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Risk Factors and Complications Among Overweight Adolescents (14-18 Years)

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Abstract

Introduction: The nutrition-based disorder known as obesity and overweight is defined by the buildup of undesirable fat in the body. The risk of various ailments, such as high blood pressure, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, etc., is increased by this medical concern. Unhealthy lifestyle, excessive eating, screen time, genes, drugs, and other problems are some of the main causes of obesity. According to statistics on childhood obesity, there were 14.7 million children and adolescents who were obese in the year 2017 to 2020, with a prevalence of 19.7%. And 12.7% of children aged 2 to 5 years, 20.7% of children aged 6 to 11 years, and 22.2% of children aged 12 to 19 years were obese (Centers for Disease Control and prevention, 2022).

Objectives: The objective of this study was to identify the risk factors and complications among overweight adolescents of 14-18 years.

Methodology: A descriptive cross-sectional study was done to assess the risk factors and complications among overweight adolescents. The purposive sampling technique along with the structured questionnaire was used to collect data from the 62 respondents. Data was calculated using BMI percentile, waist circumference and analyzed using SPSS 25.

Findings: It was observed that 45.2% of the respondents were overweight (16.12% boys, 29.03% girls) and 54.8% were obese (25.80% boys and 29.03% girls). Majority of the respondents in this study (74.2%) were in 16-18 years of age group and 58.1% of the respondents were girls. Factors such as age (P=0.03), gender (p=0.001) and family type (p=0.04) of the respondents were found to be statistically significant with the nutritional status (BMI percentile and waist circumference). Furthermore, the respondents who skipped meal due to a busy schedule (p=0.012), the respondents who consumed sugary foods/drink (p=0.028) and the respondents who consumed oily and high fat foods twice a week (p=0.043) were also significant with the nutritional status (BMI Percentile). It was also observed that the 37.10% of the respondents having abdominal obesity had screen time of 2-3 hours a day (p=0.027).

Conclusion: It is concluded that majority of the respondents were obese and more than a half of the respondents were girls in this study. Factors such age, gender, family type, meal skipping, consumption of sugary food, frequency of fatty food consumption and screen time were found to be statistically significant with the nutritional status (BMI percentile, Waist circumference). In an addition to the physical and emotional aspects, social aspects such as isolation, rejection, low self-esteem etc. can also be the risk factors in overweight adolescents.

Keywords: Obesity, Adolescents, Risk factors, Complications, Comorbidities, Body Mass Index.

Abbreviations: WHO=World Health organization, UNICEF=United Nations Children Fund, BMI=Body Mass Index, WC=Waist Circumference, CDC=Centers for Disease Control and Prevention, SPSS=Statistical Package for the Social Sciences, TV=Television, CVD=Cardio Vascular Disease, USA=United States of America, ICMR=Indian Council of Medical Research, RDA=Recommended Dietary Allowances, IDF=International Diabetes Federation

Introduction: The nutrition-based disorder known as obesity and overweight is defined by the buildup of undesirable fat in the body. The risk of various ailments, such as high blood pressure, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, etc., is increased by this medical concern. Unhealthy lifestyle, excessive eating, screen time, genes, drugs, and other problems are some of the main causes of obesity.

WHO reports that the majority of people on earth live in nations where being overweight or obese kills more people than being underweight. In 2020, there were 39 million under-fives who were overweight or obese. And in 2016, approximately 340 million children and teenagers between the ages of 5 and 19 were overweight or obese. From barely 4% in 1975 to slightly over 18% in 2016, the prevalence of overweight and obesity among kids and teenagers aged 5 to 19 has increased considerably. Both boys and girls have shown an increase in weight in 2016, 18% of boys and 19% of girls were overweight (World Health Organization, 2021).

According to statistics on childhood obesity acquired from the CDC, there were 14.7 million children and adolescents who were obese in the years 2017 to 2020, with a prevalence of 19.7%. And 12.7% of children aged 2 to 5 years, 20.7% of children aged 6 to 11 years, and 22.2% of children aged 12 to 19 years were obese (Centers for Disease Control and prevention, 2022). It has been observed that fast food is consumed at least once a week by 46% and carbonated soft drink is consumed at least once a day by 42% of school-aged adolescents in low- and middle-income nations. In high-income nations, the rates increase to 62% and 49%, respectively, for teens. As a consequence, children and adolescents are overweight and obesity rates are rising globally. The percentage of overweight children between the ages of 5 and 19 doubled between 2000 and 2016. Today, compared to 1975, there are ten times more females and twelve times more boys in the 5 to 19 age range who are obese (UNICEF, 2019).

