



PREVALENCE AND RISK FACTORS OF DENTAL CARIES AMONG CHILDREN IN URBAN SLUM AREAS OF JODHPUR

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ABSTRACT

Objective: This study aimed to determine the prevalence and identify the risk factors of dental caries among children living in urban slum areas of Jodhpur. Given the potential to significantly improve the health of this population, understanding these factors is crucial for developing effective public health strategies.

Methods: A cross-sectional survey was conducted among 392 children from various urban slums in Jodhpur. Data were collected through structured interviews and questionnaires focusing on demographic factors, oral hygiene practices, dietary habits, access to dental care, and the prevalence of dental caries.

Results: The prevalence of dental caries among the children surveyed was 55.1%, with the highest incidence observed in children aged 8 years (15.31%). The gender distribution showed that 54.34% of the respondents were female and 45.66% were male. Monthly household income was a significant factor, with the majority of families earning between INR 5000-10000 (39.29%) and less than INR 5000 (30.36%).

The majority of children (60.46%) had never visited a dental clinic or hospital, primarily due to the high cost of treatment (38.78%). Among those who sought care, 89.54% visited government hospitals, while 10.46% relied on unorganized dental practitioners. Dietary habits also played a crucial role, with 38.52% of children consuming sugary snacks occasionally (3-4 times a week), and 38.52% consuming sugary drinks with the same frequency. Alarming, 70.15% of the children never brushed their teeth, highlighting a critical area for intervention.

Conclusion: The findings indicate a high prevalence of dental caries among children in urban slums of Jodhpur, exacerbated by poor oral hygiene practices, high sugar consumption, and limited access to dental care. The socioeconomic status of the families further contributes to the barriers in obtaining adequate dental health services. These results underscore the need for targeted public health initiatives focusing on improving oral hygiene education, enhancing access to affordable dental care, and addressing dietary habits within these vulnerable communities.

KEYWORDS : Dental Caries, Oral Health, Public Health, Pediatric Dentistry, Oral Hygiene

INTRODUCTION

Dental caries, commonly referred to as tooth decay, is a major public health challenge worldwide, particularly among children. It is the most prevalent chronic disease in children, affecting their quality of life, development, and overall health. Despite being largely preventable, dental caries continues to be a significant concern, especially in low-income populations such as those residing in urban slums. The rapid urbanization in developing countries like India has led to the growth of urban slums, where living conditions are often characterized by overcrowding, poor sanitation, inadequate access to healthcare, and limited educational opportunities. These factors collectively contribute to a higher prevalence of dental caries among children living in these marginalized communities.

The city of Jodhpur, located in the state of Rajasthan, India, is no exception to these challenges. Jodhpur has witnessed significant urban growth, resulting in the expansion of slum areas where a large proportion of the population resides. The

children in these urban slums are particularly vulnerable to dental caries due to several interrelated factors. These include poor oral hygiene practices, a diet high in sugars and refined carbohydrates, lack of access to dental care, and low socioeconomic status. Understanding the prevalence and risk factors of dental caries in this population is essential for developing targeted public health interventions aimed at improving oral health outcomes.

Global and National Context of Dental Caries

Dental caries is a multifactorial disease that results from the interaction between dietary sugars, dental plaque, and the tooth surface over time. The World Health Organization (WHO) has identified dental caries as a major health concern, noting that untreated caries in primary and permanent teeth affects more than 530 million children globally. In India, the prevalence of dental caries among children is alarmingly high, with studies reporting rates ranging from 50% to 80% in various regions. The burden of dental caries is disproportionately higher among



children from lower socioeconomic backgrounds, including those living in urban slums.

Urban slums are characterized by poor infrastructure, inadequate housing, limited access to clean water, and a lack of basic health services. These conditions create an environment conducive to the development of dental caries. The lack of awareness about oral health, coupled with the unavailability of affordable dental care, exacerbates the problem. Additionally, the high cost of dental treatment in private clinics makes it inaccessible to the majority of slum dwellers, forcing them to rely on unorganized and often unlicensed dental practitioners or delay seeking care until the condition becomes severe.

