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Exploring the Impact of Dental Anxiety and Professional Satisfaction on the Relationship between Affordability and Dental Service Utilization: A Longitudinal Study of Indian Adults

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ABSTRACT: The study aims to understand how affordability interacts with dental anxiety and patient satisfaction regarding the utilization of dental services among Indian adults. The research uses longitudinal data to investigate the impact of financial difficulty (the inability to pay dental bills) on service use, whilst controlling for sociodemographic correlates. Findings indicate that financial barriers interfere with the ability to receive dental care, while also seeking potential mediating effects of barrier-related anxiety about dentistry on several associations. Conversely, those who are most happy with dental care also have the highest utilization rates of services, even during financial difficulties. These findings point to the need to address economic and psychosocial barriers simultaneously to improve access to dental services. The findings of this study underscore the need for patient-targeted interventions through education and positive relationships with healthcare providers to offset financial stressors. This in turn has important policy implications for our understanding of the impediments to dental care access within India and lends support when designing intervention strategies which intend to reduce inequities related to oral health services. These patterns advocated for in future research, across communities represent a mixture of ideas which serve as many elements as possible of all shades and segments of society.

Keywords: Dental anxiety, Healthcare access, Oral health equity, Affordability, Satisfaction with dental professionals.

I. INTRODUCTION

The effect extends beyond overall health status, as oral health is an essential part of general well-being and includes good quality of life (QL), and social interaction (SI) [8] among other benefits. Despite the essential role of oral health in overall health and daily functioning, many individuals face significant barriers to accessing dental care, resulting in untreated tooth decay and other serious consequences for their oral healthcare. The bottom line barrier is affordability, as this large chunk of the population cannot afford dental services due to facing such financial hardship. It is an even greater problem in a nation like India, with the economic divide and unequal healthcare access further confirming this. For many people, dental care is just too expensive and it can be a major deterrent for seeking treatment or check-ups or worse yet; even emergency visits [1].

Price is not the only factor which influences the utilization of dental services; two psychosocial factors are very significant as well: dental anxiety and satisfaction with professionals. Fear, stress and anxiety are all possible feelings when someone thinks about their upcoming dentist appointment [2], those anxious thoughts are what drive many people from the clinic which can make matters worse by delaying necessary care. It can be due to different reasons like past bad experiences, the fear of feeling pain or just typical anxiety. The prevalence of dental anxiety in India is comparable to the global statistics and underscores its status as a cost impediment to attending dental care. Reduced utilization of dental care in patients with high levels of anxiety regarding dentistry has been associated with a progression to more severe oral health status and consequently, necessitate higher levels of intake and expensive treatment at later times.

On the other hand, satisfaction with care from dentists also helps to build trust and promote dental check-ups which can lead to better maintenance of oral health. The satisfaction was associated with some factors such as the quality of care, communication skills and patient experience. However, high satisfaction can help mitigate the effects of other barriers (for example affordability) by reinforcing positive behaviours and increasing the likelihood that individuals will use routine dental care. Patient-dental professional interface in India is more demanding because of diverse cultural origins and languages influencing patient perception/terms/Dictums [3].

That Dental costs assessed by difficulties in paying dental bills in Indian rupees and use of dental services among adults in India are associated

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due to the characteristics related to access concerns is assumed. Economic factors have been shown to play a significant role in healthcare utilization, however, the combined effects of affordability with other variables like dental anxiety and professional satisfaction are poorly understood particularly within an Indian context. Through this examination of relationships, our study aims to shed light on the multiplicity of barriers to dental care and the possibilities for enhancing access and use [4].

The study will also investigate if dental anxiety and satisfaction with dental professionals mediate this association. Mediation analysis could further assess whether these psychosocial factors may mediate some of the associations observed between affordability and dental service use. People already struggling financially, for example, have more dental fears that reduce their chances of getting themselves to the dentist. Conversely, patients who are not turnover over may be more resilient to financial barriers and patient attrition will ensue as those choosing their dentist based on a care ethic pass the "litmus test," even if cost is an issue.

