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Dietary Behavior of Toddlers Between 2 To 6 Years in Pakistani Population-A Descriptive Study

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ABSTRACT

This research explores the dietary behaviour of toddlers aged 2 to 6 years in the Pakistani population, aiming to address the dearth of comprehensive studies in this crucial demographic. The study encompasses a cross-sectional design involving 200 children, combining anthropometric measurements, maternal and socioeconomic factors, breastfeeding practices, and dietary patterns to provide a holistic understanding of stunted growth.

The findings reveal a 38% incidence of stunted growth, emphasizing the multifaceted nature of child health. Demographically, the study includes a diverse gender distribution (54% males, 46% females) and an age range of 2 to 6 years. Anthropometric measurements showcase variability in weight (8 to 30 kg), height (59 to 118 cm), and BMI (20.683).

Maternal and socioeconomic factors play a crucial role, with 80.5% of mothers having some formal education, and 57.5% of parents belonging to the low socioeconomic group. Breastfeeding practices are prevalent (76.5%), but variations in exclusive breastfeeding duration (5.03 months) suggest potential influences on growth patterns.

The Food Frequency Questionnaire (FFQ) delves into dietary habits, indicating inadequate intake of fruits, vegetables, and proteins. Parental food restrictions (58.5%) are driven by concerns about potential indigestion, though no signs of intolerance are evident.

Statistical analysis establishes associations between stunted growth and socioeconomic status ($p<0.001$), inadequate intake of fruits ($p=0.019$), inadequate intake of vegetables ($p=0.025$), inadequate intake of proteins ($p=0.014$), and gender ($p=0.567$).

This research provides a comprehensive overview of stunted growth in Pakistani children, emphasizing the need for targeted interventions. Recommendations include enhancing maternal education, promoting breastfeeding, and implementing nutrition education for parents. Policy integration, community engagement, and regular growth monitoring are essential for addressing this complex public health challenge.

Keywords: Dietary Behavior, Pakistani Population, Weaning Food.

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INTRODUCTION

The early years of childhood mark a crucial period of rapid growth and development, during which the foundation for a child's lifelong health is laid. Nutrition plays a pivotal role in this process, influencing not only physical growth but also cognitive development and overall well-being. As Pakistan continues to undergo demographic shifts and socioeconomic changes, understanding the dietary behavior of toddlers aged 2 to 6 years becomes imperative for public health initiatives and policy formulations.

Pakistan, a South Asian nation with a diverse cultural tapestry, is home to a burgeoning population where children constitute a significant demographic segment. The nutritional status of toddlers in this age range is of paramount importance as it lays the groundwork for their future health outcomes. However, the dietary behaviors of toddlers in Pakistan have not been extensively studied, and there is a dearth of comprehensive research on this crucial demographic.

The age group of 2 to 6 years is characterized by rapid physical and cognitive development. Adequate nutrition during this period is essential for optimal brain development, bone growth, and the establishment of healthy eating habits. Understanding the dietary patterns of toddlers in Pakistan is essential for identifying potential nutritional deficiencies, excesses, and the prevalence of dietary habits that may have long-term implications on their health. The cultural context significantly influences the types of foods offered to toddlers, feeding practices, and mealtime rituals. Moreover, investigating how socioeconomic factors intersect with toddler nutrition is essential for identifying vulnerable populations and developing targeted interventions to address nutritional disparities.

Despite the significance of toddler nutrition, there is a noticeable gap in research focusing specifically on the dietary patterns of 2 to 6-year-olds in Pakistan. Existing studies often lack the depth required to inform targeted interventions and policy recommendations. This research aims to address these gaps by providing a comprehensive understanding of the factors influencing toddler nutrition in the Pakistani context. The findings of this research hold considerable implications for public health initiatives and policy formulations.

Hypothesis

The dietary behaviour of toddlers between 2 to 6 years in the Pakistani population is influenced by gender, socioeconomic, and may be characterized by high intake of carbohydrates and fats, and low intake of protein, fruits, and vegetables.

