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Original Research Article

A correlational study to assess the relationship between body mass index and selected life style practices among high school students in selected schools at Dakshina Kannada district, Karnataka, India

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ABSTRACT

Background: People in the 18.5-22.4 BMI range with high scores on the alternate healthy eating index and high levels of physical activity have the lowest risk of early mortality, while those with higher BMIs can still have a lower risk if they also have at least one low risk lifestyle component.
Objectives: To assess the body mass index of high school students in a selected school, lifestyle practice, find the association between selected lifestyle practices with demographic variables in high school students and association between Body Mass Index with demographic variables in high school students.
Materials andMethods: Prior to starting the data gathering process, approval from BEO and the headmistresses of the chosen high schools was obtained. Canara High School and St. Aloysius High School in Mangalore hosted the primary study. The data gathering period ran from October 121, 2017, to January 1, 2018. All participants were told of the study's goal and gave their informed permission. The respondents received guarantees on the privacy and confidentiality of the data they submitted. Data from the samples were gathered by the researcher herself. In order to gather data, questionnaires about baseline data were used, along with a self-made rating scale to evaluate lifestyle behaviours and measures of height and weight to determine BMI.
Statistics : Karl Pearson 's correlation coefficient and Chi square test.
Results : The majority of samples, or 70%, had normal BMIs. Merely 20% of those surveyed were overweight. The least number of respondents (10%) were underweighted. Eighty-two percent of the respondents followed moderate lifestyles. Good living habits are present in 15% of the samples. The fewest responders (3%) led unhealthy lifestyles. Level of lifestyle habits broken down by area: The average lifestyle practice of students was 60.657.68, indicating that the majority of students follow a moderate lifestyle.
A noteworthy correlation was observed between the mother's work and certain baseline factors, such as the body mass index score. Consequently, the null hypothesis was disproved. The score of a few chosen lifestyle activities and a few chosen baseline characteristics, such gender, were significantly correlated. They rejected the null hypothesis.
Conclusion: Teenagers are the future citizens of this country, and their future depends on them. It is crucial to regularly assess students' body mass index and lifestyle choices so that those who lead unhealthy lifestyles can be quickly identified and treated appropriately to reduce their chance of developing health issues later on. Nurses will be able to teach parents and pupils about healthy lifestyle practices since they are aware of the relationship. The present study's findings have been taken into consideration for drawing the following conclusions.

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1. Introduction

The World Health Organization (WHO) defines obesity as an excessive or abnormal build-up of fat that poses a health risk. [1]

Over 41 million children under the age of five are overweight or obese, according to WHO data from 2016. In 2016, more than 340 million kids and teenagers (ages 5 to 19) were overweight or obese. [2]

In both rich and developing nations, childhood obesity has been identified as one of the major societal health issues of the twenty-first century. Type 2 diabetes, heart disease, obesity, and the associated social and psychological issues. [3–7]

However, the fact that physical education and sports classes receive limited time in our nation could be a risk factor. There are two approaches to the educational system in our nation: full-time and dual enrolment. Systems of dual and full-time education might differ based on the number of students, classrooms, and schools. Full-time students attend classes from 8:30 to 15:20, while dual students attend classes in Sivas from 7:00 to 12:45 in the morning and from 13:00 to 18:45. In the afternoon Numerous research is conducted in this regard in our nation to ascertain the prevalence of childhood obesity. [8–10]

Adolescence is a stage of life characterized by significant changes in one's physical, psychological, mental, and emotional makeup, some of which can have disastrous results. Ages 10 to 19 are considered adolescence according to the WHO. Five out of every 10 individuals are adolescents. Adolescents, numbering 1.2 billion now, are at a turning point in their lives—between childhood and adulthood. Of them, 243 million are found in India. [11–13]

2. Objectives

1. The objectives of study are to:
2. To assess the body mass index of high school students in a selected school.
3. To assess the selected lifestyle practice of high school students in a selected school.
4. To find the co-relation of body mass index and selected lifestyle practices of high school students in a selected school.
5. To find the association between selected lifestyle practices with demographic variables in high school students.
6. To find the association between Body Mass Index with demographic variables in high school students.