One of the most concerning health problems of the twenty-first century is childhood and teenage obesity. It is a widespread issue that is increasingly affecting many low- and middle-income nations, especially in urban areas. Early childhood obesity has a significant negative impact on children's physical health, social and emotional development, and self-esteem. Additionally, it is linked to substandard living conditions, low academic achievement, and problems with wellbeing. Childhood obesity is also associated with a number of co-morbid illnesses, including cardiovascular, orthopedic, neurological, hepatic, pulmonary, and renal disorders.

Materials and Method: A descriptive cross-sectional study was done to assess the risk factors and complications of being overweight among adolescents using structured questionnaire. The study was conducted in the government schools located in Tokha municipality. These government schools have been established for a long time, with relatively larger population of students for research activities. A purposive sampling technique was used for the study.

Among 368 adolescents belonging to 14-18 years of age group studying in these schools, the sample size of the respondents was determined after the assessment of nutritional status (BMI Percentile-height and weight measurement). Only overweight and obese respondents were used in the study which was found to be 62.

CDC recommended BMI-for-age-percentiles chart for boys and girls aged 2-20 were used to evaluate the nutritional status. Similarly, waist circumference measurement was done to determine abdominal obesity by taking references from Asian recommendation by IDF. Structured questionnaire along with the face-to-face interview was used to collect data from the respondents and telephone interview was used to collect the data from the parents of the respondents. The secondary data was collected from various online sources such as google scholar, research gate and so on. The school-based record of the general background of students and their parents were obtained through the school authority.

3. Major findings

Table No. 1 Socio-demographic information of the respondents

Variables	Frequency	Percent
Age		
14-15	16	25.8
16-18	36	74.2
Gender		
Boy	26	41.9
Girl	36	58.1
Address		
Basundhara	10	16.1
Tokha	17	27.4
Dhapasi	29	46.8
Basundhara chauki	6	9.7
Education level		
Secondary	25	40.3
Higher secondary	37	59.7
Religion		
Hindu	46	74.2
Buddhist	4	6.5
Christian	10	16.1
Muslim	2	3.2
Ethnicity		
Brahmin	12	19.4
Chettri	13	21.0
Janajati	35	56.5
Madhesi	2	3.2
Type of family		
Joint	20	32.3

Nuclear	42	67.7

The Table No. 1 illustrates that the age group of 16 to 18 were highest with 74.2% and 25.8% of the respondents were from age group 14-15. Also, greater percent of girl respondents (58.1%) to boy respondents (41.9%) were observed during this data analysis. The respondents were mainly from Dhapasi area accounting to 46.8% and only 9.7% of respondents were from Basundhara chauki denoting the lowest. Similarly, the number of respondents from higher secondary level of education were greater (59.7%) while compared to the secondary ones (40.3%). It was also observed that 74.2% of the respondents were Hindu and only 3.2% were Muslim. Likewise, 56.5% were from janajati ethnic group and the least were from Madhesi (3.2%) ethnic group. This might be due to the religious and ethnic diversity present at the study area. Majority of 67.7% belonged to nuclear type of family and 32.3% were from joint family type, which might be because of the rapid migration of populations to the urban area from the rural part of the country.

Table No. 2 Nutritional status according to the BMI percentile of the respondents:

Variables	**Frequency**		**Percent**	
	Boys	**Girls**	**Boys**	**Girls**
Body Mass Index (BMI percentile)				
Overweight (85^{th}-95^{th} percentile)	10	18	16.12%	29.03%
Obese (>95^{th} percentile)	16	18	25.80%	29.03%
Total	26	36	41.92%	58.06%

The table above clarifies that the girls have Body Mass Index (BMI percentile) higher than boys, i.e., overweight (29.03%) and obese (29.03%). This may be due to the household roles and hormonal changes in female.

Table no. 3 Nutritional Status according to the Waist Circumference of the Respondents:

Variables	**Frequency**		**Percent**	
	Boys	**Girls**	**Boys**	**Girls**
Abdominal obesity (waist circumference, WC)				
Abdominal obesity	10	29	16.1%	46.8%
Normal WC	16	7	25.8%	11.3%
Total	26	36	41.9%	58.1%

The highest percent of abdominal obesity was observed in girls with 46.8% and in boys 16.1% were found to have abdominal obesity. This may be due to the excess visceral fat and hormones roles in girls.

