

Knowledge, Awareness And Risk Factors Of Childhood Obesity Among Adolescent Population In Chennai - A Survey Based Analysis

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Abstract: *Introduction* Childhood obesity is termed as excess body fat accumulation which negatively affects a child's health or well-being. As methods to work out body fat directly are difficult, the diagnosis of obesity is usually supported by BMI. A Body mass Index of 30 or more is considered as obesity. Children are considered to be obese if they are above the normal weight for their height in relation to their age. The problem is global and is steadily affecting many low and middle income countries. The rising prevalence of obesity in children and its many adverse health effects it's being recognized as a significant public health concern. **Aim** The aim of this study is to assess the Knowledge, awareness and risk factors of childhood obesity among the adolescent population.

Materials and Method This is a survey based study and was conducted on an online forum, Survey Planet with a sample of 100 participants. Adolescents of age group between 10-21 participated in the study. A questionnaire with 10 questions was circulated among the Chennai population. The responses were collected. The data was summarised as the number and percentage and analysed using SPSS. Chi square test was done and a P value of < 0.05 was considered statistically significant.

Results In this survey, we observed that 29% of them consider their current weight to be harmful for their health. 40% of them check their weight regularly. Half of the population were aware that chronic stress can lead to weight gain. Only 41% of the participants have the habit of exercising regularly. 67% of the participants were aware of the complications of obesity. Among all the respondents 28% of them had a family history of obesity.

Conclusion Within the limits of this survey, we can conclude that awareness on childhood obesity is present among the adolescent population. Females were more aware of Childhood obesity than males. However regular exercise and healthy diet is essential to maintain a healthy weight and prevent obesity.

Keywords

Obesity, Overweight, Epidemiology, Calories, Exercise, Complications.

1. INTRODUCTION

Obesity is an extra and abnormal fat accumulation which will impair health. The Body mass index is an index indicating the weight-for-height [1] It is defined as a person's weight in kilograms divided by the metre square of the height. BMI provides the foremost useful population-level measure of overweight and obesity because it is similar for both males and females and for all ages of adults.[2] But, it is considered as a rough guide because it does not correspond to an equivalent degree of fatness in many people. In the case of children and youngsters, age must be considered when categorising as overweight or obese. Childhood obesity is a known precursor to obesity and other non-communicable diseases (NCDs) in adulthood. [3,4] The severity of the issue among children and adolescents in India is unclear and lack of uniformity in the cut-points used to define childhood overweight and obesity. [5][3]

The possible reasons for obesity and overweight is an imbalance of energy between calories consumed and calories lost.[6] Globally, there has been a rise in intake of energy-dense foods that are high in fat and sugars and an increase in physical inactivity thanks to the increasingly sedentary nature of the many sorts of work, changing modes of transportation, and increasing urbanisation. [7] Raised BMI may be a major risk factor for noncommunicable diseases like cardiovascular diseases, diabetes, musculoskeletal disorders and a few cancers. the danger for these non communicable diseases increases, with increases in BMI. Childhood obesity is said to a far better chance of obesity, premature death and disability in adulthood[8]. In future, obese children may experience complications like breathing difficulties, increased risk of fractures, hypertension, early markers of disorder, insulin resistance and psychological effects[9][10].

They are also exposed to high-fat and micronutrient-poor foods.[11] Such dietary patterns along with physical inactivity, end in increased chances of obesity in childhood while undernutrition issues remain unsolved[12]

According to previous studies in 2019, an estimated number of 38.2 million children under the age of 5 years were overweight or obese.[13] Overweight and obesity are now on the increase in low- and middle-income countries, particularly in urban settings.[14][15][16] The increase has occurred similarly among both boys and girls: in 2016 18% of women and 19% of boys were overweight. Globally there are more people that are obese than underweight – this happens in every region except parts of Sub-Saharan Africa and Asia[17]. Overweight and obesity, also as their related noncommunicable diseases, are largely preventable. The Surrounding environment and communities are fundamental in shaping people's choices, by making the choice of healthier foods and regular physical activity the only choice. [18,19] Prevention of obesity at the individual level is carried out by limiting energy intake from total fats and sugars, increasing consumption of fruits, vegetables, whole grains and nuts and have regular physical activities.[20] The rate of obesity in children and adolescents are increasing not just among the higher socio-economic groups but also in the lower income groups where underweight still remains a major concern.[20,21] Therefore a balanced and sensitive approach addressing economic and nutrition transitions to effectively tackle this double burden paradox in India is suggested.[22][23]

This study explores the prevalence and impact of Childhood obesity among the middle childhood and adolescent population[24] A combined diet and physical activity intervention conducted in the community with a school component is more effective at preventing obesity[25]. Focusing on the causes may help in decreasing childhood obesity and lead to a healthier society as a whole[26].

2. MATERIALS AND METHODS

The study was conducted in an online platform with a sample size of 100 among the Chennai population. Adolescents of age group between 10-21 participated in the study. Adolescents of age group between 10-14 years of age considered early adolescents, age group between 15-17 years of age were categorised middle adolescents and age group between 18-21 considered late adolescents. The online study setup had certain advantages like flexibility in data collection and required sample size. A questionnaire containing 10 questions was prepared based on Childhood obesity, lifestyle and health and circulated among 100 participants through the online platform called Survey Planet, using a convenience sampling methodology. The demographic details of the participants were also collected. The responses were collected. The collected data was tabulated in Excel and filtered. The data from Excel is imported to SPSS for statistical analysis. The data was summarised as number and percentage and represented through bar graphs showing the percentage of each response. The statistical tests done for correlation analysis were Chi square tests. The results were finally interpreted.

3. RESULTS AND DISCUSSION

In this study, 42% of the participants were males and 58% of them were females (Figure 1). Adolescents of age group between 10-21 participated in the study. Among them, 32% were between 10-14 years of age considered early adolescents, 27% were between 15-17 years of age considered middle adolescents and 18-21 considered late adolescents. Among all the participating adolescents, late adolescents of age group between 18-21 were more.

(Figure 2). 29% of the participants consider their current weight to be harmful for their health out of which 17% were females and 12% were males (Figure 3). 40% feel that their eating habits can cause obesity in the future. More females consider their eating habits to cause obesity (22%) compared to males (18%) (Figure 4). The Frequency of Fast foods consumed by the participants is noted. 10% consume fast foods everyday, 54% consume twice a week and 36% consume fast foods more than twice a week. Consumption of fast food on a daily basis is higher among females (7%). Consumption of fast food on a daily basis was higher among females than males but it was statistically not significant. (Chi square test showed $p=0.598$ (p value > 0.05)) (Figure 5).

