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# Maternal, child and family factors in childhood obesity

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**Abstract**
**Objective:** Childhood obesity is an ever increasing problem in today's modern world. This study aimed at trying to recognize the role of maternal, child and family factors in childhood obesity. **Methods:** There were 2 groups in the study, the study group comprising of 80 obese primary school boys and their mothers and the control group that comprised of 80 normal weight primary school boys and their mothers. The children and mothers were assessed using a semi-structured questionnaire for collecting socio-demographic and other relevant data. Maternal mental health was assessed using the Depression Anxiety Stress Scale (DASS) and the Negative Life events scale. Parenting and family functioning was assessed using the Parenting Scale and the McMaster Family Assessment Device (FAD), respectively. **Results:** Maternal depression and anxiety, laxness and verbosity in parenting styles, meal frequency, eating out, lack of play with increased television viewing was significantly more in the study group. Family functioning was affected significantly in the study group as well. **Conclusions:** Childhood obesity is intricately linked to maternal, child and family health, both physical and mental. It is therefore essential that family based interventions be sought in the long term management of childhood obesity.

***Key Words:*** *Maternal, child, family factors, obesity*

## Introduction

Childhood obesity has reached epidemic proportions. There has been a four-fold increase in the prevalence of obesity in age groups 6-11 years and a three-fold increase in obesity in the age group 12-19 years between the years 1960-2002.[1] The result of this increase leads to an increasing presence of medical problems like diabetes, hypertension and cardiovascular problems being diagnosed in adolescence itself.[2]

The mother child dyad has been in focus in most child psychiatric disorders. Maternal involvement in childhood obesity is no exception. Studies done in the prenatal period postulated a link between the severity of maternal smoking during pregnancy and future development of childhood obesity.[3] Children of mothers who were overweight during pregnancy are known to be overweight in their early childhood.[4] Early studies on childhood obesity have reported that an overprotective dominant mother, a timid father and lack of warmth within the family are all risk factors towards the development of obesity in children.[5] Overt discipline on part of the mother and a maternal over-control on the child's feeding behavior have been noted to propel the child to eat more and in turn lead to childhood obesity.[6]

The family has been the subject of study by some authors, although no specific underlying factor or mechanism has been hypothesized to explain the role of family factors in obesity. Studies have proposed the lack of family cohesion, presence of social isolation, conflicts and disorganization of family structure with role reversal as factors that may contribute to the development of obesity in children.[7] There is no doubt that the family plays a pivotal role in the long term management of childhood obesity and in the successful management of weight control as most long term studies on weight control in childhood obesity have focused on family based interventions.[8-9] There is a lot of stigma associated with obesity both in personal and social life. Children who are obese are often perceived negatively by their own family members.[10]

There are number of factors in the child that determine his tendency to be obese. It has been noted that children that are obese tend to be more inactive, have increased energy intake and decreased energy expenditure. [11] It has been found that television viewing is a risk factor for childhood obesity.[12]

Children who are obese have a greater meal frequency, elevated fat intake, elevated food portion sizes and reduced fruit and vegetable intake.[13] Increased consumption of soft drinks and sugary foods in childhood has also been linked to overweight and obesity.[14] It has been noted that children who sleep less are more prone to childhood obesity and likewise children with obesity have disturbed sleep due to breathing problems in sleep.[15] The presence of fast food restaurants and school canteens that specialize in low cost high fat meals and the relentless television marketing of foods high in sugar and fat to children contribute what has been described by some authors as a 'toxic" food environment.[16]

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**Aim of the study**

To try and decipher the various maternal, child and family factors that play a role in the development of childhood obesity.

**Material & Methods**

The study comprised of 2 groups: a study group that was made up of 80 primary school children (all boys) that were obese. Obesity was diagnosed by calculating the body mass index (BMI) based on Indian reference data available. This was done by the visiting school pediatrician. The control group consisted of 80 normal weight primary school children (all boys) that were assessed by a pediatrician and certified as having weight and BMI normal for their age and sex. All children in the study had no other physical problems, were staying in the same place of residence for the last 5 years and were never under any psychological or psychiatric treatment in the past. Presence of any co-morbid psychiatric disorder was ruled out by clinical screening.

In each of these groups the mothers were assessed for maternal factors using a semi-structured questionnaire and proforma while for information on psychopathology, family factors and life events the following scales were used.

