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The Impact of Family Pathology on Adolescents' BMI

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Abstract

Previous research has highlighted various maternal factors influencing adolescent obesity, but the specific impact of family pathology remains under-explored. This pilot study aims to investigate whether a relationship exists between adolescents' obesity and maternal family pathology and to examine the prevalence of family pathology among mothers irrespective of their children's weight. Data collected was from a sample of 30 adolescents and their mothers respectively. Total sample size was 60. Family pathology was assessed using validated questionnaire, and adolescents' weight status was determined by using BMI measurements. Statistical analyses were conducted to explore the relationship between maternal family pathology and adolescents' obesity. While the data indicates no direct link between maternal family pathology and adolescents' weight, the high prevalence of moderate family pathology among mothers suggests that family support systems need attention. Addressing family pathology comprehensively, regardless of its direct impact on obesity remains crucial for the overall well-being of both parents and children. Given the limitations of this pilot study, further research with larger and more diverse samples is recommended to gain a deeper understanding of these relationships and to develop more effective intervention strategies.

Keywords: Pilot study, family pathology, maternal factor, adolescents, BMI

Introduction

In recent decades, weight-related issues among children, including obesity and overweight, have become a significant global health concern. The prevalence of childhood obesity has been increasing at alarming rates in many countries. According to the World Health Organization

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(WHO), the number of overweight or obese children under the age of 5 worldwide has increased from 32 million in 1990 to 38 million in 2019. This trend has been particularly noticeable in high-income countries but is now also spreading to low- and middle-income countries due to changing lifestyles and dietary habits. The rise in childhood obesity is linked to a range of factors, including poor diet, physical inactivity, environmental influences, and socio-economic factors (WHO, 2024).

Obese children are more likely to develop chronic health conditions such as type 2 diabetes, hypertension, sleep apnea, and fatty liver disease. Weight-related issues are also associated with psychological consequences, including low self-esteem, depression, and social isolation. Stigmatization of overweight children can contribute to mental health problems. Obese children are also at a higher risk of experiencing metabolic syndrome, which can lead to heart disease, stroke, and other cardiovascular problems at an earlier age than their peers (WHO, 2024) (Jaison et al., 2014). Weight-related issues in children, particularly obesity, are rising at an alarming rate worldwide, with serious health and societal consequences. Addressing these issues requires a comprehensive approach involving healthier food options, increased physical activity, family and community support, and addressing socio-economic disparities (WHO, 2024).

Mothers play a critical and multifaceted role in shaping their children's behaviors and attitudes toward food, physical activity, and overall health. Their influence can significantly impact the prevention, management, and treatment of weight-related issues like obesity and overweight in children. Mothers often hold a special place in people's lives due to the unique bond formed through pregnancy, birth, and nurturing (Laursen & Veenstra, 2021). However, the importance of any individual in someone's life can vary greatly depending on personal experiences, relationships, and circumstances. While mothers play a significant role in shaping a person's life, it's also essential to recognize the influence of other family members, mentors, friends, and personal experiences in shaping who one becomes (Laursen & Veenstra, 2021) (Aziza, 2020). Each relationship contributes its own value and significance to our lives.

Mothers also play a critical role in fostering social cohesion, nurturing healthy development, and sometimes also providing economic support within the family unit. Their contributions extend

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beyond care-giving to encompass various aspects of family life, highlighting the essential role they play in shaping society's fabric and promoting overall well-being (Aziza, 2020). Mothers are the ones who shape the eating habits, influence attitudes toward food, and monitors physical activity levels of their adolescent children. Through modeling healthy behaviors, promoting balanced diets, and offering emotional support, mothers can significantly reduce the risk of obesity in their adolescents and foster lifelong healthy habits.

While adolescents themselves are influenced by peer groups, media, and environmental factors, the foundation of a healthy lifestyle is often laid at home (Laursen & Veenstra, 2021). By focusing on balanced nutrition, emotional well-being, and physical activity, mothers can help their adolescents thrive physically, mentally, and emotionally, ultimately reducing the risk of obesity and its associated health complications.

Therefore, a mother's mental health is crucial for fostering healthy child development. A mother's mental well-being directly impacts her ability to provide consistent emotional support and nurturing to her child. When a mother is emotionally stable, she can respond sensitively to her child's needs, providing comfort, guidance, and reassurance, which are essential for healthy emotional development (Phua et al., 2020). Secure attachment between a mother and child forms the foundation for healthy relationships later in life. Her mental health also influences her parenting skills and ability to implement effective discipline, communication, and problem-solving strategies. When she is mentally healthy, she can provide consistent and appropriate guidance to her child, helping them learn important life skills and navigate challenges effectively (Phua et al., 2020) (Van Der Voot et al., 2014). Overall, prioritizing maternal mental health is essential for fostering positive child development. By supporting mothers' mental well-being, we can promote healthy parent-child relationships, enhance emotional resilience, and lay the groundwork for lifelong well-being and success.

