

The Rising Epidemic of Dental Caries in Pakistan: What Clinicians Need to Know

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ABSTRACT

Dental Caries is a non-communicable disease which is causing disturbance globally. It is a multifactorial disease, whose prevalence in Pakistan is more than 60%. Understanding these factors can lead to the development of policies and practices in mitigating the prevalence of dental caries. This review aims to explore different factors which leads to the rise of prevalence of dental caries and helps clinicians of Pakistan to mitigate it. Factors which lead to the development of dental caries are dietary habits, oral hygiene practices, socioeconomic factors, and cultural practices. Keeping in mind such factors, clinicians should provide tailored oral hygiene instructions. This is to ensure comprehensive and effective outcomes for all patients. So apart from addressing the chief complaint of a patient, clinician should focus on preventive dentistry as well. By doing this, rising epidemic of dental caries can be controlled.

Key Words: Dental Caries, Dental Clinicians, Epidemic, Pakistan

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Introduction

Oral health is one of the most important components that contribute to the overall health of an individual. The most common disease that affects oral health is Dental Caries. Dental caries is one of the most prevalent diseases affecting more than 35% of the global population.¹ Furthermore, dental caries is the most common non-communicable disease globally, the prevalence of which is currently on the rise. Dental caries is defined as the break of hard tissues of the tooth such as enamel, dentin, and cementum which if not stopped, invades the pulp of the tooth. Dental caries can affect any tooth in the oral cavity, being initiated by the acidic degradation of hard tissues caused by the invasion of bacteria.²

Hence, dental caries is often termed as a bacterial disease.

According to the World Health Organisation (WHO), dental caries is considered a major health problem in almost all countries.³ Dental caries recognition has a very long history, affecting individuals of all races, ethnicities, genders, socioeconomic status, and age.⁴ Dental caries is a multi-factorial disease based on various factors like the host, dietary intake, brushing habits, quantity and quality of saliva.⁵ Normally, the bacteria are found in the oral cavity which may lead to dental caries, however, the balance towards developing dental caries is based on the aforementioned factors. The burden of dental caries is well understood in developed countries; however,

the burden is often less understood in developing countries like Pakistan.¹ It has been estimated that the prevalence of dental caries in Pakistan is more than 60%, however, such figures are underestimated.¹ Various factors are responsible for such underestimation including lack of registries of dental caries, shortage of dentists, unequal distribution of dentists between urban and rural areas, and lack of knowledge and awareness regarding oral health.⁶ Moreover, understanding the epidemiological trends, contributing factors, clinical implications, preventive measures, and treatment modalities are of utmost importance for clinicians to understand in the midst of the rising epidemic of dental caries in Pakistan. Such an understanding may eventually lead to understanding the factors that are responsible for this epidemic which would eventually lead to the formation of policies and practices to reduce the prevalence of dental caries. So, This narrative review aims to explore different factors that are responsible for rising dental caries in Pakistan. Such factors are to be understood by clinicians in order to mitigate the rising epidemic of dental caries in Pakistan.

1. Epidemiologic Trends

Recent studies exploring the prevalence of dental caries in Pakistan have revealed concerning statistics in terms of the rising prevalence of dental caries.^{7,8} The rising prevalence of dental caries in Pakistan is observed across different provinces and major cities of Pakistan.¹ A recent systematic review has estimated that the prevalence of dental caries in different provinces of Pakistan is as follows: Sindh 58.9%, Punjab 55.4%, and Khyber Pakhtunkhwa (KPK) and Balochistan 51.1%, respectively.¹ Furthermore, this study stated that the prevalence of dental caries in major cities of Pakistan is as follows: Karachi 61.9%, Lahore 57.6%, Islamabad and Rawalpindi 57.3%.¹

Now most of the studies have been carried out in the provinces of Sindh and Punjab, however, fewer studies have been carried out in KPK and Balochistan.¹ Despite such statistics, these findings

do not represent the whole population as the majority of the population in Pakistan lives in rural areas, the data of which is not available. Hence, the prevalence of dental caries in Pakistan is largely underestimated and understudied.

In terms of different age groups, dental caries have an impact across different ages of life including children, adults, and older age patients.⁹ However,



Figure 1. Factors Leading Towards Development of Dental Caries

the prevalence of dental caries has been observed generally to increase as the individual ages.¹⁰ Additionally, keeping in mind the socioeconomic status, a high prevalence of dental caries is noted and suspected in rural areas as compared to urban areas.¹¹ This disparity is largely accounted for by the lack of availability of dental services in rural areas as compared to urban areas.¹² However, this is not always noted, as urban areas have greater access to processed food therefore, prevalence may be higher in some urban areas as compared to rural areas.¹³

2. Contributing Factors

Dental caries is a multifactorial disease, encompassing dietary habits, oral hygiene practices, socioeconomic factors, and cultural practices especially in Pakistan, as illustrated in Figure 1.

