





RESEARCH
ARTICLE

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The Role of Mothers' Varied Parenting Styles in Childhood Obesity**ABSTRACT**

Objective: The aim of this study is to evaluate the role of mothers' democratic, authoritarian, permissive, and overprotective parenting styles in childhood obesity and mothers' perception of their children's body weight.

Method: The research was cross-sectional in design, and a total of 94 children aged between two and six years were included, together with their mothers. Mothers were administered the Parental Attitude Scale, and children's Body Mass Index (BMI) was classified using age-gender-specific tables of the International Obesity Task Force (IOTF). The effect of mothers' parental attitudes on their children's BMI groups was evaluated. However, mothers matched their child's appearance to the appearance they thought corresponded to the age and gender-specific weight plot and mothers' weight perceptions were evaluated.

Results: The prevalence of overweight-obesity among children was found to be 19.2%. There wasn't statistically difference between democratic, authoritarian, overprotective and permissive parenting styles and BMI categories of children ($p=0.819$, $p=0.878$, $p=0.319$, $p=0.494$). The mothers of overweight-obese children perceived their children as significantly overweight compared to other children ($p<0.001$), they associated their overweight-obese children with the normal body weight imagery. Mothers of children with a normal body weight also selected thinner child images to represent their own child.

Conclusions: Mothers of children with normal body weight and overweight-obese BMI, perceived their children's body weight as thinner than it actually was. It's recommended that mothers' perceptions of their children's body weight be assessed in well-child clinics. In cases where these perceptions are inaccurate, mothers should be informed and provided with educational materials.

Keywords: Parenting Style, Pediatric Obesity, Weight Perception.

Çocukluk Çağı Obezitesinde Annelerin Farklı Ebeveyn Tutumlarının Rolü**ÖZET**

Amaç: Bu çalışmanın amacı annelerin demokratik, otoriter, izin verici ve aşırı korumacı ebeveyn tutumlarının çocukluk çağı obezitesindeki rolünü ve annelerin çocuklarının kilo durumuna ilişkin algısını değerlendirmektir.

Yöntem: Araştırma kesitsel tipte olup, 2-6 yaş arası 94 çocuk anneleriyle birlikte çalışmaya dahil edildi. Annelere Ebeveyn Tutum Ölçeği uygulandı ve çocukların Beden Kitle İndeksi (BKİ), Uluslararası Obezite Çalışma Grubu'nun yaşa ve cinsiyete özel tabloları kullanılarak sınıflandırıldı. Annelerin ebeveyn tutumlarının, çocuklarının BKİ grupları üzerindeki etkisi değerlendirildi. Aynı zamanda anneler, çocuklarının görünümünü, yaşa ve cinsiyete özel ağırlık çiziminde, karşılık geldiğini düşündükleri görünümle eşleştirdi. Annelerin kilo algıları değerlendirildi.

Bulgular: Çocukların %19,2'si fazla kilolu-obez olarak sınıflandırıldı. Annelerin demokratik, otoriter, aşırı korumacı ve izin verici ebeveyn tutumları ile çocukların BKİ kategorileri arasında anlamlı fark bulunmadı ($p=0,819$, $p=0,878$, $p=0,319$, $p=0,494$). Fazla kilolu-obez çocukların anneleri, çocuklarını diğer çocuklara göre anlamlı derecede kilolu olarak algılamakla birlikte ($p<0,001$), fazla kilolu-obez çocuklarını normal kilo çizimi ilişkilendirdiler. Benzer durum, normal ağırlıktaki çocukların annelerinde de görülmüş olup çocuklarını olduklarından daha zayıf çocuk çizimleri ile eşleştirdiler.

Sonuç: Annelerin ebeveyn tutumlarının, çocuklarının BKİ kategorileri üzerinde etkisi olmadığı görüldü ancak normal ve fazla kilolu-obez çocukların annelerinin, çocuklarını olduğundan daha zayıf görme eğiliminde olduğu saptandı. Sağlam çocuk kliniklerinde annelerin kilo algıları değerlendirilmelidir, hatalı algılamaları durumunda anneler bilgilendirilmeli, konuyla ilgili eğitim broşürleri verilmelidir.

Anahtar Kelimeler: Ebeveyn Tutumu, Pediatrik Obezite, Kilo Algısı.