LITERATURE REVIEW

The dietary behavior of toddlers between the ages of 2 to 6 years is crucial for their growth, development, and long-term health. Understanding the dietary patterns and habits of this age group is important for devising effective strategies to promote healthy eating and prevent nutrition-related

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problems. This literature review aims to explore and analyze existing research on the dietary behavior of toddlers in the Pakistani population.

A comprehensive search was conducted in electronic databases, including PubMed, Google Scholar, and Scopus. Only studies published in English language between the years 2000 and 2023 were included in this review.

Populations experiencing simultaneous issues of undernutrition and overnutrition face the challenge known as the double burden of malnutrition (DBM). Global Nutrition Reports 2018 indicate that one in three people suffers from malnutrition, one in 20 children experiences hunger, and one in five global deaths is attributed to poor die. DBM is more prevalent in low- and middle-income countries (LMIC), particularly in the poorer ones, with a significant presence in sub-Saharan Africa, South-East Asia, and the Pacific. Progress in reducing malnutrition globally has been slow, emphasizing the need for population-specific data to comprehensively understand nutrition dynamics worldwide and address the nutritional needs of communities effectively.

In 2011, the United Nations Children's Fund (UNICEF) emphasized adolescence as a crucial opportunity to improve the nutritional status of children and prevent future health consequences of malnourishment. Nutritional challenges persist throughout an individual's life, necessitating assessment and adequate addressal of nutritional needs in each phase, particularly for school-going children. Mental and physical development occurs during this period, offering a chance to rectify nutritional deficiencies and prevent impairments in growth, development, and cognitive achievement.

During the ages of 2 to 10, children experience slower growth and development compared to the first two years of life. Despite improved digestive and enzymatic capacity, enhanced neural and hormonal responses, children in this age group are susceptible to nutritional deficiencies and diseases due to poor dietary practices, hygiene, and lack of awareness among mothers/caregivers. While the period is considered one of "catch-up growth" to replenish nutrient stores and cover earlier deficits, many children fail to do so.

Rates of stunting, wasting, and underweight continue to rise in developing countries, including Pakistan, attributed to factors like poor hygiene, lack of awareness, and prevalent diseases like diarrhea and acute respiratory infections. In the age range of 2-10 years, growth and development remain slower, requiring a well-balanced diet to cover previous growth deficits and support ongoing development. Though children in this age group are less vulnerable to nutritional deficiencies than infants, inadequate consumption of milk and milk products, limited exposure to sunlight, and poor dietary habits contribute to deficiencies in calcium, phosphorus, and vitamin D, increasing the risk of conditions like rickets.

Children's diets often lack nutrient-dense foods, with snacks consisting of energy-dense but nutritionally poor options. Inadequate consumption of meat, fruits, and vegetables further contributes to the risk of malnutrition and various diseases. The challenge lies not only in the natural slowing of growth but also in overcoming early-age nutritional deficits to ensure proper development and health in later stages.

Studies in Pakistan have shown that while breastfeeding rates are relatively high, the timely introduction of appropriate complementary foods remains a challenge. Delays in introducing solid foods beyond six months and inadequate variety in the diet have been reported. The reasons behind these practices include cultural beliefs, lack of awareness, and inadequate feeding practices education among parents.

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Research indicates that Pakistani toddlers' diets often lack diversity and fail to meet recommended nutrient intakes. Studies have reported low consumption of fruits, vegetables, and dairy products, while high intake of sugary snacks, processed foods, and beverages. This imbalanced diet contributes to a higher risk of nutrient deficiencies, including iron, calcium, and vitamin A.

Toddlers in Pakistan tend to have a preference for energy-dense and nutrient-poor foods, such as sweets, fried snacks, and carbonated drinks. This preference is influenced by factors such as parental feeding practices, exposure to advertising, and the availability of unhealthy food options. Furthermore, inadequate feeding practices, including inappropriate portion sizes and lack of family meals, have been observed.