1. Depression Anxiety Stress Scales (DASS) – this is a set of 3 self report scales designed to measure depression (dysphoria, hopelessness, devaluation of life, self depreciation, lack of interest, anhedonia and inertia), anxiety (autonomic arousal, skeletal muscle effects, situational anxiety and subjective experience of the anxious affect) and stress (difficulty relaxing, nervous arousal, being easily upset, agitation, irritability and impatience). The behaviour was rated over the previous month.[17]

2. McMaster Family Assessment Device: the general functioning scale of the device was administered to all mothers. This subscale was used to assess the overall health and pathology of the family. Mothers rated their agreement or disagreement with how well the items described their families.[18-19]

3. Parenting Scale: the 30 item parenting scale is designed to measure dysfunctional discipline practices. Paired extremes of discipline strategies form the anchors for a seven point scale.[20] Three factors can be derived from the parenting scale: laxness, verbosity and over-reactivity.

4. Life Events Scale: mothers assessed recent negative life events using the list of threatening experiences which includes 12 categories of negative life events.[21] This scale was assessed over the last 6 months.

All mothers in the study were screened clinically at baseline for presence of a psychiatric disorder and the presence of the same was ruled out. None of the mothers had received psychiatric treatment in the past. All the mothers were evaluated by a physician and presence of any medical disorder was ruled out.

**Results and Discussion**

The mean age of the children in the study group was 9.69 years while that in the control group was 9.36 years (Table 1). All the participants were boys. On assessing meal frequency in the children it was noted that more children in the obese group ate more than 3 meals in a day (82.5%). It is well known that children with obesity eat more, eat faster and hence feel hungry more often leading to greater meal frequency.[22] It is known that children who are obese take more bites and chew their food less while they also take a longer time to finish their meals.[23] It was noted that obese children had significantly greater television viewing time compared to non obese children ($p = 0.0001$). Television viewing affects obesity either by influencing food choices or by encouraging excess food intake during viewing.[24]

**Table 1:** Child related factors in childhood obesity

| Variable | Obese Group (n = 80) | Normal Group (n = 80) | p value |
|---|---|---|---|
| Age | 9.69 years | 9.36 years | |
| | N (%) | | |
| > 3 meals per day | 66 (82.5) | 16 (20%) | |
| | Mean (SD) | | |
| Hours of TV use | 4.5 (1.3) | 2.6 (1.1) | 0.0001* |
| Hours of Play | 0.7 (0.3) | 1.5 (0.8) | 0.0001* |
| Eating Out per week | 9.71 (3.14) | 3.7 (1.3) | 0.0001* |
| Hours of sleep per night | 6.66 (1.33) | 7.81 (0.6) | 0.0001* |
| Soft Drinks per week | 9.36 (4.59) | 5.72 (2.33) | 0.0001* |

Student t test used in the statistical analysis* significant.

**Table 2:** Maternal factors in childhood obesity

| Variable | Obese Group (n = 80) | Normal Group (n = 80) | p value |
|---|---|---|---|
| DASS Scores | Mean (SD) | | |
| Depression | 7.75 (4.31) | 3.69 (2.95) | 0.0001* |
| Anxiety | 4.59 (5.52) | 2.41 (4.13) | 0.0001* |
| Stress | 11.31 (7.64) | 8.48 (5.21) | NS |
| Parenting Scale | Mean (SD) | | |
| Laxness | 2.31 (0.99) | 1.74 (0.58) | NS |
| Verbosity | 2.89 (0.84) | 1.88 (0.66) | 0.0001* |
| Over-Reactivity | 2.48 (0.73) | 2.26 (0.92) | NS |
| | Mean (SD) | | |
| Life Event Scale Score | 2.14 (1.9) | 1.36 (1.2) | 0.0492* |

Student t test used in the statistical analysis.* significant.