Socioeconomic and Environmental Determinants

The socioeconomic determinants of health play a critical role in the prevalence of dental caries. Children in urban slums are often exposed to poor dietary habits, including the frequent consumption of sugary snacks and beverages, which are readily available and affordable. These dietary choices are influenced by economic constraints, as healthier food options are often more expensive and less accessible. Moreover, the crowded living conditions in slums make it difficult for families to maintain proper hygiene practices, including regular tooth brushing.

Oral hygiene practices are a significant factor in the development of dental caries. However, in urban slum settings, the use of fluoride toothpaste and regular brushing are not always feasible due to financial limitations. Many families in these areas may not prioritize oral hygiene due to a lack of education and awareness about its importance. This is compounded by the fact that many slum residents do not have access to safe and clean water, which is essential for maintaining oral hygiene.

Access to dental care is another critical determinant of oral health in slum populations. Government hospitals and public health facilities are often the only option for those seeking dental care in urban slums. However, these facilities are frequently overburdened, under-resourced, and may not provide specialized pediatric dental services. The reliance on government hospitals is evident in the high percentage of children in Jodhpur's slums who seek care at these facilities. Additionally, some families resort to unlicensed dental practitioners due to the lower cost, despite the potential risks associated with substandard care.

Need for Research and Public Health Interventions

Despite the high burden of dental caries among children in urban slums, there is a paucity of research focused on understanding the specific risk factors and the extent of the problem in these communities. Most studies on dental caries in India have concentrated on general populations or school-going children from more affluent backgrounds, leaving a significant gap in the literature regarding the oral health of children in slum areas. Addressing this gap is crucial for developing effective public health strategies that cater to the unique needs of these vulnerable populations.

Public health interventions aimed at reducing the prevalence of dental caries in urban slums must be multifaceted, addressing both the immediate needs for treatment and the underlying social determinants of health. Education and awareness campaigns are essential for promoting good oral hygiene practices and reducing the consumption of sugary foods and beverages. Additionally, increasing access to affordable dental care through mobile clinics, community health workers, and partnerships with non-governmental organizations can help to alleviate the burden of dental caries in these communities.

REVIEW OF LITERATURE

Some of the relevant review of literature are listed below to gain some insight regarding the dental caries.

The study by **Kassebaum et al. (2017)** provides a comprehensive analysis of the global burden of oral conditions, particularly dental caries, using data from the Global Burden of Disease Study 2015. It highlights that dental caries remains one of the most prevalent chronic diseases worldwide, affecting billions of people, especially in low- and middle-income countries. The study underscores that despite advancements in dental care, the prevalence of untreated caries in both primary and permanent teeth remains high, leading to significant disability-adjusted life years (DALYs). The authors emphasize the need for global public health strategies to address this persistent issue, particularly in disadvantaged regions where access to dental care is limited. The study calls for greater emphasis on preventive measures, education, and improving access to dental services as key strategies to reduce the global burden of dental caries.

Schwendicke et al. (2015) conducted a systematic review and meta-analysis to explore the relationship between socioeconomic status (SES) and the prevalence of dental caries. The study analyzed data from multiple countries and found a strong inverse relationship between SES and dental caries, with lower SES populations exhibiting higher caries prevalence. The authors attribute this to several factors, including limited access to dental care, poor oral hygiene practices, and dietary habits characterized by high sugar consumption. The review highlights that children from low-SES backgrounds are particularly vulnerable to caries, with socioeconomic disparities contributing significantly to their oral health outcomes. The study underscores the importance of addressing these social determinants through targeted public health interventions, such as improving access to dental care, enhancing oral health education, and promoting healthy dietary habits to reduce the incidence of dental caries in lower socioeconomic groups.