Several studies have highlighted the impact of socioeconomic factors on the dietary behavior of toddlers. Low-income households tend to have limited access to nutritious foods, leading to reliance on cheaper, less healthy alternatives. Food insecurity, inadequate parental knowledge about nutrition, and limited availability of feeding resources contribute to suboptimal dietary practices.

Parents and caregivers play a crucial role in shaping the dietary behaviors of toddlers. Studies have shown that parental feeding practices, including pressuring or restricting food, can impact a child's food preferences and consumption patterns. Additionally, the influence of peers and social norms, especially in the form of shared meals or eating habits within extended families, can shape a child's dietary choices.

Despite the significance of early childhood nutrition, there is a paucity of research specifically focusing on the dietary behavior of toddlers in the Pakistani population. Understanding the dietary patterns and habits of Pakistani toddlers is essential for identifying potential nutritional deficiencies, excessive intake of unhealthy foods, and associated health risks. This knowledge can guide targeted interventions and policies to improve the nutritional status and overall well-being of this vulnerable population. Pakistani culture and local food practices may have a unique impact on the dietary choices of toddlers. Investigating the dietary behavior of Pakistani toddlers within their specific cultural context can provide insights into culturally appropriate interventions and help design effective strategies to promote healthy eating habits. Moreover, identifying the dietary behaviors prevalent in this population can inform targeted interventions and public health policies to address these concerns.

Hence, by understanding the current dietary practices, barriers, and facilitators in the Pakistani population, interventions can be developed to provide education and support to parents. Empowering parents with knowledge about nutrition and appropriate feeding practices can help them make informed choices and create a healthy food environment for their toddlers. The findings of this study can serve as a basis for designing and evaluating interventions aimed at improving the dietary behavior of toddlers in Pakistan. Evidence-based interventions can be tailored to address the specific challenges identified.

METHODOLOGY

Study Design:

The research study employed a cross-sectional design to gather data on the dietary behavior of toddlers in the Pakistani population. This design allowed for the collection of information at a specific point in time, providing a snapshot of the dietary practices at that time.

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Sampling technique:

A total of 200 toddlers, aged 2-6 years and presumed to be in good health, were enrolled in the study using a convenient and non-purposive sampling method. The recruitment process involved reaching out to participants through two distinct approaches. Firstly, a door-to-door approach was employed to engage with community residents in Pano Aqil. Additionally, individuals who were either employees of the hospital or their relatives residing anywhere in Pano Aqil were also approached to participate in the study.

Data Collection

Developing Food Frequency Questionnaire: To compile the food items for the Food Frequency Questionnaire (FFQ) and assess nutrient intake, data from 24-hour dietary recall surveys were gathered from individuals attending community services near various hospitals across the country. Drawing upon the findings of the 24-hour recalls and previous research, a list of food items was formulated for the FFQ, classified into distinct food groups. Additionally, a comprehensive food composition table was developed to facilitate the conversion of dietary intake into nutrient estimations. The frequency of food consumption was reported using categorical options ranging from "never" to "≥ 4 times/day," encompassing various frequencies such as several times per year, 1-3 times/month, once a week, 2-3 times/week, 4-6 times/week, once a day, and 2-3 times/day. In order to calculate nutrient intake, the reported frequency of consumption for each food item in the FFQ was multiplied by the reported portion size and the corresponding nutrient composition. This calculation was performed for all the listed foods. The nutrient composition of raw food items was obtained from the USDA database. In cases where the required information was not available in the USDA database, alternative local food composition tables were referred to for the necessary data. The questionnaire also included demographic data such as age, gender, number of siblings, and socio-economic status.

Filling of Questionnaire: The structured questionnaires developed to collect information on the dietary behavior of toddlers were administered to the parents. The parents or caregivers were assisted regarding any queries, and a helpline with a mobile number was provided to them to ensure correct documentation of data.

