A Study on Prevelance of Obesity among Selected School Children at Kalaburgi City

Manjunath G Gandage1, Kartik Reddy. D2, Prathviraj Wadekar3, Y Vindhya4, Syeda Nabila shahela5
Corresponding author: Manjunath G Gandage
Department of Pharmacy Practice, HKES's Matoshree Taradevi Rampure Institute of Pharmaceutical sciences, Kalaburagi, Karnataka, India

--- ---------
--- ---------

ABSTRACT
Purpose: Presently in India as per WHO the prevalence of obesity in children is 18%. Obesity has emerged as one of the major health problems in recent years. This increasing prevalence has implications in health issues in later parts of life. Lifestyle factors and diet practices are the attributed factors to the development of obesity. Childhood Obesity has become a major public health challenge in developing countries including India due to the changes in the lifestyle and food habits of children vowing to the influence of urban cultures and technological growth.

Methodology: The present study is a Prospective; Observational school-based study conducted to assess the prevalence of Obesity and to determine the demographic variables influencing the obesity among school children. The study was carried out for a period of 6 months. Schools were selected from different areas of Kalaburagi city. Assent form was taken from the participants at the time of enrolment into the study. Student's data was collected in pre-study in suitably designed Data Collection Form. Later, the students were given education programmes through leaflets and 1 month from the baseline, Post study was conducted using same Data Collection Form. The collected data was analysed as per study objectives. Each question under prevalence study was scored to assess the level of knowledge regarding obesity. The prevalence of obesity in the child was assessed by calculating BMI of the child using his/her height and weight parameter

Result: According to the obtained result, we found out that 30.49% of children were Under weight, 47.19% children were of Healthy weight, 16.88% of children were Over weight and 5.44% of children were Obese. 52.81% of Male children were overweight and obese compared to female children. Children of 14 years age had more prevalence of overweight and obesity (42.67%) and

least count was 13.79 in 16 years old children. Class wise prevalence shows that 48.2% of 9th standard children were overweight and obese, 16.5% children of 10th c lass were overweight and obese. xiii 14.93% of overweight and Obese children were associated with Genetics as risk factor, 17.32% of overweight and Obese children were associated with Lack of physical activity as risk factor, 17.86% of overweight and Obese children were associated with Dietary patterns as risk factors and 49.89% of overweight and Obese children were associated with all the above factors.

Conclusion: Preventive and promotive measures to reduce the burden of obesity needs to be initiated from early childhood and must be insisted to the family members also. School based lifestyles and behavioural change measures, encouraging school teachers to actively participate in these measures, active involvement of school children in regular sports activities, periodic anthropometric assessment and intervention when needed along sensitization of parents towards the consequences of obesity are some of the measures to prevent the rising epidemic

KEYWORDS: Underweight, Healthy weight, Overweight, Obese

I.   INTRODUCTION
Childhood obesity is the emerging as a major public health issue of the twenty 21 century with an alarming rise in its Prevalence in Several developing countries. As per the WHO Introduction Department of Pharmacy Practice HKES"s MTRIPS Kalaburagi Page 2 Statistics the Prevalence of obesity among children in the age group of 5-19 years has increased from 4% in 1975 to 18% in2016 which is much higher than a three - time increase. India is a rapid economic development and nutritional transition which is linked with a change in the eating habits and physical activity of children. In India Many

children today are living in an obesogenic environment. Recent globalization has forced the child from all socio-economic strata to develop heavily on ultra-processed calorie rich cheap and readily available foods which are poor in nutrients. Introduction of online food apps, increased pressure on academic with less or no time spent for outdoor activities, increased screen time, increased 'pocket money' and busy working pattern of parents add to magnitude of the problem[1].

With social-economic development, India moved away from childhood malnutrition and towards the better health and food security, this resulted in reduced number of underweight, malnourished, Overweight and stunted-wasted children. With changing lifestyle and food habits there is a spike in overweight and obesity not only in adults but also among children. With high prevalence the India is ranked third in the childhood obesity after the USA and China. Abnormal or excessive fat accumulation results into overweight and obesity this presents greater risk to health. Obesity can be measured using body mass index (BMI) Which is calculated using person's weight in kilogram divided by square of his or her height in meters. BMI of more or equal to 30kg/m2 is considered as obese whereas BMI of more or equal to 25 kg/m2 is defined as overweight. In children Both overweight and obesity are the risk factors for the development of chronic disease including diabetes mellitus, cardiovascular diseases and cancer[2].