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3. Materials and Methods

3.1. Ethical clearance

The research proposal was approved by Dr. M. V. Shetty College of nursing institutional ethical review board. Prior permission was obtained from the Block Education Officer and headmasters of respective schools keeping in mind the ethical aspect of the research. Data were collected after obtaining informed consent from the respondents and were assured of the anonymity and confidentiality of the information provided by them.

3.2. Inclusion criteria for sampling

1. High school students:
2. Studying in selected schools at Mangalore.
3. Willing to participate in the study.
4. Present at the time of data collection.

3.3. Exclusion criteria for samplings

There are no exclusion criteria included in this study

A collection of systematic, disciplined techniques used in the intentional gathering, analysing, and interpreting of data is referred to as research methodology. The research design, study environment, population, sample and size, sampling strategy, tool creation, data collection instrument, data collection method, and data analysis plan are all covered in article.

The purpose of the current study was to evaluate the association between lifestyle choices and BMI among high school students at a particular Mangalore school. The problem's nature, sample characteristics and availability, time constraints, ethical issues, and availability of samples all played a role in the research approach selection.

In view of the nature of the problem under study and to accomplish the objectives of the study, descriptive correlational research design was adopted. In this study, the researcher checked the height and weight of students to assess BMI and administer rating scale to the high school students for assessing their lifestyle practices. [14]

The tool was developed as follows:

4. Review of Literature

Review of literature was made from research and non-research material, textbooks, journals, online sources in the area relevant to general information regarding Body mass index and lifestyle practices in high school students. Further, consultation with the guide, subject experts and clinical nutritionist were sought for developing an appropriate tool. Items were collected, scrutinized, selected and checked for ambiguity and error.

5. Discussion with Experts

Opinion and suggestions were taken from expert nursing faculties. Modifications were made in consultation with paediatric nursing experts. The final tool consisted of 30 items to assess lifestyle practices in high school students.

5.1. Preparation of blue print

Table 1: Blueprint of the tool

Area	Content	Items	Number of items	Percentage
Part IILifestyle practices	Physical activity	1-13	13	43.3%
	Eating and drinking habits	14-24	11	36.7%
	Sleeping pattern	25-30	6	20%
	Total		30	100%

6. Description of the Tool

The tool was divided into three parts:

1. **Part 1:** It includes the questions on the of baseline variables the subjects.
2. **Part 2:** It includes the BMI formula used to assess the BMI of high school students.
3. **Part 3:** It includes the rating scale to assess the lifestyle practices among high school students.

Altogether there were 30 items in rating scale for assessing lifestyle practices in high school students with a maximum total score of 90. The respondents were instructed to tick (®) mark in space for each statement that suits best to their condition.

There were instructions given prior to assess the height and weight, like remove the shoes, empty the bladder etc. Measured the height and weight of high school students and calculated the Body mass Index.

Table 2: Interpretation of BMI in high school students score

Interpretation	Score
Under weight	Less than 18.5
Normal weight	18.5-24.9
Over weight	25-29.9
Obese	30-34.9

6.1. Content validity of the tool

Validity is a measure of truth or accuracy of a claim and is an important concern throughout the research process. It refers to whether a measurement instrument accurately measures what it is supposed to measure.

Table 3: Interpretation of lifestyle practices in high school students score

Interpretation	Score
Good lifestyle practices	71-90
Moderate lifestyle practices	51-70
Poor lifestyle practices	30-50

The prepared content was given to ten experts in the field of paediatric nursing for the content validity. The selection of experts was done based on their experience and clinical expertise. The experts were requested to give their opinion regarding relevance, accuracy and appropriateness of the content for further modifications. The suggestions and recommendations given by the experts were accepted and necessary corrections were done for modifying the tool.