Anthropometric Measurements: Anthropometric measurements, such as height, weight, and body mass index (BMI), were taken to assess the nutritional status of toddlers. These measurements provided objective data on growth patterns and helped identify any associations between dietary behaviors and nutritional outcomes.

DATA ANALYSIS AND RESULTS

Data Analysis

Quantitative data collected through questionnaires and anthropometric measurements were analyzed using appropriate statistical techniques. Descriptive statistics were used to summarize the demographic characteristics of the sample and key dietary behavior indicators. Inferential statistics, such as chi-square tests or regression analysis, were applied to identify associations between dietary behaviors and relevant factors such as socioeconomic status or parental feeding practices.

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Results

A total of 200 children were included after consecutive assessment of children reporting in OPD. The incidence of stunted growth came out to be 38% (76/200). There were a total of 108 male participants (54%) and 92 female participants (46%) in both groups. The distribution of gender among individuals who had stunted growth and who did not is given in table 1.

Group	Males	Females
Study population	74(52.9%)	66(47.1%)

Table 1. Descriptive statistics for gender (n=200)

The mean age of all participants was 3.45 ± 1.12 years. The age distribution in participants who had stunted growth and who did not is shown in table 2. The minimum age was 2 years and maximum age was 6 years.

Group	N	Mean (years)	Std. Deviation	minimum	Maximum
Study population	200	3.45	1.120	2 years	6 years

Table 2.Descriptive statistics for Age (n=200)

The mean weight in all participants was 15.497 ± 3.1744 Kgs. The further distribution of weight is given in table 3. Minimum weight was 8 Kgs whereas maximum was 30 Kgs.

Group	N	Mean (kgs)	Std. Deviation	Minimum (kg)	Maximum (kg)
Study population	200	15.497	3.174	8	30

Table 3.Descriptive statistics for Weight (n=200)

The mean height of participants was 87.67 ± 11.628 cms. Maximum height was 118 cms and minimum height was 59 cms. Further distribution between participants who had stunted growth and who did not is shown in table 4. Mean BMI of participants was 20.683 ± 5.225. The mean mid arm circumference was 15.68 ± 2.135 cms. The mean age of mothers was 29.55 ± 5.617 years. Maximum age was 45 years and minimum age was 18 years. Further distribution between participants is shown in table 5.

Group	N	Mean (cms)	Std. Deviation	Minimum (cms)	Maximum (cms)
Study Population	200	87.67	11.628	58	118

Table 4.Descriptive statistics for Height of partcipants (n=200)

Group	N	Mean (kgs)	Std. Deviation	Minimum (years)	Maximum (years)
Study population	200	29.55	5.617	18	45

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Table 5.Descriptive statistics for Age of Mother (n=200)

The mean family size was 4.95 ± 1.853 with maximum of 10 and minimum of 2 per family. Analysis showed that a total of 161 mothers had some form of formal education before making incidence of

