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RESEARCH ARTICLE

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PARENTAL ORAL HEALTH LITERACY ON MOBILE DENTAL APPLICATION AND ITS IMPACT ON CHILDREN'S ORAL HEALTH STATUS: A CROSS-SECTIONAL STUDY IN A DENTAL OPD IN COIMBATORE

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ABSTRACT

Aim: To assess the association between parental knowledge regarding mobile dental applications and the dental health status of their children. **Methods:** A cross-sectional study was carried out among 120 children (3–12 years) and their parents who reported to the Department of Paediatric and Preventive Dentistry, RVS Dental College, Coimbatore. Data were obtained through a validated questionnaire assessing parental awareness of mobile dental applications, and the dental caries status of the children was determined using the DMFT/DMFS index. Descriptive and inferential statistics were used to identify associations. **Results:** Only 18.3% of parents were aware of mobile dental applications. The DMFS scores of children whose parents were aware of such apps were lower (median: 4.0) than those of children whose parents were not aware of mobile dental applications (median: 7.0; $p = 0.022$). Mean DMFT scores decreased with an increase in the child's age. **Conclusions:** Parental awareness of mobile dental applications is associated with better oral health outcomes (lower caries experience) in children. Initiatives to enhance parental awareness through digital platforms may serve as an effective strategy to improve paediatric oral health

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INTRODUCTION

Parental oral health literacy has been shown to significantly influence early childhood oral health outcomes, particularly through caregivers' understanding of preventive practices and disease management⁽¹⁾. The risk of dental caries in children is directly impacted by the literacy levels of their parents, according to a recent scoping review⁽²⁾. Children's clinical oral health status and literacy abilities are quantifiably correlated, according to research assessing caregiver functional oral health literacy⁽³⁾. Inadequate parental knowledge is associated with a higher prevalence of caries and poorer hygiene practices, according to studies evaluating parent-child oral health behavior patterns⁽⁴⁾. Furthermore, there is evidence linking a higher incidence of untreated dental caries in preschool-aged children to lower caregiver literacy⁽⁵⁾. The integration of mobile health technologies into dentistry has emerged as a promising strategy to improve oral hygiene behaviours⁽⁶⁾. The increasing use of mobile applications to promote behavioral reinforcement and preventive

dental outcomes is highlighted by recent scoping reviews⁽⁷⁾. The efficacy of structured mobile app interventions in enhancing oral hygiene behaviors is highlighted by protocol-based studies⁽⁸⁾. Brushing compliance and plaque control have improved in randomized controlled trials assessing particular applications, like "WhiteTeeth"⁽⁹⁾. Similarly, app-based reminders greatly improve adherence to oral hygiene, according to clinical research in orthodontic populations⁽¹⁰⁾. Dental caries remains one of the most prevalent chronic diseases globally, affecting children across all socioeconomic groups⁽¹¹⁾. Untreated caries has been linked to significant prevalence and disability-adjusted life years, according to Global Burden of Disease analyses⁽¹²⁾. To lessen the burden of oral disease, international public health reports emphasize the necessity of ongoing preventive initiatives and caregiver-focused interventions⁽¹³⁾. Disparities in access to early management techniques and preventive care are further highlighted by global oral health surveillance data⁽¹⁴⁾. Oral health behaviors, perceptions, and treatment-related outcomes are strongly correlated with oral health literacy, according to systematic reviews⁽¹⁵⁾. This study aimed to evaluate parental

awareness regarding mobile dental applications and to determine its correlation with the dental health status of children aged 3 to 12 years.

Objectives

- To evaluate the parent's awareness regarding dental applications using questionnaires
- To evaluate the oral health status of the children using DMFT index
- To correlate the parent's awareness regarding mobile dental applications and its relationship with dental health status of the children

MATERIALS AND METHODS

Study Design: This was a cross-sectional questionnaire-based observational study conducted at the Department of Pediatric and Preventive Dentistry, R.V.S Dental College and Hospital, Coimbatore.

Population and setting: Children with their Parents reporting to the Department of Pediatric and Preventive Dentistry, Coimbatore, were recruited.

Sample Size and Sampling: The sample size was calculated using the standard formula for estimating a single population proportion, $N = Z^2 p(1 - p)/d^2$, considering the expected proportion of parental awareness (p).

Inclusion Criteria: Parents of children age 3 to 12 years having smartphones.

Ethical Considerations: Ethical clearance (EC/NEW/INST/2023/TN/0323) was obtained from the Institutional Ethical Committee. Written informed consent and assent form was secured from all participating parents and children.