6.2. Pre-testing of the tool

The pre-testing of the validated tool was done in B. G. S. High School, Mangalore to determine the clarity of the items, feasibility, ambiguity and the time required to complete the items.

Data were collected from 20 selected samples using self-constructed rating scales to assess lifestyle practices and assess height and weight to calculate BMI in high school students. The tool was found to be clear, feasible and was understood well by the samples. The average time taken for the completion of the tool was 15-20 minutes.

6.3. Reliability

The reliability of a measuring tool can be assessed in the aspects of stability, internal consistency, and equivalence depending on the nature of the instrument and aspects of the reliability concept. [15]

To establish the reliability, self-constructed rating scales to assess lifestyle practices was administered and assess height and weight to calculate BMI of 20 samples other than the study samples in the pilot study setting. The scores of the items were calculated and correlations were found using Karl Pearson ‘s correlation coefficient. The correlation coefficient for lifestyle practice and BMI score was found to reliable (r=0.73). [16]

6.4. Pilot study

Pilot study is a small version of the proposed study conducted to refine the methodology. It was developed in a similar way to the proposed study, using similar subjects, the same setting, the same treatment, the same data collection method, and the same analysis technique.

The purpose of the pilot study was to find out the feasibility of the study, clarity of language in the tool as

well as in the instructional demonstration and to finalize the plan for analysis. The pilot study was conducted in B.G.S. high school, Mangalore on 05/12/2017. Twenty students were selected by using disproportionate stratified random sampling technique. The subjects for the study possessed the same characteristics as that of sample for final study.

Data were collected from twenty selected samples using self-constructed rating scales and assess the BMI by calculating height and weight of high school students. The collected data was analyzed using descriptive and inferential statistics. The correlation between BMI and lifestyle practices was found using Karl Pearson 's correlation coefficient formula.

6.5. Pilot study findings

The pilot study findings revealed that age of the respondents was of age 13 years (20%), 14 years (80%), Male and female were 45% and 55% respectively. Most (90%) of the samples belong to Hindu religion. Most (65%) of respondents belong to nuclear family. Majority (60%) of the respondents has the monthly income of family as above 20000. Most (70%) of the respondent 's father and mother (85%) had graduate and above education. Majority (45%) of the respondent's father had service as occupation and most (70%) of mothers were housewife. Most (65%) of them have mixed diet pattern and highest (90%) of them have normal sleeping pattern. Majority (55%) students had less than1hours of play/day and majority (50%) of students taking 1-2 litre of water/day. Highest (90%) of students had no family history of obesity.

Lowest (15%) of respondents are under weight. Lowest (20%) of respondents are obese, and most (65%) respondents are normal weight.

Most (70%) of respondents had score of good lifestyle practices. Lowest (15%) of respondents had score of moderate lifestyle practices and lowest (15%) of samples had score of poor lifestyle practices.

Chi-square test will be used to find the association between adolescent BMI with selected baseline variables. Chi-square test will be used to find the association between adolescent lifestyle practices with the selected baseline variables. There was significant association found (family income) with the demographic variables.

Karl Pearson coefficient correlation formula was applied to calculate the correlation between BMI and lifestyle practices among high school students. The correlation between BMI and lifestyle practices was r=0.73 which refers positive correlation.

After conducting the pilot study, it was found that the study was feasible, subjects were cooperative, the structured knowledge questionnaire was relevant, and the time and cost for the study was within the limit.

6.6. Data collection procedure

Before commencement of data collection, permission was sought from BEO and the headmistresses of the selected high schools. The main study was conducted in Canara High School and St. Aloysius High School, Mangalore. The period of data collection extended from 10/1/2017-10/1/2018. The purpose of the study was explained to all the participants and informed consent was obtained from them. The respondents were assured the anonymity and confidentiality of the information provided by them. The researcher herself collected data from the samples. Data was collected by using questions on baseline data, self-constructed rating scale to assess lifestyle practices and assess height and weight to calculate BMI.

