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The Obesity and Psychological Resilience in Children: Investigating the Connection

Çocuklarda Obezite ve Psikolojik Sağlamlık; Bağlantının Araştırılması

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ABSTRACT

Aim: Obesity is a critical public health issue that is increasingly prevalent among children. This study aimed to examine the psychological resilience of both obese and normal-weight children, as well as the factors influencing their resilience levels.

Material and Method: This study included obese and normal-weight children who applied to Başkent University Hospital over a period of two months. Children and their parents filled out a questionnaire consisting of parents' socio-demographic data and the "Child and Youth Resilience Measure". SPSS-23 was utilized to conduct a comparison of scale scores through Pearson's correlation coefficient test. Additionally, multiple linear regression was employed to elucidate the connections between the variables.

Results: A total of 111 adolescents were included in this study, comprising 48 (43.2%) normal weight individuals and 63 (56.8%) obese individuals. The two groups did not differ significantly in terms of age and gender distribution (p >0.05). The study revealed a negative correlation between psychological resilience and children's age (r=-0.210, p=0.027), a positive correlation with family income (r=0.247, p=0.009), and a negative correlation with obesity (r=-0.342, p <0.001). Both univariate and multivariate analyses revealed a significant negative association between obesity and the father's education level (B: -1.00, p=0.046), as well as a negative relationship between obesity and psychological resilience (B:-0.12, p=0.001).

Conclusion: Our study revealed a negative correlation between children's resilience levels and their age and obesity status, while also showing a positive correlation with family income. Further research is warranted to explore the underlying mechanisms of these associations and to develop effective interventions aimed at enhancing children's resilience.

Keywords: Child, obesity, psychological resilience

ÖZ

Amaç: Obezite, çocuklar arasında giderek yaygınlaşan kritik bir halk sağlığı sorunudur. Bu çalışmanın amacı, hem obez hem de normal kilolu çocukların psikolojik dayanıklılıklarının yanı sıra psikolojik sağlamlık düzeylerini etkileyen faktörlerin incelenmesidir.

Gereç ve Yöntem: Bu çalışmaya **iki ay boyunca** Başkent Üniversitesi Hastanesi'ne başvuran obez ve normal kilolu çocuklar dahil edilmiştir. Çocuklar ve ebeveynleri, ebeveynlere ait sosyo-demografik verilerden ve "Çocuk ve Genç Psikolojik Sağlamlık Ölçeği"nden oluşan bir anket formunu dol-durmuştur. Pearson korelasyon katsayısı testi ile ölçek puanlarının karşılaştırılması için SPSS-23 kullanılmıştır. Ek olarak, değişkenler arasındaki bağlantıları açıklamak için çoklu doğrusal regresyon kullanılmıştır.

Bulgular: Bu çalışmaya 48 (%43,2) normal kilolu, 63 (%56,8) obez olmak üzere toplam 111 adolesan dahil edilmiştir. İki grup yaş ve cinsiyet dağılımı açısından anlamlı farklılık görülmemiştir (p >0,05). Bu çalışmada; psikolojik dayanıklılık ile çocukların yaşı arasında negatif (r=-0,210, p=0,027), aile geliri ile pozitif (r=0,247, p=0,009) ve obezite ile negatif bir ilişki saptanmıştır (r=-0,342, p <0,001). Hem tek değişkenli hem de çok değişkenli analizler sonucunda obezite ile babanın eğitim düzeyi (B: -1,00, p=0,046) ve psikolojik dayanıklılık (B: -0,12, p=0,001) arasında negatif bir ilişki gözlenmiştir.

Sonuç: Çalışmamız çocukların dayanıklılık düzeyleri ile yaş ve obezite durumları arasında negatif, aile geliri ile pozitif korelasyon göstermiştir. Bu ilişkilerin altında yatan mekanizmaları keşfetmek ve çocukların dayanıklılığını artırmayı amaçlayan etkili müdahaleler geliştirmek için daha fazla araştırma yapılması gerekmektedir.