INTRODUCTION

The World Health Organization (WHO) defines overweight and obesity as "abnormal or excessive fat accumulation that presents a risk to health." The WHO also identifies childhood obesity as one of the most significant public health challenges of the 21st century, noting that worldwide obesity rates have nearly tripled since 1975. In 2022, 37 million children under the age of five were classified as overweight or obese, representing a significant increase from previous years. Previously regarded as a phenomenon exclusive to high-income countries, the prevalence of overweight and obesity is now on the rise in low- and middle-income countries. (1).

The likelihood of an obese child or adolescent becoming obese in adulthood is five times greater than that of a non-obese child or adolescent. A significant proportion of obese children (55%) remain obese in adolescence, with 70% of obese adolescents being obese by the age of 30 (2). Obese children are at an increased risk of developing cardiovascular diseases, diabetes, musculoskeletal diseases (osteoarthritis, degenerative joint) and certain types of cancer (endometrium, breast, colon) in adulthood (1).

There is a general consensus that environmental factors play a pivotal role in the development of obesity, given the alarming increase in childhood obesity that cannot be attributed solely to genetic predispositions (3). The intrauterine environment, nutritional status, physical activity, familial and psychosocial characteristics are the primary environmental factors that influence the risk of obesity (4). A significant proportion of children's dietary and physical activity behaviours are influenced by their families during the preschool period. The child's acquisition of positive or negative habits is largely influenced by their family (5).

The attitudes and behaviours adopted by parents result in differences in the way children are raised (6). Parents have been examined in different dimensions according to this attitude and behaviour. The democratic, authoritarian and permissive dimensions defined by Baumrind were used in determining parenting styles. Democratic parents expect mature behaviour from their children and require them to adhere to the established rules. They listen to their children in a caring and patient manner and take their children's views into consideration when making decisions. Permissive parents afford their children considerable freedom, exhibit occasional negligence, and are unable to control their children. There are no restrictions regarding television viewing or computer gaming, and there is no established eating or sleeping routine. Authoritarian parents suppress children's efforts to challenge authority. They engage in minimal exchange with their children and expect unconditional compliance with the rules they set,

otherwise they impose penalties (7). Furthermore, an additional dimension was proposed, namely that of overprotection (8). This concept encompasses the notion of maternal overprotection, which can be defined as an excessive level of care and control exerted by mothers over their children, characterised by frequent contact and the prevention of social maturity.

It is aimed to assess the role of mothers' democratic, authoritarian, permissive and overprotective parenting styles on childhood obesity and mothers' perceptions of their children's weight status.

MATERIAL AND METHODS

Participants: The research is cross-sectional. The sample size was calculated using a confidence interval of 95%, an effect size of 0.40, and a power of 90% in the G-Power 3.1 program, resulting in a required sample size of 84. A total of 201 children were admitted to the well-child clinic between July and August 2016. Of these, 107 were excluded from the study due to the presence of one or more exclusion criteria, including the presence of a chronic disease, the use of drugs that may cause obesity or weight loss, and the presence of an adult other than the child's mother. The remaining 94 children and their mothers were included in the study.

Data Acquisition: BMI of the children was calculated. The children were classified according to the age and gender specific tables of the International Obesity Task Force (IOTF) as morbidly obese, obese, overweight, normal, grade 1 underweight, grade 2 underweight and grade 3 underweight. Morbidly obese, obese and overweight have been combined as "overweight-obese". Grade 1 underweight, grade 2 underweight and grade 3 underweight were combined as "low body weight". A total of three groups were evaluated, including those with normal body weight.

The questionnaire comprises a series of questions pertaining to socio-demographic characteristics, daily activities, and the existing literature on the subject, with a total of 38 questions in all (9, 10).

The Parental Attitude Scale (PAS) was developed by Karabulut as a means of determining the parenting attitudes that parents have demonstrated in raising their children aged 2-6 (11). The scale comprises four dimensions: democratic, authoritarian, overprotective, and authoritarian. The Cronbach alpha reliability coefficients for the dimensions are 0.83, 0.76, 0.75, and 0.74, respectively. The scale comprises 46 items, with 17, 11, 9 and 9 items, respectively, for each dimension. Mothers were invited to express their parenting attitudes on a 5-point Likert scale. The points awarded for each dimension were calculated individually, with one point being awarded for each

dimension. A high score on the scale indicates that the respondent is embracing the behaviour that the dimension represents.