6.7. Statistics

Karl Pearson 's correlation coefficient and Chi square test.

7. Results

The results have been organised and presented in 6 parts:

1. Part I: Description of baseline data of the high school students.
2. Part II: Body mass Index among high school students.
3. Part III: Selected lifestyle practices among high school students
   (a) Section A: Assessment of the level of selected lifestyle practices.
   (b) Section B: Area-wise analysis of the lifestyle practice scores.
4. Part IV: Correlation between Body mass index and selected lifestyle practices among high school students.
5. Part V: Association of Body mass Index with selected baseline variables.
6. Part VI: Association of selected lifestyle practices with selected baseline variables.

7.1. Part I

Description of baseline data of the high school students

This part deals with distribution of participants according to their baseline data. Data were analysed using descriptive statistics and are summarized in terms of percentage.

Table 4: Frequency and percentage distribution of samples according to baseline variables of the high school students

Sl. No. Baseline variables	Frequency	Percentage (%)
1. Age (in years)		
a. 13	41	41
b. 14	50	50
c. 15	9	9
2. Gender		
a. Male	70	70
b. Female	30	30
3. Religion		
a. Hindu	78	78
b. Muslim c. Christian	4 18	4 18
d.		
4. Type of family		
a. Joint	23	23
b. Nuclear	77	77
5. Educational status of father		
a. Primary education	7	7
b. Secondary education	14	14
c. PUC	33	33
d. Graduation and above	46	46
6. Educational status of mother		
a. Primary education	8	8
b. Secondary education	7	7
c. PUC	32	32
d. Graduation and above	53	53
7. Occupation of father		
a. Government	13	13
b. Private	42	42
c. Self-employee	45	45
N=100		
Age (in years)		
13	41	41
14	50	50
15	9	9
Gender		
Male	70	70
Female	30	30
Religion		
Hindu	78	78
Muslim	4	4
Christian	18	18
1. Type of family Joint	23	23
2. Nuclear	77	77
3. Educational status of father		
4. Primary education	7	7
5. Secondary education	14	14
6. PUC	33	33
7. Graduation and above	46	46
8. Educational status of mother		
9. Primary education	8	8
10. Secondary education	7	7

Continued on next page

Table 4 continued

11. PUC	32	32
12. Graduation and above	53	53
13. Occupation of father		
14. Government	13	13
15. Private	42	42
16. Self-employee	45	45
17. Occupation of mother		
18. House wife	69	69
19. Government	5	5
20. Private	19	19
21. Self-employee	7	7
22. Monthly income of family		
23. < Rs. 10,000	5	5
24. Rs. 10,001-15,000	8	8
25. Rs. 15,001-20,000	10	10
26. > Rs. 20,000	58	58
27. Dietary pattern:		
28. Vegetarian	17	17
29. Mixed	83	83
30. Hours of sieep/day		
31. < 6 hour	6	6
32. 6-8 hours	80	80
33. > 8 hours	14	14
34. Hours of play /day		
35. <1 hour	45	45
36. 1-2 hours	38	38
37. 2-3 hours	12	12
38. >3hours	5	5
39. Amount of water intake/day a. . <1 litre 40. 1-2 litre	7 74	7 74
41. >2 litre	19	19
42. Family history of obesity		
43. Yes	17	17
44. No	83	83

Data presented in Table 4 shows that the majority (50%) of the samples were of age group 15 years. Most (70%) of the samples were males. Most (78%) of the samples belongs to Hindu religion. Most (77%) of the samples were from nuclear family. Majority (46%) of educational status of father and mother (53%) were graduated. Majority (45%) of the samples father are self-employee and most (69%) of samples mothers are house wife. Majority (58%) had a monthly income of the family of > Rs. 20000. Most (83%) of the samples are mixed dietary pattern. Most (80%) of the samples had 6-8 hours of sleep/day. Majority (45%) of the samples had play activity <1hour /day. Most (74%) of samples had amount of water intake 1-2 litre/day. Most (83%) of the samples were no family history of obesity.