Obesity is one of the most prevalent nutritional diseases in children and adolescents in many developed and developing countries. The world health organizations (WHO) has declared overweight as one of the top ten health risks in the world and one of the top five in developed nations. Existing WHO standards and data from 79 developing countries including a number of industrialized countries suggest that about 22 million children who are five years old are overweight. Once considered a problem of affluence, obesity is fast growing in many developing countries also. Even in countries like India, which are typically known for high Prevalence of under nutrition a significant proportion of overweight and obese children now coexist with those who are under nourished increasing relative weight trends in population have caused much concern among health care providers[7].

Childhood obesity is one of the most important child and public health issues in many parts of the world today [1]. In simple terms, obesity refers to abnormal or excessive fat accumulation resulting from energy imbalance between calories consumed and calories expended [1]. Several factors contribute to obesity. These include sedentary lifestyle, physical inactivity and poor eating habits, including consumption of savoury foods with hidden fats and sugars that impair metabolism [1, 2]. Other factors include biophysiological causes such as genetic causes, insulin resistance, hyperinsulinism, and disruption of the normal satiety feedback mechanisms.[19]

II. METHODOLOGY

Study approval:
The study protocol was prepared and submitted to the Ethics Committee on Human subject's research for ethical clearance. The study was approved by institutional ethics committee and issued ethical clearance certificate.

Consent letter: The study was initiated at five selected schools in Kalaburagi city after obtaining a consent letter from respected principals.

Study materials:
1. Case Report Form consisting of two parts:
 a) Students Socio-Demographic details.
 b) Questionnaires.
2. Leaflets on Prevalence of obesity.

Study site:
Study was conducted at the five different Selected schools in Kalaburagi city (SRN Mehta school, St.Mary's School, Vani vilas school, saradagi shakti English medium school, Sunrise English medium school)

Study Design: A Prospective observational study

Study Period: The Study was carried out for a duration of six months.

Study Criteria: Patients were enrolled into the study by considering study criteria.

- **Inclusion criteria:**
Students who were willing to participate in the study
Students of both Gender
Students who attended school regularly

- **Exclusion criteria:**
Students who were not willing to participate in the study
Children with chornic major illness were excluded from the study

Study Procedure:

A Prospective observational study was carried out for a period of 6 months among school going children at Kalaburagi city. Schools were selected from different areas of Kalaburagi city and enrolled into the study by considering the criteria. Ascent form was taken from the participants at the time of enrolment into the study. Student's data was collected as per study objectives in a suitable designed Data collection From. The collected data was analysed as per study objectives.

Analysis of Data:

Each question under prevalence study were scored to assess their level of knowledge regarding obesity. The Prevalence of obesity in the child was assessed by calculating BMI of the child using his/her height and weight parameters

III.   RESULTS

Table no.01: Demography variables of adolescents (gender, age, class distribution)

Demographic data	Total number	Percentage (%)
1.Gender		
Male	291	52.81
Female	260	47.89
2.Age		
13years	93	16.88
14years	234	42.67
15years	148	26.86
16years	76	13.79
3.Class		
$_8$th $_9$th $_{10}$th	194 266 91	35. 48.2 16.5

Table no.02: Demography variables of adolescents (weight, height distribution)

Demographic Data	Total number	Percentage (%)
1.Weight (in kgs)		
30-49	322	58.43
50-69	220	39.92
70-89	8	1.41
.> 90	1	0.18
2.Height (in cm)		
120-135	28	5.08
136-150	199	36.11
151-170	281	50.99
171-185	43	7.80

Among 551 students 322(58.43%) weight were between 30-49, 220(39.92%) weight were between 50-69, 8(1.41%) students were weight between 70-89, and 1(0.18%) students' weight were >90. And 28(5.08%) students height were between 120-135cm, 199(36.11%) students height were between 136- 150cm, 281(50.99%) students height were between 151-170cm, and 43(7.80%) students height were between 171-185cm.