The mothers were presented with image of children of 2-6 age and gender specific weight imagery (Figure 1) (12). They were asked to

indicate which child they believed their own child most resembled. The images comprised seven pictures, ranging from the thinnest child to the fattest child, with four images representing a normal body weight child.

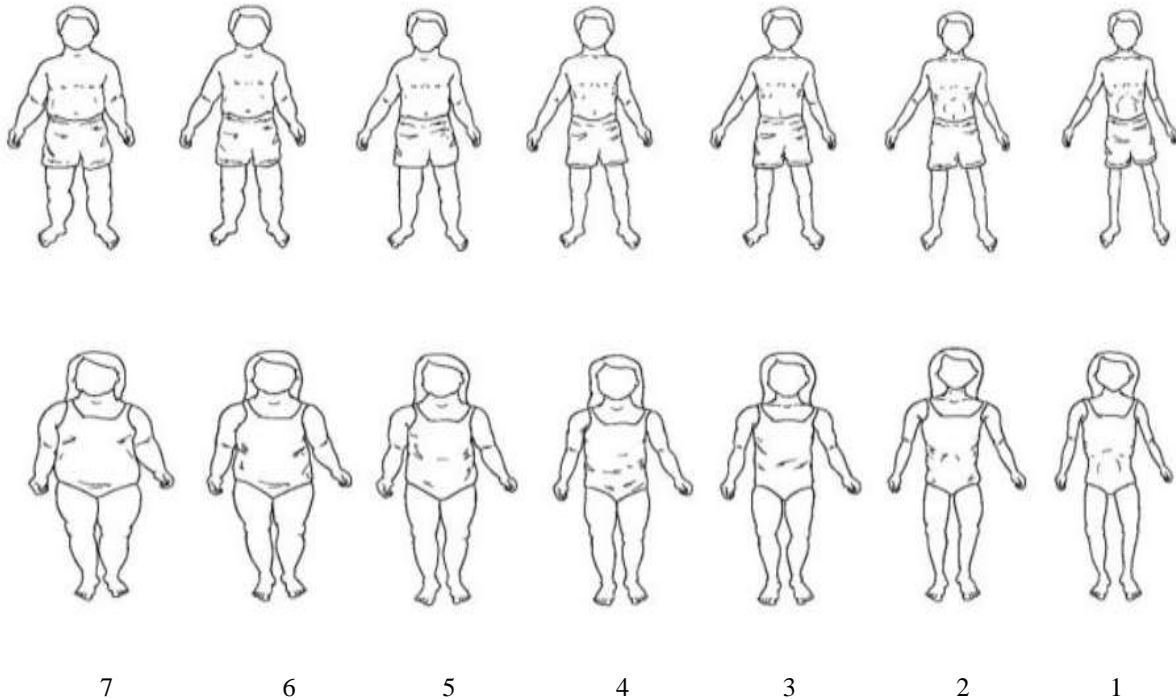


Figure 1. 2-6 age and gender specific weight imagery (© 2003 Scott Millard, medical illustrator). The first 3 numbers on the right are indicative of low body weight, the 4th number is within the normal body weight, and the numbers from 5 to 7 are indicative of overweight-obese.

A further comparison was made between the scores given by mothers of children with overweight-obese, normal body weight, and low body weight.

Written permission from medical illustrator Scott Millard was obtained for the utilisation of 2-6 age and gender specific weight imagery. Ethical approval for this study was granted by the X University Clinical Research Ethics Committee on 29/06/2016, with the protocol number 2016-72-29 / 06.

Statistical Analysis: The statistical analysis was conducted using the IBM SPSS Statistics for Windows, Version 24.0 (Armonk, NY: IBM Corp.) software.

The compatibility of numerical variables with a normal distribution was evaluated through the implementation of the Shapiro-Wilk test. Descriptive statistics were expressed as the arithmetic mean \pm standard deviation (SD) and median (minimum-maximum) for numerical variables, and as numbers and percentages for categorical data. The Chi-square test was employed to analyse differences between groups in terms of

categorical variables. In the case of numerical variables, one-way ANOVA of variance was utilised when parametric test assumptions were met, whereas Kruskal-Wallis variance analysis was employed when these assumptions were not satisfied. Dunn's test was used to compare the subgroups in pairs in the latter case, and a value of $p \leq 0.05$ was considered statistically significant.