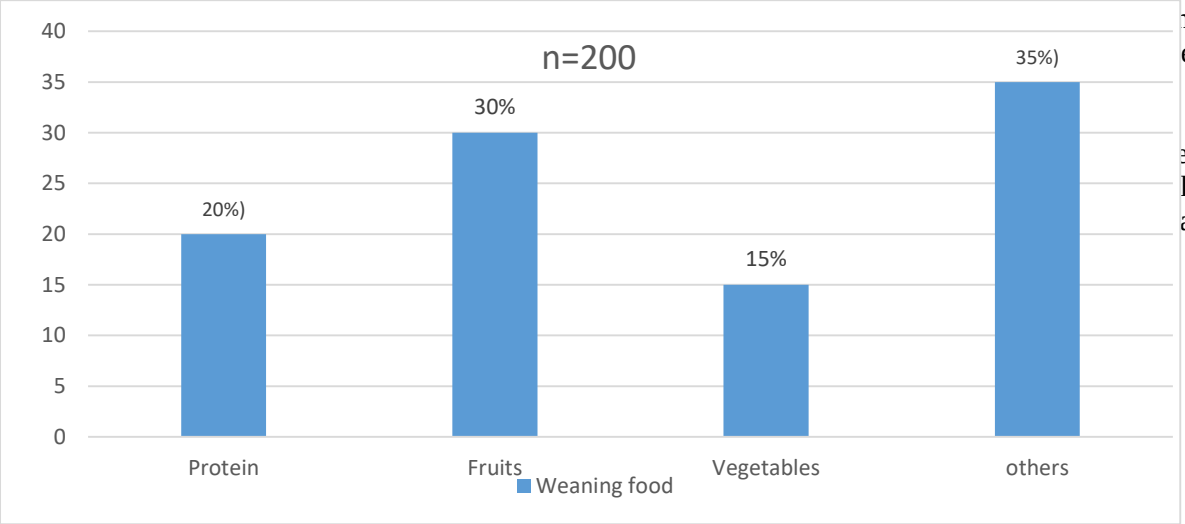

Figure 1: Type of weaning food (n=200)

A detail of type of food was assessed using FFQ questionnaire which has been shown in figure 2 till 7. For fruits most kids consumed it 1-3 times per month 95 (47.5%) whereas, vegetables were consumed in 150 (75%) at 2-3 times per week. Proteins were used 1-3 times per month in 73 (36.5%) kids. Carbohydrates were consumed 2-3 times daily in 117 (58.5%) participants and fats in 108 (54%) individuals were consumed 2-3 times a week. Sugar beverages were used in 77 (38.5%) kids at 1-3 times per week.

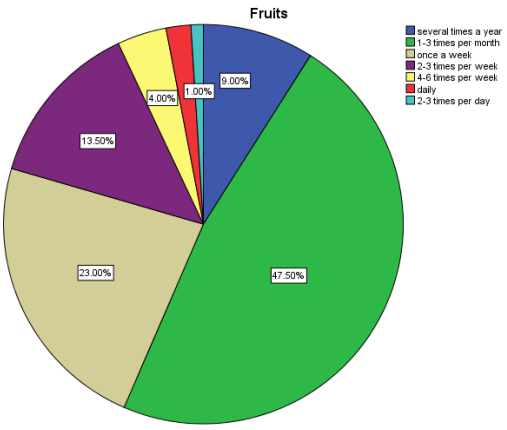

Figure 2: Fruits consumption among participants (n=200)

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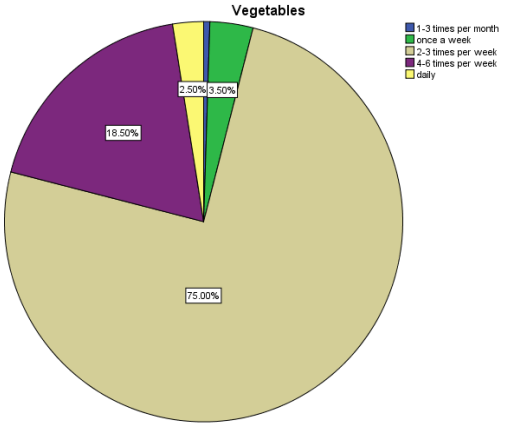

Figure 3: Vegetables consumption among participants (n=200)

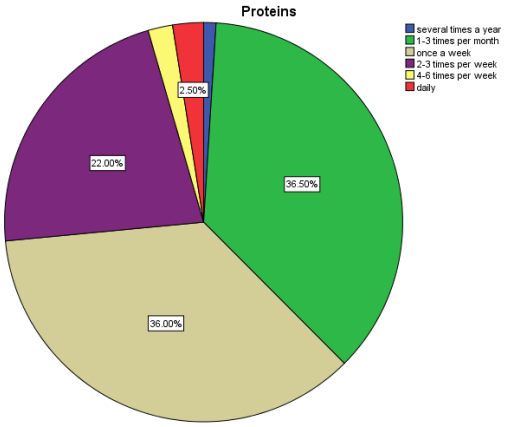

Figure 4: Proteins consumption among participants (n=200)