Anahtar Kelimeler: Çocuk, obezite, psikolojik sağlamlık

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INTRODUCTION

Childhood obesity has emerged as a pressing public health concern, posing multifaceted challenges to individuals and society at large. The complexities surrounding its etiology have led to growing concerns not only about the metabolic complications of obesity but also its profound psychological consequences (1-3). Research in this field has shown a strong association between obesity and various psychological issues, including depression, low self-confidence, impaired social communication, and body image dissatisfaction (4). As such, it is increasingly recognized that safeguarding children from obesity may also serve as a means to protect them from potential negative psychological outcomes.

Resilience refers to both the process and the outcome of successfully adapting to difficult or challenging life experiences, according to the definition from the American Psychological Association (APA) (5). It's having the mental, emotional, and behavioral flexibility and ability to adjust to both internal and external demands, per APA. Psychological resilience is a potentially protective factor against obesity (6). One possible explanation for this may be the ability of resilience to mitigate the effects of stress on eating behaviors (7). In particular, studies have shown that resilience may moderate the relationship between perceived stress and binge eating tendencies (7). Additionally, there is evidence to suggest that individuals with higher levels of psychological resilience tend to consume more fruits, vegetables, dietary fiber, and fish while consuming fewer soft drinks and fast food options (8,9). Furthermore, optimism, which is commonly observed in resilient and thriving individuals, has been associated with increased consumption of fruits, vegetables, and grains, and decreased consumption of sugar (10,11). Taken together, these findings suggest that psychological resilience may be a crucial factor in reducing the risk of obesity by promoting healthier eating habits and attitudes (6,7).

Findings from research conducted on adults have shown that resilience plays a crucial role in the psychosocial characteristics of individuals with severe obesity, particularly those who are being considered for bariatric surgery (12).

Obesity can have a significant impact on an individual's psychology, presenting itself in two distinct ways. Firstly, a high-fat diet can trigger chronic inflammation in the brain, which may potentially affect mood and behavior (2). Secondly, children with obesity may experience negative emotions due to the actions of others, resulting in issues such as poor body image and low self-esteem. Research has shown that children with a higher body mass index (BMI) are more vulnerable to discrimination, social isolation, and bullying. They may face verbal bullying, such as name-calling and teasing, physical bullying, such as hitting and pushing, and relational bullying, such as the withdrawal of friendships, within their immediate environment, such as school and home (13).

There is evidence showing that obesity and psychological resilience are mutually related (12). In this regard, psychological well-being may serve as a protective factor against childhood obesity, or the psychological resilience of an obese child may be affected. The present study aimed to compare resilience levels and explore the factors influencing those levels in both normal-weight and obese children.

MATERIAL AND METHOD

The study was carried out with the permission of Başkent University Non-invasive Clinical Researches Ethics Committee (Date: 2023, Decision No: 23/282) and was conducted according to the principles outlined in the Declaration of Helsinki. Informed consent was obtained from both the participants diagnosed with obesity and the healthy controls, as well as from their parents, before their inclusion in the study.

Measures

Body Mass Index Measure

In this research, the children were categorized as either obese or non-obese based on their BMI (Body Mass Index) percentile. The participants' BMI was calculated by dividing their weight in kilograms by the square of their height in meters. The children's height and weight were measured to determine their body mass index (BMI). BMI percentile charts, which were developed based on reference values for Turkish children, were used to categorize the children as normal weight (between the 5th and 85th percentile) or obese (above the 95th percentile) (14).