RESULTS

Sociodemographic characteristics of the mothers were evaluated; the youngest mother was aged 21, while the oldest was 46 years old. The mean age was 31.35 ± 5.11 years. 1.1% (n=1) of the mothers were only literate, 29.8% (n=28) had completed primary school, 29.8% (n=28) had completed secondary school, 27.6% (n=26) had completed high school, and 11.7% (n=11) had graduated from an undergraduate program or above. All the mothers were married. The average income of the families was $742,3 \pm 389,3$ Turkish Dollars (\$). The majority of families (75.5%, n=71) were of the nuclear type. The sociodemographic characteristics of the mothers participating in the study are provided in Table 1.

Table 1. Sociodemographic characteristics of mothers.

| Sociodemographic characteristics | | n | Mean ± SD | Median (min-max) |
|----------------------------------|-------------------|----|-------------|------------------|
| Age (years) | | 94 | 31.35 ±5.11 | 31 (21-46) |
| Family Income (\$) | | 85 | 2277 ±1168 | 2000 (1000-6000) |
| Number of children | | 94 | 1.89±0,72 | 2 (1-4) |
| | | n | | % |
| Educational status | Literate only | 1 | | 1.1 |
| | Primary school | 28 | | 29.8 |
| | Middle School | 28 | | 29.8 |
| | High school | 26 | | 27.6 |
| | License and above | 11 | | 11.7 |
| Occupation | Housewife | 80 | | 85.0 |
| | Officer | 6 | | 6.4 |
| | Employee | 6 | | 6.4 |
| | Other* | 2 | | 2.2 |
| Economic situation perception | Low | 12 | | 12.8 |
| | Middle | 61 | | 64.8 |
| | Good | 20 | | 21.3 |
| | Very good | 1 | | 1.1 |
| Family structure | Nuclear | 71 | | 75.5 |
| | Extended | 23 | | 24.5 |

*Hairdresser, Coach

The age and gender distribution of children is analyzed; the youngest child was 24 months old, while the oldest was 71 months old, with an average age of 45.58 ± 12.92 months. Of the total number of children, 43.6% (n = 41) were female, while 56.4% (n = 53) were male. The mean birth weight of the children was 3107 ± 704.47 grams (Table 2).

A total of 24.5% (n=23) of the children were classified as having low body weight, 56.4% (n=53)

were classified as having normal body weight, and 19.1% (n=18) were classified as overweight or obese. Of the children with low body weight, 13.0% (n=3) were underweight 3, 17.4% (n=4) were underweight 2, and 69.6% (n=16) were underweight 1. In the obese group, 66.7% (n=12) were overweight, 5.5% (n=1) were obese, and 27.8% (n=5) were morbidly obese.

Table 2. Sociodemographic characteristics of children.

| Sociodemographic characteristics | | n | Mean ± SD | Median (min-max) |
|----------------------------------|------|----|--------------|------------------|
| Age (month) | | 94 | 45.58 ±12.92 | 44.5 (24-71) |
| Birth weight (gr) | | 91 | 3107 ±704.47 | 3230 (770-4600) |
| | | n | | % |
| Gender | Girl | 41 | | 43.6 |
| | Boy | 53 | | 56.4 |
| Ever breastfed | Yes | 88 | | 93.6 |
| | No | 6 | | 6.4 |

The mothers indicated that 26.6% (n=25) of their children use the computer for a minimum of two hours per day, 59.6% (n=56) watch television for a minimum of two hours, and 79.8% (n=75) engage in outdoor play for a minimum of two hours. The mean duration of computer/tablet usage was 1.08 ± 1.3 hours, television viewing was 2.07 ± 1.5 hours, and outdoor gaming was 3.04 ± 1.9 hours. The time spent using computers on a daily

basis, the time spent watching television, and playing outside were not found to have a statistically significant impact on the weight of children ($p=0.510$, $p=0.198$, $p=0.940$).

Weight classification of children did not change with their age ($p = 0.992$).