7.2. *Part II*

Body mass index among high school students

This part deals with assessment of the Body mass Index in samples and area wise analysis of the BMI level. The level of BMI among high schoolers was assessed by measuring height and weight then calculated Body Mass Index.

In order to assess the level of Body Mass Index, the scores were graded arbitrarily as follows: underweight (<18.5), normal weight (18.5-25), over weight (>25).

Table 5: Frequency and percentage distribution of existing level of Body Mass Index among high schoolers

Category of BMI	Frequency	Percentage (%)
Under weight (<18.49)	10	10.0
Normal weight (18.5 – 24.99)	70	70.0
Over weight (>25)	20	20.0
Total	100	100.0

The data in Table 5 revealed that majority (70%) of samples had normal weight followed by 20% of samples having over weight.

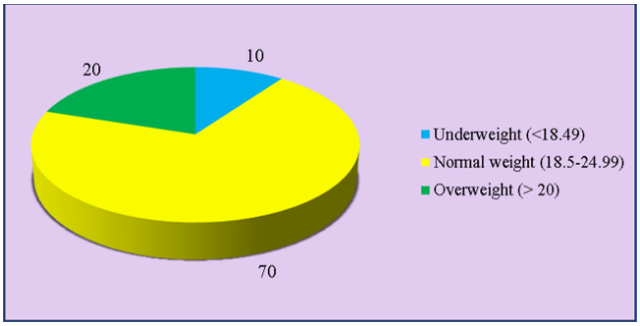

Figure 1: Pie diagram showing levels of body mass index in percentage

7.3. *Part III*

Lifestyle practices among high school students

Assessment of the existing lifestyle practices among high school students and area wise analysis by using a self-constructed rating scale.

Section A:

Assessment of the level of lifestyle practices.

The scores of high schoolers lifestyle practice level was graded as follows; poor lifestyle practices (30-50), moderate lifestyle practices (51-70) and good lifestyle practices (71-90).

Table 6: Frequency and percentage distribution of existing level of lifestyle practices among high schoolers

Level of lifestyle practices	Frequency	Percentage (%)
Poor lifestyle practices	3	3
Moderate lifestyle practices	82	82
Good lifestyle practices	15	15

The data in Table 6 reveals that majority (82%) of samples had moderate lifestyle practices followed by 15% of samples having good lifestyle practices.

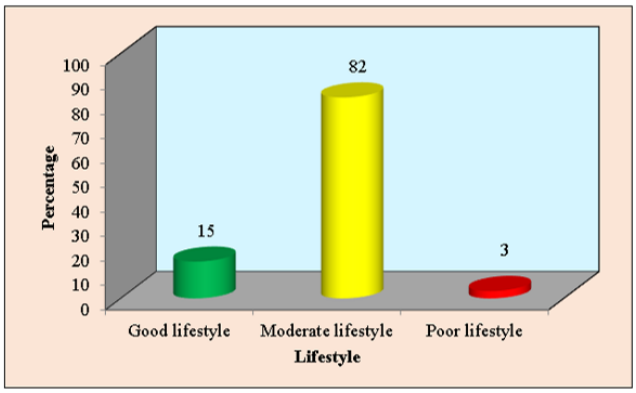

Figure 2: Cylindrical diagram showing levels of lifestyle practice in percentage Section B: Area-wise analysis of the lifestyle practice scores

This part deals with area- wise mean and SD of level of lifestyle practices among high school students.

The data in table revealed that lifestyle practices minimum score, maximum score, mean and standard deviation. The mean of students' lifestyle practices was 60.65±7.68, revealing that most students had a moderate lifestyle practice.

7.4. *Part IV*

Correlation between Body Mass Index and lifestyle practices among high school students.