Table no. 4 Dietary habits of the respondents

Variables	Frequency	Percent
1-2 times/day	11	17.7
3-4 times/day	39	62.9
5-6 times/day	9	14.5
> 6 times/day	3	4.8
Meal Skipping		
Yes	34	54.8
No	28	45.2
Meal skipped		
Breakfast	20	32.3
Lunch	3	4.8
Snacks	4	6.5
Dinner	7	11.3
Reason of meal skipping		
Religious belief	4	6.5
Busy schedule	16	25.8
Losing weight	9	14.5
Low income or poor access to food	5	8.1

The table above indicates that 62.9% respondents consume their food for 3-4 times a day whereas 4.8% respondents only consume their food more than 6 times a day. Similarly, it has been observed that most of the respondents i.e., 54.8% skipped meal and 45.2% didn't. Among meal, breakfast was highly skipped with 32.3% and lunch was least skipped, 4.8%. Meal skipping was done mainly due to the busy schedule (25.8%) while 6.5% of the respondents skipped meal due to their religious belief.

Table no. 5 Consumption of Frequency of Different Food Groups by the Respondents:

Food Groups		Frequency	Percentage
Cereals/Grains	Daily	51	82.3%
	3-4 times a week	6	9.7%
	Once a week	2	3.2%
	Sometimes	3	4.8%
Pulses/Legumes	Daily	46	74.2%
	3-4 times a week	8	12.9%
	Once a week	4	6.5%
	Sometimes	2	3.2%
	Never	2	3.2%
Milk and Milk Products	Daily	7	11.3%
	3-4 times a week	37	59.7%
	Once a week	6	9.7%
	Sometimes	7	11.3%
	Never	5	8.1%

Fruits	Daily	4	6.5%
	3-4 times a week	13	21.0%
	Once a week	27	43.5%
	Sometimes	13	21.0%
	Never	5	8.1%
Green and other vegetables	Daily	13	21.0%
	3-4 times a week	24	38.7%
	Once a week	15	24.2%
	Sometimes	7	11.3%
	Never	3	4.8%
Meat and meat products	Daily	10	16.1%
	3-4 times a week	20	32.3%
	Once a week	23	37.1%
	Sometimes	4	6.5%
	Never	5	8.1%

The table above demonstrate the frequency of meal consumed by the respondents. It can be clearly observed that 82.3% of the respondents had cereals/grains daily and only 3.2% consumed it once a week. Likewise, 74.2% of respondents consumed pulses/legumes daily and only 3.2% never consumed it or only consumed it sometimes. Furthermore, majority of the respondents (59.7%) consumed the milk and milk products for 3-4 times a week and 8.1% never consumed it.

In addition to this, there were 43.5% of respondents who consumed fruits once a week and only 6.5% consumed it daily. While taking a look at green/other vegetables, 38.7% of the respondents consumed it 3-4 times a week, while 4.8% never consumed it. At last, but not the least, 37.1% of the respondents consumed meat and meat products once a week and 6.5% only ate meat and meat products sometimes.

Table No. 6 Consumption of Sugary and oily Food by the Respondents

Variable	Frequency	Percent
Consume sugary foods		
Yes	45	72.6
No	17	27.4
Type of sugary foods/drinks consumed		
Baked goods and confectionery	6	9.7
Goods prepared from refined flour	12	19.4
Carbonated drinks or sodas	27	43.5
Frequency of consumption		
Regularly	24	38.7
Twice a week	19	30.6
Sometimes	2	3.2
Never	17	27.4

Consume oily foods		
Yes	41	66.1
No	21	33.9
Type of oily foods consumed		
Potato chips or French fries	12	19.4
Fried meat items	21	33.9
Samosas/pakoda	3	4.8
Doughnuts or selroti	5	8.1
Frequency of consumption		
Regularly	11	17.7
Twice a week	25	40.3
Sometimes	5	8.1
Never	21	33.9

The table above illustrates that most of the respondents consumed sugary food that account to 72.6%. On the other hand, only 27.4% didn't consume any sugary food. Among the type of sugary foods, carbonated drinks or sodas were highly consumed (43.5%) and baked goods and confectionery were least consumed (9.7%). Majority of the respondents consumed it regularly (38.7%) and least of the 3.2% respondents only consumed it sometimes. Similarly, it also reveals that 66.1% consumed fatty/oily foods and 33.9% didn't. Among them 33.9% consumed fatty food such as fried meat items and only 4.8% consumed fatty food like samosas or pakodas. The majority of respondents consumed fatty/oily foods twice a week (40.3%) and 8.1% only consumed them sometimes.