Child and Youth Resilience Measure (CYRM)

The Child and Youth Resilience Measure (CYRM) is an assessment tool designed to gather information about the psychological resilience of children and adolescents. The original scale consisted of 28 items, organized into three subscales and eight sub-dimensions (15). A short-form version of the scale was later developed, resulting in a 12-item structure (16). The factor loading values of the scale ranged from .39 to .88, indicating a good level of consistency. The internal consistency coefficient of the scale, as measured by Cronbach's alpha, was found to be .84. The scale is rated on a five-point Likert structure, with responses ranging from "Describes me completely (5)" to "Does not describe me at all (1)". In scoring the items, all positive items are reverse coded. Consequently, high scores on the CYRM indicate the presence of a negative cognitive triad, while low scores indicate a positive cognitive triad. Thus, individuals with high levels

of psychological resilience receive lower scores on the CYRM, whereas those with low levels of psychological resilience receive higher scores. The Turkish adaptation of the 12-item short form scale was conducted by Arslan (2015), specifically on children and adolescents aged 11-16, and statistical analyses were performed (17). The reliability study revealed a Cronbach alpha reliability coefficient of .76 for the entire scale.

Statistical Analysis

Descriptive statistics were used to summarize the data, with numbers and percentages reported for categorical variables and mean ± standard deviation and median (minimum-maximum) reported for continuous variables. The Chi-square test was used to analyze associations between categorical variables. Nonparametric tests were utilized due to the non-normal distribution of sample data across groups. Specifically, the Mann-Whitney U test was used to compare quantitative variables between the obese and non-obese groups.

Univariate and multivariate logistic regression analyses were performed to identify significant predictors of obesity. In the univariate analysis, variables with a significance level of p <0.25 were included in the multivariate logistic regression analysis. Statistical significance was determined by a p-value of <0.05. Data analysis was conducted using the IBM SPSS version 28.0 software for Windows (IBM Corp; Armonk, NY: 2021).

RESULTS

Our study comprised a total of 111 adolescents with a mean age of 14.0±1.9 (range: 11-16) years, among whom 43.2% (n=48) were classified as normal-weight and 56.8% (n=63) were classified as obese. There was no difference between the two groups in terms of age and gender distribution (p=0.087, p=0.386). When examining the sociodemographic data of the parents in both groups, there was only a difference in the father's educational status (p=0.021), as shown in **Table 1**. While 63.5% of fathers of obese children had a bachelor's degree or higher education level, this percentage was 83.3% for fathers of normal-weight children (p=0.021).

The mean age of the mothers was 41.5±3.9 years, and the mean age of the fathers was 45.0±6.1 years. The majority of the parents (90%) were married, and 87.4% had an income more than twice the minimum wage. Furthermore, 69.4% of the mothers and 80% of the fathers had a bachelor's degree or higher education.

The average score obtained by the children on the CYRM was 48.0±7.2 (range: 26-60). While the mean CYRM score for obese children was 50.9±7.2 (range: 35-60), it was 45.9±7.8 (range: 26-60) in the normal weight children (p<0.001).

When examining the relationship between children's psychological resilience level and sociodemographic characteristics, we found that psychological resilience was negatively correlated with child age (r= -0.210, p=0.027), positively correlated with family income (r= 0.247, p=0.009), and negatively correlated with childhood obesity (r= -0.342, p<0.001), as shown in **Table 2**.

Table 1. Comparison of the socio-demographic characteristics and resilience levels between obese and normal weight children.

	Groups of children classified by body mass index		
	Normal n (%) 48 (43.2)	**Obese n (%) 63(56.8)**	**p values**
Children's characteristics			
Age (M±SD)	13±2 (11-16)	14±2 (11-16)	0.087
Gender (n (%))			
Female	25 (52.1)	38 (60.3)	
Male	23 (47.9)	25 (39.7)	0.386
Score of the CYRM	50.9.±7.2 (35-60)	45.9±7.8 (26-60)	<0.001*
Parents' characteristics			
Age (M±SD)			
Mother	41±4 (35-48)	42±4 (36-52)	0.460
Father	45±5 (35-53	44±7 (38-56)	0.359
Marital status (n (%))			
Married	38 (79.2)	52 (82.5)	0.653
Divorced	10 (20.8)	11 (17.%)	
Income level			
Minimum wage and x2	4 (8.3)	11 (17.5)	0.078
>2x minimum wage	44 (91.7)	52 (82.5)	
Educational level (n (%))			
Mother			
Below bachelor's degree	11 (22.9)	23 (36.5)	0.073
Bachelor's degree and above	37 (77.1)	40 (63.5)	
Father			
Below bachelor's degree	8 (16.7)	23 (36.5)	0.021*
Bachelor's degree and above	40 (83.3)	40 (63.5)	

n: number, M: mean, SD: standard deviation, CYRM= Child and Youth Resilience Measure.