To test the correlation between the BMI and lifestyle practices among high school students, the following null

Table 7: Area- wise mean and SD of level of lifestyle practices among high school students

Area	Minimum score	Maximum score	Mean	Standard deviation
Physical activity	13	39	30.75	3.44
Eating and drinking habits	11	33	18.65	2.23
Sleeping pattern	6	18	11.25	2.01
Total	30	90	60.65	7.68

hypothesis was formulated.

$H_0$1: There will be no positive correlation between Body Mass Index and lifestyle practices among high school students in selected school at Mangalore.

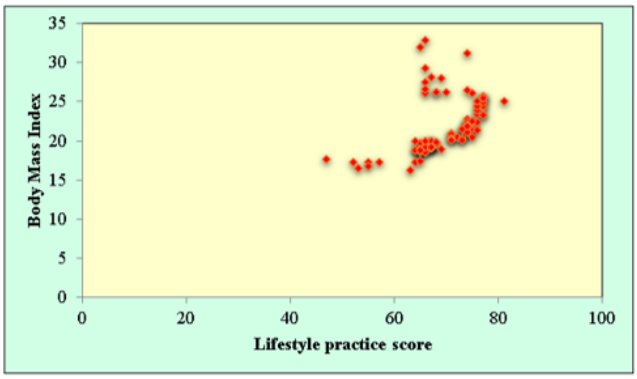

Figure 3: Scatter diagram showing correlation between BMI and lifestyle practices among high school student

Figure 3 depicts that there is positive correlation between BMI and lifestyle practices among high school students. Karl Pearson 's correlation coefficient was used to find the correlation (r=0.45). So, the null hypothesis was rejected.

7.5. Part V

Association of high school students BMI with selected baseline variables

Chi-square test was used to test the association between the BMI and selected baseline variables; the following hypothesis was formulated at 0.05 level of significance.

$H_0$2: There will be no significant association between BMI with the selected baseline variables among 8th and 9th grade high school students of selected schools at Mangalore.

The data presented in Table 8 shows that there was significant association between the score of BMI with selected baseline variables**,** e.g., occupation of mother. Hence the null hypothesis was rejected.

7.6. Part VI

Association of high school students' lifestyle practices with selected baseline variables

Chi-square test was used to test the association between the high school student's lifestyle practices scores with the selected baseline variables; the following null hypothesis was formulated at 0.05 level of significance.

$H_0$3: There will be no significant association between lifestyle practices with the selected baseline variables among 8th and 9th grade high school students of selected schools at Mangalore.

The data presented in Table 9 shows that there was significant association between the score of lifestyle practices with selected baseline variables, e.g., gender. Hence the null hypothesis was rejected.

The present study was designed to assess the relationship between BMI and lifestyle practices among high school students studying in selected high school at Mangalore. In view of the nature of the problem under study and to achieve the objectives, a descriptive survey approach and a descriptive correlational research design was found to be appropriate to describe the study. Disproportionate stratified random sampling which is a type of probability sampling technique was used to select the samples. The data were collected from 100high school students.

7.7. Level of BMI in high school students

Most (70%) of the samples had normal BMI. Only 20% of the respondents had over weight. Least (10%) of the respondents had underweight.

The finding was supported by a study conducted to evaluate the level of child hood obesity related to physical activity conducted at Canada. The data was collected by using parents' reports regarding physical activity and sports participation, sedentary behaviours like video game use and TV/video watching and BMI of the children was measured from school. Study results shows that TV watching and video game use are risk factors for being overweight (17-44% increased risk) or obese (10-61% increased risk).[17]

7.8. Level of selected lifestyle practices in high school students

Most (82%) of the respondents had moderate lifestyle practices. 15% of the samples have good lifestyle practices. Least (3%) of the respondents had poor lifestyle practices.

Area-wise analysis of the level of lifestyle practices: The mean of student's lifestyle practices was (60.65±7.68) revealing that most students have a moderate lifestyle practice.