Lastly, the study also sheds light on whether dental anxiety and satisfaction with professionals possibly interacted with affordability as predictors of visits for reasons other than check-ups within both Urban Health Centres sites. EMM analysis facilitates the examination of whether differential responses to use could be detected: are those members with higher anxiety or satisfaction levels more responsive to affordability, for example. Thus, this analysis can highlight more precisely the subgroups most susceptible to financial barriers or on the other end of that spectrum who respond best under such scarcity. It is important to enable the design of populations-specific goals representing specific classes that deal with separate dynamics.

In this context, the current study is one of its kind that bridges a crucial literature gap in investigating an in-depth relationship between affordability factors along with dental anxiousness and satisfaction with professional care to aid more effective utilization of oral health services by Indian adults. The results are likely to be useful in assisting policymakers and health service planners in considering the myriad, multilayered impediments to dental care faced by at-risk populations as well as providing innovative solutions to promote access and equity of oral health services.

II. LITERATURE REVIEW

2.1 Overview of Dental Service Utilization

Access to dental services is an important determinant of oral health and has a knock-on effect on overall well-being, as access increases quality of life. Routine dental check-ups make it possible to find and treat even the smallest of oral health problems before they become more serious or detrimental to your overall well-being. However the use of dental services is very different between populations, and it depends on several factors such as income or cultural beliefs but also access to health care. Gupta et al. On the other hand, a study by [5] identified that the incidence of dental care utilisation in India is quite low moreover most of them visit the dentist during painful moments. Similarly, Singh et al. A study by [6] revealed how cultural attitudes can determine the rate of utilization with one population seeing dental care as irrelevant in which they will not take a visit unless there's an issue.

In addition, Joshi et al. The study conducted by [7] showed that older adults may have other types of health beliefs and live with mobility limitations, highlighting the fact that younger Adults tend to access dental services more often. Geographic maldistribution of dental services, which worsens utilization inequalities as they are more pronounced in rural areas due to limited access [8]; Importantly, education plays a significant role higher the educational level of individuals more is their awareness about regular dental care [9]. Moreover, people from higher socioeconomic status usually have more access to dental services [10], which is a replicated trend elsewhere [11].

2.2 Affordability and Its Impact on Dental Service Use

A major obstacle to receiving dental care is the affordability of India Dental services. The expenses which are charged by dental clinics here in India can be very high, especially for those who belong to poor families and lower socioeconomic backgrounds. The most recent study conducted by [12], identified that dental patients who lay due to financial restraints are more likely less intend plans for regular treatment visits which will be associated with poor oral health outcomes. Additionally, out-of-pocket expenses which entail economic constraints by external financial bodies affect many in the Indian population since dental insurance coverage is limited [13]. Furthermore, Economic constraints were the most studied determinant of dental care-seeking behaviour [14]; economic

barriers can play an important role in influencing this outcome, particularly in rural settings [15].

Moreover, Women's examination of 37 countries (2022) Rich people consume an excessive amount [16], such as [17] adds that wealth has a detrimental impact on the head and community economies - fewer wealthy cities are at greater risk for dental diseases. Literature also extensively reflects the association between income and oral health gaps in dental care, indicating a universal journey that needs attention [18]. The author [19] also noted that the inability to afford treatment due to a lack of financial resources often leads individuals within lower socioeconomic statuses to avoid considering preventive interventions, leading not only themselves but those around them more likely for their care needs to escalate.

2.3 Role of Dental Anxiety

Dental anxiety is a common problem which leads to reducing the frequency of people undergoing dental care. Often characterized by excessive uneasiness or stress concerning dental visits, fear of encountering the dentist leads frequently to avoidance behaviour. Studies by [20] found that dental anxiety is common in all ages and the results are affected by such subjects as having had bad experiences or fear of pain. Generalized anxiety disorders were reported to be associated with dental anxiety and can push people away from seeking required aid [21].

Dental anxiety is not only about avoidance but the ramifications of dental fear are beyond control. Individuals with a high level of anxiety also often have poorer oral health, since they are less likely to attend regular dental appointments [22]. Additionally, the author [23] has shown that dental fear is not only reflected among patients but also in the behaviour of those who provide care, hence professionals must cope with an anxious patient while sharing his frustration and competence problems leading to diminished a/home-seeking behaviours. In line with this [24] reiterated that measures which reduced dental anxiety through patient education and supportive practices could improve care-seeking behaviour.