Table No.03: Demography Variables Of Adolescents (BMI)

Data	Total no	Percentage %
1.**BMI**		
<18 kg (underweight)	168	30.49
18-25 kg (healthy weight)	260	47.19
25-30 kg (overweight)	93	16.88
>30 kg (obese)	30	5.44

Among 551 students 168(30.49%) students were underweight,260(47.19%) students were healthy weight,93(16.88%) were Overweight and 30(54.44%) students were obese.
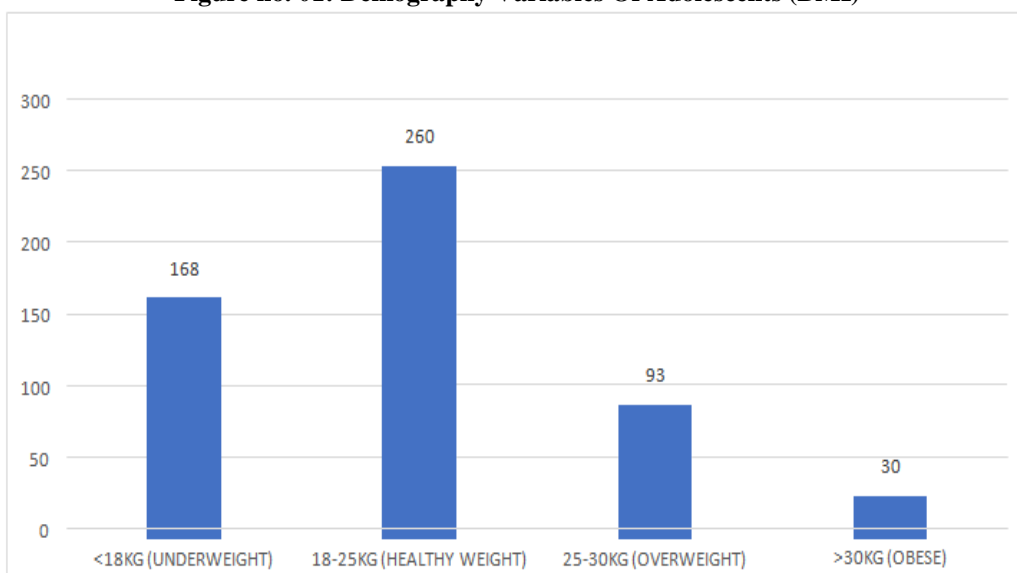
Figure no. 01: Demography Variables Of Adolescents (BMI)

Table no. 4 Dietary patterns questionnaire's

Data	Number	Percentage %
1.**Your food habits**	222	40.29
vegetarians non vegetarians	329	59.71
2. **Junk food**	103	18.69
Daily	213	38.69
Weekly	181	32.84
Monthly	54	9.78
Never		
2. **Type of food you like**		
packed food	37	6.71
street food	45	8.16
homemade food	202	36.66
	267	48.47

all the above.		
3. Skip of breakfast once a week twice a week thrice a week Never	192 93 66 200	34.84 16.88 11.98 36.30
4. Exercise per day 30 mins 1 hour 2 hours Never	201 84 35 231	36.47 15.24 6.35 41.94
6. Transportation to school Walking Bicycle bus or train Car	131 103 155 162	23.77 18.69 28.13 29.41

Table no. 5 Gender wise overweight and obese adolescents

Gender	Total no. Students	Over weight	Obese
Male	291	46	09
Female	260	47	21

Among 551 students 291 students were male in that 46 were overweight and 9 were obese and 260 students were female in that 47 were overweight and 21 were obese

Table No.6 Age wise risk factors for overweight and obese adolscents

Risk factors	13years	14years	15years	16years	Percent
Genetics	1	10	12	0	**17.86%**
Lack of physical activity	4	11	2	4	**17.32%**
Dietary patterns	3	5	4	6	**14.93%**
All of the above	12	10	15	24	**49.89%**

