Prevalence and Risk Factors of Childhood Obesity among School Children in Kerala

Sandra Johny¹, Sobha PS²

Abstract

This descriptive study was aimed at assessing the prevalence and risk factors of childhood obesity among 800 school children in Thrissur district, using simple random sampling technique. Theoretical framework of the study was based on Betty Neuman’s system model. The tools used were bio-physical measurement, body mass index (BMI) for age percentile chart for boys and girls, structured questionnaire and food frequency table. The study revealed that the prevalence of childhood obesity among school children was 5.38 percent; 9.6 percent of children had a family history of obesity; 37.6 percent children had medium risk sleep and leisure habits; 45.5 percent of the children were following medium risk dietary practices. From food frequency table (FFT), 39 percent of children belonged to medium risk group. There was significant association between family history of obesity and monthly family income with obesity among children (p<0.001). There was no significant association between risk factors such as sleep and leisure habits, physical activity, dietary practices and frequency of food consumption per week with obesity among children. There was no significant association between socio-personal variables such as age, sex, place of residence, type of diet of child and education of parents with childhood obesity (p>0.05).

G lobalisation and nutrition transition together generated a new health problem, obesity. What remains the matter of concern is that it is not just adults who are largely affected; it is now growing like a curse among children too. According to WHO, childhood obesity is one of the most serious public health challenges of the 21st century. About 42 million infants and young children were overweight or obese, worldwide by 2013 and 70 million young children will be overweight or obese by 2025 if current trends continue (WHO, 2015).

Prevalence has increased substantially in children and adolescents in developed countries; 23.8 percent of boys and 22.6 percent of girls were overweight or obese in 2013. The prevalence of overweight and obesity has also increased in children and adolescents in developing countries, from 8.1 percent to 12.9 percent in 2013 for boys and from 8.4 percent to 13.4 percent in girls (Marie et al, 2013). In India, meanwhile, the largest study to date included nearly 40,000 children ages 8 to 18. It was found that 14 percent were overweight or obese - a number that, if extrapolated to urban youth across India, amounts to an estimated 15 million children (Gupta et al, 2012). A study conducted in Thiruvananthapuram (Kerala) in 2012 revealed a high prevalence of overweight (16%) and obesity (7%) among students of 13-18 years (George et al, 2012).

Obese children and adolescents are at increased risk of medical and psychological complications. Childhood obesity has association with increased risk of coronary heart disease, stroke, and cancer in later life. Wright et al (2001) showed that body mass index in childhood and age 50 are strongly associated. Among children in the top quarter of weight at 13 years, 8 percent are overweight or obese at age 50.

However, whether or not obesity persists into adulthood, obesity in childhood appears to increase the risk of subsequent morbidity. The emerging burden of non-communicable diseases is likely to erode the demographic-dividend of India and compromise the national growth and development. Significance of estimating prevalence of childhood obesity thus cannot be overlooked.

Objectives

The study endeavoured to: (1) assess the prevalence of childhood obesity among children of selected schools; (2) identify the risk factors of childhood obesity among children of selected schools; (3) find out association between childhood obesity; and (a) risk factors, and (b) socio-personal variables.

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Review of Literature
Best et al (2010) found that children’s health, cognition, and educational achievements are affected by their nutritional status. Gupta et al (2010) showed that rapidly changing dietary practices and a sedentary lifestyle lead to increasing prevalence of childhood obesity (5-19 years) which is 22.0 percent in India. In similar studies conducted in Kochi (2011) and Calicut (2012), the prevalence of obesity was 3.0 percent for boys and 5.3 percent for girls and 11.9 percent respectively (Paul et al, 2012; Kumar et al, 2010).

There are several substantial risk factors for the development of childhood obesity like heredity, social environment, dietary pattern, physical inactivity, diseases, cultural, psychological factors, habits and medications. The greatest risk factor for childhood obesity is the obesity of both parents.

Kumar et al (2010) reported that children with parental history of obesity had 25.2 times more chances of developing obesity than controls. Seth & Sharma (2013) found that childhood obesity, consumption of high calorie food, lack of physical activity and increased screen time are major risk factors for childhood obesity apart from other genetic, pre-natal factors and socio-cultural practices.

Kuriyan et al (2007) found that decreased duration of sleep and increased television viewing were significantly associated with overweight. Among the eating behaviours, increased consumption of fried foods was significantly associated with overweight. The known physical side effects of obesity include increase in risk of developing type 2 diabetes mellitus (DM), menstrual irregularity, infertility, cardiac arrest, stroke, asthma, obstructive sleep apnoea, bowed legs, hip instability, and metabolic issues. Psychological consequences include lowering of self-esteem, depression, bulimia and anorexia nervosa.