Data Collection Instruments and Procedure

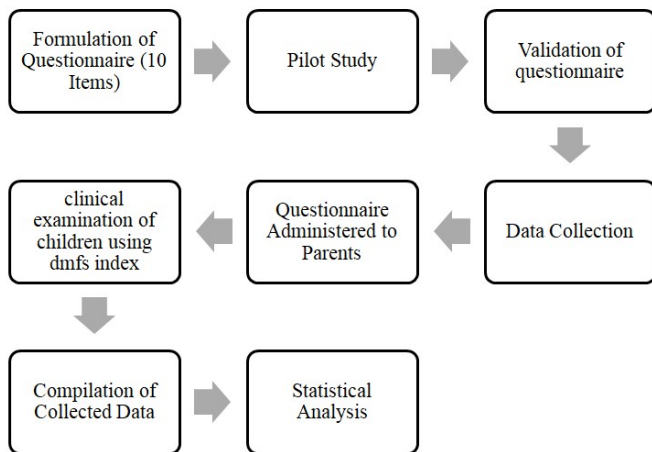


Figure 1. Data Collection Instruments and Procedure

Data Management and Statistical Analysis: The collected data were tabulated and coded using into SPSS software version 23 (IBM, Chicago, USA) for analysis. Descriptive statistics were used to analysis the data (e.g., Mann-Whitney U test, chi-square test) with a significance threshold set at $p < 0.05$.

RESULTS

Table 1. Distribution of participants by age and sex, (N=120)

VARIABLE	AGE	n (%)	SEX	n (%)
	3-6	27(22.5)	MALE	64 (53.3)
	6-9	50(41.7)	FEMALE	56 (46.7)
	9-12	43(35.8)		
Total n (%)		120(100%)		120(100%)

QUESTIONNAIRE FORM:

1. Have you aware of dental applications available for download in the Play Store?
 A] Yes B] No
 IF yes for Qns 1 answer the following questions:
 2A) Have you personally downloaded any dental applications from the Play Store?
 A] Yes B] No
 B) Do you agree dental applications can be beneficial for maintaining oral hygiene or managing dental health?
 A] Yes B] No
 C) Have you ever discussed dental applications with your dentist or dental healthcare provider?
 A] Yes B] No
 D) Would you prefer an app that includes parental control features?
 A] Yes B] No
 E) Will you motivate your child to play dental applications game specifically designed for children?
 A] Yes B] No
 F) Would you recommend these applications (apps) for others?
 A] Yes B] No
 G) Would you like to know more regarding paediatric dental apps?
 A] Yes B] No
 H) Do you find this dental application to be helpful in monitoring your diet?
 A] Yes B] No
 I) On the scale of 1 to 5, how satisfied are you with dental application you used?
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Figure 2. Questionnaire form

Table 1 shows the distribution of participants by age and sex. The largest age group was 6–9 years (41.7%), followed by 9–12 years (35.8%) and 3–6 years (22.5%). Males comprised 53.3% of the participants, while females accounted for 46.7%.

Table 2. Mean DMFT Scores According to Age Group, (N = 120)

Variable		DMFT Score Mean±SD
Age (in years)	3-6	8.5±5.4
	6-9	7.2±5.5
	9-12	6.9±3.9

Table 2 indicates that mean DMFT scores decreased with age, with the highest scores in children aged 3–6 years (8.5 ± 5.4) and the lowest in those aged 9–12 years (6.9 ± 3.9).

Table 3. Parent's awareness regarding mobile dental applications and its relationship with dental health status of children, (N=120)

Awareness regarding dental applications	n (%)
Aware	22 (18.3)
Not aware	98 (81.7)

Table 3 demonstrates that only 18.3% of parents were aware of mobile dental applications, while the majority (81.7%) were not aware. Table 4. About 14(63.64%) of parents had downloaded and used the mobile dental applications. Table 5. illustrates that children of parents who were aware of mobile dental applications had a lower median DMFS score [4.0 (3.75–7.0)] compared to those whose parents were not aware [7.0 (4.0–10.0)]. The difference was statistically significant ($z = -2.293, p = 0.022$), indicating that higher parental awareness is associated with better dental health status among children.