2.1 Dietary Habits

High sugar intake is one of the primary factors that is responsible for the rise in dental caries.¹⁴ Despite studies reporting that preventive measures are in place such as the use of dentifrices, and intake of

fluoridated water, dental caries are still on the rise, possibly emphasizing the role of dietary intake.¹⁵ Almost two decades ago, a National Oral Health Survey was conducted in Pakistan which did not take dietary habits into account despite seeing an increase in sugar intake by the adults. Since, then no such surveys have been conducted in Pakistan, therefore, the burden of dental caries is not well understood in Pakistan. A study by Qureshi et al conducted in Karachi, Pakistan reported that a higher intake of cereals in adults was associated with a higher severity of dental caries.¹⁶ Moreover, this study stated that the association of Body Mass Index (BMI) with caries is also poorly studied in the Pakistani population. BMI has been systemically studied and found a positive relation with dental caries as increased BMI has been shown to reflect an increase in the incidence of dental caries.¹⁷

Now, the clinician who treats patients at either their clinics or in a hospital-based setting should focus on the dietary habits of the patients. Most of the time, clinicians neglect the dietary habits of the patients due to various reasons such as high patient load, urgent procedures, and negligence in asking patients.¹⁸ Although dietary advice for the maintenance of oral health has been advocated by many organizations, however, due to cultural and socioeconomic status, such dietary habits vary in different parts of the world. Therefore, clinicians in their respective countries should be aware of such diversities and give dietary advice accordingly. Dietary chart can also be introduced as part of the treatment therefore, providing tailored dietary advice to every individual.¹⁹

2.2 Oral Hygiene Practices

Oral hygiene practices play a major role in determining the status of the oral health of an individual. In terms of the rising epidemic of dental caries in Pakistan, addressing oral hygiene practices may help reduce such rising epidemics. The basic advice that a clinician provides to each of their patients is about brushing habits.²⁰ However, brushing habits significantly vary across different

demographics observed throughout Pakistan.²¹ Many times, clinicians do advise their patients to brush, however, only a few patients follow such recommendations.²² Most of the patients do not practice proper brushing, especially when their primary complaint of visiting a dentist is resolved. To overcome such challenges, a tailored approach keeping in mind the socioeconomic status and cultural diversities, the clinicians need to address every individual in a way understandable to them. Other than brushing, clinicians should emphasize the usage of fluoridated toothpaste to their patients. Fluoridated toothpaste helps in strengthening the enamel which in turn offers protection against the acidic attack initiated by the cariogenic bacteria.²³ Flossing is a proven effective way to keep the interdental spaces clean which are present in all the individuals.²⁴ Now, patients with periodontitis (inflammation of the gingiva, cementum, and bone) and with prostheses have enlarged interdental spaces, for which clinicians recommend the use of floss.²⁵ However, most of the patients neglect the use of floss, which eventually leads to food accumulation in the interdental spaces and increases the chances of infection.²⁵ The clinicians should demonstrate to the patients how to use the floss and its importance in keeping the teeth healthy. Moreover, informative brochures and videos should also be provided to the patients to increase their knowledge and understanding of flossing.

2.3 Socioeconomic Factors

Socioeconomic factors play a significant role in the rising dental caries prevalence in Pakistan. One of the major factors in the socioeconomic status of individuals is their income. Most of the individuals in Pakistan are not able to afford dental services because of their limited income and dental treatments seem a luxury to them.²⁶ Due to such limitations, visits to the dentist are often neglected until and unless severe and excruciating pain arises for which a visit to the dentist becomes important.²⁷ Such scenarios then eventually lead to an increase in

the burden of dental caries leaving many patients untreated. The dental treatments are largely expensive because most of them are located in urban localities where making a clinic operational is expensive.²⁸ Moreover, patients need to travel many kilometers to reach a dental clinic, which many times becomes unaffordable for the patients. Therefore, clinicians should be encouraged to open their clinics in rural areas where most of the population of Pakistan is concentrated and neglected. Local organizations should support the clinicians to open their clinics in such deprived areas. The level of education often determines how well an individual takes care of his or her health, including oral health. Individuals who are educated recognize the importance of oral health, therefore, they visit the dentist for regular check-ups as compared to individuals who are not educated.²⁹ To overcome such challenges, clinicians should organize dental camps for screening and educational purposes, especially in rural areas where most people are deprived of education. Such initiatives will help the local community to be educated about oral health and encourage them to visit a dentist to maintain their oral health.

