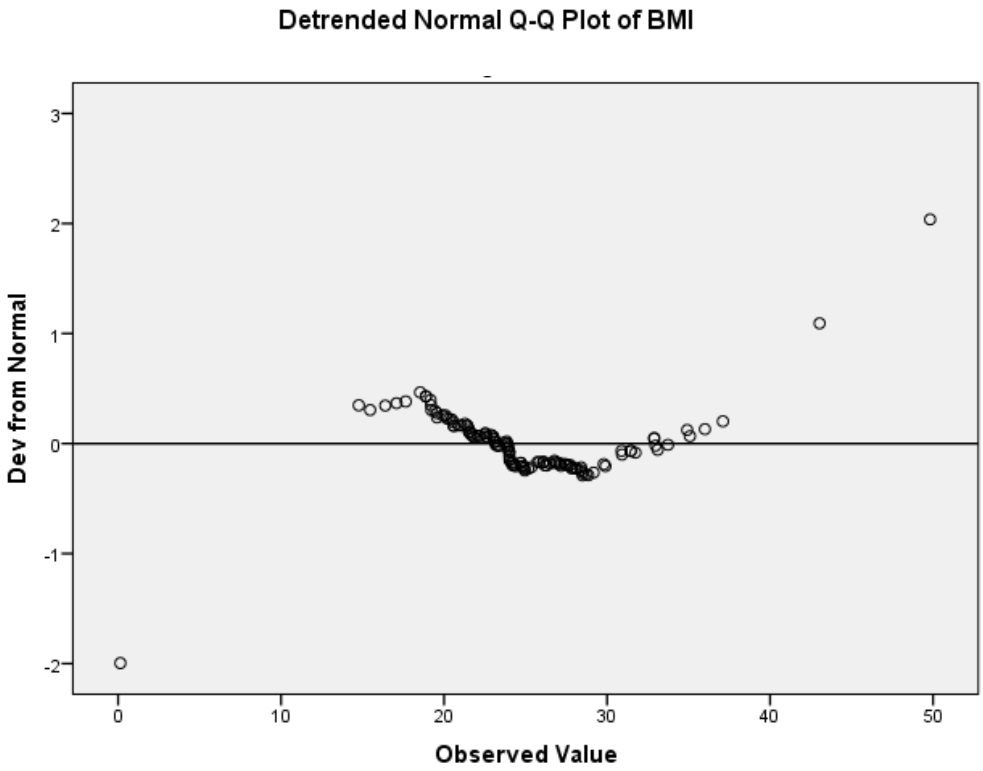

Figure 2: *Detrended Normal Q-Q Plot of BMI*

We gathered a total of 300 individual data, 125 of which were male and the remaining 175 were female. The following table shows the median of the individual's age, height in cm, weight in kg and BMI in kg/m2, as well as their respective range. Until estimation, all of the above parameters were classified into male and female, and the overall median and parameter range were also determined.

Table 2: Participants' data (median ± range)

Gender	N	Age	Height (cm)	Weight (kg)	BMI (kg/m^2)
Male	125	23±6	170.69±1801.37	70.00±100.00	24.03±49.7
Female	175	22±6	158.50±54.56	56.00±53	22.15±23.5
Total	300	22±6	164.59±1813.26	61.50±103.00	23.13±49.7

4.2.1 BMI & Watching television

Participants were fairly divided into 3 groups, Group 0 (who watch TV for 0-2 hours), Group 1 (who watch TV for 3-5 hours) and Group 2 (who watch TV for equal or more than 6 hours). Later, to verify whether the P-value to be observed via Mann-Whitney U is significant or not significant, we compared these various groups. To our concern, we found that all P-values were not significant (> 0.05), which demonstrates in our analysis that watching television does not influence the BMI of the participants in the different groups. The effect of watching television (independent variable) on BMI (dependent variable) was not observed.

Table 3: BMI & Watching TV

Groups	**BMI (kg/m^2)** **(median±range**)	**P-value (Mann-Whitney U)**
0,1	24.03± 49.7 22.15 ± 23.5	0.309
1,2	22.27 ± 7.00 19.22 ± 9.23	0.171
0,2	24.19 ± 49.7 22.10 ± 23.5	0.383

****** [Group 0(who watch TV for 0-2 hours), Group 1 (who watch TV for 3-5 hours) and Group 2 (who watch TV for equal or more than 6 hours)].

4.2.2 BMI & Sleeping hours

In this part of analysis, the participants were divided into 3 groups fairly, Group 1 (who sleep for 4 to 5 hours), Group 2 (who sleep for 6 to 7 hours) and Group 3 (who sleep for 8 to 9 hours). Later, to identify whether the P – value to be observed through Mann – Whitney U is significant or not significant, we have compared between these different groups. To our concern, we have found that all the P- values to be not significant (> 0.05), which concludes in our analysis that the BMI of the participants of the different groups are not influenced by their sleeping hours. The effect of sleeping hours (independent variable) was not found or was negligible on the participant's BMI (dependent variable).