49% of them were aware that Chronic stress can lead to weight gain and obesity out of which 32% were females and 17% were males indicating that females were more aware than males but it was not statistically significant. (Chi square test showed $p=0.147$ (p value > 0.05))(Figure 6).

Only 40% of the respondents checked their weight regularly out of which 24% were females and 16% were males indicating that females checked their weight regularly than males but it was statistically not significant. (Chi square test showed $p=0.741$ (p value > 0.05))(Figure 7).

Only 41% of the participants have the habit of exercising regularly out of which 25% were females and 16% were males indicating that females exercise regularly than males but it was statistically not significant. (Chi square test showed $p=0.615$ (p value > 0.05))(Figure 8). The frequency of exercise of participants are observed. 18% of them exercise everyday, 40% of them exercise 1-2 times a week, 23% of them exercise 3-5 times a week and 19% of them don't have a habit of exercising. There was no major difference among males and females. Chi square test showed $p=0.590$ (p value > 0.05) indicates statistically not significant (Figure 9).

Among the total participants 28% of them had a family history of Obesity among which 16% were females and 12% were males indicating that more number of females had a history of obesity than males but it was statistically not significant. (Chi square showed $p=0.914$ (p

value > 0.05)) (Figure 10). 67% of them were aware that Obesity leads to complications later in life out of which 28% were males and 39% were females indicating that females were more aware of complications of obesity but it was statistically not significant. (Chi square test showed $p=0.952$ (p value > 0.05)) (Figure 12).

This study was conducted in an online platform for 100 participants in which 42% of them were males and 58% of them were females of varying age groups. The responses were collected and analysed. In this survey, 29% of the participants consider their current weight to be harmful for their health. There are possibilities of obesity in case of such individuals. Unhealthy weight causes many other diseases like high vital signs, diabetes, bad cholesterol, cancers, stroke, and heart attacks. Those patients with unhealthy weight have damage to the neurohormonal system of the brain that results in patients having a better weight point[27]. The hypothalamus is a part of the brain that controls energy and appetite. Those who suffer from unhealthy weight may have damaged the hypothalamus. [28]

40% of participants feel that their eating habits can cause obesity in the future. Because of improper eating behaviours children consume an excess amount of energy and their diet is deficient in elements necessary for correct development. Bad eating habits such as snacking highly processed and calorie-rich foods between meals eating ahead of the TV screen, skipping breakfasts, drinking sugar-sweetened beverages and eating outside food frequently are the crucial factors for obesity. These habits are usually formed in infancy and play an important role in their development[29]. The Frequency of Fast foods consumed by the participants is noted. 10% consume fast foods everyday, 54% consume twice a week and 36% consume fast foods more than twice a week. Most of the fast food contains an outsized amount of sugar, fats and carbohydrates and fewer minerals and vitamins[30]. This refers to an intake of an outsized amount of unhealthy calories in the shape of fast food which results in weight gain and ultimately obesity. Most of the fast foods have exceeding levels of sugar and fats which are directly related to increasing weight[31].

49% of them are aware that Chronic stress can lead to weight gain and obesity. It has long been theorized that an association exists between long-term stress and obesity. Chronic stress can cause comfort eating, which frequently involves the overeating of foods that are high in fat, sugar and calories, which, in turn, can cause weight gain. [32]Chronic stress causes the discharge of a hormone called cortisol. This hormone increases a person's appetite and if the strain doesn't pass, cortisol and appetite levels remain increased. The most step an individual can take if they find stress has increased their hunger levels and thus waistline, is to eliminate foods within the diet that are high in fat and sugars[33].

Only 41% of the participants have the habit of exercising regularly. The frequency of exercise of participants are observed. 18% of them exercise everyday, 40% of them exercise 1-2 times a week, 23% of them exercise 3-5 times a week and 19% of them don't have a habit of exercising. Physical activity increases people's total energy expenditure, which may help them stay in energy balance or maybe reduce, as long as they don't eat more to catch up on the additional calories they burn. It decreases the fat around the waist and total body fat, slowing the event of abdominal obesity[34]. Weight lifting, push-ups, and other muscle-strengthening activities build muscle mass, increasing the energy that the body burns throughout the day-even when it's at rest-and making it easier to regulate weight[35]. Among the total participants 28% of them had a family history of Obesity. Occurrence of obesity in children also influenced by the genetics in a family. Maternal obesity can be one of the reasons for occurrence of obesity in children[36]. Hence, it has been said that pregnant women with obesity must undergo several treatments before the child's birth in order to

reduce the risk of obesity in the child. Childhood obesity is associated with a family history of obesity, cardiovascular and metabolic disease, with the most severely obese children showing insulin resistance[37].

57% of participants are aware of BMI for their age group. BMI of 24 or less is considered to be a healthy weight whereas a BMI of 25 to 29.9 is considered to be overweight. BMI of 30 and above is considered obese. At an individual level, BMI can be used as a screening tool but is not diagnostic of the body fatness or the health of an individual[38]. BMI is useful in population-based studies because of its wide acceptance in defining specific categories of body mass as a health issue[39]. 67% of them are aware that Obesity leads to complications later in life. People with higher weights have shorter lifespans. This shorter lifespan is from weight-associated effects alone. Obesity also causes many life-shortening conditions. 90% of individuals who develop type 2 diabetes will have a body mass index (BMI) greater than 23. The risk of getting type 2 diabetes is highest if there is excess weight gain during childhood and if there is a family history of diabetes, abdominal obesity, or mother having had gestational diabetes. In obesity, the prospect of developing high blood pressure and atherosclerosis is up to 5 times greater compared to someone with a normal weight[41]. Moreover childhood obesity can affect children's health, social relationship, academic performance and together it reduces the children's quality of life and well being[42]. Apart from these problems it also affects the breathing capacity and asthma is more commonly seen as BMI goes up in obese individuals [43].

As far as the different ages of humans are concerned, childhood age gains maximum importance as it is the crucial age at which the child learns everything in terms of social, psychological, academic aspects, required to lead a better life in their future. Hence the children's part of the future relies on this crucial age which should not be spoiled by such undesirable conditions.