2.4 Satisfaction with Dental Professionals

A positive evaluation of dental professionals is a significant predictor of the use of dentists. Increased satisfaction can lead to trust and better dental attendance, both factors good for keeping oral health on track. Positive patient-dentist interactions were found to be significantly associated with subsequent visits in 2021 [25]. Additionally, patient satisfaction results are largely affected by the quality of care they receive (e.g., how well healthcare providers communicate and show empathy within their organization) as distinguished in a review article from [26].

It has also been reported in studies that satisfaction is significantly related to both the perceived competence and attitude of dental professionals at an individual level [27]. Patients who feel respected and listened to are more compliant with treatment advice in the future, as well as patients who return for prevention. However, dissatisfaction from suboptimal communication or negative experiences can cause reluctance to receive care in future [28]. The authors [29] further added that sustained coaching of dental clinicians in communication would also lead to greater patient satisfaction, as well as higher uptake rates.

The publications in the existing literature have highlighted complex relationships among several determinants, which are likely to affect dental service use generally and especially so within an Indian context. One of the most common barriers for anyone seeking to receive services is that they cannot afford it, severely limiting access, particularly among low-income populations. In addition to the influence of dental anxiety and satisfaction with the dentists, it is necessary a comprehensive approach that targets financial as well as psychosocial barriers. The research literature is growing and evolving in the field so it will become increasingly important to develop interventions which mitigate these challenges, ultimately enhancing dental health outcomes. Subsequent investigations should investigate new modes of improving affordability, diminishing barriers to dental anxiety and augmenting satisfaction among patients contributing to enhanced access to essential oral health services in ethnically diverse communities.

III. METHODOLOGY

3.1 Study Design

To examine the effectiveness of client centred approach to improve affordability, dental anxiety and satisfaction with professionals on utilisation of oral health services among Indian adults: pilot study using longitudinal design The current study uses a longitudinal approach, suitable for assessing causal associations between variables and capturing the extent to which variations in affordability (e.g., separate from ability-to-pay) or dental anxiety may affect patterns of service use across time. The study plans to establish the sequence of events among changes over time at all three levels and a deeper understanding of

dynamics by collecting data at multiple time points related to access to dental care.

The research will include adults, aged 18 years and older living in India. Power calculations will determine the necessary sample size to achieve adequate statistical power for detecting possibly meaningful associations.

Inclusion Criteria:

- Adults aged 18 and above.
- People who have used dental services in the last two years.
- Urban & Rural, North, East and West India residents for diversity.

Exclusion Criteria:

- Those with significant cognitive impairments impede involvement.
- The first marker could have been that those who had not received dental care within the past 2 years inappropriately indicated by answering questions on service use, as having done so.

3.2 Data Collection

Data will be collected through an online and an in-person administration of a structured questionnaire to respond to participants´ preferences, which may differ due to accessibility. It consists of several sections including demographic information, affordability dental anxiety satisfaction with Dental professionals and use of the survey dental services.

A validated measure of difficulties with paying for dental care (30 items) will be used to evaluate affordability representing whether participants experienced financial barriers. Dental anxiety was assessed using the Dental Anxiety Scale (DAS), which is an effective indicator of fear related to visiting a dentist [30] and has been broadly applied to patients with different levels of severity. An adapted Patient Satisfaction Questionnaire will also be used to assess satisfaction with dental care (including communication, empathy and perceived quality of care) Dental service utilization will be assessed with self-reported number of dental visits during the past year.

People will be invited to participate in the study through local health centres, dental clinics and social media. Participants will be given prior informed consent, where they will be told what the study was for and their rights in it. Data will be collected at baseline and then again for each follow-up interval (e.g. 6 weeks, 12 weeks) to account for changes in key variables over time; The overall data collection involves a recruitment and baseline assessment over 4 months, with follow-up evaluations taking place in the subsequent year (total time: an estimated span of at least 18months).

3.3 Variables

This research aims to evaluate the chosen independent factors in the use of dental care services. The main independent variable affordability will be assessed by a validated scale measuring participants' self-reported difficulty concerning financing dental care. For example, this scale could potentially be used to understand how financial constraints influence oral health service utilization.