Table 6: BMI & Sleeping hours

Groups	**BMI (kg/m^2)** **(median±range)**	**P-value (Mann-Whitney U)**
1,2	24.15 ± 49.7 22.23 ± 23.5	0.789
1,3	24.00 ± 18.0 21.40 ±17.7	0.279
2,3	24.03 ± 49.7 22.19 ±23.5	0.235

** [Group 1 (who sleep for 4 to 5 hours), Group 2 (who sleep for 6 to 7 hours) and Group 3 (who sleep for 8 to 9 hours)].

4.3 Previous findings and history about the parameters and their effects

4.3.1 BMI and watching television

In the analysis, the result shows that watching television retains null hypothesis. This means watching television has no significant effect on BMI. However, study shows that the more television people watch, the more likely they are to gain weight or become overweight or obese (Shuval et al., 2013). The difference in race and ethnicity can be a possible reason for our result. In a study, compared to both black and Hispanic young adult females, the relation between TV watching and BMI is found to be distinct in white young adult females (*Television Viewing Is Not Predictive of Body Mass Index in Black and Hispanic Young Adult Females*, n.d.). The outcome of such research shows that the relationship between watching television and BMI varies between racial and ethnic groups (Shuval et al., 2013).

In college graduates and non-graduates and those employed, substantial associations between higher TV viewing and increased BMI were observed (Richmond et al., 2010). Therefore, it can be said that since our analysis consists of undergraduate students, no associations between watching television and BMI can be possible. Moreover, in the analysis, it is observed that those students who watch TV for a long time are also involved in physical activity which eventually minimizes the possibility of increasing BMI and thus we did not get any significant result. Another reason behind our result could be that, most of the undergraduate students were involved in part time jobs that increase their physical activity which results in no change of BMI despite watching TV for a long time or short time. Furthermore, nowadays watching television is becoming poorer among the students in this age of internet and android devices. Perhaps, a smaller sample size could be another possible reason for not finding a significant effect of watching television on BMI of university students.

4.3.2 BMI and sleeping hours

In the analysis, the result shows that sleeping hours retain null hypothesis. This means that sleeping hours have no significant effect on BMI. However, study shows that sleep loss causes a hormone imbalance in the body that facilitates weight gain and overeating (*Sleep | Obesity Prevention Source | Harvard T.H. Chan School of Public Health*, n.d.). In spite of varying the BMI with the variation of sleeping hours, our analysis shows no significance between BMI and sleeping hour. The possible reason could be that, since most of the students in our analysis are involved in part time jobs and other physical activity, they have a good quality of sleep. Also, the samples of our analysis reveal normal sleeping hours. Therefore, the parameter did not show any effect on BMI. However, the study could be more justified if various groups and aged people could be included in the analysis rather than researching on a constant group and aged people.

4.4 Limitations

1)The survey was performed among just 300 respondents, which is a very small population. As a consequence, the impact was not significant. Having large data may have revealed pattern of effects.

2) We had an uneven ratio of male and female participants. For instance, we had 125 males and 175 females. Equal number of male and female participants could justify the analysis.

3) The analyzed samples were of a uniform type of people. If we could get a graduate, post graduate or college graduate student's data, the analysis could be more justified and variations of the result could be obtained.

4.5 Recommendations

1) The analysis may be more selective. We could have picked 50 percent of the participants who watch TV and other 50 percent who do not watch tv and ensured that at least equivalent numbers were participating in the operation in all categories before data collection. It is a possible goal to screen the participants according to our demands.

2) Other information obtained as referred to in the survey form can be used in the future for further research.

3) The generation of participants could have been enhanced. We could demonstrate a potential pattern on the plots if we could have managed about 500 people.

CHAPTER 5: CONCLUSION

5.1 Conclusion

We expected to find and conclude any correlation of watching TV and sleeping hours with BMI according to the previous data and findings. For example, both of the parameters of watching TV and sleeping hours will indicate a certain increase in BMI in participants relative to those who possess lengthy watching TV and sleeping hours. But our results were not as expected. All of our parameters showed marginal effects on the BMI of the participant, or no trend. We further concluded, therefore, that the relationship with BMI between watching TV and sleeping time is not significant. Nevertheless, more responses will be added to the given questionnaire in the future to get a more credible and accurate result on the relationship of the parameters with BMI. It would make the outcomes fairer and rational to have a broad population size. In addition, to make people more conscious and aware of their health, more studies need to be conducted in this area. Many other parameters that could be responsible for abnormal BMI and prevent people from the catastrophic effects and chronic diseases associated with increased BMI should be included by authors and researchers. Nevertheless, it is now seen that public health authorizations have taken responsibility around the world and are taking appropriate steps, offering guidance, encouraging people to be healthy and sound.