This finding was supported by a study was conducted to determine the dietary habits and lifestyle among adolescents in Karachi. The study samples comprised of 384 students among those 53.4 percent were males and 46.6 percent

Table 8: Association between BMI with the selected baseline variables

Sl. No. Baseline variables	Chi square	Degree of freedom	P value	Inference
1. Age	2.28	4	0.68	Not significant
2. Gender	5.98	2	0.50	Not significant
3. Religion	2.88	4	0.57	Not significant
4. Type of family	2.96	2	0.22	Not significant
5. Education of fathers	4,79	6	0.57	Not significant
6. Education of mothers	14.42	6	0.25	Not significant
7. Occupation of father	2.19	4	0.69	Not significant
8. Occupation of mother	14.43	6	0.02	Significant
9. Monthly Income	2.83	6	0.82	Not significant
10. Type of food intake	0.12	2	0.94	Not significant
11. Hours of sleep/day	5.30	4	0.25	Not significant
12. Hours of play/day	5.01	6	0.54	Not significant
13. Amount of water intake	2.27	4	0.68	Not significant
14. History of obesity	1.33	2	0.51	Not significant
N=100				

Table 9: Association between lifestyle practices with the selected baseline variables

Sl. No. Baseline variables	Chi square	Degree of freedom	P value	Inferences
1. Age	0.35	2	0.83	Not significant
2. Gender	4.20	1	0.04	Significant
3. Religion	1.23	2	0.54	Not significant
4. Type of family	0.12	1	0.72	Not significant
5. Education of fathers	2.05	3	0.56	Not significant
6. Education of mothers	3.55	4	0.47	Not significant
7. Occupation of father	0.15	2	0.92	Not significant
8. Occupation of mother	3.53	3	0.31	Not significant
9. Monthly Income	5.19	3	0.15	Not significant
10. Type of food intake	3.14	1	0.07	Not significant
11. Hours of sleep/day	1.54	3	0.67	Not significant
12. Hours of play/day	1.06	2	0.58	Not significant
13. Amount of water intake	3.31	2	0.12	Not significant
14. History of obesity	0.03	1	0,86	Not significant

were females. A pre-tested semi structured questionnaire was administered after taking consent. The obtained results showed that 97 percent of the students consumed junk food and according to body mass index 41.7 percent were overweight.[18]

7.9. Correlation between the BMI and selected lifestyle practices among high school students

There was a positive correlation between the Body mass index and selected lifestyle practices among high school students(r=0.45). The null hypothesis was rejected.

A cross-sectional study conducted on dietary intake, eating behaviour and physical activity related determinants of high body mass index in rural communities in Wyoming, Montana, and Idaho. A total 928 males and 889 females are randomly selected. Data was collected by participants in this study completed a questionnaire. Study results showed that prevalence of overweight was 70% in men and 59% in women. Increased likelihood of overweight or obesity was associated with greater frequency of drinking sweetened beverages, eating while doing other activities and watching television. The researcher suggested that the vast majority of overweight and obese respondents believed that they do not get as much exercise as needed strengthens the assertion that finding ways to increase participation in physical activity should remain a high priority in obesity.[19]

Association of Body mass index and selected lifestyle practices in high school students with selected baseline variables

1. There was significant association between the score of Body mass index with selected baseline variables, e.g., occupation of mother. Hence the null hypothesis was rejected.
2. There was significant association between the score of selected lifestyle practices with selected baseline variables, e.g., gender. The null hypothesis was rejected.

8. Conclusion

Adolescents are the citizen of tomorrow on whom the future of the nation stands. Regular monitoring of Body Mass Index and lifestyle practices of students are very important so that the students who are practicing unhealthy lifestyle can be easily diagnosed and early and appropriate intervention can be instituted to protect them from the risk of health problems in future. Because of their awareness of the relationship, nurses will be able to teach, to both the parents and students, the ways of good lifestyle practices. The following conclusions have been drawn keeping in mind the findings of the present study.

9. Source of Funding

None.

10. Conflict of Interest

None.

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