Tinanoff et al. (2019) provide an in-depth review of early childhood caries (ECC), discussing its epidemiology, etiology, risk factors, and societal burden. The study highlights that ECC is a significant public health issue, particularly in low-income and disadvantaged populations where the prevalence is notably higher. The authors explore the complex interplay of factors leading to ECC, including frequent exposure to sugary foods and beverages, poor oral hygiene, and inadequate access to preventive dental care. The review also emphasizes the long-term consequences of ECC, which can lead to pain, infection, and difficulties in eating and speaking, potentially impacting a



child's overall development. The authors call for comprehensive public health strategies that include early interventions, parental education, and community-based programs to prevent ECC and mitigate its impact on vulnerable populations.

Marinho (2014) reviews the effectiveness of fluoride therapies in preventing dental caries, drawing from a series of Cochrane reviews on randomized trials. The study consolidates evidence that fluoride, in various forms such as toothpaste, varnish, and water fluoridation, is highly effective in reducing the incidence of dental caries across different age groups and populations. The review highlights that fluoride strengthens tooth enamel and makes it more resistant to acid attacks from plaque bacteria and sugars. It also discusses the cost-effectiveness of fluoride as a preventive measure, particularly in public health programs aimed at reducing caries in children. Marinho concludes that the widespread use of fluoride is a crucial component of caries prevention strategies, especially in communities with high caries prevalence and limited access to other forms of dental care.

Moynihan and Kelly (2014) conducted a systematic review to evaluate the effect of restricting sugar intake on dental caries, in line with the World Health Organization's guidelines. The study confirms a strong positive relationship between sugar consumption and the development of dental caries, with higher sugar intake leading to increased caries risk. The authors emphasize that reducing free sugars to less than 10% of total energy intake significantly lowers the risk of caries, particularly in children. The review also discusses the challenges of implementing dietary changes, especially in populations where sugary foods and beverages are highly accessible and affordable. The authors advocate for public health policies that promote healthier eating habits, such as reducing sugar content in processed foods, implementing sugar taxes, and enhancing public awareness about the risks of high sugar consumption.

Petersen and Ogawa (2012) review the disparities in dental caries prevalence between urban and rural populations, with a focus on the role of fluoride in prevention. The study finds that rural populations often have higher caries rates due to lower access to fluoride and dental care services. In contrast, urban populations may have better access to fluoride through public water systems and dental products, but face higher exposure to dietary sugars and processed foods. The authors highlight the importance of integrating fluoride use into broader public health strategies, particularly in rural areas where dental care infrastructure is lacking. The review also calls for increased efforts to address the social and environmental determinants of health that contribute to the observed disparities, emphasizing the need for tailored public health interventions that consider the unique challenges of both urban and rural populations.

Watt and Sheiham (2012) propose the integration of the common risk factor approach into a social determinants framework to address dental caries and other non-communicable diseases. The study argues that many risk factors for dental caries, such as poor diet, tobacco use, and inadequate hygiene, are common to other chronic diseases, making an integrated approach more effective. The authors

advocate for public health interventions that target these shared risk factors, particularly in disadvantaged communities where the burden of disease is highest. They emphasize the need for policies that promote healthier environments, such as reducing sugar content in foods, regulating tobacco, and improving access to oral health education and care. The review highlights the potential for significant public health gains through the adoption of this holistic approach, which addresses the root causes of poor oral health and other related conditions.

OBJECTIVES OF THE STUDY

This study aims to determine the prevalence of dental caries among children in urban slum areas of Jodhpur and to identify the key risk factors contributing to this condition. By understanding the socioeconomic, dietary, and hygiene-related factors that influence the development of dental caries, this research seeks to inform the design and implementation of targeted public health interventions. Ultimately, the goal is to improve oral health outcomes and reduce the incidence of dental caries among children in these marginalized communities.

This paper will contribute to the growing body of knowledge on the oral health challenges faced by children in urban slums and highlight the urgent need for comprehensive, community-based approaches to address this pressing public health issue.

RESULT AND DISCUSSION

This section presents the study's findings on the prevalence and risk factors of dental caries among children in urban slum areas of Jodhpur. The results are discussed about the study objectives.

