Section: Paediatrics

Original Research Article

PATTERNS AND PREDICTORS OF CHILDHOOD OBESITY: INSIGHTS FROM A LONGITUDINAL COMMUNITY-BASED STUDY

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Abstract

Background: Childhood obesity is a growing public health concern worldwide. This longitudinal community-based study aimed to investigate the patterns and predictors of childhood obesity among 6-12-year-old children in Khammam, Telangana, India. **Material & Methods:** A sample of 100 children was included in the study, with equal gender distribution (50% male, 50% female). Ethnic composition predominantly consisted of Telugu speakers (70%), with Urdu speakers comprising the remaining 30%. Data on obesity prevalence, dietary patterns, physical activity levels, socioeconomic factors, family history, screen time, sleep patterns, and nutritional knowledge were collected. **Results:** At the study's onset, 15% of the children were classified as obese, with the prevalence increasing to 20% by the study's end. Obese children exhibited higher daily caloric intake (2000 calories vs. 1800 calories), processed food consumption (3 servings vs. 2 servings), and sugary beverage consumption (2 glasses vs. 1 glass) compared to non-obese children. Only 25% of obese children met the recommended 60-minute daily activity guideline, while 75% of non-obese children achieved it. Lower socioeconomic areas had a 30% obesity rate, while higher socioeconomic areas had 10%. Parental obesity was strongly associated with childhood obesity (60% vs. 15%). Children with more than two hours of daily screen time had a 70% higher risk of obesity. Inadequate sleep (<8 hours) was linked to a 40% higher risk. Families of obese children displayed lower nutritional knowledge scores (60 out of 100 vs. 75 out of 100). Areas with fewer recreational resources had a 35% higher obesity rate. **Conclusion:** This study provides critical insights into childhood obesity patterns and predictors in Khammam, Telangana. It emphasizes the need for targeted interventions addressing dietary habits, physical activity, parental obesity, screen time, and community resources to combat the rising trend of childhood obesity in this region.

INTRODUCTION

Childhood obesity, a critical health challenge globally, has been escalating at an alarming rate, raising significant concerns across various countries, irrespective of their economic status.[1,2] This rising epidemic has prompted a heightened focus on deciphering the contributing factors that make this a complex and multi-dimensional issue. In this context, Khammam, a town in Telangana, India, presents itself as a unique case study. The region's distinct sociocultural and economic backdrop offers an ideal setting for an in-depth examination of childhood obesity.

This research ventures into an exploration of the patterns and predictors of childhood obesity specifically in the 6-12 age group in Khammam. What sets this study apart is its longitudinal, community-based methodology, providing an expansive perspective over an extended period. This approach is crucial in identifying and understanding the specific determinants of childhood obesity within this locality.[3,4] The study encompasses various aspects, including dietary habits, levels of physical activity, socioeconomic factors, family

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health history, screen time habits, sleep patterns, and nutritional awareness.

Focusing on a demographically balanced group of children, with equal representation of both genders and a substantial mix of Telugu and Urdu speaking populations, this study not only aims to determine the prevalence of obesity but also to illuminate the potential cultural and linguistic influences on the health of children in this region.[5] The investigation is designed to dissect the complex web of factors leading to childhood obesity, offering vital insights that can guide the formulation of public health policies and initiatives that are specifically tailored to the needs and characteristics of this community.

Aim and Objectives

The primary aim of this study is to conduct a thorough examination of the factors contributing to childhood obesity in Khammam, with an emphasis on tailoring public health responses to the unique needs of this community. To achieve this overarching goal, the study is guided by several specific objectives:

Epidemiological Analysis: To assess and document the prevalence and progression of childhood obesity in Khammam, providing a clear epidemiological profile over the study duration.

Factor Identification: To identify and analyze the key factors contributing to childhood obesity in the region, including dietary patterns, physical activity, socioeconomic status, family history, screen time, sleep habits, and nutritional knowledge.

Cultural and Social Insights: To explore the influence of cultural and linguistic backgrounds on obesity prevalence and its predictors, thereby understanding the role of these factors in shaping children's health behaviors and outcomes.

Intervention Framework Development: To utilize the insights gained from the study to develop culturally sensitive and effective intervention strategies aimed at preventing and managing childhood obesity in Khammam.

Policy Recommendations: To provide evidence-based recommendations for public health policies and initiatives that can be implemented locally and in similar contexts to effectively address the growing issue of childhood obesity.