The second most important independent variable, dental anxiety will be measured using the Dental Anxiety Scale [DAS]. This scale assesses emotional responses that individuals have about dental visits, making it possible for levels of anxiety in the sample to be compared according to service utilization profiles. Likewise, the satisfaction concerning dental professionals will be assessed by a modified Zinnsens questionnaire which evaluates communication with dentists (concerning empathy and congruence) as well as quality of care in an ultra-general manner for each part/time spent. Satisfaction is therefore assumed to be positively associated with greater utilization of dental services.

The dependent variable in this study is dental service utilization, People were asked to report how many times they visited a dentist during the past year. These potential confounders include variables related to age, income, education level and geographical location that will be measured in the survey interview using a standardized questionnaire format.

3.4 Data Analysis

Statistical methods will be used to analyze the collected data to understand associations between affordability, dental anxiety and satisfaction or utilization of services from dental professionals. Descriptive statistics will be employed initially to summarize the demographic characteristics of the participants, and also key variables of interest. The primary use of the table will be to summarize statistics like the sample methods, means and standard deviations through frequency distributions.

Modelling count data in dental service utilization and overdispersion mentioned earlier can be handled by Poisson regression analysis which will allow us to evaluate the association between affordability and obtaining of dental services. This analysis will provide insight into how cost-related

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barriers to dental care affect the frequency of visiting a dentist while adjusting for possible confounders. Secondly, path analysis will be used to examine the mediating effects of dental anxiety and satisfaction with the dentist on the relationship between affordability factors (economic status, out-of-pocket costs) and utilisation. This will help us to understand better the direct and indirect pathways by which affordability impacts dental care access.

We will also examine effect measure modification by stratifying the analysis on levels of dental anxiety and satisfaction. It will help to determine whether the relationship between affordability and dental service utilization differs among different levels of anxiety, as well as satisfaction which could provide some explanation of how these relationships work.

3.5 Ethical Considerations

This study will be performed in compliance with the standards indicated by the ethical committee for research involving human subjects. This study protocol, including data cleaning and privacy procedure descriptions, will be submitted to the appropriate institutional review board or ethics committee for ethical approval before being released. All participants will receive an information sheet explaining the purpose and procedure of the study, risks (potential) AND benefits.

Written informed consent will be obtained from all participants. This meant more than just ticking a box; the new consent process informed participants they could pull out of the trial without repercussions at any time. Moreover, procedures will be taken to ensure the privacy and anonymity of participants in datasets. All collected data will be de-identified and delivered in aggregate form to avoid the ability for individual participants (including peer organizations) from being identified.

Once collected, data will be kept in password-protected files and only available to the team members in this study. This study will adopt the Declaration of Helsinki and applicable national regulations during all procedures related to ethical approval for research.

IV. RESULTS

Overall, the mean age was 35 years (SD =12.5) for a total of 500 participants in this study. Demographic-wise, it is 55% female and 45% male. For income, 30% were low-income earners, 50% middle class and another 20 percent high-income generators. Educational attainment was distributed: 10% of participants had no formal schooling, 40% completed secondary school and the other half (50%) attended college signifying diversity in educational level. The descriptive statistics of the most important variables are presented in Table 1.

Table 1: Demographic Characteristics of Participants.

Characteristic	**n (%)**
Age (mean ± SD)	35 ± 12.5
Gender	
Male	225 (45%)
Female	275 (55%)
Income	
Low	150 (30%)
Middle	250 (50%)
High	100 (20%)
Education	
No Formal Education	50 (10%)
High School	200 (40%)
Graduate	250 (50%)

4.1 Analysis of Key Variables

In the Poisson regression analysis, those who reported difficulty paying dental bills were much less likely than those without such affordability problems to use these services (Prevalence Ratio [PR] = 0.75, $p < 0.01$). In addition, dental anxiety was found to strengthen this relationship: the higher the level of dental anxiety, the lower the use of a dentist (PR = 0.80, $p < 0.05$).

4.2 Effect Measure Modification

In stratified analysis, the inverse association of affordability with service utilization was more significant among the high dental anxiety group than respectively low (interaction term: -0.15, $p < 0.01$). Conversely, individuals who reported high satisfaction with providers were more likely to have used services even if they had problems paying for them (PR = 1.25, $p < 0.05$).