Table 1

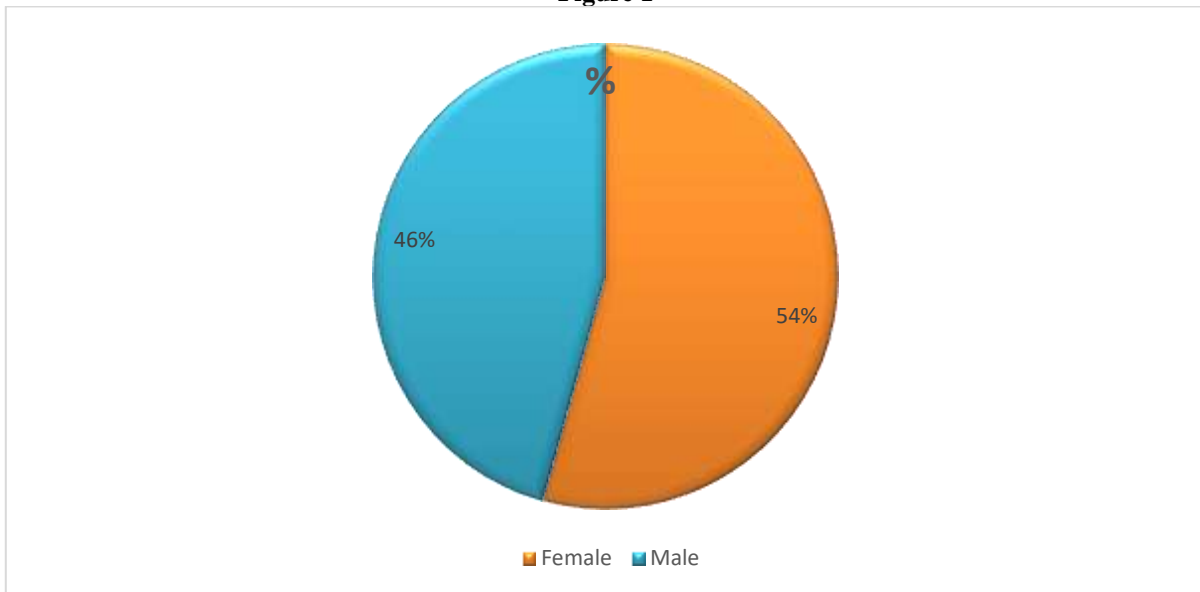
Age	Frequency	Percentage
8	60	15.31
5	55	14.03
11	54	13.78
12	50	12.76
7	49	12.50
10	43	10.97
6	42	10.71
9	39	9.95
Total	392	100

This table presents the age distribution of 392 children who participated in the study. The most represented age group is 8-year-olds, accounting for 15.31% of the total sample. Following closely are 5-year-olds (14.03%) and 11-year-olds (13.78%). The least represented age group is 9-year-olds, making up 9.95% of the sample. This distribution reflects a balanced representation of children across various ages, which is crucial for analyzing how dental caries prevalence and risk factors vary across different developmental stages. The spread of age groups also ensures that the study can make more generalized conclusions applicable to a wider range of children within the urban slum population.

Table 2

Gender	Frequency	Percentage
Female	213	54.34
Male	179	45.66
Total	392	100

Figure 1



This table details the gender distribution of the children surveyed. Out of the 392 participants, 54.34% are female (213 individuals), and 45.66% are male (179 individuals). This slight predominance of females over males in the sample ensures that both genders are adequately represented, allowing the study to explore potential gender-based differences in the prevalence and risk factors for dental caries. A balanced gender distribution is important to ensure that the findings are not biased towards one gender, thereby increasing the generalizability of the study's results.

Table 3

Monthly Household Income	Frequency	Percentage
5000 - 10000	154	39.29
Less than 5000	119	30.36
10000 - 15000	77	19.64
More than 15000	42	10.71
Total	392	100

The third table shows the distribution of monthly household income among the families of the children. The majority of families (39.29%) earn between INR 5000 and 10000 per month, while 30.36% earn less than INR 5000. A smaller portion of the sample falls into the higher income brackets, with 19.64% earning between INR 10000 and 15000, and 10.71% earning more than INR 15000. This income distribution highlights the economic challenges faced by the families living in urban slums, with a significant proportion of the population falling within lower income brackets. This socioeconomic data is critical for understanding the broader context in which these families live and how it might affect their access to dental care and their children's oral health.