References:

Alley, S., Wellens, P., Schoeppe, S., de Vries, H., Rebar, A. L., Short, C. E., Duncan, M. J., & Vandelanotte, C. (2017). Impact of increasing social media use on sitting time and body mass index. Health Promotion Journal of Australia : Official Journal of Australian Association of Health Promotion Professionals, 28(2), 91–95. https://doi.org/10.1071/HE16026

Audrain-Mcgovern, J., & Benowitz, N. L. (2011). Cigarette smoking, nicotine, and body weight. Clinical Pharmacology and Therapeutics, 90(1), 164–168. https://doi.org/10.1038/clpt.2011.105

Barlow, S. E. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. Pediatrics, 120 Suppl. https://doi.org/10.1542/peds.2007-2329C

Davey S. G., Bracha Y., Svendsen K.H., Neaton J.D., Haffner S.M., Kuller L.H. and Intervention M.R.F. (2005) Incidence of type 2 diabetes in the randomized multiple risk factor intervention trial. Annals of Internal Medicine., 142, 313–322.

Hursel, R., Viechtbauer, W., & Westerterp-Plantenga, M. S. (2009). The effects of green tea on weight loss and weight maintenance: A meta-analysis. International Journal of Obesity, 33(9), 956–961. https://doi.org/10.1038/ijo.2009.135

Katzmarzyk, P. T., Hebebrand, J., & Bouchard, C. (2002). Spousal resemblance in the Canadian population. International Journal of Obesity, 26, 241–246.

Morris, R. W., Taylor, A. E., Fluharty, M. E., Bjørngaard, J. H., Åsvold, B. O., Gabrielsen, M. E., Campbell, A., Marioni, R., Kumari, M., Korhonen, T., Männistö, S.,

Marques-Vidal, P., Kaakinen, M., Cavadino, A., Postmus, I., Husemoen, L. L. N., Skaaby, T., Ahluwalia, T. V. S., Treur, J. L., Sattar, N. (2015). Heavier smoking may lead to a relative increase in waist circumference: Evidence for a causal relationship from a Mendelian randomisation meta-analysis. The CARTA consortium. BMJ Open, 5(8). https://doi.org/10.1136/bmjopen-2015-008808

Popkin, B. M., Adair, L. S., & Ng, S. W. (2012). Global nutrition transition and the pandemic of obesity in developing countries. Nutrition Reviews, 70(1), 3–21. https://doi.org/10.1111/j.1753-4887.2011.00456.x

Popkin, B. M., & Nielsen, S. J. (2003). The sweetening of the world's diet. Obesity Research, 11(11), 1325–1332. https://doi.org/10.1038/oby.2003.179

Speiser, P. W., Rudolf, M. C. J., Anhalt, H., Camacho-Hubner, C., Chiarelli, F., Eliakim, A., Freemark, M., Gruters, A., Hershkovitz, E., Iughetti, L., Krude, H., Latzer, Y., Lustig, R. H., Pescovitz, O. H., Pinhas-Hamiel, O., Rogol, A. D., Shalitin, S., Sultan, C., Stein, D., Hochberg, Z. (2005). Consensus statement: Childhood obesity. Journal of Clinical Endocrinology and Metabolism, 90(3), 1871–1887. https://doi.org/10.1210/jc.2004-1389

Tijburg, L. B. M., Mattern, T., Folts, J. D., Weisgerber, U. M., & Katan, M. B. (1997). Tea flavonoids and cardiovascular diseases: A review. Critical Reviews in Food Science and Nutrition, 37(8), 771–785. https://doi.org/10.1080/10408399709527802

Tudor-Locke, C., Ainsworth, B. E., Whitt, M. C., Thompson, R. W., Addy, C. L., & Jones, D. A. (2001). The relationship between pedometer-determined ambulatory activity and body composition variables. International Journal of Obesity, 25(11), 1571–1578. https://doi.org/10.1038/sj.ijo.0801783

VAGUE, J. (1956). The degree of masculine differentiation of obesities: a factor determining predisposition to diabetes, atherosclerosis, gout, and uric calculous disease. The American Journal of Clinical Nutrition, 4(1), 20–34. https://doi.org/10.1093/ajcn/4.1.20

Wardle, J., Carnell, S., Haworth, C.M., Plomin, R. (2008). Evidence for a strong genetic influence on childhood adiposity despite the force of the obesogenic environment. The American Journal of Clinical Nutrition, 87(2): 398– 404.

World Health Organisation (2009) *Global Health Risks: Mortality and Burden of Disease Attributable to Selected Major Risks*. WHO Press, Geneva.