Table 2. Correlations Between Children's Psychological Resilience, Obesity, and Sociodemographic Variables.

		1	2	3	4	5	6	7	8	9	10
1. Psychological Resilience Level	r		-0.210	-0.342	0.022	0.104	-0.008	-0.156	0.247	0.164	0.182
	p	1	0.027*	0.000**	0.819	0.276	0.934	0.102	0.009**	0.086	0.056
2. Children's age (year)	r			0.132	0.159	0.198*	-0.084	-0.035	-0.012	-0.217	-0.136
	p		1	0.166	0.096	0.037	0.383	0.718	0.904	0.022*	0.155
3. BMI status (Obese= BMI>95p; normal= BMI 5-85p)	r				0.061	-0.115	-0.082	-0.043	-0.167	-0.146	-0.219
	p			1	0.527	0.229	0.390	0.657	0.079	0.126	0.021*
4. Maternal age (year)	r					0.189*	-0.178	-0.044	0.228	0.093	0.216
	p				1	0.047	0.062	0.650	0.016**	0.334	0.023*
5. Paternal age (year)	r						-0.230	-0.407	-0.014	-0.061	0.037
	p					1	0.015*	0.000**	0.883	0.522	0.703
6. Children's gender (year)	r							0.228	-0.161	0.146	0.016
	p						1	0.016*	0.091	0.126	0.864
7. Marital status of the parents	r								0.114	0.071	-0.007
	p							1	0.233	0.456	0.942
8. Income level of the parents	r									0.454	0.550
	p								1	0.000**	0.000**
9. Mothers's education level	r										0.806
	p									1	0.000**
10. Fathers's education level	r										
	p										1

*: p <0.005, ** p<0.01. BMI= Body mass index, p=percentile

Table 3. Factors that affect obesity in children.

	Univariate logistic regression analysis				Multivariate logistic regression analysis			
	B	Wald	OR 95% CI	p	B	Wald	OR (95% CI)	p
Children's age (year)	0.15	1.90	1.16 (0.94-1.42)	0.67				
Children's gender (Female/Male)	0.33	0.75	1.39 (0.65-3.0)	0.386				
Marital status (Married/Divorced)	0.22	0.20	1.24 (0.50-3.23)	0.653				
Income level (Minimum wage and x2, >2x minimum wage)	1.16	2.87	3.18 (0.84-12.10)	0.98				
Psychological Resilience level	-0.12	11.15	0.89 (0.83-0.95)	0.001*	-0.12	10.24	0.89 (0.82-0.95)	0.001*
Fathers's education level	-1.06	5.11	0.35 (0.14-0.87)	0.020	-1.00	3.98	2.73 (1.02-7.32)	0.046
Mothers's education level	0.66	2.33	1.93 (0.83-4.51)	0.127				

OR: odd ratio, CI=Confidence Interval.

The factors influencing obesity in children were examined using both univariate and multiple regression analyses. The results of the univariate regression analyses indicated that there were no statistically significant effects of the income level of families, the marital status of parents, the education level of the mother, as well as children's age and gender, on obesity (**Table 3**). However, the results of both univariate and multiple regression analyses revealed significant associations. Specifically, obesity was found to have a negative relationship with the father's education level (B: -1.00, odds ratio (95% CI): 2.73 (1.02-7.32), p=0.046) and psychological resilience (B: -0.12, odds ratio (95% CI): 0.89 (0.82-0.95)).