Table 4

Has Dental Caries	Frequency	Percentage
Yes	216	55.10
No	176	44.90
Total	392	100

This table outlines the prevalence of dental caries among the children surveyed. Over half of the children (55.10%) have experienced dental caries, while 44.90% have not. This high

prevalence rate underscores the significant public health issue posed by dental caries in urban slum areas. The data suggests that more than half of the children in these areas suffer from tooth decay, highlighting the need for targeted interventions to improve oral hygiene practices, dietary habits, and access to dental care within these communities.

Table 5

Age of First Tooth Decay	Frequency	Percentage
9	31	7.91
11	30	7.65
10	29	7.40
5	27	6.89
7	27	6.89
4	25	6.38
6	24	6.12
8	23	5.87
Total	392	100

The fifth table presents the age at which children first experienced tooth decay. The data shows that tooth decay commonly begins at around 9 years of age, with 7.91% of children reporting their first decay at this age. The frequency remains high for ages 11 (7.65%) and 10 (7.40%). However, tooth decay is also reported in younger children, with 6.89% first experiencing decay at age 5. This early onset of dental caries suggests that interventions to prevent tooth decay need to start at a very young age, possibly even before children enter school.

Table 6

Visited Dental Clinic/Hospital	Frequency	Percentage
No	237	60.46
Yes	155	39.54
Total	392	100

This table shows whether the children had ever visited a dental clinic or hospital for their dental issues. A significant 60.46% of children had never visited a dental clinic or hospital, while 39.54% had. This high percentage of children who have never received professional dental care is alarming and indicates a

substantial gap in access to dental services. The data suggests that many children in urban slums are not receiving the dental care they need, likely due to financial constraints, lack of access, or other barriers, which may contribute to the high prevalence of untreated dental caries.

Table 7

Reason for Not Visiting Clinic	Frequency	Percentage
Visited	155	39.54
High cost	152	38.78
Distance	35	8.93
Lack of time	29	7.40
Other	21	5.36
Total	392	100

This table explores the reasons given by parents for not taking their children to a dental clinic. Among the children who did not visit a clinic, 38.78% cited high cost as the main reason, followed by distance (8.93%) and lack of time (7.40%). The “nan” category, representing 39.54%, corresponds to children who had visited a clinic, so no reason was recorded for them. These findings highlight the financial barriers that prevent families from accessing dental care, suggesting that affordability is a major issue in these communities. This information is crucial for policymakers to consider when designing interventions to improve access to dental services.