Several factors within familial pathology, such as stress, familial conflicts, socioeconomic status, and parenting styles, can impact both mental health and lifestyle behaviors, including diet and physical activity levels. These factors may contribute to the development of unhealthy eating habits, sedentary behaviors, and ultimately, higher BMI in adolescents (Phua et al., 2020) (Van

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Der Voort et al., 2014) (Kumar & Tiwari, 2008).

Family pathology refers to patterns of dysfunction or unhealthy dynamics within a family system that can contribute to emotional, psychological, or social problems among its members. These issues can manifest in various ways and may result from a range of factors, including interpersonal conflicts, communication breakdowns, trauma, substance abuse, mental illness, and generational patterns of behavior (Van Der Voort et al., 2014).

The goal of the current study is to determine the prevalence of family pathology among Indian mothers of early adolescent children and whether or not it is associated with the physical health of those particular adolescents determined by their body mass index (BMI) which is a metric used to determine whether a person's weight is appropriate for their height (WHO, 2023). Investigating the connection between familial pathology and adolescent's BMI is crucial in understanding and addressing the global rise in obesity. Family environment can significantly influence an adolescent's behavior, habits, and overall health outcomes.

Understanding these relationships can inform the development of targeted interventions and support systems aimed at promoting healthy behaviors and preventing obesity in adolescents. By addressing familial pathology and supporting mental health within the family unit, we may be able to positively impact adolescent health outcomes and mitigate the obesity epidemic.

Literature Review

A study done in Spain with the purpose to investigate the present and potential relationships between pediatric obesity and mental health issues by offering a thorough psychological evaluation. It compared 37 children with normal weight and 34 obese children at baseline with a follow up of 5 years. It revealed that the obese group had higher frequency of mental health issues as compared to the other group and in 5 years psychological co morbidity increased too in the former group. Obesity in childhood was prospectively linked to a psychiatric diagnosis in adolescence. Additionally, the obese group's symptoms were more severe both times. Lastly, regardless of weight status, body esteem played a role in predicting mental health issues in adolescence, but eating symptomatology was a signal exclusive to the obese group (Beltrán-Garrayo et.al, 2023).

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Most of the cross-sectional studies done in the last decade were reviewed systematically revealed review a strong correlation between obesity and the mental illness in children and adolescents (Kokka, 2023).

In a cross-sectional descriptive study done in Thailand on University students, showed that in addition to counseling by a family physician alone, half of the students who visited the mental health consultation clinic needed specialized therapy, such as medication or a referral to a psychiatrist. Family environment was linked to mental health issues in university students. Examples of this included parental migration, unfamiliarity with the parents, financial difficulties, family conflicts, communication breakdowns within the family, parental adultery, and domestic violence. This study reevaluated the usefulness of familial circumstances in predicting current mental health issues among college students (Luvira, 2023).

A study done by Coles and Cage, highlights an important and well-documented connection between maternal mental health and adolescent mental health, as well as the role of **social** determinants of health in shaping a child's psychological well-being. The study underscores the idea that maternal mental health doesn't just influence the immediate environment of the child but can have long-lasting effects on their emotional and social functioning as they grow into adolescence (Coles & Cage, 2022).

According to a research, maternal obesity is not only a concern for pregnancy outcomes but also for long-term offspring health. The emerging role of epigenetic modifications offers a potential mechanism by which maternal obesity can influence offspring health. Animal studies have provided significant insights, but more clinical studies are needed to fully understand the epigenetic effects in humans. Addressing maternal obesity before and during pregnancy may be critical in reducing the risk of obesity and cardiometabolic diseases in future generations (Reichetzeder, 2021).

In a cross-sectional study done in Iran, it was revealed that the most significant source of stress related to teenage mental health is stress from the family. In contrast to academic self-efficacy, self-concept played a significant mediation effect in the relationship between various academic

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stressors and the mental health of teenagers (Aziza, 2020).

A study done on breastfeeding suggests that exclusive breastfeeding and longer breastfeeding durations are associated with lower odds of obesity and high body fat in children aged 9-11 years, across a multinational cohort. However, these effects may be partially mediated by maternal BMI, implying that maternal weight before and during pregnancy could influence the child's obesity risk regardless of breastfeeding duration. The study indicates that breastfeeding may be a protective factor for obesity and body fat in children, though further research is needed to better understand the mechanisms and the impact of maternal factors (Ma et.al, 2020).