Table No. 7 Physical Activity of the Respondents

Variables	Frequency	Percent
Doing exercise regularly		
Yes	11	17.7
No	51	82.3
Type of exercise		
Walking	2	3.2
Stretching	3	4.8
Yoga	5	8.1
Cycling	1	1.6
Exercise Duration		
10-20 min/d	3	4.8
20-30 min/d	5	8.1
30 min-1 hour/d	3	4.8
Spending leisure		
Sleeping	19	30.6
Watching TV/Using mobiles/internet	36	58.1
Playing outdoors	4	6.5
Reading/Writing	3	4.8

Screen Time		
Yes	59	95.2
No	3	4.8
Screen Duration/day		
Half an hour	3	4.8
1 hour	23	37.1
2-3 hours	29	46.8
> 3 hours	4	6.5
Never	3	4.8

Table No. 7 indicates that majority of respondents 82.3% didn't do any exercise, only 17.7% did exercise regularly. Similarly, most of the 8.1% of respondents did yoga as an exercise and only 1.6% did cycling as an exercise. Also, majority of 8.1% of the respondents did exercise for 20-30 min/day, whereas only 4.8% of respondents did exercise for 10-20 min and 30 min to 1 hour per day. Likewise, 58.1% spend their leisure watching TV/Using mobiles/internet and least number of respondents i.e., 4.8% spend their leisure by engaging in reading/writing. It has also been determined that 95.2% were engaged in screen time and only 4.8% weren't. The greater number of respondents (46.8%) were engaged in screen time for 2-3 hours a day, whereas only 4.8% were involved for half an hour. This might be mainly due to the sedentary lifestyle of the respondents.

Table No. 8 Sleeping Patterns and Parental Obesity in the Respondents

Variables	**Frequency**	**Percent**
Sleep on time		
Yes	36	58.1
No	26	41.9
Duration of sleep		
< 4 hours	3	4.8
4-6 hours	19	30.6
6-8 hours	33	53.2
> 8 hours	7	11.3
Wake up on time		
Yes	29	46.8
No	33	53.2
Parental Obesity		
Yes	39	62.9
No	23	37.1
Obesity in Parents		
Father		
Mother	23	37.1
Both	10	16.1
	6	9.7
Nutritional disorder in parents		

Yes	36	58.1
No	26	41.9
Health Problems in parents		
Cardiovascular disease	3	4.8
Hypertension	12	19.4
Diabetes	16	25.8
Cancer	3	4.8
Others	2	3.2

The table above demonstrate that most of the respondents (58.1%) slept on time and 41.9% didn't. Among them, majority of 53.2% slept 6-8 hours every night, whereas only 4.8% slept < 4 hours every night. Likewise, most of the 53.2% respondents didn't wake up at time, while only 46.8% did. Similarly, the study also found that 62.9% of the respondents had obese parents and 37.1% of the respondents didn't. It showed that most of the respondents (37.1%) had their father with obesity and only 9.7% had both parents with obesity.

Moreover, 58.1% of the respondents had nutritional disorder in parents and 41.9% didn't. Among them, 25.8% of the respondents stated that their parents were diabetic and 4.8% of respondents had parents suffering from cancer and cardiovascular disease as well as 3.2% of the respondents had other nutritional complications in parents.

Table No. 9 Complications of being Overweight in Respondents

Variables	Frequency	Percent
Hypertension		
Yes	1	1.6
No	61	98.4
Type 2 diabetes		
Yes	4	6.5
No	58	93.5
Respiratory problem (Asthma)		
Yes	35	56.5
No	27	43.5
Sleep apnea		
Yes	4	6.5
No	58	93.5
Feeling tired/anxious often		
Yes	47	75.8
No	15	24.2
Depressed/stressed		
Yes	43	69.4
No	19	30.6
Average academic performance		
Yes	27	43.5

No	35	56.5
Social isolation, shame or guilt		
Yes	49	79.0
No	13	21.0

The table above signifies that 98.4% and 93.5% of the respondent didn't have any complications related to hypertension and type 2 diabetes respectively. However, 1.6% of the respondent were had hypertension. Likewise, 6.5% of the respondent had type 2 diabetes. In addition to that, large number of respondents, 56.5% had breathing problems such as asthma, whereas 43.5% didn't have such problems. In case of sleep apnea, 93.5% of the respondent didn't have it, whereas only 6.5% had it.