**Table 3:** Family factors in childhood obesity

| Variable | Obese Group (n = 80) | Normal Group (n = 80) | p value |
|---|---|---|---|
| | Mean (SD) | | |
| Family Assessment Device Scores | 2.77 (1.31) | 1.69 (0.41) | 0.0001* |
| | Mean (SD) | | |
| Number of members in the family | 4.2 (1.02) | 4.3 (1.03) | NS |
| Family outings per month | 10.11 (3.74) | 9.99 (3.41) | NS |
| | N (%) | | |
| Parent Away | 22 (27.5%) | 06 (7.5%) | |

Student t test used in the statistical analysis* significant

It also reduces the time available for activities to burn calories. Increased television viewing also could be the result of social rejection and diminished recreational opportunities secondary to obesity.[25] In keeping with increased television viewing the obese group also showed lesser number of hours of physical activity and play in a day (p = 0.0001). Inactivity is prominent amongst children in developed and developing countries. This is in keeping with increased intake of fatty foods and sedentary lifestyle role models of their parents (Table 1). [26]

A significantly greater eating out episodes were seen in the obese children. They also consumed a significantly greater number of soft drinks per week compared to the non obese group (p = 0.0001). Eating out more often may correlate with greater soft drink consumption in the obese group. Very often it is the entire family that eats out. It is documented that greater amount of food is consumed when people eat in groups and children tend to eat the wrong foods more often when adults are also eating.[27-28] Children in the obese group slept for lesser number of hours per day than the control group (p = 0.0001). It has been noted that with reduced sleep duration, the levels of anorexigenic hormone were reduced whereas that of orexigenic hormone ghrelin were increased suggesting the probable mechanism for increased BMI (Table 1).[29]

Mothers of children in the obese group showed significantly greater scores on the depression and anxiety subscales of the DASS (p = 0.0001). Longitudinal studies have shown a predictive value between depression in childhood and childhood obesity. Parental depression and anxiety have been noted to be antecedents for depression and anxiety in children. It may also be hypothesized that childhood obesity in turn may be a source of anxiety and depression in parents of these children.[30] Stress scores were similar in both the groups which may indicate the representation of general stress as noted in the modern world or rather the stress of parenting that most parents today undergo (Table 2).

When scores on the Parenting Scale were assessed, it was seen that mothers in the obese group had significantly greater scores on the laxness and verbosity subscales (p = 0.0001) while both groups had similar groups on the over-reactivity scale. Laxness on the part of parents in discipline as well as lack of food hygiene being taught from an early age is a common determinant of childhood obesity. Similarly ridicule and verbal reprimand along with over-control on part of the parents may lead to defiance in the child and lack of control with respect to eating leading to childhood obesity.[31] Both groups showed elevated over-reactivity scores in keeping with elevated stress scores on the DASS (Table 2).

In keeping with scores on the DASS and Parenting Scale, mothers in the obese group showed significantly greater scores on the Life Events Scale (p = 0.0492). This could probably indicate a cause and effect relationship (Table 2).

On assessing scores on the McMaster Family Assessment Device (FAD), it was seen that mothers in the obese group reported significantly greater scores than the non obese group (p = 0.0001). This indicated lack of family cohesion, warmth and probable disorganization within the family. Studies mentioned earlier have implicated these as factors in the development of childhood obesity (Table 3). [7]

The number of people in the family was similar in both groups. Today with modernization there is a tendency to break away from joint and the presence of nuclear families has emerged. 27.5% of children in the obese group had one parent who was away on job or was present at home for less than 15 days a month. This might indicate another reason for higher scores by their mothers on the DASS. In all cases it was the father that was away. Lack of a father figure has also been implicated as a causative factor in childhood obesity.[32] Family outings per month was similar in both groups. The quality of family outings whether for eating out, travel, movies, meeting relatives etc. were not enquired into and may have probably yielded better results (Table 3).

**Conclusions**

This study has both its strengths and limitations. The strength is the maternal involvement allowing us to gather data on maternal mental health and parenting style – factors that are seldom considered in studies of childhood obesity. We have found that laxness and increased verbosity in parenting was linked to childhood obesity. Parenting practices in the child's food and exercise behavior definitely play a role in children's weight problems. Limitations of our study include its small sample size and cross sectional nature. Another caveat is the omission of some aspects of family functioning like family communication patterns and the child's perceived level of parental support. Our scores on the FAD, however, yield findings similar to studies in the past.

Our findings suggest that childhood obesity may be associated with adverse maternal and family characteristics like maternal depression and anxiety, negative life events, poor general family functioning and ineffective parenting

styles. These findings need to be replicated in larger samples across diverse cultures to gain a stronghold. This study paves the way for further studies to confirm the need to find ways of targeting prevention and intervention efforts for childhood obesity in families of children with obesity.

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