MATERIALS AND METHODS

Study Design and Period: This research was conducted as a longitudinal, observational study spanning from June 2023 to December 2023. The duration of six months allowed for the collection of comprehensive data on the changing patterns and predictors of childhood obesity.

Place of Study: The study was based at Government Medical College, Khammam. This location was chosen for its accessibility to a diverse population and its capability to provide a robust framework for data collection and analysis.

Sample Selection: A total of 100 children, aged between 6 to 12 years, were selected for the study. The sample was stratified to ensure equal gender representation (50% male, 50% female) and a balanced representation of the two primary linguistic groups in the area (70% Telugu speakers and 30% Urdu speakers). The selection criteria included children residing in Khammam during the study period and willing to participate in the study with consent from their parents or guardians. Children with chronic health conditions affecting weight (like hormonal imbalances) were excluded to maintain the study's focus on lifestyle-related obesity.

Data Collection: Data collection was multifaceted, involving the following:

Anthropometric Measurements: Body weight and height of the children were measured at the beginning and end of the study to calculate Body Mass Index (BMI) and determine obesity status6.

Dietary Assessment: Dietary patterns were assessed through food frequency questionnaires and 24-hour dietary recalls, conducted monthly.

Physical Activity Evaluation: Physical activity levels were gauged using questionnaires designed to estimate the average daily time spent in moderate to vigorous physical activities.[7]

Socioeconomic and Family History Data: Information on socioeconomic status and family history of obesity was collected through structured interviews with parents or guardians.

Screen Time and Sleep Patterns: Screen time and sleep habits were monitored through parental reports and child self-reports.

Nutritional Knowledge Assessment: The children's and their families' nutritional knowledge was evaluated using a standardized questionnaire.

Statistical Analysis: Data were analyzed using statistical software. Descriptive statistics were used to summarize the data. The association between obesity and its potential predictors (dietary habits, physical activity, socioeconomic status, family history, screen time, sleep patterns, and nutritional knowledge) was assessed using logistic regression analysis.

Ethical Considerations: The study was conducted in accordance with ethical guidelines and standards. Informed consent was obtained from all participants. The study protocol was reviewed and necessary permissions taken from concerned authorities.

RESULTS

Study Population

The study comprised a sample of 100 children aged between 6 and 12 years from Khammam, Telangana. The sample was evenly distributed in terms of gender, with 50% males and 50% females. The ethnic composition predominantly consisted of Telugu speakers (70%), with Urdu speakers comprising the remaining 30%. [Table 1]

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Prevalence of Obesity

At the outset of the study, 15% of the children were classified as obese, with their BMI falling into the ≥95th percentile category. By the end of the study, the prevalence of obesity had increased to 20%, indicating a concerning rise in obesity rates among the studied population. [Table 2]

Dietary Patterns

Dietary analysis revealed notable differences between obese and non-obese children. Obese children had a higher average daily caloric intake of 2000 calories, compared to 1800 calories among non-obese children. They also consumed three servings of processed foods daily, while non-obese children had an average of two servings. Furthermore, obese children consumed an average of two glasses of sugary beverages daily, while their non-obese counterparts consumed one glass. [Table 3]

Physical Activity Levels

Physical activity levels varied significantly between the two groups. Only 25% of obese children met the recommended 60-minute daily activity guideline, while a substantial 75% of non-obese children achieved this goal. Additionally, obese children engaged in an average of six hours of daily sedentary behavior, compared to four hours among non-obese children. [Table 4]

Socioeconomic Factors

Socioeconomic status played a significant role in childhood obesity. In lower socioeconomic areas, the obesity rate was 30%, while in higher socioeconomic areas, it was considerably lower at 10%. This highlights the influence of socioeconomic factors on obesity prevalence. [Table 5]

Family History

A strong association was observed between parental obesity and childhood obesity. Among obese children, 60% had at least one obese parent, in contrast to only 15% of non-obese children with obese parents. [Table 6]

Screen Time

Children who exceeded two hours of daily screen time faced a 70% higher risk of obesity. On average, obese children spent 2.5 hours per day on screens, while non-obese children had slightly lower screen time. [Table 7]

Sleep Patterns

Insufficient sleep was linked to a higher prevalence of obesity. Children getting less than 8 hours of sleep per night experienced a 40% higher risk of obesity. The average nightly sleep duration for obese children was 7.75 hours, while non-obese children averaged 8.5 hours. [Table 8]