Figure 2

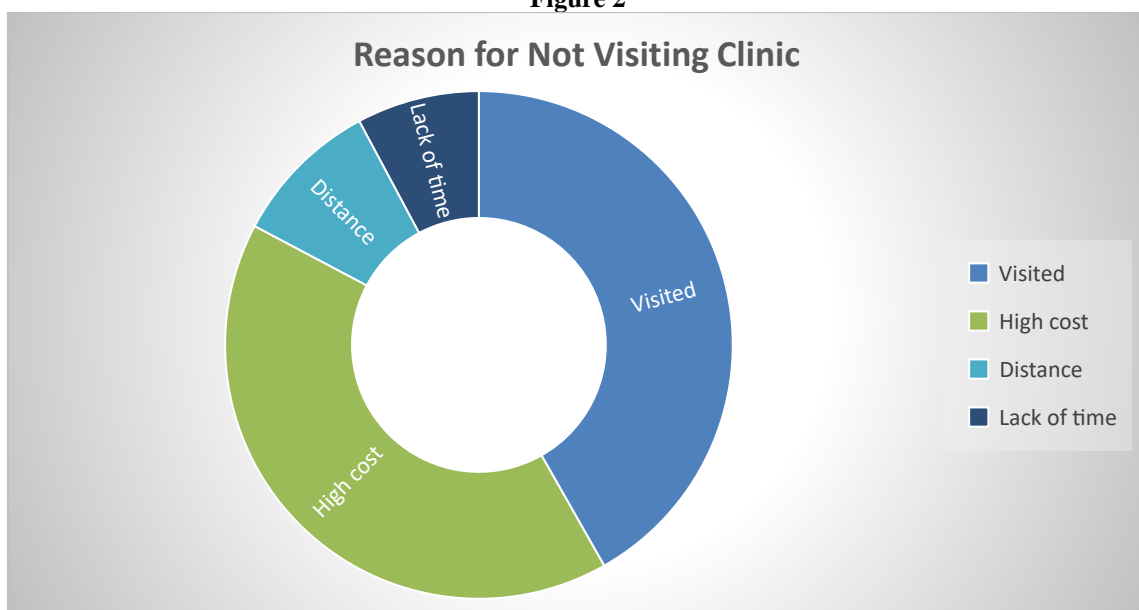


Table 8

Usual Place of Care	Frequency	Percentage
Government Hospital	351	89.54
Unorganized Dental Practitioner	41	10.46
Total	392	100

The eighth table identifies where children typically receive care for dental issues. An overwhelming majority (89.54%) of children receive care at government hospitals, while 10.46% visit unorganized dental practitioners. The reliance on government hospitals reflects the limited financial resources of these families, who may not be able to afford private dental care. However, the fact that some families resort to unorganized practitioners raises concerns about the quality and safety of the care their children receive. This finding underscores the importance of improving the availability and quality of public dental services in urban slums.

Table 9

Sugary Snacks Consumption	Frequency	Percentage
Occasionally (3-4 times a week)	151	38.52
Rarely (1-2 times a week)	119	30.36
Frequently (5+ times a week)	75	19.13
Never	47	11.99
Total	392	100

This table provides insight into the frequency of sugary snack consumption among the children. A significant portion (38.52%) consumes sugary snacks occasionally (3-4 times a week), while 30.36% do so rarely (1-2 times a week). A smaller percentage consumes sugary snacks frequently (19.13%), and 11.99% never consume them. The high frequency of sugary snack consumption is a known risk factor for dental caries, and these findings suggest that dietary habits are likely contributing to the high prevalence of tooth decay in this population. This data highlights the need for dietary interventions aimed at reducing sugar intake among children in urban slums.

Table 10

Sugary Drinks Consumption	Frequency	Percentage
Occasionally (3-4 times a week)	151	38.52
Rarely (1-2 times a week)	137	34.95
Never	55	14.03
Frequently (5+ times a week)	49	12.50
Total	392	100.00

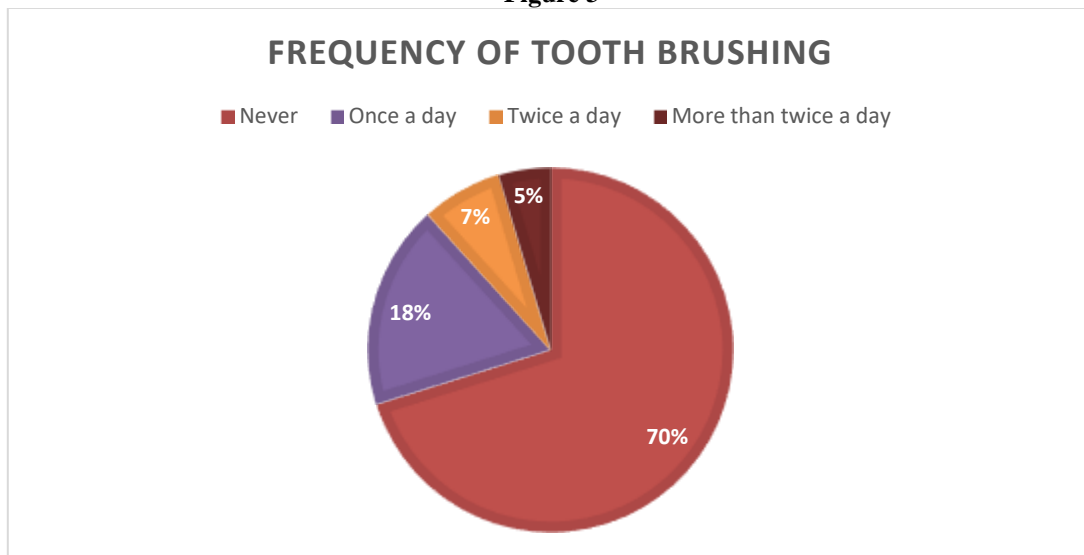
The tenth table examines the consumption of sugary drinks among the children. The data shows that 38.52% of children consume sugary drinks occasionally (3-4 times a week), and 34.95% consume them rarely (1-2 times a week). A smaller percentage (12.50%) consumes sugary drinks frequently, while 14.03% never consume them. Similar to sugary snacks, the frequent consumption of sugary drinks is a significant risk factor for dental caries. These findings suggest that reducing the intake of sugary drinks should be a key component of efforts to prevent dental caries in these communities.