Limitations of the study

There are certain limitations in this study. Geographic limitation may be a major factor for the study of prevalence. Not much quantitative data is obtained. The sample size is 100 and it can be further expanded and the study can be done for longer durations

Future scope of the study

Better results can be obtained if the study is performed with a large sample size of varied population. Due importance should also be given for the identification and assessment of the population determinants of childhood obesity.

4. CONCLUSION

Within the limits of this survey, we can conclude that awareness on childhood obesity was present among the adolescent population. Females had comparatively more awareness than males. However regular exercise and healthy diet is essential to maintain a healthy weight and prevent obesity. Overweight and obesity rates in children and adolescents are increasing not just among the upper socio-economic groups but also within the lower income groups where underweight still remains a serious concern. This means the necessity for a balanced and sensitive approach addressing economic and nutrition transitions to effectively tackle this double burden paradox in India.

Author Contributions

Author 1 (Jagadheeswari Ramamoorthy) carried out the study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Karthik Ganesh Mohanraj) aided in conception of the topic, has participated in the study design, statistical

analysis and has supervised in the preparation of the manuscript. Author 3 (Geo Mani) has supervised and coordinated in developing the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript

5. ACKNOWLEDGEMENT

The study is supported by the Research Department of Saveetha Dental College and Hospitals. We extend our gratitude to thank our colleagues and all those who provided their insight, support and expertise that greatly assisted the study.

Conflict of InterestS

None Declared

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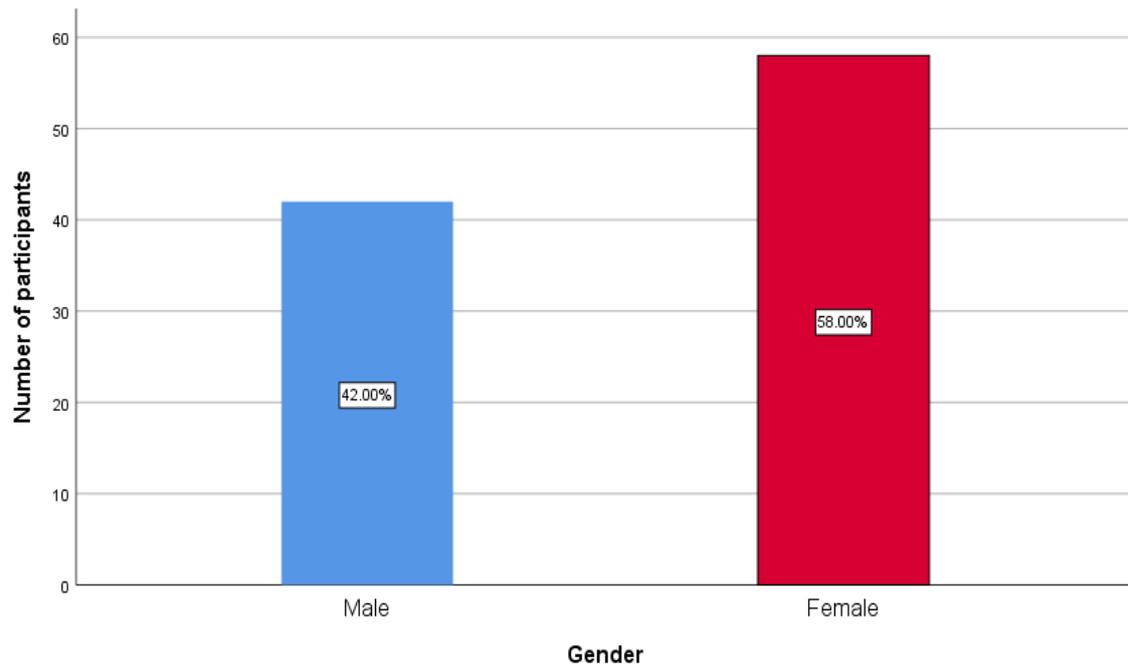


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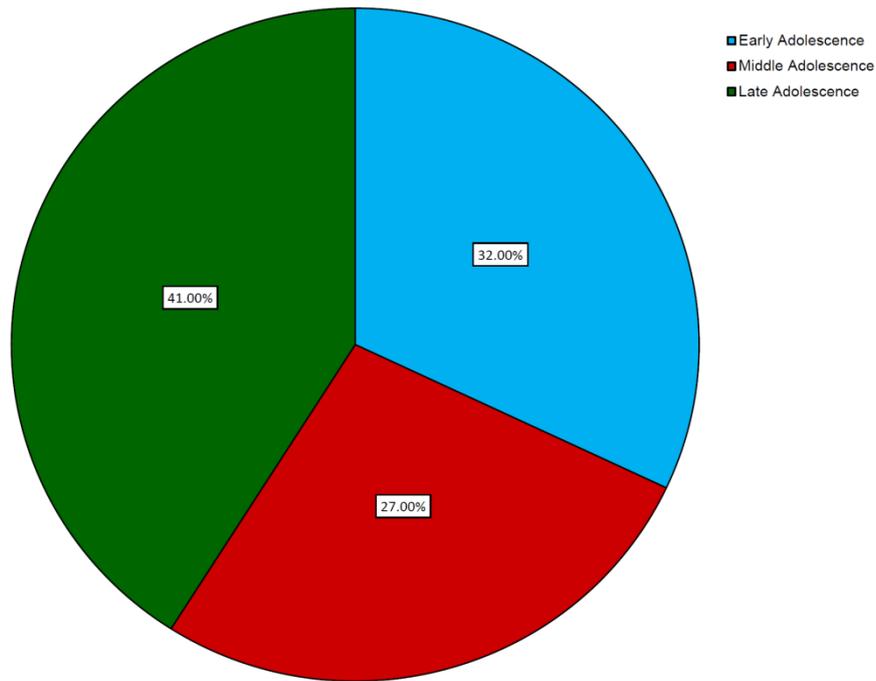


Figure 2 - Pie chart showing the frequency distribution of age of the adolescents participated in the study. Adolescents of age group between 10-21 participated in the study. Among 32% were between 10-14 years of age considered early adolescents (blue), 27% were between 15-17 years of age considered middle adolescents (red) and 18-21 considered late adolescents (green). Among all the participants, late adolescents of age group between 18-21 were more than other age groups.