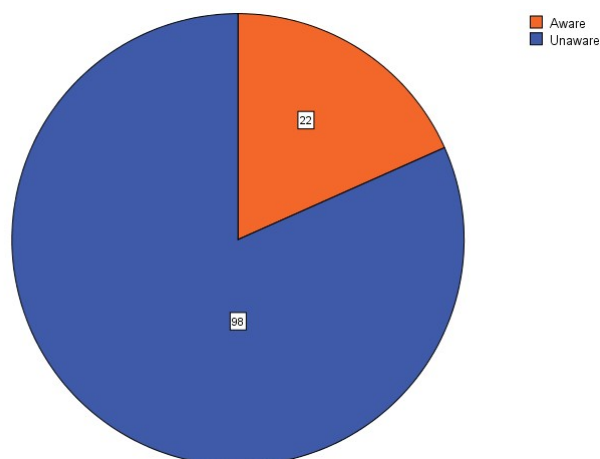
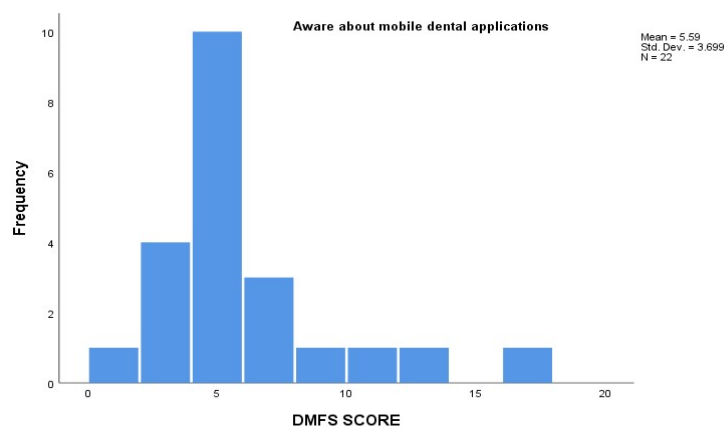
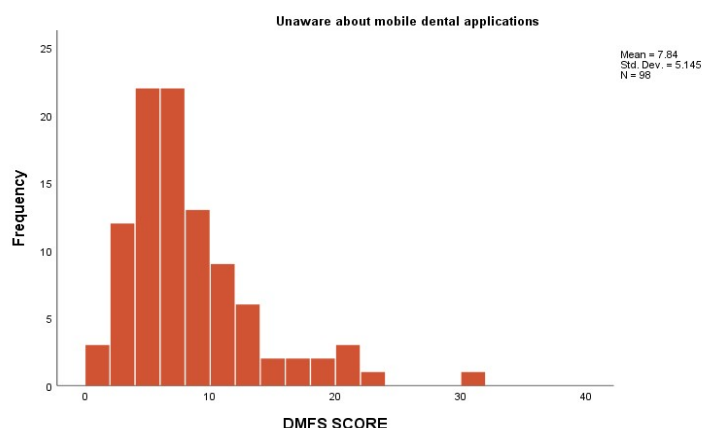
Table 4. Questionnaire response of the parent's who were aware of mobile dental Application, (N=22)

S.NO.	QUESTIONS	YES n(%)	NO n(%)
I.	Are you aware of dental applications available for download on the Play Store?	22(100%)	
2A]	Have you personally downloaded any dental applications from the Play Store?	14(63.64%)	8(36.36%)
B]	Do you agree that dental applications can be beneficial for maintaining oral hygiene or managing dental health?	19(86.36%)	3(13.64%)
C]	Have you ever discussed dental applications with your dentist or dental healthcare provider?	7(31.82%)	15(68.18%)
D]	Would you prefer an app that includes parental control features?	12(54.55%)	10(45.45%)
E]	Will you motivate your child to play dental application games specifically designed for children?	16(72.73%)	6(27.27%)
F]	Would you recommend these applications (apps) to others?	20(90.91%)	2(9.09%)
G]	Would you like to know more regarding paediatric dental apps?	17(77.27%)	5(22.73%)
H]	Do you find this dental application helpful in monitoring your diet?	6(27.27%)	16(72.73%)

Table 5. Comparison of DMFS scores between parents based on awareness regarding mobile dental applications, (N=120).

Awareness status	DMFS score Median (IQR)	z- statistics	p- value
Aware	4.0 (3.75, 7.0)	-2.293	0.022
Not aware	7.0 (4.0, 10.0)		

*p- value <0.05 is considered statistically significant. Comparison performed using Mann-Whitney U test.