The study highlights a key finding in the relationship between gestational diabetes mellitus (GDM) and childhood obesity. Compared to children of non-diabetic moms, children of mothers with GDM had a considerably higher chance of becoming overweight at a young age (Hakanen et al., 2016).

A study done in Iran, showed a link between of mothers' psychological status and development of Children. According to this study, moms' psychological state is most likely a significant contributing factor to developmental delays. It is advised that moms' psychological status be evaluated in order to implement early therapies (Sajedi et al., 2016).

A study highlighted that maternal pre-pregnancy obesity and excessive weight gain during pregnancy are significant risk factors that contribute to an adverse in utero environment and have long-term cardiovascular and metabolic consequences for the offspring (Gaillard, 2015).

A study found that maternal stress during pregnancy represents a major environmental factor that can have lasting effects on both physical and mental health outcomes for offspring. The growing body of evidence suggests that fetal programming during sensitive periods of development plays a crucial role in shaping the risk for various diseases later in life (Entringer et al., 2015).

A study done on, ''Parent and Family Associations With Weight-Related Behaviors and Cognitions Among Overweight Adolescents" revealed that parents behaviors related to weight control had an adverse effect on adolescents. Such adolescents' body satisfaction were low and they were involved in unhealthy forms of weight control behavior. Low scores of family

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cohesion and adaptability was associated with overeating. The study further revealed that adolescents' body satisfaction was related to parents' body satisfaction and self esteem and parents with low self esteem was associated with adolescents who valued thinness (Cromley et al., 2014).

A study done in Western Australia related to maternal factors and childhood obesity showed that childhood obesity was not influenced by poor general family functioning, maternal depression, negative life events or parenting style (Gibson et al., 2007)

Hypotheses

1.High family pathology may lead to obesity or overweight.

2. Moderate family pathology may lead to obesity or overweight.

3. Low family pathology may not lead to obesity and overweight.

Materials and Methods

The study used convenience sampling method to collect the data from a sample of 30 adolescents aged 10-15 years and their 30 respective mothers, resulting in a total sample size of 60 participants. Family pathology was assessed using the Pathology Scale by Dr. Vimala Veeraghavan and Dr. Archana Dogra. It determines the extent of maladaptive behavior in the family. On a 3-point rating system, respondents indicate how frequently each item pertains to their family. Adolescents' weight status was determined based on BMI measurements. **BMI** stands for **Body Mass Index**, which is a measurement used to assess whether an individual has a healthy weight for their height (WHO, 2023). Statistical analyses were conducted to explore the relationship between maternal family pathology and adolescents' obesity.

Aim and Objectives

Aim: To study the prevalence of family pathology in Indian mothers and its corelation with obese adolescents in Indian households.

Objectives: i) To estimate the prevalence of family pathology in mothers of early adolescents among Indian households.

ii) To estimate the prevalence of low family pathology in mothers of early adolescents among Indian households.

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iii) To estimate the prevalence of moderate family pathology in mothers of early adolescents among Indian households.

iv) To estimate the prevalence of high family pathology in mothers of early adolescents among Indian households.

v) To study the impact of family pathology in mothers on non-obese and obese Indian adolescents.

Statistical Analysis

1) Prevalence rate was calculated using the formula,

$$\text{Prevalence} = \frac{\text{Number of people in sample with characteristic}}{\text{Total number of people in sample}}$$

2) Fisher's Exact Test were used.

Table 1.1

	Moderate Weight (Adolescents)	Overweight (Adolescents)	Obese (Adolescents)
LOW FAMILY PATHOLOGY	1	3	0
MODERATE FAMILY PATHOLOGY	4	0	2
HIGH FAMILY PATHOLOGY	10	5	5

Results

Out of 30 mothers, 24 exhibited moderate family pathology, 2 had high family pathology, and 4 had low family pathology. The Fisher's Exact Test calculated was 0.174, indicating a weak relationship between the BMI of adolescents and the family pathology of their mothers in Indian households.

Conclusion

The lack of a direct relationship between maternal family pathology and adolescents' obesity suggests that other factors may play a more critical role in influencing adolescent weight. The

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high prevalence of family pathology highlights the need for family support and intervention programs that address overall family dynamics and emotional health. Given the limitations of this pilot study, further research with larger and more diverse samples is recommended to gain a deeper understanding of these relationships and to develop more effective intervention strategies.

Discussion

Family pathology can be defined as maladaptive behaviors and patterns of interaction among family members that negatively affect the psychological and emotional well-being of individuals within the family system. These maladaptive behaviors can contribute to various psychological problems for family members, such as anxiety, depression, low self-esteem, and difficulties in forming healthy relationships outside the family. These maladaptive behaviors can include poor communication, conflicts, role confusion, lack of boundaries, etc (Mohan & Sahai, 2020).