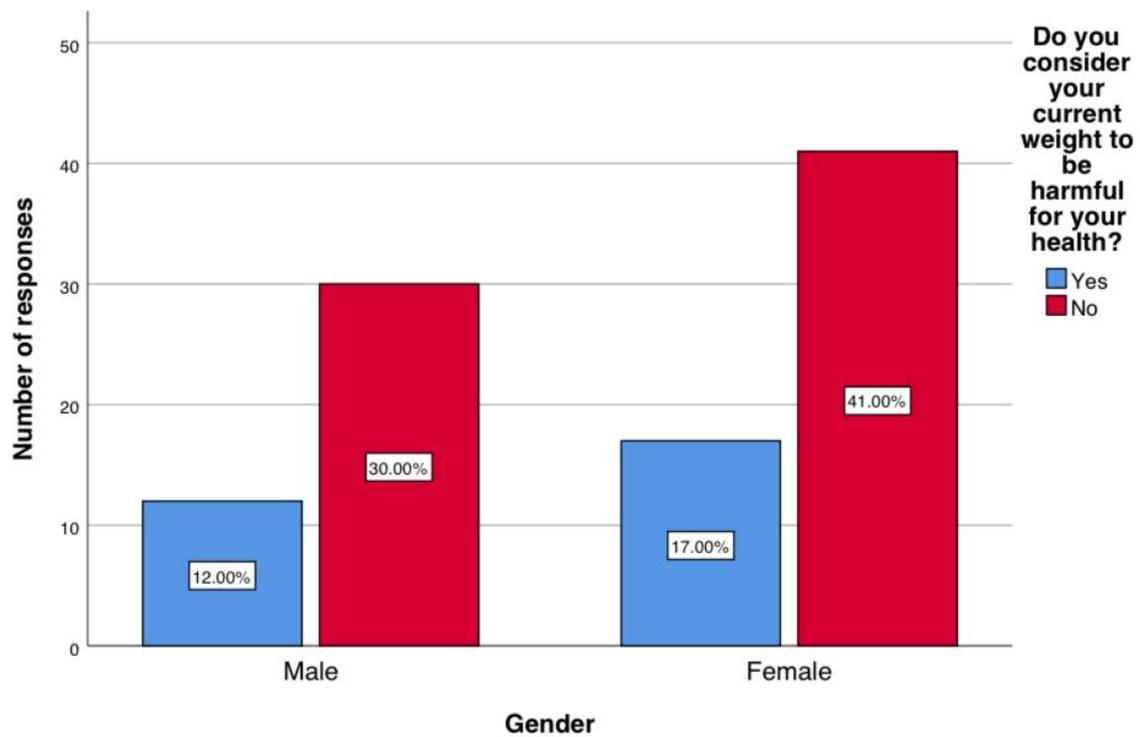


Figure 3 - Bar chart showing the association between gender and participants responses who consider their current weight to be harmful for their health. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes (Blue) and No (Red). 29% of the total participants considered their current weight to be harmful for their health out of which 17% of them were females and 12% were males indicating that females consider their weight to be harmful for health than males but statistically this was not significant. (Chi square test - $p=0.936$ ($p>0.05$))

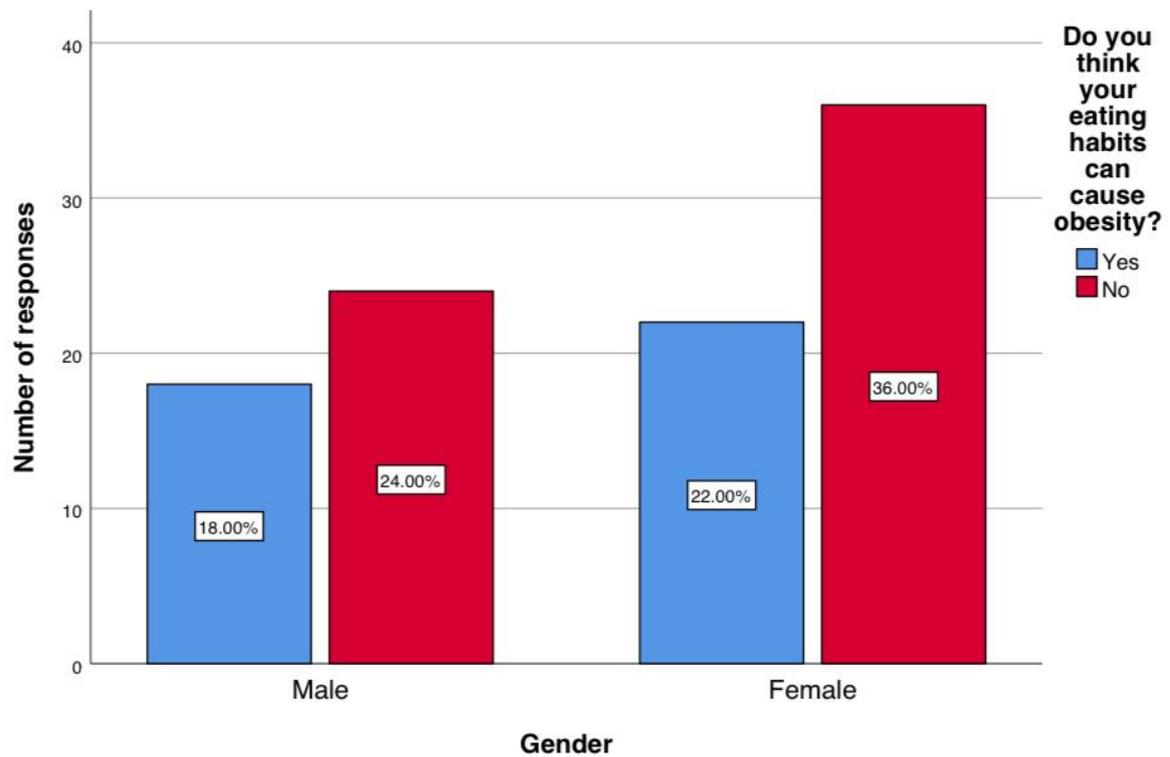


Figure 4 - Bar chart showing the association of gender and participants who consider their eating habits can cause obesity. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes(Blue) and No(Red).40% of the respondents felt that their eating habits can cause obesity in the future out of which 22% were females and 18% were males indicating that females considered their eating habits to cause obesity than males but it was not statistically significant . (Chi square test showed $p=0.620$ (p value > 0.05))