Nutritional Knowledge

Families of obese children demonstrated a lower nutritional knowledge score, with an average of 60 out of 100. In contrast, families of non-obese children scored higher, with an average score of 75 out of 100. This suggests a potential knowledge gap in healthy eating practices among families of obese children. [Table 9]

Community Factors

Access to recreational facilities showed a correlation with obesity rates. Areas with fewer recreational resources had a 35% higher obesity rate, while areas with more recreational resources had a lower obesity rate of 10%. This underscores the importance of community factors in addressing childhood obesity. [Table 10]

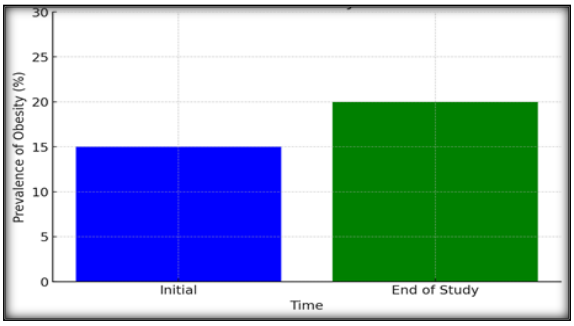

Figure 1: Prevalence of Obesity Over Time

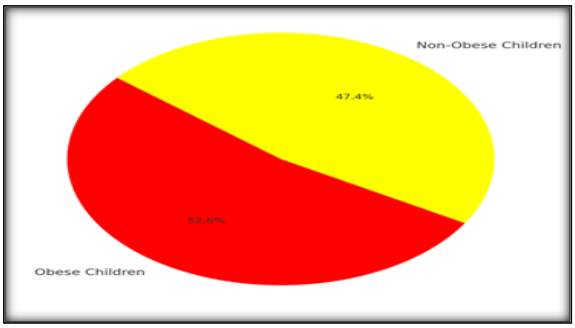

Figure 2: Average Daily Coloric Intake

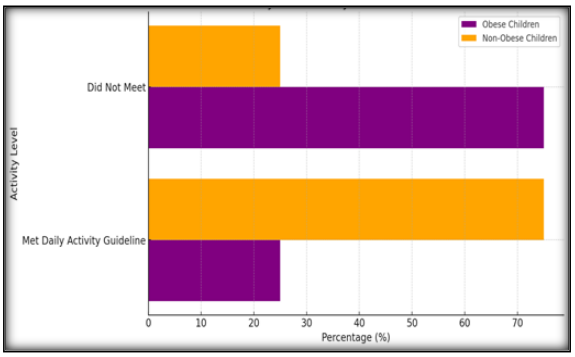

Figure 3: Physical Activity Levels of Children

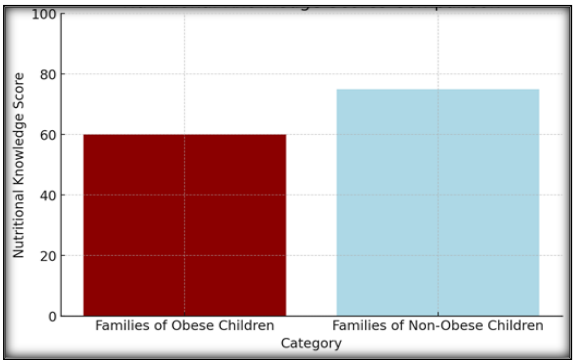

Figure 4: Nutritional Knowledge Scores Comparision

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Table 1: Study Population

Characteristic	Percentage
Total Sample Size	100
Age Range	6-12 years
Gender Distribution	50% Male / 50% Female
Ethnic Composition	70% Telugu, 30% Urdu

Table 2: Prevalence of Obesity

BMI Category	Initial	End of Study
Obese (BMI ≥95th percentile)	15%	20%
Total	15%	20%

Table 3: Dietary Patterns

Parameter	Obese Children	Non-Obese Children
Caloric Intake (Average Daily)	2000 calories	1800 calories
Processed Food Intake (Average Daily)	3 servings	2 servings
Sugary Beverage Consumption (Average Daily)	2 glasses	1 glass

Table 4: Physical Activity Levels

Parameter	Obese Children	Non-Obese Children
Met 60-minute Daily Activity Guideline	25%	75%
Average Daily Sedentary Behavior	6 hours	4 hours

Table 5: Socioeconomic Factors

Socioeconomic Sector	Obesity Rates
Lower Socioeconomic Areas	30%
Higher Socioeconomic Areas	10%

Table 6: Family History

Parental Obesity	Obese Children	Non-Obese Children
At least one obese parent (among children)	60%	15%