DISCUSSION

Resilience refers to the ability to maintain or promptly recover one's mental health in the face of stressful situations resulting from traumatic events. Several studies have demonstrated a decrease in psychological resilience among adolescents with obesity (18). According to the findings of this study, adolescents with obesity exhibited diminished levels of psychological resilience, and the educational attainment of their fathers emerged as a noteworthy sociodemographic variable linked to obesity.

Similar to our study, Uzun et al. (2023) showed a relationship between psychological resilience and adolescent obesity, consistent with our findings (19). The findings reveal that adolescents with higher levels of psychological resilience are more successful in dealing with obesity and receive greater social support. Additionally, it has been observed that receiving social support enhances adolescents' psychological resilience, assisting them in coping with stress and challenges associated with obesity (19). Previous research has also suggested that increasing psychological well-being can serve as a protective factor against obesity, as psychologically healthier individuals tend to have lower rates of other obesity-related disorders (20). Conversely, some studies have reported no significant relationship between obesity and psychological resilience (4). In summary, although a definitive cause-and-effect relationship has not been established, we believe that

promoting psychological resilience among adolescents may aid in preventing obesity in children and managing obesity in those who are already obese.

In our study, we examined the factors influencing obesity and found that both the education level and psychological resilience of the father had a significant negative impact on obesity. While these findings do not establish a causal relationship, they indicate that fathers of obese children tend to have lower education levels and lower psychological resilience. These results might underscore the importance of psychological resilience in obesity prevention and treatment processes. Health professionals and families should develop appropriate strategies to foster adolescents' psychological resilience and strengthen their social support systems. By doing so, more effective and sustainable outcomes in combating obesity can be achieved.

Another important finding of our study is the positive relationship between the psychological well-being of children and family income. While the income levels of families with obese children were more than twice the minimum wage, they were still lower than those of normal-weight children, although this difference was not statistically significant. This is consistent with previous research, which has also shown that the family income of obese children tends to be lower (19). Although we were not able to obtain a statistically significant difference between obese and normal-weight children due to our small sample size, there may still be a difference. A higher socioeconomic status can promote healthy eating behaviors and prevent obesity. However, some studies have also suggested that individuals with lower incomes may be less motivated to control their weight gain (21). Additionally, we found that a low-income level was associated with reduced psychological resilience, which can increase the risk of obesity by impairing adolescents' ability to cope with stress. Therefore, it is important to recognize that adolescents from low-income backgrounds may be at greater risk for obesity, and to develop preventive programs accordingly.

Psychological resilience is a proven and remediable condition in which individuals play a major role in maintaining their well-being. This study found that obese adolescents had lower psychological resilience and that their father's education level may be a significant sociodemographic factor associated with obesity. At this juncture, it can be argued that obesity may negatively impact psychological well-being, while psychological resilience may serve as a protective factor against obesity. While the causal relationship between resilience and obesity has not been fully established, it is evident that obesity might have adverse effects on mental health. These findings underscore the importance of promoting psychological resilience among obese individuals and addressing the mental health needs of those who are affected by obesity. In this regard, we firmly believe that our research significantly contributes to the literature by demonstrating the link between obesity and psychological resilience in children. Despite these findings, our study has some limitations. Firstly, the sample size is relatively small. Secondly, the evaluation of children's psychological well-being was not conducted by a child psychiatrist. We are optimistic that further research in this area will provide valuable insights and guidance.

CONCLUSION

Obesity stands as a profound public health challenge. This study has shed light on the correlation between obesity and psychological resilience in children. As such, it is appropriate to assess the psychological resilience of children with obesity and those with normal weight like the evaluation of metabolic parameters in healthy child controls. By doing so, we can implement targeted interventions to enhance the psychological well-being of children, thereby safeguarding them from adverse psychological experiences. Addressing these factors collectively may pave the way for a healthier and happier future for our younger generation.

ETHICAL DECLARATIONS

Ethics Committee Approval: Ethics Committee Approval: The study was carried out with the permission of Başkent University Non-invasive Clinical Researches Ethics Committee (Date: 2023, Decision No: 23/282).

Informed Consent: Written and verbal informed consent form was obtained from participants for the study.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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