Among 13 years old children, 1 was associated with Genetics, 4 were associated with lack of physical activities, 3 were associated with Dietary patterns and 12 were associated with all these factors. Among 14 years old children, 10 was associated with Genetics, 11 were associated with lack of physical activities, 5 were associated with Dietary patterns and 10 were associated with all these factors. Among 15 years old children, 15 was associated with Genetics, 2 were associated with lack of physical activities, 4 were associated with Dietary patterns and 15 were associated with all these factors. Among 16 years old children, 0 was associated with Genetics, 4 were associated with lack of physical activities, 6 were associated with Dietary patterns and 24 were associated with all these factors

Table No:7 Age wise risk factors for overweight and obese adolscents

Risk factors	13years	14years	15years	16years	Percent
Genetics	1	10	12	0	17.86%
Lack of physical activity	4	11	2	4	17.32%
Dietary patterns	3	5	4	6	14.93%
All of the above	12	10	15	24	49.89%

Among 13 years old children, 1 was associated with Genetics, 4 were associated with lack of physical activities, 3 were associated with Dietary patterns and 12 were associated with all these factors. Among 14 years old children, 10 was associated with Genetics, 11 were associated with lack of physical activities, 5 were associated with Dietary patterns and 10 were associated with all these factors. Among 15 years old children, 15 was associated with Genetics, 2 were associated with lack of physical activities, 4 were associated with Dietary patterns and 15 were associated with all these factors. Among 16 years old children, 0 was associated with Genetics, 4 were associated with lack of physical activities, 6 were associated with Dietary patterns and 24 were associated with all these factors

Table no.8 Details of type of food the student like

Type of food	Pre-test	Post-test
Packed food	37(6.71%)	29(5.26%)
Street food	45(8.16%)	42(7.62%)
Homemade food	202(36.66%)	220(39.92%)
All	267(48.47%)	260(47.18%)

Among 551 students 37(6.71%) Answered packed food in pre-test which got decrease to 29(5.26%) in post-test, 45(8.16%) Answered Street food in pre-test which got decreased to 42(7.62%) in post- test, 202(36.66%) Answered homemade food in pre-test which got increased 220(39.92%) in post- test, 267(48.47%) Answered all in pre-test which got decreased to 260(50.83%) in post-test.

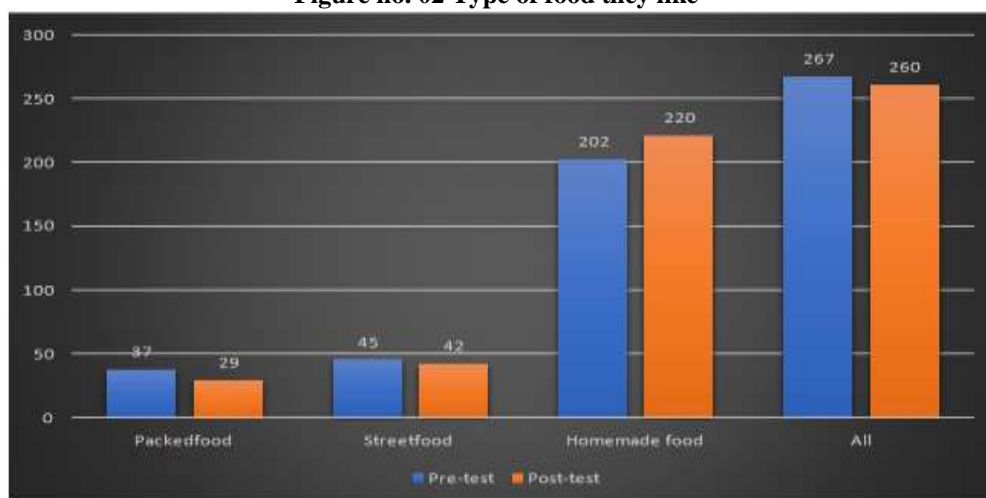**Figure no. 02 Type of food they like**

Table No. 09 Details of students' Knowledge about What is Obesity

What is Obesity	Pre-test	Post-test
<18kg/m^2	131(23.78%)	4(0.73%)
18-25kg/m^2	123(22.32%)	5(0.90%)
25-30kg/m^2	107(19.42%)	7(1.27%)
>30kg/m^2	190(34.48%)	535(97.10%)