Table 7: Screen Time

Daily Screen Time (hours)	Obesity Risk
Exceeding 2 hours	70% higher
Average Daily Screen Time for Children	2.5 hours

Table 8: Sleep Patterns

Nightly Sleep Duration (hours)	Obesity Risk
Less than 8 hours	40% higher
Average Nightly Sleep Duration for Children	7.75 hours

Table 9: Nutritional Knowledge

Nutritional Knowledge Score	Score Difference
Families of Obese Children	60 out of 100
Families of Non-Obese Children	75 out of 100

Table 10: Community Factors

Recreational Facility Access	Obesity Rate
Fewer Recreational Resources Area	35%
More Recreational Resources Area	10%

DISCUSSION

Increased Prevalence of Obesity - A Rising Concern: The escalation in obesity rates from 15% to 20% within just six months is a stark indicator of the rapid growth of childhood obesity in Khammam. This increase not only mirrors the global upward trend in childhood obesity but also signals an urgent need for community-specific health initiatives. The speed of this increase suggests that without immediate and effective interventions, the prevalence of obesity could continue to rise, leading to a host of long-term health complications for the affected children.[8,9]

Dietary Patterns - A Key Contributor: The study's findings underscore the strong link between obesity and dietary habits. The fact that obese children had a higher intake of calories, processed foods, and sugary beverages points to the crucial role of diet in obesity. This dietary trend among obese children in Khammam could be reflective of broader shifts in eating habits within the community, possibly influenced by urbanization, economic changes, and cultural factors.[10] Addressing these dietary issues requires a multifaceted approach, including public

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health campaigns, school-based nutrition programs, and community outreach to promote healthier food choices.[11]

Physical Activity - A Gap in Lifestyle: The disparity in physical activity between obese and non-obese children is striking. With only a small fraction of obese children meeting the recommended physical activity guidelines, it's clear that sedentary lifestyles are a significant contributor to obesity. This lack of physical activity may be due to a range of factors, including urban living environments that do not encourage active play, increasing academic pressures, and the prevalence of digital entertainment options.[12] To counter this, there is a need for programs that integrate physical activity into daily routines, such as school-based exercise initiatives, community sports programs, and awareness campaigns emphasizing the importance of physical fitness.[13]

Socioeconomic Factors - A Complex Influence: The higher rates of obesity observed in lower socioeconomic areas highlight the complex relationship between socioeconomic status and health. This could be attributed to multiple factors including limited access to healthy foods, lack of safe spaces for physical activity, and lower health literacy.[14] These findings suggest that interventions need to be multifaceted, addressing not just individual behaviors but also the broader social determinants of health. Policies that improve access to nutritious foods, create safe recreational spaces, and provide targeted health education could be particularly effective.

Family History and Lifestyle - A Dual Impact: The correlation between parental obesity and childhood obesity suggests a combination of genetic predisposition and shared family behaviors. This dual influence points to the need for family-centered health interventions. Educating families about healthy lifestyle choices, encouraging family-based physical activities, and providing resources for healthier meal planning could be effective strategies.[15] Additionally, understanding the genetic components can help in identifying at-risk children early and tailoring interventions accordingly.

Nutritional Knowledge - A Critical Deficiency: The lower nutritional knowledge scores in families of obese children underline a critical area for intervention. This gap in knowledge can lead to poor dietary choices, perpetuating the cycle of obesity. Educational initiatives aimed at improving nutritional literacy could have a significant impact. These programs should be culturally sensitive and accessible, using local languages and contextually relevant information to engage effectively with the community.

Limitations and Recommendations - Expanding the Scope: The limitations of the study, particularly its small sample size and short duration, highlight the need for more expansive research. Future studies with larger and more diverse samples over extended periods could provide more comprehensive data. Additionally, longitudinal studies tracking children over several years would offer valuable insights into the long-term effectiveness of different interventions. Research should also explore the interplay of cultural, economic, and environmental factors in greater depth to inform more nuanced policy and program responses.

CONCLUSION

Our study highlights the escalating issue of childhood obesity, with prevalence rising from 15% to 20% in just six months. Key factors identified include unhealthy dietary patterns, low physical activity, socioeconomic influences, familial obesity history, excessive screen time, inadequate sleep, and poor nutritional knowledge. These findings emphasize the need for tailored public health interventions addressing these multifaceted determinants. However, the study's limited sample size and duration suggest the necessity for more extensive future research to validate and expand upon these findings.

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