The gender, family structure, and maternal educational status of children did not effect their weight (Table 3).

Table 3. The gender of children, family structure, educational status of mothers.

| | | Low body weight (n=23) | | Normal body weight (n=53) | | Overweight-obese (n=18) | | p |
|--------------------------------------|----------------------------------|------------------------|------|---------------------------|------|-------------------------|------|-------|
| | | n | % | n | % | n | % | |
| Gender | Girl | 10 | 24.4 | 20 | 48.8 | 11 | 26.8 | 0.225 |
| | Boy | 13 | 24.5 | 33 | 62.3 | 7 | 13.2 | |
| Family structure | Nuclear type | 20 | 28.2 | 37 | 52.1 | 14 | 19.7 | 0.271 |
| | Extended type | 3 | 13.0 | 16 | 69.6 | 4 | 17.4 | |
| Educational status of mothers | Literate only and Primary school | 8 | 27.6 | 19 | 65.5 | 2 | 6.9 | 0.151 |
| | Middle School | 8 | 28.6 | 13 | 46.4 | 7 | 25.0 | |
| | High school | 5 | 19.2 | 17 | 65.4 | 4 | 15.4 | |
| | License and above | 2 | 18.2 | 4 | 36.4 | 5 | 45.5 | |

The mean family income per month was 791± 371 721± 402 826± 385 dollars (\$), and 2478±1157 \$, respectively, for children with low, normal body weight, and overweight-obese. There was no statistically significant difference between family income and the weight of the children (p=0.438).

The effect of parenting styles on children's weight was evaluated. The findings revealed that the democratic, authoritarian, overprotective, and permissive dimensions did not effect children's weight (p = 0.819, p = 0.878, p = 0.319, p = 0.494) (Table 4).

Table 4. Effect of parental attitude dimension on children's weights.

| | Low body weight (n=23) Median(min-max) | Normal body weight (n=53) Median(min-max) | Overweight-obese (n=18) Median(min-max) | p |
|-----------------------|---|--|--|-------|
| Democratic | 75(55-85) | 73(57-85) | 73(59-85) | 0.819 |
| Authoritarian | 21(15-38) | 21(14-42) | 21,5(15-35) | 0.878 |
| Overprotective | 37(33-45) | 37(24-45) | 33,5(21-45) | 0.319 |
| Permissive | 21(12-32) | 21(10-37) | 20(12-35) | 0.494 |

Mothers of low body weight, normal body weight and overweight-obese children marked the image that most closely resembled their children's appearance in the 2-6 age and gender specific child weight imagery (Figure 1). When the scores corresponding to the image they marked were compared, a significant difference was found (p<0.001). When the values in the body weight classification were compared pairwise, it was observed that the mothers of overweight-obese children gave significantly higher scores on the imagery than the other two groups (Table 5). The

mean score of the overweight-obese group was 4.16, the mean score of the normal body weight group was 2.90, and the mean score of the low body weight group was 2.26. Although mothers of overweight-obese children perceived their children as significantly overweight compared to other children (p<0.001), they associated their overweight-obese children with normal body weight image number four. A similar pattern was observed in mothers of normal body weight children, who associated their children with image that were thinner than they were.

Table 5. The mothers' imagery scores according to children's BMI groups.

| | Low body weight* (n=23) | Normal body weight* (n=53) | Overweight-obese* (n=18) | p | Post-hoc |
|------------------|-------------------------|----------------------------|--------------------------|--------|-----------------|
| Mean ± SD | 2.26±1.17 | 2.90±1.21 | 4.16±1.65 | <0.001 | c>b** c>a*** |
| Median | 2 | 3 | 5 | | |
| (min-max) | (1-4) | (1-6) | (1-7) | | |

*: Low body weight: a, Normal body weight: b, Overweight-obese: c. **:< 0.05 ***:< 0.001

DISCUSSION

The prevalence of childhood obesity is rising globally, representing a significant public health concern (1). The 2021 report of the American Center for Disease Control and Prevention (CDC) indicates that the prevalence of obesity in children

aged 2-5 is 12.7% (13). The latest features of the Turkey Nutrition and Health Survey reveal that the prevalence of overweight in children aged 0-5 in Turkey is 18%, with a prevalence of obesity of 9% (3). In various studies conducted in Turkey, the

prevalence of overweight or obesity during the preschool period has been reported to range from 8% to 26% (14, 15, 16, 17). The results of the research indicate that 12.8% of children aged 2-6 are overweight and 6.4% are obese. A total of 26.8% of girls and 13.2% of boys are classified as overweight or obese. This finding aligns with the results of numerous other studies that have demonstrated a higher prevalence of overweight and obesity in girls (16,17).