Among 551 students 131(23.78%) students answered less that 18kg/m^2 in pre-test, which got decreased to 4(0.73%) in the post-test ,123(22.32%) students answered in between 18-25 kg/m^2 in pre-test which got decreased to 5(0.90%) in post-test, 107(19.42%) students answered in between 25- 30kg/m^2 in pre-test which got decreased to 7(1.27%) in post-test, 190(34.48%) students answered more than 30kg/m^2 in pre-test which got increased to 535(97.10%) in post-test.
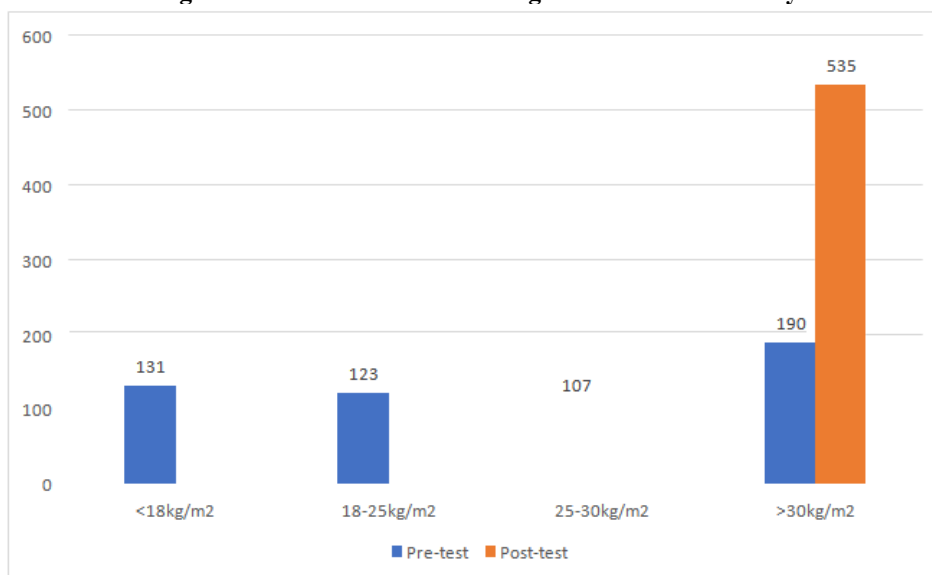
Figure No. 03 Students' knowledge about what is obesity

Table no. 10 Details of Preventive practice of obesity

Preventive practice	Pre-test	Post-test
Exercise regular	142(25.77%)	12(2.17%)
Drink enough water	128(23.24%)	11(1.99%)
Avoid high sugar	98(17.78%)	4(0.75%)
All of the above	183(33.21%)	524(95.09%)

Among 551 students 142(25.77%) Answered exercise regular in pre-test which got decreased to 12(2.17%) in post-test, 128(23.24%) Answered drink enough water in pre-test which got decreased to 11(1.99%) in post-test, 98(17.78%) Answered avoid high sugar in pre-test which got decreased to 4(0.75%) in post-test, 183(33.21%) Answered all of the above in pre-test which got increased to 524(95.09%) in post-test.