Similarly, it was observed that 75.8% of the respondents felt tired/anxious more often, while 24.2% didn't feel tired/anxious often. Furthermore, 69.4% of respondents felt depressed/stressed often, whereas 30.6% of the respondents didn't feel depressed/stressed. In addition to that, only 43.5% of respondent had average academic performance, while 56.5% of the respondents didn't have average academic performance. Correspondingly, 79.0% of the respondents had social isolation, shame or guilt, at the same time, 21.0% didn't have any social isolation, shame or guilt.

Table No. 10 Factors Associated with the Nutritional Status (BMI Percentile) of the respondents

Variables		**BMI percentile**		**Chi-square value**	**p-value**
		Overweight	Obese		
Age	14-15 years	3	13	6.732[a]	0.035*
	16-18 years	25	21		
Meal skipping	Yes	11	23	4.987[a]	0.026*
	No	17	11		
Reason of meal skipping	Religious belief	1	3	12.876[a]	0.012*
	Busy schedule	9	7		
	Losing weight	0	9		
	Low income	1	4		
Consumption of sugary foods/drink	Yes	17	28	3.613[a]	0.057*
	No	11	6		
Frequency of Consumption of oily foods	Regularly	9	2	8.139[a]	0.043*
	Twice a week	9	16		
	Sometimes	1	4		
	Never	9	12		

Table No. 11 Factors Associated with the Nutritional Status (Waist Circumference) of the respondents:

Variables		Waist Circumference		Chi-square value	p-value
		Normal WC	Abdominal Obesity		
Gender	Girl	7	29	11.463[a]	0.001*
	Boy	16	10		
Family type	Joint	11	9	4.055[a]	0.044*
	Nuclear	12	30		
Screen Time	Half an hour	3	0	10.942[a]	0.027*
	1 hour	12	11		
	2-3 hours	6	23		
	> 3 hours	1	3		
	Never	1	2		

*P-value<0.05=Statically significant**

4. Discussion

Obesity and overweight in adolescent are a condition characterized by the excessive body fat indicating the risk of long-term nutritional disorder and complications. The age group 14-18 years are generally considered as a teen as well it falls under the category of adolescents. It is also known as a growing child age. This age is a foundation for physical, cognitive and psychosocial development to grow and develop as a healthy individual. So, the present study was formulated to determine the risk factors and complications among overweight adolescents.

The present study shows that 45.2% were overweight (16.12% boys, 29.03% girls) and 54.8% were obese (25.80% boys and 29.03% girls). This is contrary to the study done in India, which showed that the boys were more likely to be overweight (17.8%) than girls (15.8%). At the age of 18, 3.6% of boys and 2.7% of girls were obese (Ramachandran et al., 2002). This might be possible due to the greater population of girls involved in this study.

This study also found that majority of girls (46.77%) had abdominal obesity in comparison to the 16.12% of boys (P=0.001). This was similar to the study carried out in Greece which indicated that girls were more likely than boys to have abdominal obesity (21.7% vs. 13.5%) (Tzotzas et al., 2008). This may be due to the accumulation of visceral fat because of the hormonal changes during the onset of puberty in girls.

Majority of the respondent in this study i.e., 74.2% were in 16-18 years of age group (P=0.035) and 58.1% of the respondent were girls. A large number of respondents, 56.5% were Janajati and 67.7% lived in a nuclear family. Majority of the respondent in this study had nuclear type of family which was similar to the study conducted in Kathmandu, Nepal, which also showed that 53% of respondents were from nuclear family. However, this study contradicts with the same study in terms of the gender males (51%) and belonged to Brahmin/Chhetri ethnicity (44.9%) (Singh *et al.,* 2021). The similarity in family type may be

due to the rapid urbanization and high migration rate from the countryside to the town area. However, the differences in gender and ethnicity might be due to the different study area and study population.