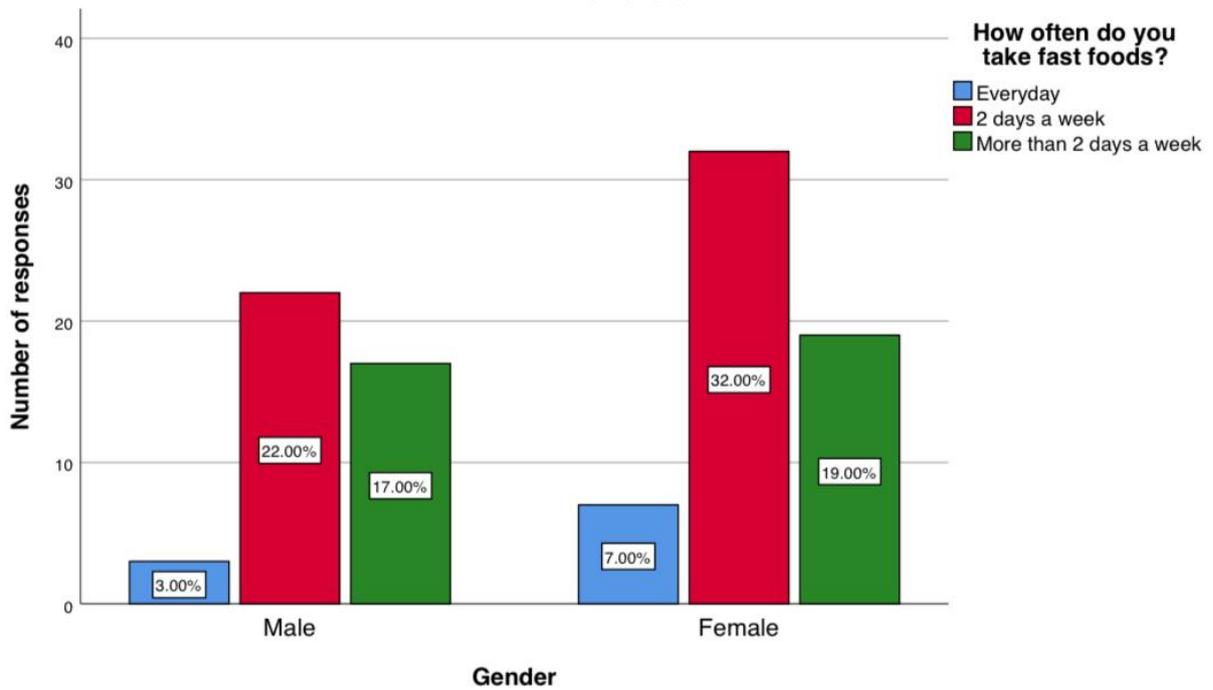


Figure 5 - Bar chart showing the association of gender and frequency of fast food consumption of the participants. X axis denotes the gender of the participants and Y axis denotes the percentage of each response - Everyday (Blue), 2 days a week (Red) and More than 2 days a week (Green). Among the total population, 10% consume fast foods everyday, 54% consume twice a week and 36% consume fast foods more than twice a week. Consumption of fast food on a daily basis was higher among females(7%) than males(3%) but it was statistically not significant. (Chi square test showed $p=0.598$ (p value > 0.05)).

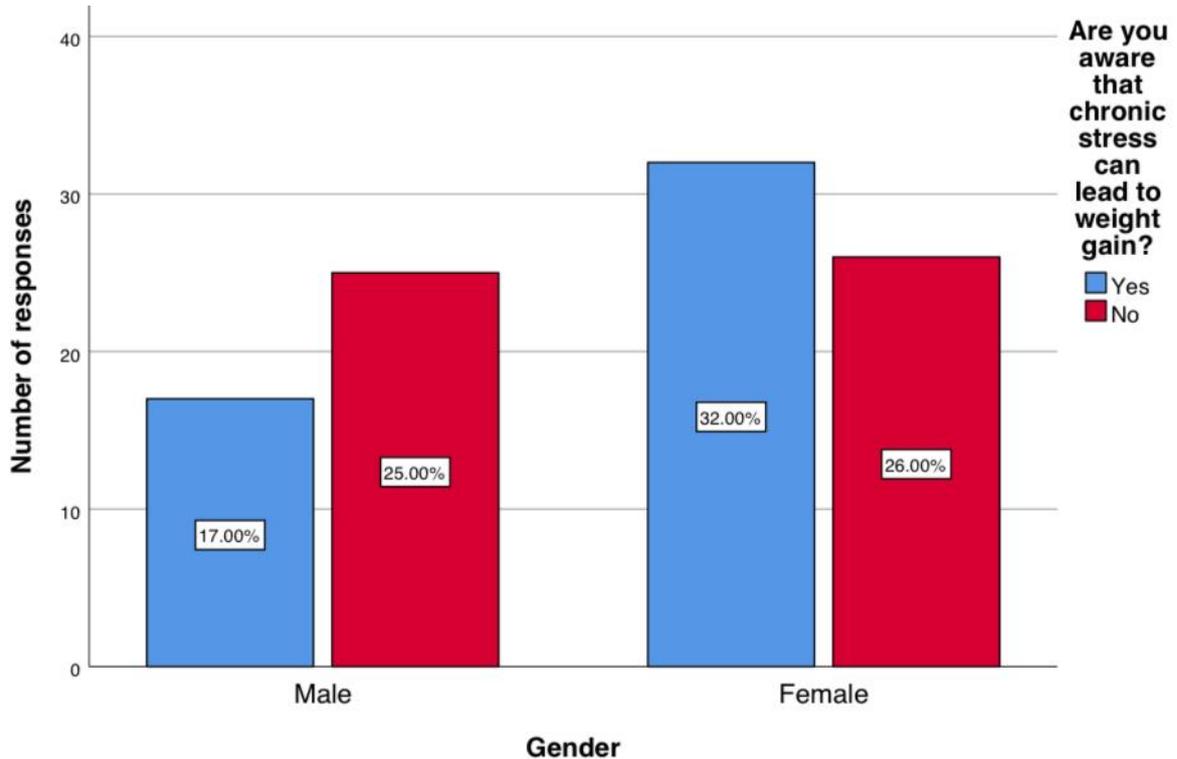


Figure 6 - Bar chart showing the association of gender and participants who were aware that Chronic stress leads to obesity. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes(Blue) and No(Red). 49% of them were aware that Chronic stress can lead to weight gain and obesity out of which 32% were females and 17% were males indicating that females were more aware than males but it was not statistically significant .(Chi square test showed $p=0.147$ (p value > 0.05))