Maternal factors can play a significant role in the development of obesity in adolescence. Research suggests that the intrauterine environment, maternal health during pregnancy, and early life exposures influence childhood and adolescent obesity (Luvira et al., 2023) (Ramanathan et al., 2022) (Laursen & Veenstra, 2021) (Entringer et al., 2015). Several mechanisms have been proposed, including genetic, epigenetic, and environmental factors (WHO, 2023) (Reichetzeder, 2021).

Gestational diabetes, which affects a significant proportion of pregnant women, has been linked to an increased risk of obesity in offspring. High glucose levels during pregnancy can affect fetal development, influencing the child's metabolism and risk of obesity (Hakanen, 2016).

Maternal nutrition during pregnancy can have a long-term impact on a child's weight. Diets high in fats and sugars may lead to metabolic changes that predispose the child to obesity. Poor maternal nutrition can influence the development of the fetus's hypothalamic pathways that regulate appetite and energy balance (Hakanen et.al, 2016) (Gaillard, 2015).

Maternal stress, anxiety, and depression during pregnancy can also influence the development of obesity in children. These factors can lead to changes in fetal brain development, particularly in areas responsible for appetite regulation. Chronic stress may also alter maternal behaviors post-

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pregnancy, influencing child diet and activity levels (Coles & Cage, 2022) (Sajedi et al., 2016) (Ertinger et al., 2015).

Breastfeeding is associated with a reduced risk of childhood and adolescent obesity, while formula feeding has been linked to higher obesity risk. This is thought to be due to differences in nutrient composition, infant gut microbiota, and appetite regulation mechanisms (Ma et al., 2020).

Recent research indicates that maternal obesity and poor health during pregnancy can lead to epigenetic changes that affect offspring metabolism and increase the risk of obesity later in life. These changes involve the modification of gene expression without altering the underlying DNA sequence, influencing long-term health outcomes (Reichetzeder, 2021).

The current research tries to highlight whether there exist a relationship between adolescents' weight and family pathology of mothers. Previous research has highlighted that mothers play a critical role in shaping their children's dietary habits and attitudes toward physical activity (Ramanathan et al.,2022) (Aziza, 2020) (Hosseinkhani et al., 2020). Factors like maternal obesity, nutritional knowledge, and health behaviors directly influence children's risk of becoming overweight or obese(Ramanathan et al., 2022) (Mohan & Sahai,2020). While they have identified various maternal factors influencing obesity, such as maternal diet, physical activity,

and socio-economic status, the specific impact of family pathology on adolescents' weight remains under-explored (Coles & Cage, 2022) (Ramanathan et al.,2022) (Aziza, 2020) (Hosseinkhani et al., 2020).

The study includes both, working as well as non-working mothers as the impact of maternal employment on childhood obesity is multifaceted. While there are indications that working mothers may be linked to higher rates of obesity in both themselves and their children, it is important to understand that this relationship is complex and influenced by multiple factors, including socioeconomic status, lifestyle choices, and available support systems (Martin et al., 2018) (Datar et al.,2014) (Ziol-Guest et al., 2013)

Based on the data collected from adolescents and their mothers, it appears there is no significant

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relationship between the weight of the adolescents and the level of family pathology experienced by their mothers. Additionally, the data indicates a high prevalence of moderate family pathology among mothers, regardless of their children's weight status. This indicates that family pathology is a widespread issue but does not specifically impact adolescents' weight in a measurable way within this dataset.

These findings suggest several important considerations such as, it is likely that broader factors such as genetics, individual lifestyle choices, environmental influences, and socio-economic status are more critical determinants of adolescent obesity and the high prevalence of moderate family pathology among mothers highlights the need for general family support and interventions, regardless of the children's weight. This could include programs aimed at improving family communication, conflict resolution, and overall emotional health.

Given these findings, further research could explore the following areas such as to investigate the relative impact of individual behaviors (e.g., diet, physical activity) and family dynamics on adolescent obesity, to examine which specific aspects of family pathology, if any, might interact with other factors to influence adolescent weight and to develop and test interventions that simultaneously address family dynamics and individual health behaviors to see if a combined approach yields better outcomes for preventing and treating adolescent obesity.

While the current research is a pilot study, it does provide valuable initial insights, expanding the research to a larger and more diverse sample can significantly enhance the understanding of the relationship between maternal family pathology and adolescents' obesity. This approach will help identify more precise factors at play and guide the development of more effective interventions and policies.

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