Figure no. 04 Preventive practice of obesity
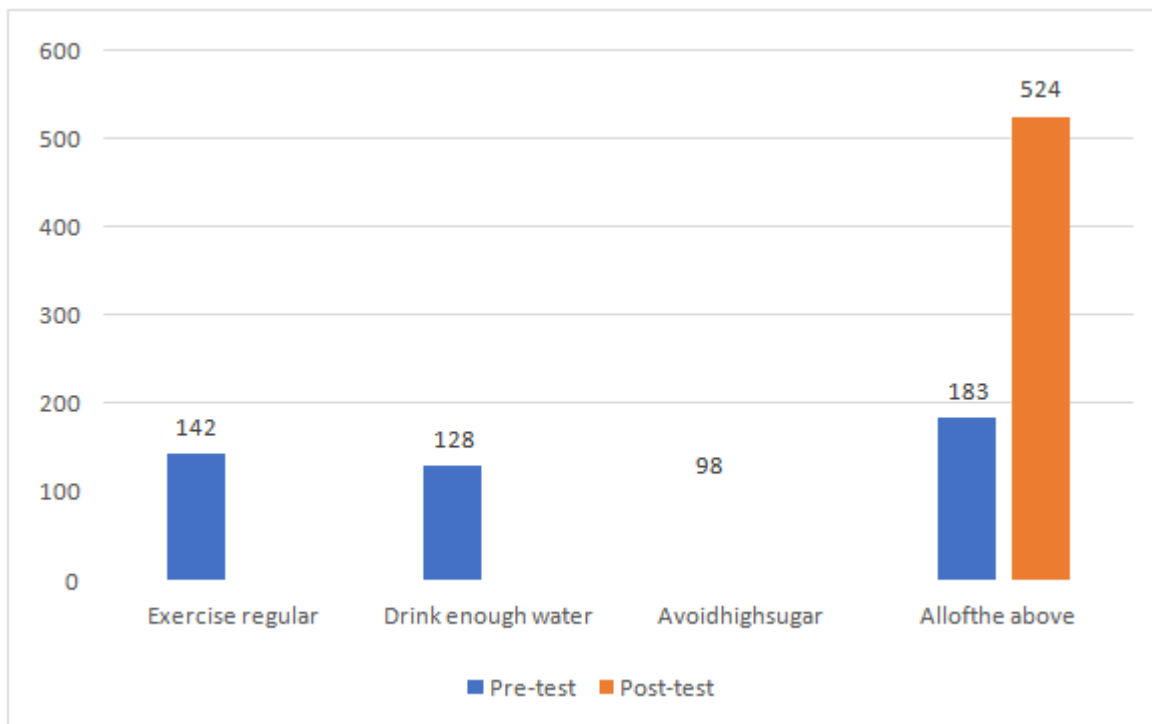
IV.   DISCUSSION

Obesity – A disorder involving excessive body fat that increase the risk of health problems.
BMI- Body mass index.
If the BMI is <18kg= Underweight
                18 to 25= Healthy weight
                25 to 30 = Overweight
                    >30 = Obese
BMI: Weight(kg)/Height(M^2)

Symptoms of obesity:
- Difficulty in sleeping. Sleep apnoea
- Back and joint pain
- Excessive sweating
- Intolerance to skin folds
- Depression

Main cause: Obesity is grnrrally caused by eating too much and movig too ittle. If you consume high amount6s of energy. Particularly fat and sugar, but do not buru off the energy through exercise and physical activity much of the surplus energy will be stored by the body as fat.

Presently in india as per who the prevalence of obesity in children is 18%. Obesity has emerged as one of the major health problems in recent years. This increasing prevalence has implications in health issues in later parts of life.

Lifestyle factors and diet practices are the attributed factors to the development of obesity. Childhood obesity has become a major public health challenge in developing countries including india due to the changes in the lifestyle and food habits of children vowing to the influence of urban cultures and technological growth.

In our study 16.88% & 5.44% children were overweight & obese, A study conducted by the Shilpa p. et al [9] which were results are similar to our results, Same results were found in the study conducted by the Prof. M. Chinna et al[13].

In our study among 551 students, we included 13, 14, 15 & 16 years of children's. in 13 years of children 2.72%%0.36% were overweight& obese. In 14years of children 7.44%&2.17% were over weight and obese, & in 15 years of children 4.35%&1.45% children were overweight & obese. Our study results were similar to the study conducted by the Prof. M. Chinna et al [13].

We included 551 students, in that males were 8.34% & 1.63% children's were overweight & obese and in females 8.52% & 3.81% were overweight & obese, a similar result found by the study conducted by the Prof. M. Chinna et al[13]. A same result found by the study conducted by the Usha M et al [1].

Among 551 students 101 students consume junk food daily, 205 were consume junk food weekly, 178 were consume junk food monthly & 67 were they never consume junk food. A similar study results were found by the study conducted by the Lynn R et al[20] . And similar results found by the syudt conducted by the Sachin P et al,[30].

In our study 29 students were like packed food, 42 were like street food, 220 were like homemade food & 260 children's were like all type of foods. A similar study conducted by the Swati G et al, were results similar to our results [17]. And similar results found by the syudt conducted by the Sachin P et al,[30].