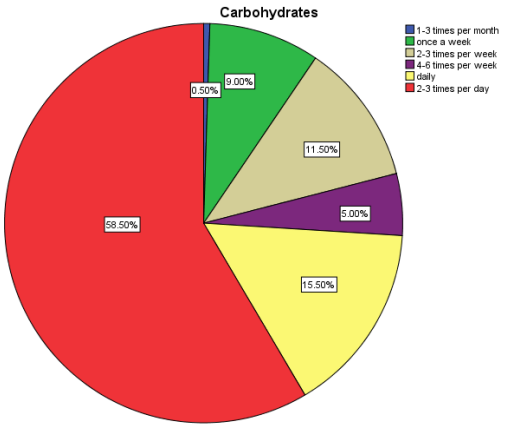

Figure 5: Carbohydrates consumption among participants (n=200)

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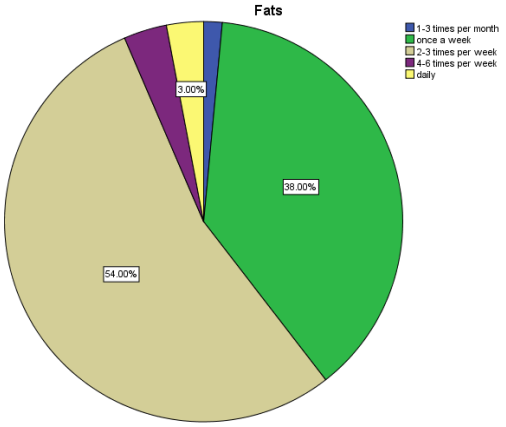

Figure 6: Fats and oils consumption among participants (n=200)

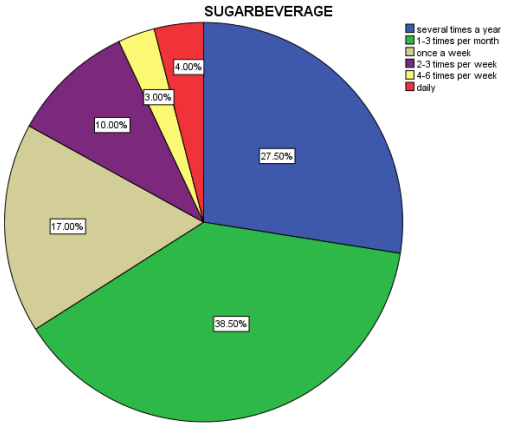

Figure 7: Sugar Beverages consumption among participants (n=200)

In terms of food choice, FFQ showed 76 (38%) had inclination to giving particular food to their kids and in terms of restriction 117 (58.5%) said they were avoiding particular food. When further inquiry was made as to why certain food was avoided, 54% thought it may cause indigestion to their child. Most importantly their child did not exhibit any signs of intolerance. Figure 8 shows the various foods which were avoided by parents.