The present study also demonstrated that 48.39% of the respondents who had abdominal obesity were from nuclear type of family (p=0.044). This contradicts with the community-based cross-sectional study carried out in Chennai, India where the type of family and abdominal obesity was not significantly associated (Anuradha *et al.,* 2012). This might be due to the lack of proper care and guidance regarding diet and sedentary lifestyle which is most likely to increase the incidence of excessive weight gain in isolated households.

In this study, it was noted that 25.80% of the respondents who skipped meal due to a busy schedule were obese/overweight (p=0.012), which is contrary to a similar study where there was no association between meal skipping and the risk of being overweight or obese (Ardeshirlarijani *et al.,* 2019). The major differences might be due to the family background of the respondents involved in the study. Most of them belonged to low-income families where they themselves have to earn as well as attend the school which leads to a busy lifestyle.
The present study also revealed that 62.9% of the respondents who were overweight and obese consumed meal for 3-4 times a day. This contradicts with the similar study carried out in Nepal, where five or more daily servings of meal each day increased the chance of becoming overweight (Sapkota *et al.,* 2020). This may be due to the small sample size and area of this study.

Likewise, it was noticeable from the findings above that 40.32% of the respondents consumed oily and high fat foods twice a week (p=0.043). This was similar to the cross-sectional study which was conducted in Indonesia where 17.5% adolescents ages 13 to 18, from multiple junior and senior high schools had diets high in fat (Florens et al., 2022). The main reason for high fat consumption might be due to the easy access, preference and taste of the fatty foods.

In addition to this, 72.6% of the respondents consumed sugary foods and drink (p=0.028), which was similar to the study conducted in Greece where for the intakes of 10% of total energy were from added sugars and being overweight or obese was 2.57 (p=0.002) and 1.77 (p=0.047) times more likely, respectively (Magriplis *et al.,* 2021). High intake of foods or drinks loaded with sugar is often analogous to the weight gain that occurs mainly due to the taste and availability of sugary food items.

The present study also reveals that 46.8% of the respondents with screen time of 2-3 hours were overweight and obese. This was contrary to the study carried out in USA, where greater probability of become overweight or obese was linked to having screen time more than four hours a day (Bakour *et al.,* 2022). A greater proportion of screen time is related to the greater attraction towards the marketed goods and beverages that may lead to the excessive weight gain.

Similarly, 37.10% of the respondents having abdominal obesity had screen time of 2-3 hours a day (p=0.027). This result was similar to the findings of cross-sectional epidemiological study of 930 adolescents aged 14–19 years where adolescents that watched television daily for two or more hours had

a higher chance of having abdominal obesity (Castro *et al.,* 2016). This might be due to the high eating frequency while watching TV or mobile phones resulting in a sedentary lifestyle.

This study showed that 53.2% of the respondents with 6-8 hours of sleep every night were obese and overweight, which didn't align with the study done in South Korea where reduced sleep is strongly related to a higher risk for overweight and obesity, $p < 0.0001$ (Park, 2011). This difference in the study might be due to the specific location chosen for the study and the variation of study population.

Moreover, this study found out that 24.18% of overweight and 32.25% of the obese adolescents had breathing difficulty (asthma). This was similar to the study carried out in USA, where higher percentage of adolescents with asthma (34%) were obese than the adolescents without asthma (24%) (Groth et al., 2016). This may be mainly due to the inflammatory chemicals produced by fat tissue of obese or overweight individuals that may have an impact on lungs leading to respiratory difficulty such as asthma.

5. Limitation

- Study was limited to obese and overweight adolescents of 14-18 years studying in government school.
- Due to the limited time and resources, biochemical and clinical assessments couldn't be included in this study.

6. Conclusion

It is concluded that majority of the respondents were obese (greater than 95th percentile) and more than half of the respondents were girls in this study. Factors such age, gender, family type, meal skipping, consumption of sugary food, frequency of fatty food consumption and the screen time of the respondents were found to be statistically significant with the nutritional status (BMI percentile, Abdominal obesity). The study also revealed higher consumption of carbohydrates, fat and calorie than the recommended value. However, the protein consumption of respondents was insufficient than the RDA value. In an addition to the physical and emotional aspects, social aspects such as social isolation, rejection, low self-esteem, depression and so on can also be the risk factors in overweight adolescents.

7. Acknowledgement

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