**Figure 3. Distribution of parents based on awareness regarding mobile dental applications, (N=120)****Figure 4. Distribution of DMFS scores among children whose parents were aware of mobile dental applications, (N=22)****Figure 5. Distribution of DMFS scores among children whose parents were unaware of mobile dental applications, (N=98)**

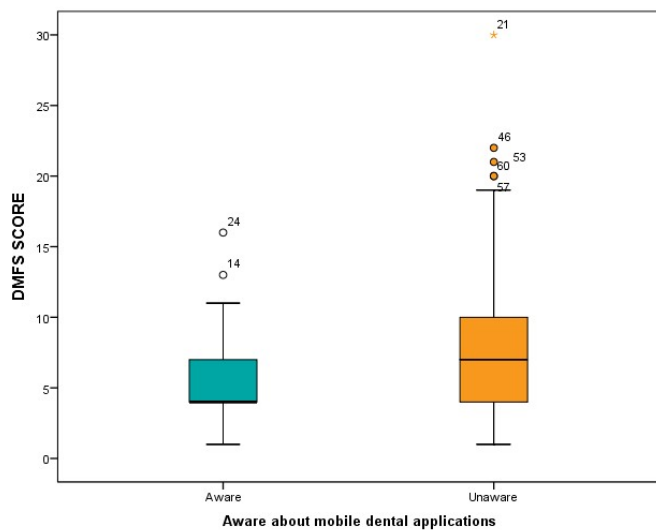


Figure 6. Comparison of DMFS Scores Between Participants Aware and Unaware of Mobile Dental Applications, (N=120)

DISCUSSION

The present study evaluated the association between parental awareness of mobile dental applications and the dental health status of children. The study population consisted of 120 children, including boys (53.3%) and girls (46.7%), which is nearly an equal number for both sexes and thus eliminates gender-related bias. The majority of children were in the 6-9 year age group (41.7%), 9-12 years (35.8%), and 3-6 years (22.5%). The age range of these children helped to examine the patterns of caries in the most caries-prone age groups of children. There were significant differences in the caries experience between the age groups. The highest average DMFT was recorded in the 3-6 years age group (8.5- 5.4), which went down to 7.2- 5.5 in the 6-9, year group and further to 6.9 -3.9 in the 9-12, year, old children. The pattern of gradual lowering of DMFT with age shows that these younger children are more affected by the disease. This is probably because of their limited ability to perform oral hygiene by themselves, their reliance on changing their lifestyles with the help of their parents, and their frequent consumption of cariogenic diets in early childhood. Besides these, as children gain more years, their brushing skills get better and they become more conscious of their oral hygiene, thus having fewer caries than before. Parents' knowledge of mobile dental applications among the study sample was at a very low level. Just 22 parents (18.3%) said they knew about such apps, while 98 parents (81.7%) said they had no idea. This result reveals a huge gap in digital knowledge although smartphones are used by almost everyone. The low level of awareness indicates that families are losing their first, line, of, access to potential tools that can offer tips on brushing habits, a diet plan, and appointment reminders, all of which help in the prevention of early childhood caries. The severity of caries measured by DMFS scores showed a significant difference between children with parents aware and unaware of the apps. Kids of parents who knew about mobile dental applications had a median DMFS score of 4.0 (IQR 3.75-7.0), whereas children of uninformed parents had a higher median score of 7.0 (IQR 4.0-10.0). The difference was statistically significant ($z = 2.293, p = 0.022$), meaning that awareness of digital dental tools by parents correlates with fewer tooth surfaces being affected and an overall better oral health status. These findings suggest that even limited exposure to digital oral-health resources can translate into meaningful clinical benefits. Parents who are aware of dental applications are more likely to supervise brushing, reinforce healthy eating habits, and seek timely dental care, thereby reducing caries progression.

Considering the high DMFT values seen in younger children, promoting mobile dental applications among parents could be an effective and practical strategy to strengthen preventive pediatric dental care and reduce the overall burden of dental disease.

Limitation: The present research had a few limitations. The questionnaire part was limited to one Locality; thus, its outcome may not represent the broader community. Self-report of the awareness also has its downside in the form of recall bias.

Future scope

1. Implement multi-centre randomised trials to assess long-term caries incidence after regular app use.
2. Use objective engagement metrics (e.g., in-app analytics, duration of use).
3. Improve collaboration with developers to embed AI-powered caries risk prediction into apps.
4. Determine the worth of mobile interventions in community- and school-based programs via cost-benefit analysis.

Implementation of an academically supported, quality-assured, multilingual, and evidence-based paediatric dental oral health app by collaboration of dentist and app developer could be a way to make oral healthcare reliable and accessible to everyone worldwide.

CONCLUSION

Parental awareness of mobile dental applications remains limited but exerts a substantial influence on paediatric oral-health outcomes. Children whose parents actively engage with dental apps exhibit lower caries experience and improved oral-hygiene behaviour. The collective evidence from the questionnaire study indicates that integrating mobile dental applications and AI-driven dental education into clinical and community settings can revolutionise preventive paediatric dentistry.

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