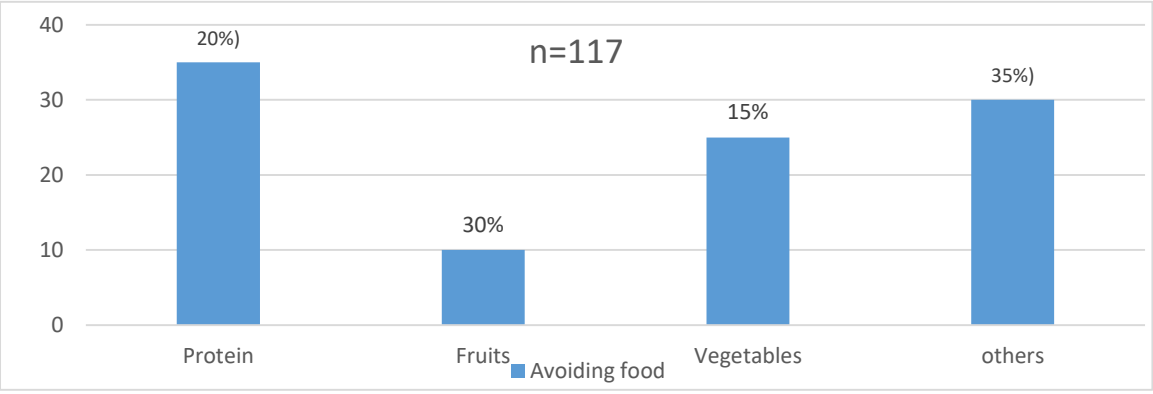

Figure 8: Parents avoiding the type of food (n=117)

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To understand the effects of various food preferences or habits and their effects on stunded growth. The FFQ was divided into inadequate and adequate in take depending on recommended daily allowances. The effects of various variables and food in take on stunted growth is shown in table 6.

S.no	Variable	Stunted Growth		P-value
		Yes	No	
1	**Socioeconomic status**			
	High	**0**	**9**	**<0.001**
	Middle	**20**	**56**	
	Low	**56**	**59**	
2	**Gender**			
	Male	**43**	**65**	**0.567**
	Female	**33**	**59**	
3	**Fruits**			
	Inadequate intake	**75**	**111**	**0.019**
	Adequate intake	**1**	**13**	
4	**Vegetables**			
	Inadequate intake	**0**	**8**	**0.025**
	Adequate intake	**76**	**116**	
5	**Proteins**			
	Inadequate intake	**76**	**115**	**0.014**
	Adequate intake	**0**	**9**	
6	**Carbohydrates**			
	Inadequate intake	**24**	**28**	**0.159**
	Adequate intake	**52**	**96**	
7	**Fats and Oils**			
	Inadequate intake	**29**	**50**	**0.761**
	Adequate intake	**47**	**74**	

Table 6: The effects of various variables and food in take on stunted growth (n=200)

The study conducted on 200 children, with an average age of 3.45 years, aimed to explore the prevalence and potential factors contributing to stunted growth in the Pakistani population. The key findings reveal that 38% of the participants experienced stunted growth, shedding light on critical aspects of child health in the region.

Demographic Overview:

The gender distribution showed 54% males and 46% females, reflecting a relatively balanced representation. The mean age of the children ranged from 2 to 6 years, emphasizing the inclusion of toddlers and preschoolers in the study. The diverse age range ensures a comprehensive understanding of growth patterns during early childhood.

Anthropometric Measurements:

Anthropometric measurements, such as weight, height, and BMI, provided crucial insights into the nutritional status of the participants. The mean weight was 15.497 kg, height was 87.67 cm, and BMI was 20.683. These values serve as benchmarks for evaluating the physical development of the children. The distribution of weight, height, and BMI showcased the diversity within the study population, with weights ranging from 8 to 30 kg and heights from 59 to 118 cm.

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Maternal and Socioeconomic Factors:

The mean age of mothers was 29.55 years, with a range of 18 to 45 years. The family size averaged at 4.95 members per family. A significant portion of mothers (80.5%) had received some form of formal education, underscoring the potential influence of maternal education on child health. The socioeconomic analysis revealed that 57.5% of parents belonged to the low socioeconomic group, indicating a potential correlation between socioeconomic status and stunted growth.

Breastfeeding Practices:

Breastfeeding, a crucial determinant of early nutrition, was prevalent among 76.5% of the children. However, the mean age of exclusive breastfeeding was 5.03 months, suggesting variations in breastfeeding duration. This information could contribute to understanding the impact of breastfeeding duration on growth patterns.