Among 551 children's 192 children's skip their breakfast once a week, 93 children's were skip their breakfast twice a week, 66 were skip their breakfast thrice a week & 200 were never skip their breakfast. A similar result shown by the study conducted by the Sachin P et al,(30)

Among 551 children's 131 children's does exercise 30mins per day, 84 were does exercise 1hour per day,35 were does exercise 2hours per day & 231 were never does exercise. A similar study conducted by the Swati G et al, were results similar to our results [17].

Among 551 childrens 384 childrens were sleep 7-8 hours in a day,94 childrens sleep 8-9 hours in a day, 41 were sleep 9-8 hours and 34 sleep more than 10 hours in a day Swati G et al, were results similar to our results [17]

Obesity among adolescent have increased at a dramatic rate along with prevalence of weight related complications .

Health care professional like clinical pharmacist who is knowledgeable about behavioural and environmental factor that influence obesity will be better able to educate parents and children's .
Educated them will enhance the adolescent about physical activity and dietary habits which inturn reduces the risk for obesity reliable and complications.

V. CONCLUSION
Obesity is emerging as an important public health problem. 50-80% obese children become obese adults. Major factors like food habits, time spent on physical activity and family history of obesity are significant factors of obesity. Gender wise there was no such difference in over weight and obesity proportion. Combined prevalence of overweight and obesity increased with advancements in age.

At the study site, prevalence of overweight and obesity was 16.88% and 5.44% respectively. Risk factor for obesity was Lack of physical activity, Junk foods, sedentary lifestyle. Education regarding child dietary habits to prevent obesity and its complications is at most important.

The study provided the overweight, obesity among school aged children in Kalaburagi city is high. The result of an adjusted analysis showed that fruit and vegetable intake, household wealth status, type of school. Physical activity and mode of transportation were identified as the key determinants of overweight and obesity. Therefore, promoting a healthy lifestyle such as improving fruit and vegetable intake and regular physical activity are essential. In addition, special attention needs to be given for children from high income families and enrolled in private schools. Early identification of the problem by screening the BMI and assessment of the sedentary behaviour and eating practices of school children should be implemented at the schools. Awareness programme regarding dietary habits and physical training should be advocated at all schools which in turn controls the obesity in children, which will have lesser risk factors for disease

Primordial prevention is better. Preventive and promotive measures to reduce the burden of obesity needs to be initiated from early childhood and must be insisted to the family members also. School based lifestyles and behavioural change measures, encouraging school teachers to actively participate in these measures, active involvement of school children in regular sports activities, periodic anthropometric assessment and intervention when needed along sensitization of parents towards the consequences of obesity are some of the measures to prevent the rising epidemic.

BIBLIOGRAPHY
[1]. Usha M T, Narayanappa D, Sujatha MS. "Prevalence of overweight & obesity among school children in Mysuru", Karnataka. Journal of family medicine & primary care. 2021:10(8);1-5.
[2]. Vipul D, Neha J, Manoj. "Prevalence of childhood obesity & overweight in urban adolescent school children's": A prospective study. International journal of research & review.2020: 7(2); 2-7.
[3]. Eun young Lee, kun-Ho Yoon Epidemic obesity in children and adolescents: risk

factors and prevention; Higher Education press and springer-Verlag GmbH Germany, Part of springer Nature 2018 Received 29,2017:1-9.

[4]. G. Angeline Grace, Shanthi Edward, Gopalakrishnan Habits and Obesity among Adolescent School children; A case control study in an Urban Area of Kancheepuram district; Indian Journal of Community Medicine Received .2020:46(4);1-4.

[5]. Baby S NayakH.VinodBhat. Prevalence of Overweight / Obesity among school children in Karnataka, South India. International Journal of Public Health Research.2015: 11 ;1- 6.

[6]. Keertankumar, M., Prashanth, K., Katya E, kavya R, Kumar Krishna B., Krishnamurthy Mrinal Kumar, Manish Shetty, Nayak N. Kavya C.P, Sandeep Kumar G &Rahul R. prevalence of obesity among high school children in dakshinakannadaNUJHs, 2011:1(4);1-6.

[7]. Supreme Kaur MD, HPS Sachdev, SN Dwivedi, R Lakshmi P Prevalence of overweight Obesity amongst School Children in Delhi, India Asia Pac J clin 2008:17(4);1-5.