2.4 Cultural Practices

Most of the time cultural practices and values are often neglected by clinicians when they are treating their patients.³⁰ For clinicians, it is of paramount importance to understand and recognize cultural diversities among their patients for better understanding and communication in terms of oral health. In terms of oral hygiene practices, different communities in Pakistan practice the use of natural substances such as miswak for cleaning their teeth, and studies have reported the effectiveness of the use of miswak.³¹ Although natural substances are always better due to fewer side effects, individuals should also be encouraged by the dentist to implement the use of modern modalities such as the use of toothbrushes and fluoridated toothpaste to improve their oral hygiene. Respecting the existing cultural practices and encouraging the use of newer

technologies is crucial for the larger communities towards their acceptance. The use of tobacco and betel nut is largely prevalent in Pakistan which has a negative effect on the oral health of the consumers.³² The use of tobacco may lead to a decrease in salivation, which in turn increases the chances of accumulation of plaque, further if left untreated, may lead to dental caries.³³ On the other hand, consumption of betel nut may lead to fracture of a part of the tooth, which forms a favourable site for plaque accumulation along with difficulty to clean due to difficulty in access.³² This may lead to the development of dental caries. Such awareness and knowledge must be disseminated by the clinicians to their patients when they visit their practices along with educating the patients when they visit their dental camps. Traditional remedies are still prevalent in many parts of the world, including Pakistan. Some communities prefer the use of such natural remedies over pharmacological modalities which they largely consider unsafe. To overcome such beliefs, clinicians need to understand such cultural values, respect them, and make the patients understand the need for professional dental care which will be beneficial for them, on the contrary thinking it might harm them.

3. Clinical Implications

Pakistan is a developing country that is short on many essential resources, including healthcare. According to WHO, the recommended ratio of dentists to patients is 1:20,000, however, in Pakistan the ratio has been estimated to be 1:42,000 in urban areas and 1:500,000 in rural areas.³⁴ This depicts a high and concerning shortage of dentists in Pakistan as many patients do not have access to a dentist. Keeping in mind the shortage of dentists, a high patient load is experienced by the dentists at their clinical practices, which may lead to a decrease in the quality of treatment offered to the patients.³⁵ To overcome such a challenge, there is a need for more dental practitioners in Pakistan and the current dental practitioners should opt for practicing in rural settings which form 60% of the Pakistani

population.³⁶ The equal distribution of clinicians in urban and rural areas may help. The clinicians should focus on tailored treatment approaches for each patient. Now, each individual has a different lifestyle, therefore, an effective preventive and treatment regime that was effective in one patient might not be beneficial or may even worsen the condition of the patient as well.³⁷ Keeping in mind factors such as socioeconomic status, cultural diversity, and dietary patterns, the clinicians should offer tailored oral hygiene instructions to the patients. This ensures comprehensive and effective outcomes for all patients. Given the rising epidemic of dental caries in Pakistan, clinicians should shift their focus more towards preventive dentistry. Preventive dentistry focuses on addressing the factors that lead to dental diseases.³⁸ There are times when clinicians only address the chief complaint with which the patient presents and neglect to evaluate the oral health of the patient.³⁹ Evaluating the oral health of the patient provides an idea to the clinician how observant is the patient regarding their oral health.³⁹ Therefore, after addressing the chief complaint, the clinician can offer the patient-tailored oral hygiene advice which can prevent or decrease the occurrence of dental diseases. Furthermore, oral hygiene education in the form of brochures can also be provided to the patient in their local languages which can help patients understand and implement it.⁴⁰ Lastly, clinicians as part of their practice should introduce and increase the use of preventive dental procedures such as fluoride applications and dental sealant, which are effective modalities in decreasing the incidence of dental caries.⁴¹

Dental clinicians should actively engage and participate in community outreach and educational initiatives. Many times, in countries like Pakistan, collaboration with the local communities may help raise awareness levels of individuals regarding oral health and its importance to overall well-being.⁴²

Moreover, educational workshops and the organization of dental camps will further help

evaluate the prevalence of dental caries in such areas and the attitudes of individuals toward oral health.⁴³

In recent times, teledentistry has been implemented in clinical practice to consult patients in areas where dental services are not available.⁴⁴ Teledentistry can help patients consult a dentist when it is not feasible for them to visit a dentist in person due to restrictions such as high travel costs.⁴⁵ However, clinicians should instruct the patients that when required, in-person consultations should be done to treat conditions before they get worse.

Future Research Directions: The prevalence of dental caries in Pakistan largely remains understudied with increasing incidence. Future studies should evaluate and identify different factors that may be responsible for the rising incidence of dental caries in Pakistan. Moreover, high-risk groups that are more prone to develop dental caries should be identified implementing tailored approaches to address their oral health. The use of technology, such as teledentistry, artificial intelligence for diagnostics, and digital health records, can improve the efficiency and accessibility of dental treatment. Integrating oral health within primary care can improve early diagnosis and treatment of dental caries. Collaboration between dental practitioners and primary care doctors can help to promote a more comprehensive approach to healthcare that addresses both oral and systemic health.

Conclusion

To conclude, the growing pandemic of dental caries in Pakistan is a complex and diverse public health issue that needs extensive and targeted remedies. The research suggests that the frequency of dental caries is growing across all age categories, socioeconomic sectors, and geographical areas. Contributing variables such as dietary patterns, dental hygiene practices, socioeconomic disparities, and cultural influences highlight the importance of

personalised therapies that take into account Pakistan's particular setting.

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