Data from the International Obesity Task Force indicate that more than two thirds of children 10 years and older who are obese will become obese adults. Obesity in young adults decreases life expectancy by 5 to 20 years.

Methods and Materials
The present study was conducted based on quantitative descriptive approach, in selected schools of Thrissur district; it covered 800 children chosen using simple random sampling technique.

Inclusion criteria: Children (a) who were willing to participate in the study, (b) in the age group of 11-14 years, (c) who were able to read and write Malayalam.

Exclusion criteria: Children with chronic illness; children taking medications for chronic illnesses.

Description of the tools
Tool 1: Semi structured questionnaire to assess the socio-personal data
It included age, sex, religion, place of residence, type of family, perception of body weight, birth order and type of diet of children and monthly family income, education and occupation of parents.

Tool 2: Biophysical measurement using weighing machine and tape measure
Physical parameters of children including height, weight and body mass index (BMI).

The BMI was calculated using the formula

\[ \text{BMI} = \frac{\text{Weight (in kg)}}{\text{Height (in m)^2}} \]

WHO guidelines for classification of BMI in children
Underweight - <5th percentile
Normal - 5th - 85th percentile
Overweight - 85th - 95th percentile
Obese - >95th percentile

Tool 3: WHO BMI for age percentile chart for boys and girls

Tool 4: Structured questionnaire to assess the risk factors of childhood obesity
Structured questionnaire to assess the selected risk factors of childhood obesity such as family history of obesity, sleep and leisure habits, physical activity, dietary practices and frequency of food consumption per week.

Tool 5: Food frequency table
Data were collected on favourite foods of children and were classified according to the fat and energy content into risk and low risk groups. Placing food items along with their frequency of intake per week a food frequency table was prepared.

Results
Based on the findings, most of the selected risk factors were present among children (Tables 1-5, Fig 1). Majority of the children (95.1%) were following mixed diet and 5.38 percent were in the obese category. Only 25.2 percent of children were having age appropriate sleep periods. On schooldays 32.9 percent of children and in holidays 25.75 percent of them spent free time on indoor
Dietary practices as a risk factor for obesity from dietary practices (n=800)

Table 3: Frequency distribution and percentage of children based on their risk for obesity from dietary practices (n=800)

<table>
<thead>
<tr>
<th>Dietary practices as a risk factor for obesity</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk (7-13)</td>
<td>424</td>
<td>53.00</td>
</tr>
<tr>
<td>Medium risk (14-20)</td>
<td>364</td>
<td>45.50</td>
</tr>
<tr>
<td>High risk (21-25)</td>
<td>12</td>
<td>1.50</td>
</tr>
</tbody>
</table>

Physical activity as a risk for obesity from their physical activity (n=800)

Table 4: Frequency distribution and percentage of children based on their physical activity (n=800)

<table>
<thead>
<tr>
<th>Physical activity as a risk for obesity</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk (7-13)</td>
<td>91</td>
<td>11.4</td>
</tr>
<tr>
<td>Medium risk (14-20)</td>
<td>531</td>
<td>66.4</td>
</tr>
<tr>
<td>High risk (21-25)</td>
<td>178</td>
<td>22.2</td>
</tr>
</tbody>
</table>

Obese, Overweight, Non-obese

Fig 1: Frequency distribution and percentage of children based on prevalence of obesity.

Table 5: Frequency distribution and percentage of children based on their risk for obesity according to frequency of food consumption in a week (n=800)

<table>
<thead>
<tr>
<th>Group</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk (18-48)</td>
<td>488</td>
<td>61</td>
</tr>
<tr>
<td>Medium risk (49-79)</td>
<td>312</td>
<td>39</td>
</tr>
<tr>
<td>High risk (80-108)</td>
<td>000</td>
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The prevalence of childhood obesity in the present study was found to be 5.38 percent which is more than the latest reported prevalence among school children in India (4.5%). Almost similar prevalence has been reported by different studies conducted in Kerala. Studies in Thiruvananthapuram in 2003 and 2007 showed a rising prevalence rate of childhood obesity from 4.2 percent to 4.99 percent. Prevalence of 3 percent among boys and 5.3 percent among girls was reported by Cherian and others (2012) from Cochin in 2011. A prevalence rate of 11.9 percent was seen in children of selected schools of Calicut district (Paul et al, 2012). In the present study the prevalence of overweight and underweight were 7.2 percent and 11.8 percent respectively. Together the over-nutrition is substantially coexisting with underweight in the same population.