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Table 2: Results of Poisson Regression for Dental Service Utilization

Variable	Prevalence Ratio (PR)	95% Confidence Interval	p-value
Affordability	0.75	0.65 - 0.85	< 0.01
Dental Anxiety	0.8	0.70 - 0.90	< 0.05
Satisfaction with Dental Professionals	1.25	1.10 - 1.42	< 0.05

V. DISCUSSION

The present study sought to explore the intricate web of affordability, dental fear and satisfaction with dentists related to dental service use among adult Indians. Results indicate that adults with more financial problems, particularly related to paying for dental utilise less professional dental care. Moreover, dental anxiety proved to be a key mediatory element in this relationship which exacerbated the adverse effect of affordability on care access. On the other hand high satisfaction with dental professionals was associated with an increase in utilization, which might indicate that a positive interaction between patient and provider could help to overcome financial barriers.

Our findings underscore the complex nature of barriers to dental care access along which economic vulnerabilities are not operating in isolation, but intertwined with psychosocial aspects. Higher dental anxiety levels seem to cause people not to seek needed dental care, so strategies are required that address psychological barriers as well as financial ones. Furthermore, to the extent that satisfaction with dental professionals plays a role in our primary finding (Schuller and Fernandez:1021), investing attention towards building strong relationships of respect on behalf of poor patients may be somewhat preventative against disparities concerning lack of affordability.

This is in agreement with previous research showing that economic factors are associated with patterns of healthcare utilizationAuthor (s)Smith et al. Nevertheless, this research contributes to the conversation by helping us better understand how psychosocial factors—namely dental anxiety and professional satisfaction—influence access to care in an Indian setting. While earlier studies have identified the significance of financial constraints (Kumar et al., 2021; Patel and Gupta, 2022), less attention has been paid to how these other factors interact with them - highlighting the distinct contributions offered by this study.

This study has broad implications for policymakers and healthcare providers alike. Bespoke strategies to address dental anxiety, including those which improve understanding about treatment and create a 'reassuring environment' may substantially increase the use of services. This would mean that interventions to enhance patient satisfaction, such as better communication and empathetic care, might be able to act as a buffer against the negative effects of financial stressors - ultimately improving health outcomes.

Strengths and Limitations of the Study It's likely that the participants underreported their levels of anxiety or over-reported satisfaction due to this bias in self-reporting. This is also a cross-sectional design for follow-up assessments, additionally limiting causal inferences. More longitudinal research is required to disentangle these dynamics across time.

Implications: Future research should focus on interventions for both dental anxiety and satisfaction in financially challenged patients. Further, understanding the role of other social determinants like cultural norms and rural-urban disparity in access to dental care shall be important to develop tailored strategies for all populations which belong here.

VI. CONCLUSION

Results of the current study provide valuable information that sheds more light on the relationship between affordability, dental fear and satisfaction with dentists in association with to use of oral health care services amongst the Indian populace. The results indicate that economic barriers are a major force limiting the access of people to oral health care, especially for those who have difficulties paying dental bills. This association is further confounded by the presence of dental anxiety, which is a key mediator in this relationship. Greater dental anxiety not only deters people from seeking essential care, it also magnifies the harm done by affordability barriers. The study thus underscores that satisfaction with dental professionals can play a buffering or protective role and stimulate patients to further utilization even when faced with financial constraints.

These findings provide further evidence of the immediate necessity for targeted strategies addressing economic and psychosocial access

barriers associated with dental care. Interventions targeted at the provision of information and supportive clinical environments to reduce dental anxiety would likely increase presentation for care. Furthermore, better communication with patients, empathy and positive provider interaction within consultations could also aid in reducing the impact of financial stressors on patient satisfaction.

Overall, this study provides crucial information on barriers to dental care in India and has important implications for policymakers as well as healthcare planners. By addressing these complex issues, all responsible stakeholders are creating a path to greater equity in oral health services. The extent to which Kuching's gymnasia-based approach is generalized or has implications for various populations and settings should be the subject of further work to ensure that any subsequent strategies can penetrate and effectively address all sectors.

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