Beccuti, G., & Pannain, S. (2011). Sleep and obesity. In *Current Opinion in Clinical Nutrition and Metabolic Care* (Vol. 14, Issue 4, pp. 402–412). https://doi.org/10.1097/MCO.0b013e3283479109

Richmond, T. K., Walls, C. E., Gooding, H. C., & Field, A. E. (2010). Television viewing is not predictive of BMI in black and hispanic young adult females. *Obesity*, *18*(5), 1015–1020. https://doi.org/10.1038/oby.2009.391

Shuval, K., Gabriel, K. P., & Leonard, T. (2013b). TV Viewing and BMI by Race/Ethnicity and Socio-Economic Status. *PLoS ONE*, *8*(5). https://doi.org/10.1371/journal.pone.0063579

Sleep | Obesity Prevention Source | Harvard T.H. Chan School of Public Health. (n.d.). Retrieved December 29, 2020, from https://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/sleep-and-obesity/#references

Television Watching and "Sit Time" | Obesity Prevention Source | Harvard T.H. Chan School of Public Health. (n.d.). Retrieved December 29, 2020, from

https://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/television-and-sedentary-behavior-and-obesity/

Appendix

A SURVEY FORM

Project name: BMI perception of undergraduate students on watching television and sleeping hours

Name: Sabrina Sultana Punom

ID: 16346047

University: Brac University

Participants: Students of Brac University

Project Supervisor: Dr. Afrina Afrose, PhD

Assistant Professor, Department of Pharmacy, Brac University.

*Required

Disclaimer

All the data for this survey will be used for research purpose only. The subject's name and identity will not be disclosed in any research publication.

I acknowledge that I have been asked to participate in a survey regarding social media usage. This survey is conducted by Sabrina Sultana Punom. I understood the disclaimer and agreed to participate willingly. *

Signature: _____

Date: _____

Name of the participant:

Date of birth:

Name of the University studying:

Department:

Instructions:

Mark only one box.

1. Gender *

Mark only one box.

- Male
- Female
- Others

2. Age *

Mark only one box.

- 21-22

- 23-24
- 25-26
- 26+

3. Height (ft-in) *

……

4. Weight (kg) *

……

5. Living status *

Mark only one box.

- Living alone in apartment
- Sharing
- Rent with family
- Own home

6. Marital status

Mark only one box.

- Married
- Unmarried
- Single
- Divorce
- In a relationship

7. How many hours do you spend watching TV every day? *

Mark only one box.

- None
- 1
- 2
- 3
- 4
- 5
- 6+

8. How many hours do you spend on Facebook, YouTube, Instagram, Snapchat, twitter etc every day? *

Mark only one box.

- None
- 1
- 2
- 3
- 4
- 5
- 6+

9. How many hours do you sleep? *

Mark only one box.

- 4

- 5
- 6
- 7
- 8
- 9
- 10+

10. When do you go to sleep? *

Mark only one box.

- Before 10 pm
- 10-11 pm
- 11-12pm
- After 12pm

11. History of insomnia

Mark only one box.

- Yes
- No

12. How many hours do you work out every day? *

Mark only one box.

- None
- 1 hr
- 2 hrs
- 3 hrs

- 4+ hrs

13. How many hours do you walk, run or play outside every day? *

Mark only one box.

- None
- 1 hr
- 2 hrs
- 3 hrs
- 4+ hrs

14. How often do you eat fast food? *

Mark only one box.

- None
- Once a week
- Twice a week
- Everyday

15. How much carbonated drinks (250ml) do you take per week? *

Mark only one box.

- None
- 2-3
- 4-5
- 7+

16. How many cups of tea/coffee do you drink per day? *

Mark only one box.

- None
- 2-3
- 4-5
- 6+

17. Do you eat timely on a regular basis? *

Mark only one box.

- Yes
- No
- Sometimes

18. How many cigarettes do you smoke per day?

Mark only one box.

- Non-smoker
- 1-3
- 4-6
- 1pack

19. Have you ever been to a restaurant because of the recommendation from social media?

Mark only one box.

- Yes
- No
- Sometimes

20. After using social media daily, how do you feel? *

Mark only one box.

- Excited
- Happy
- Normal
- Bored
- Sad
- Depressed

21. How much do you care about your social appearance in Facebook or Instagram? *

Mark only one box.

- Must be perfect
- Has to be good
- Okay is fine
- Don't care much
- Don't care at all

22. After starting to use social media, how is your face-to-face interaction with other people?

Mark only one box.

- Same as before
- I have more interaction
- I have less interaction
- little to none

23. Guardian’s socio economic status?

Mark only one box.

- Less income (below 20000 tk)
- Moderate (20,000-50,000 tk) High (50,000-100,000 tk)
- Very high (above 100,000 tk)

24. History of mental illness?

Mark only one box.

- Depression
- Anxiety
- Schizophrenia
- Suicidal
- Others

25. Family history of heath disorder

Mark only one box.

- Yes
- No