This study identified the presence of major risk factors of childhood obesity such as family monthly income (35%), heredity (6.9%), unhealthy habits (39%), physical inactivity (88.6%) and dietary pattern (47%) among school children. Gupta et al (2010) showed that rapidly changing dietary practices and a sedentary lifestyle had led to increasing prevalence of childhood obesity (5-19 years) in developing countries recently which is 22.0 percent in India.

According to the study of Yang et al (2007), if one parent is obese the likelihood of having an obese child is three times higher. If both parents are obese, the likelihood is 10 times higher. In the present study, 6.9 percent of children had a family history of obesity.

Kuriyan et al (2007) found that decreased duration of sleep and increased television viewing were significantly associated with overweight. Among the eating behaviours, increased consumption of fried foods was significantly associated with overweight. They discovered children were 21.5 percent more likely to be overweight when watching more than 4 hours of TV per day, 4.5 percent more likely to be overweight when using a computer one or more hours per day. Now a days, only 20 percent of children experience more than two episodes of vigorous play per week.

Nayak & Bhat (2011) found that the physical activity risk factors associated with childhood obesity are less than two hours of physical education per year.
week, spending more than two hours per day in video games and watching TV, and never participating in team sports. In the present study, nearly half of the children (42.5%) were not doing any regular exercise; 6.6 percent of the children were not spending time for sports on school days and 16.6 percent of the children were spending less than 30 min for sports on holidays. Most of the children (71%) were depending on vehicles for transport.

In a study by Gable (2007) children who watched more television and ate fewer family meals were more likely to be overweight. In the present study, only 25.2 percent of children were having age appropriate sleep periods. In schooldays 32.9 percent of children and in holidays 25.75 percent of them spent free time on indoor games; 16.75 percent of children were watching screens 3 hours daily. More than half (63.75%) of the children reported the habit of taking snacks while watching screens.

In a study on changes in childhood food consumption patterns St-onge et al (2003) showed that as children’s body weights increased, so had their consumption of fast foods and soft drinks. The present study revealed that 20.8 percent of children were having fried food items after meals. Most of the children (67.1%) were occasionally taking foods from outside, 17.2 percent of them were taking health drinks.

**Implications**

The findings of the study have implications on nursing service, nursing education, nursing administration and nursing research.

**Nursing service:** As health advisors, nurses can act as change agents, through continuous instructions on healthy practice among children to prevent the risk factors of childhood obesity. Obesity screening clinics can be started in hospitals or by nurse practitioners. Nurse may also initiate life style education units in schools.

**Nursing education:** Nurse educators should plan and conduct structured teaching programme regarding lifestyle modifications in children. Nursing education should incorporate necessary programmes in the curriculum to enrich the future nurses for the management and prevention of childhood obesity.

**Nursing administration:** Nurse administrators can constitute a team to promote awareness through mass media and may formulate policies to implement regular screening and education programme among children and adolescents in schools.

**Nursing research:** More elaborate and intensive studies ought to be conducted on lifestyle modifications of children with obesity. Study results motivate the nurses to conduct more research studies regarding childhood obesity.

**Recommendations**

The study may be replicated in pre-school children; a comparative study can be conducted to assess the prevalence of childhood obesity in urban and rural areas; experimental studies can be conducted on effect of nursing interventions on management of childhood obesity; a longitudinal study may be conducted among children with risk factors of obesity to assess the effectiveness of health interventions. Further studies can be conducted to assess the knowledge and practices of children with obesity in specific areas like diet, exercise, habits and complications. Studies to assess the impact of regional/national policies on childhood obesity prevention including agriculture policy and regulations on food retailing and distributions can be planned.

**Conclusion**

Risk factors more prevalent in children were monthly family income, unhealthy habits, physical inactivity and dietary practices. There was statistically significant (p<0.001) association between family history of obesity and obesity among school children. There was no significant association between other risk factors such as sleep and leisure habits, physical activity, dietary practices, and food consumption per week and obesity among school children. There was statistically significant (p<0.001) association between family monthly income and obesity among school children. There was no statistically significant (p>0.05) association between other selected socio-personal variables such as age, sex, place of residence, type of diet of child and education of parents with obesity among school children.

**References**


13. Alice T Cherian, Sarah S Cherian, Sobhana Subbiah. Prevalence of obesity and overweight in urban school children in Kerala, India. Lakeshore Hospital, Kochi. *Indian Paediatr* 2012; 49(6): 475-77


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