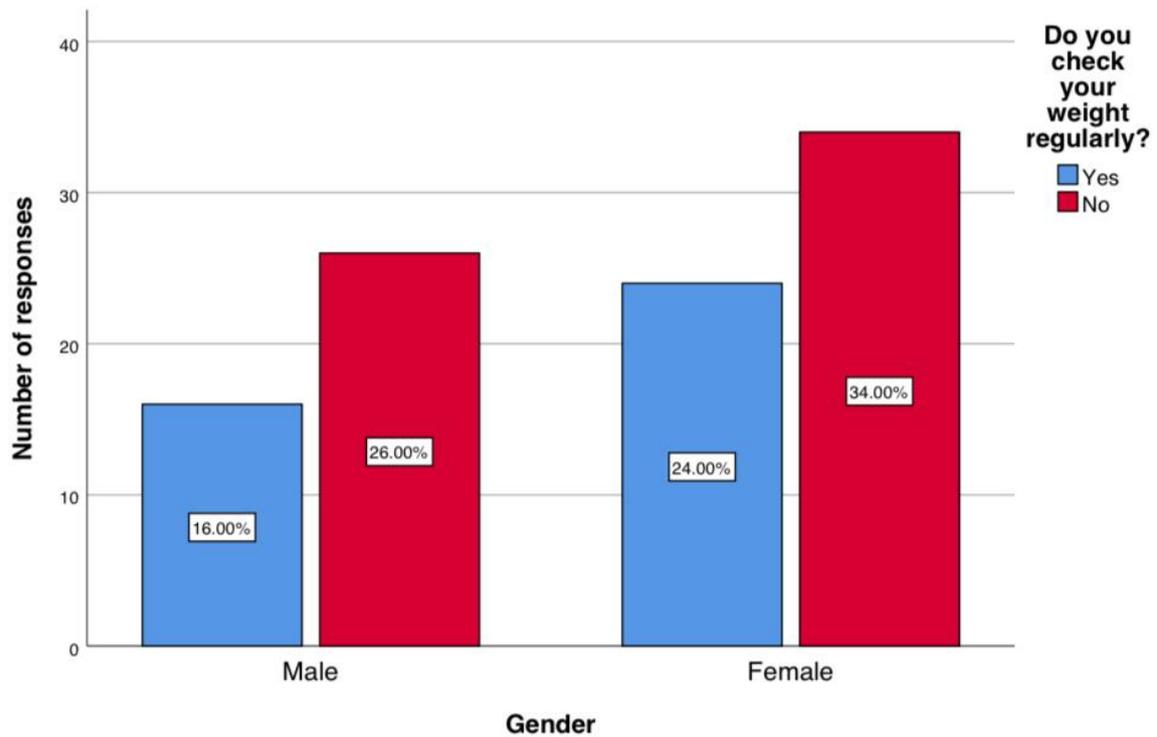


Figure 7 - Bar chart showing the association between gender and participants who check their weight regularly. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes(Blue) and No(Red). Only 40% of the respondents checked their weight regularly out of which 24% were females and 16% were males indicating that females checked their weight regularly than males but it was statistically not significant. (Chi square test showed $p=0.741$ (p value > 0.05))

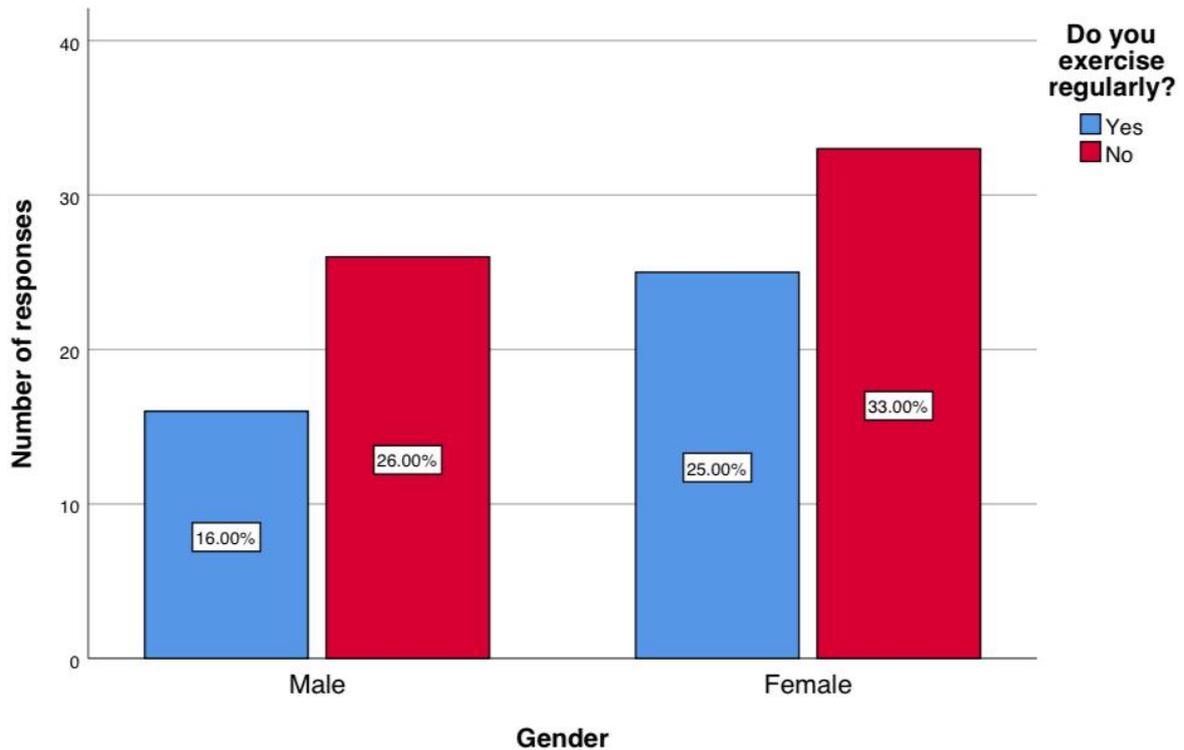


Figure 8- Bar chart showing the association between gender and participants who exercise regularly. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes(Blue) and No(Red). Only 41% of the participants have the habit of exercising regularly out of which 25% were females and 16% were males indicating that females exercise regularly than males but it was statistically not significant. (Chi square test showed $p=0.615$ (p value > 0.05))