The effect of sociodemographic characteristics of mothers and children on children's body weights was evaluated; family income, mother's perception of economic status, mother's education level were not effective on children's weights. Similarly, Öztoprak Hacıoğlu and Edem reported that the mother's level of education, family income, and mother's perception of economic status did not affect the weights of children (9,10). Garipağaoğlu et al. also found no difference between maternal education level and obesity (18). In the United States, it has been reported that low income causes overweight and obesity, but it has also been reported that income has no effect on weight status (19, 20). There are studies reporting the effect of maternal education level on obesity with different results. In a study conducted in Germany among children aged 5-6 years, it was reported that the high level of education of mothers had a preventive effect on obesity in children (21). In a study conducted in China, it was reported that parents' high level of education had a preventive effect on obesity in children (22). In contrast to the studies conducted in Germany and China, in a study conducted in Turkey in children aged 6-12 years, the incidence of obesity was found to be higher in children of families with higher educational status and income (23). In some other studies conducted in Turkey, no significant difference was found between parental education level and obesity in children (9,10,18). These different results in the studies suggest that in addition to income and education level, cultural differences, attitudes towards nutrition and eating habits may also have an effect on children's weight. Another factor thought to affect children's weight status was television viewing time. The American Academy of Pediatrics recommends that children under the age of two should not watch television at all and children over the age of two should watch television for a maximum of two hours a day (24). In this study, no significant difference was found between television viewing time and weight status, but it was found that approximately 60% of the children watched television for at least two hours a day. The average television viewing time of children is more than two hours and is above the recommended time.

Parental attitudes may differ according to countries and cultures. In our study, in addition to democratic, authoritarian and permissive parental

attitude dimensions, the "overprotective dimension", which is known to be common in Turkey, was also examined. Our study is important as it is the first study to include the overprotective dimension. When we evaluate the studies conducted in different countries, parental attitude was measured in four dimensions as democratic, authoritarian, permissive and "neglectful" dimension in the studies examining the effect of parental attitude on obesity in Australia and USA (USA Mexican origin parents) (5, 25). the study conducted in Mexicans, it was reported that obesity emerged three years later in children of permissive type parents (25). The study conducted in Australia, no significant difference was found between parental attitude and obesity (25). In this study, it was observed that parental attitude did not affect the weights of children. When mothers were asked to mark which image their children most resembled in the 2-6 age and gender specific child weight imagery, mothers of overweight-obese children marked the imagery with higher scores (heavier) than mothers of other children. This difference was found to be significant. However, both mothers of overweight-obese children and mothers of children with normal body weight matched their children with image of thinner children. This suggests that mothers tend to see their children as thinner than their actual weight. Many physicians encounter concerns from parents that their children are underweight, even though the weights of the children they monitor for growth are within normal limits. In one study, 36% of the parents labeled their children thinner than they were on the visualization, while 4% labeled them overweight (26). Although it is thought that this situation may differ between cultures, similar results are found in foreign studies (27, 28).

Limitations: The study was conducted in a single pediatric well-child clinic, and thus the results cannot be considered to represent the entire population. Participants were recruited from a pediatric well-child clinic during normal working hours. It is possible that working mothers may not have been able to apply to the university hospital, which is located far from the city centre, during working hours.

CONCLUSION

The parenting styles did not affect the BMI categories of the children. However, the mothers were likely to perceive their children's body weight as thinner than it actually was. Such perceptions may be more deleterious than protective in the context of the current global obesity epidemic. The affect of parenting style on children's weight can be researched in more than one center and during pediatric examinations in outpatient clinics, mothers' perception of their children's weight can be rapidly assessed with the use of age- and gender-specific imagery. In the event of a discrepancy between the actual weight of the children and the

perception of the mothers, the mothers should be informed and provided with educational materials on healthy nutrition.

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