Dietary Patterns and Food Preferences:

The study delved into the dietary habits of children, capturing valuable data on the types and frequencies of food consumption. The Food Frequency Questionnaire (FFQ) revealed that fruits were consumed 1-3 times per month by 47.5% of children, while vegetables were consumed 2-3 times per week by 75%. Notably, 38% of parents reported avoiding specific foods for their children, with concerns about potential indigestion being a prominent reason.

Association between Variables and Stunted Growth:

Statistical analysis explored the association between various factors and stunted growth. Significant associations were found between stunted growth and socioeconomic status ($p<0.001$), inadequate intake of fruits ($p=0.019$), inadequate intake of vegetables ($p=0.025$), inadequate intake of proteins ($p=0.014$), and gender ($p=0.567$). These findings highlight the multifaceted nature of stunted growth, influenced by both socio-economic and dietary factors.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study provides a comprehensive overview of the prevalence and potential determinants of stunted growth in Pakistani children. The integration of anthropometric measurements, maternal factors, breastfeeding practices, and dietary patterns enriches the understanding of the complex interplay influencing child health. The identified associations between socio-economic status, dietary habits, and stunted growth emphasize the need for targeted interventions to address these modifiable factors. Further research and public health initiatives can build upon these insights to develop effective strategies for improving child nutrition and reducing the prevalence of stunted growth in the population.

Recommendation

The findings of the study underscore the multifaceted nature of stunted growth in Pakistani children, with potential associations identified across socio-economic, dietary, and maternal factors. To address this issue effectively, a holistic approach involving targeted interventions and policy considerations is recommended:

Enhance Maternal Education Programs: Invest in educational programs targeting mothers to enhance their knowledge of nutrition, child health, and proper feeding practices. By empowering

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mothers with accurate information, there is a higher likelihood of improved dietary choices and better adherence to breastfeeding practices.

Promote Early and Exclusive Breastfeeding: Implement public health campaigns emphasizing the importance of early and exclusive breastfeeding. Encourage healthcare providers to provide counseling and support to mothers during antenatal and postnatal care visits, stressing the benefits of prolonged breastfeeding for child health and growth.

Nutrition Education for Parents: Establish community-based nutrition education programs aimed at parents, focusing on balanced and age-appropriate diets for young children. These programs can address misconceptions about certain foods causing indigestion and provide practical guidance on creating nutrient-rich meals.

Targeted Socio-Economic Interventions: Design targeted interventions for families belonging to the low socio-economic group, addressing economic constraints that may hinder access to nutritious foods. This may involve subsidies, nutritional assistance programs, or initiatives that promote income generation among economically disadvantaged families.

Diversify and Enhance Weaning Practices: Educate parents on diverse weaning practices, introducing a variety of nutrient-rich foods during the weaning process. Encourage the consumption of fruits, vegetables, proteins, and carbohydrates in adequate amounts to ensure a well-rounded and balanced diet.

Public Health Initiatives: Collaborate with public health agencies to develop and implement community-based initiatives that address the identified risk factors for stunted growth. This may involve the dissemination of educational materials, community workshops, and awareness campaigns to reach a wider audience.

Regular Growth Monitoring: Establish and promote routine growth monitoring programs for children within healthcare facilities and communities. Regular check-ups can help identify early signs of growth faltering, allowing for timely interventions and support for affected children.

Policy Integration: Advocate for the integration of nutrition education and growth monitoring into existing healthcare policies and programs. This ensures that addressing stunted growth becomes an integral part of the broader healthcare agenda, receiving sustained attention and resources.

Community Engagement and Participation: Foster community engagement and participation in designing and implementing interventions. Involving communities in the decision-making process ensures that interventions are culturally sensitive, sustainable, and tailored to the unique needs of the population.

By implementing these recommendations, policymakers, healthcare professionals, and community leaders can work collaboratively to address stunted growth in Pakistani children, fostering a healthier and more resilient future generation.

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DATA AVAILABILITY

The data can be accessed through e-mail and getting in touch with corresponding author.

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