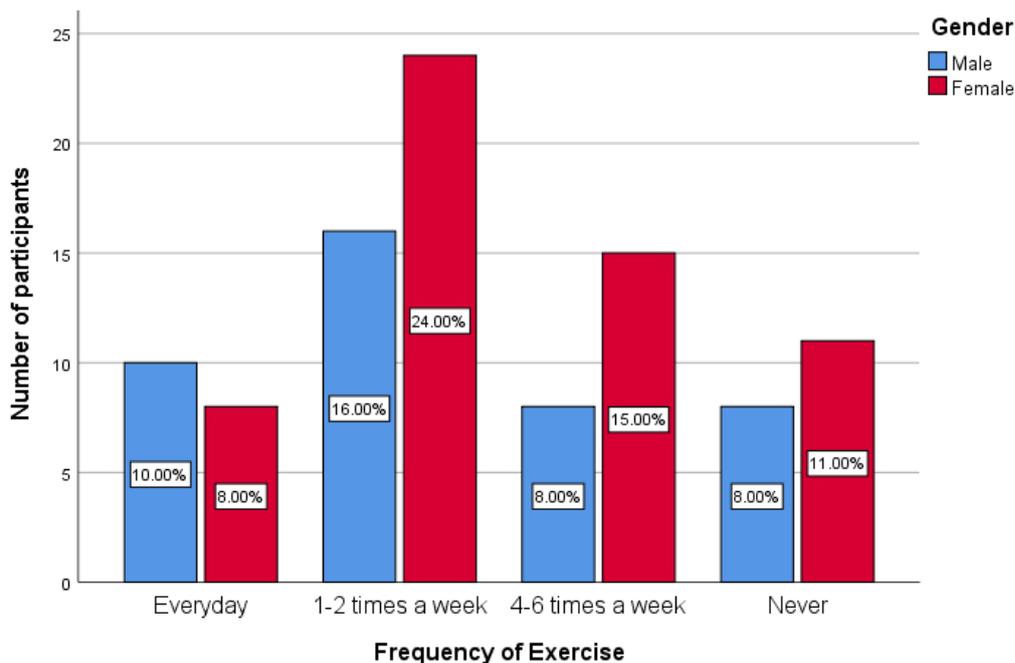


Figure 9 - Bar chart showing the association between gender and frequency of Exercise by the participants .X axis denotes the Frequency of Exercise based on gender of the participants - Male (Blue) and Female (Red) and Y axis denotes the number of participants. Among the total participants 18% of them exercise everyday, 40% of them exercise 1-2 times a week, 23% of them exercise 3-5 times a week and 19% of them don't have a habit of exercising. There was no major difference among males and females. Chi square test showed $p=0.590$ (p value > 0.05) indicates statistically not significant.

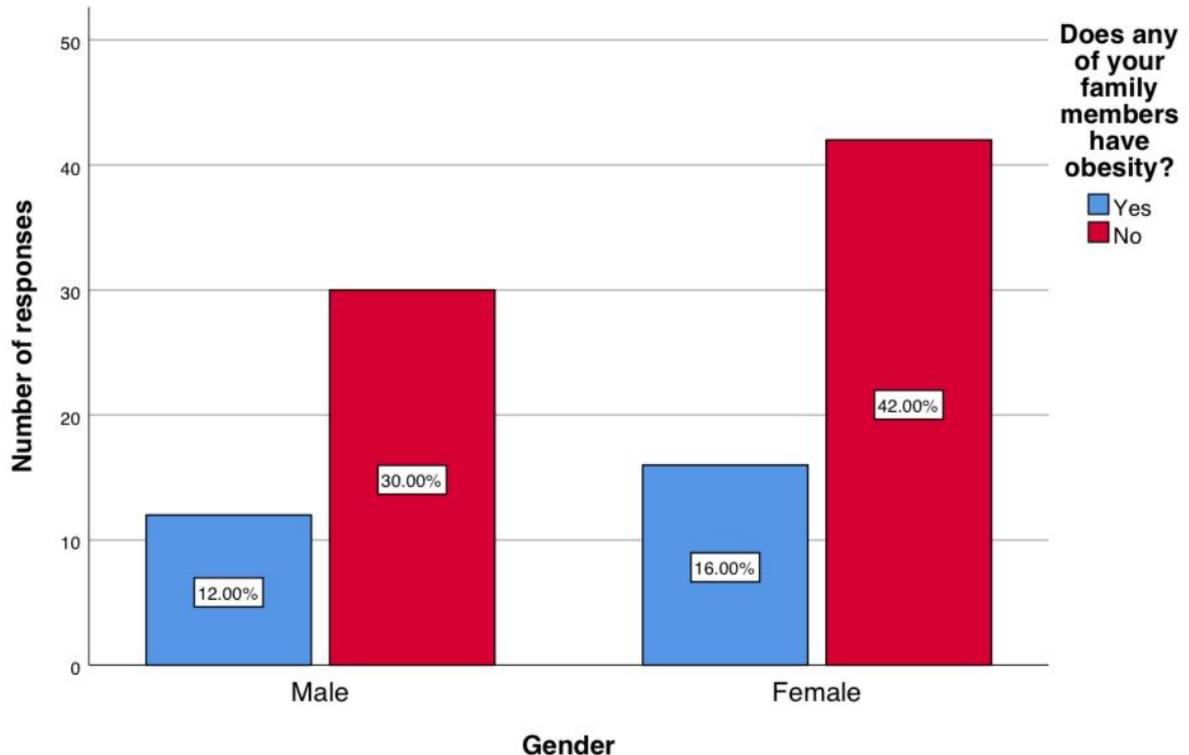


Figure 10 - Bar chart showing the frequency of participants who have a family history of Obesity. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes(Blue) and No(Red) .Among the total participants 28% of them had a family history of Obesity among which 16% were females and 12% were males indicating that more number of females had a history of obesity than males but it was statistically not significant .(Chi square showed $p=0.914$ (p value > 0.05)).