Table 11

Frequency of Tooth Brushing	Frequency	Percentage
Never	275	70.15
Once a day	71	18.11
Twice a day	28	7.14
More than twice a day	18	4.59
Total	392	100

The final table presents data on the frequency of tooth brushing among the children. Alarming, 70.15% of the children never brush their teeth, indicating a severe lack of basic oral hygiene practices. Only 18.11% brush once a day, 7.14% twice a day, and 4.59% more than twice a day. This lack of regular tooth brushing is a major contributor to the high prevalence of dental caries observed in the study and underscores the urgent need for oral hygiene education and resources in these communities. The data indicates that promoting regular tooth brushing could be a key strategy in reducing the incidence of dental caries among children in urban slums.

Figure 3



CONCLUSION

The study highlights a significant public health challenge posed by the high prevalence of dental caries among children in the urban slum areas of Jodhpur. With over 55% of the surveyed children affected by dental caries, the findings underscore the urgent need for targeted interventions in these communities. The study reveals that the primary risk factors contributing to this high prevalence include poor oral hygiene practices, such as the alarming rate of 70.15% of children who never brush their teeth, as well as dietary habits characterized by frequent consumption of sugary snacks and drinks.

Socioeconomic factors play a crucial role, with the majority of families falling into lower income brackets, limiting their access to adequate dental care. The reliance on government hospitals and the use of unorganized dental practitioners further reflect the financial barriers that hinder these families from seeking timely and quality dental care. Additionally, the early onset of tooth decay among children as young as 4 years old

indicates a critical need for early preventive measures and education.

SUGGESTIONS

Enhanced Oral Hygiene Education:

Implement comprehensive oral hygiene education programs targeting both children and parents in urban slum areas. These programs should emphasize the importance of regular tooth brushing and the use of fluoride toothpaste to prevent dental caries.

Improved Access to Affordable Dental Care:

Increase the availability of affordable dental care services in urban slums through mobile dental clinics, community health workers, and partnerships with non-governmental organizations. Subsidized dental treatments at government hospitals could also be expanded to reduce the financial burden on low-income families.



Dietary Interventions:

Promote healthy dietary habits by reducing the consumption of sugary snacks and drinks among children. Public health campaigns should focus on educating families about the risks associated with high sugar intake and encourage healthier alternatives.

Early Preventive Measures:

Initiate preventive dental care programs for young children, starting as early as possible. Regular dental check-ups and the application of fluoride varnish could be implemented in schools and community centers to prevent the early onset of dental caries.

Policy and Infrastructure Improvements:

Advocate for policy changes that improve the quality and accessibility of dental care in urban slums. Investments in dental care infrastructure, particularly in government hospitals, should be prioritized to ensure that these facilities are adequately equipped to meet the needs of the population.

Community-Based Initiatives:

Encourage community-based initiatives that involve local leaders and residents in promoting oral health awareness and practices. Community-driven programs can foster a sense of ownership and commitment to improving the overall health of the community.

These suggestions aim to address the root causes of dental caries in urban slum populations and provide a roadmap for public health initiatives that can significantly reduce the burden of this preventable disease among children in Jodhpur.

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