[8]. AbduelmulaR. Abdelkarim, Suleiman I. Sharif, Farah G. Bankessli, sharing A. Kamal, Nahed M. Kulhasan, Amar M. Hamrouni. Obesity and its associated risk factors among school aged children in Sharjah, UAE. Published: 2020;1-12.

[9]. Shilpa p.&vairagade prevalence of overweight and obesity among school children in Aurangabad city, International Journal of current Medical and Applied Science 2015:5(2);1-5.

[10]. Peter T The international study of childhood obesity, Lifestyle and the Environment 2013;1-13.

[11]. Teferi M overweight and obesity among school aged children in bahirdar city Italian journal of pediatrics 2018:44(17);1-8.

[12]. Harish R Epidemiology of childhood overweight and obesity in India. Indian J MED RES. 2016:1-15

[13]. Prof. M. Chinna D "A Pilot Study on Prevalence of Obesity and its Determinants among Adolescents in Schools of Jalandhar, Punjab" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456- 6470, Volume-3 | Issue-4, June 2019

[14]. Kumari V "Prevalence of Overweight and Obesity in Indian adolescent school going children: a cross sectional study done in an urban area of Rohtas, Bihar" Annals of International Medical and Dental Research, Vol (5), Issue (3)

[15]. Rajaat V "Overweight and obesity among school-going children of Lucknow city" Journal of Family and Community Medicine | August 2011 | Vol 18 | Issue 2

[16]. Robin J "Survey of obesity among school children in rural Kerala, India" International Journal of Contemporary Paediatrics | November-December 2019 | Vol 6 | Issue 6

[17]. Swati G "Prevalence of obesity and overweight among school children of Pune city, Maharashtra, India: a cross sectional study" International Journal of Research in Medical Sciences | December 2015 | Vol 3 | Issue 12

[18]. Jacob K "Prevalence of Overweight and Obesity in Adolescent Children: A Cross-sectional Study" International Journal of Scientific Study | September 2016 | Vol 4 | Issue 6

[19]. John K "Childhood obesity in urban Ghana: evidence from a cross-sectional survey of in-school children aged 5–16 years" Ganle et al. BMC Public Health (2019) 19:1561

[20]. Lynn R "Childhood obesity: food, nutrient, and eating-habit trends and influences" Appl. Physiol. Nutr. ME tab. 32: 635–645 (2007)

[21]. Vangal K "Obesity in School Children in India" Public Health in Developing Countries- Challenges and Opportunities

[22]. Krushna Priya S "Childhood obesity: causes and consequences" Journal of Family Medicine and Primary Care Volume 4: Issue 2.

[23]. Edward Y. Hu "Obesity Among High School Students in the United States: Risk Factors and Their Population Attributable Fraction" VOLUME 15, E137.

[24]. Feyzi G "The prevalence of obesity and the factors affecting obesity in the students of secondary education" International Journal of Research in Medical Sciences | August 2019 | Vol 7 | Issue 8.

[25].   Garima N "OBESITY AMONG SCHOOL CHILDREN: AN EMERGING THREAT IN CENTRAL INDIA" J of Evolution of Med and Dent Sci/ eISSN- 2278-4802, pISSN- 2278-4748/ Vol. 3/ Issue 43.

[26].   Mohd Shahnawaz "Overweight/Obesity: An Emerging Epidemic in India" Journal of Clinical and Diagnostic Research, 2018, Nov, Vol-12(11)

[27].   Mahajan P "Study of Childhood Obesity Among School Children Aged 6 to 12 Years in Union Territory of Puducherry" Indian Journal of Community Medicine/Vol 36/Issue 1.

[28].   Rajesh K "Is Obesity a Problem among School Children?" Indian Journal of Public Health ¦ Volume 62 ¦ Issue 2.

[29].   Sundareswaran M "Prevalence of Obesity among School Children" Journal of Family Medicine and Primary Care Volume 4: Issue 2.

[30].   Sachin P "A cross sectional study of lifestyle factors associated with childhood obesity among school children" Med Pulse International Journal of Community Medicine, Print ISSN: 2579-0862, Online ISSN: 2636-4743, 12, (2)