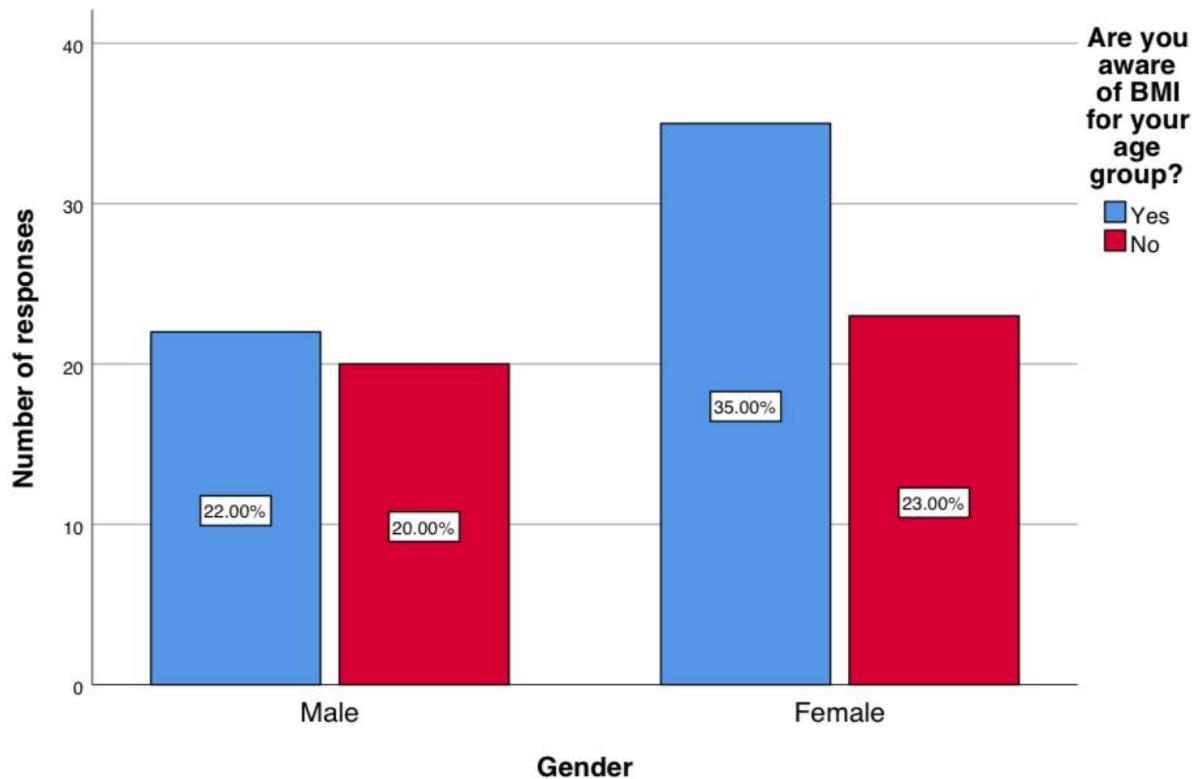


Figure 11- Bar chart showing the frequency of participants who were aware of the BMI for their age group. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes (Blue) and No (Red). 57% of participants were aware of BMI for their age group out of which 35% were females and 22% were males indicating that females were aware of BMI than males but it was statistically not significant. (Chi square test showed $p=0.427$ (p value > 0.05)).

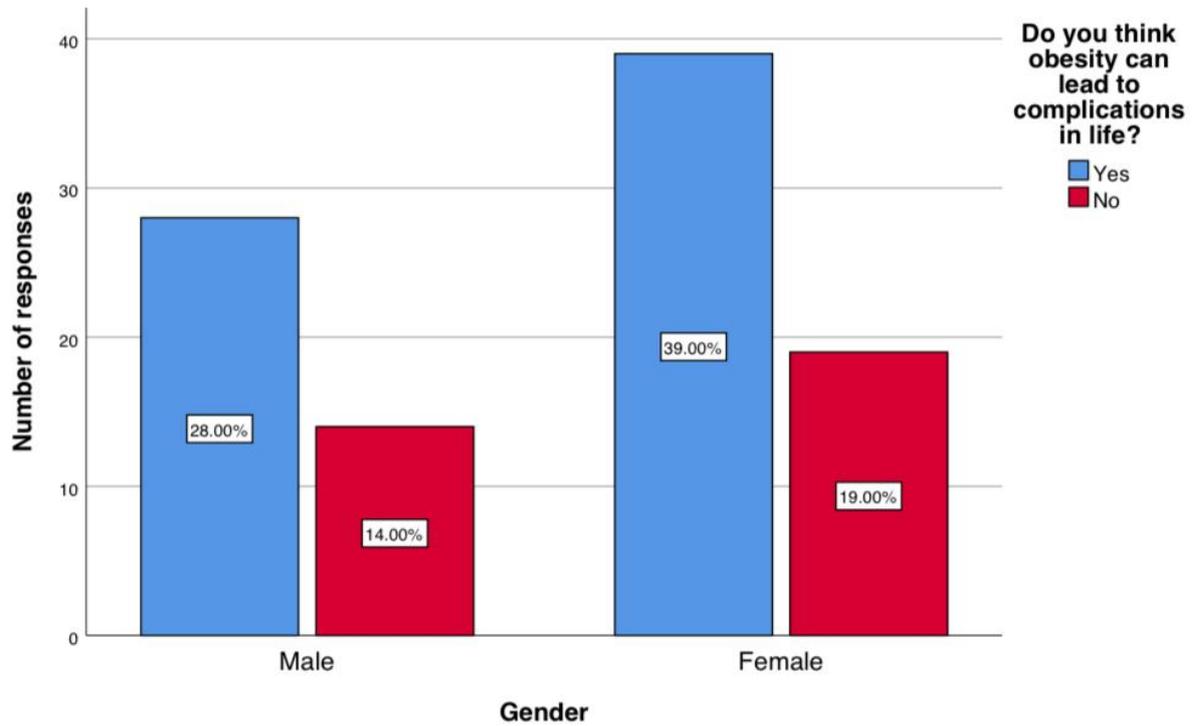


Figure 12- Bar chart showing the frequency of participants who were aware that Obesity leads to complications later in life. X axis denotes the gender of the participants and Y axis denotes the percentage of response - Yes(Blue) and No(Red). 67% of them were aware that Obesity leads to complications later in life out of which 28% were males and 39% were females indicating that females were more aware of complications of obesity but it was statistically not significant. (Chi square test showed $p=0.952$ (p value > 0.05)).