

Evaluation of Knowledge, Attitude, and Practices about Paediatric Dental Apps among Paediatric Dentists in India: A Questionnaire-based, Cross-sectional Study

KRISHNA SANDEEP KADAM¹, NIRAJ SATISH GOKHALE², SHIVAYOGI MALLAPPA HUGAR³, RIDDHI SHRIPAD JOSHI⁴, NEHA KOHLI⁵, POOJA KISHORE DIALANI⁶



ABSTRACT

Introduction: Dental anxiety is of prime concern for the paediatric dentist as it can prevent a child from seeking effective dental care by creating conditions that are challenging to the paediatric dentists and thereby not allowing to render the highest quality care. The dental application (apps) can be a useful tool in alleviating the anxiety in children, but these apps have not yet been evaluated for its use by paediatric dentists.

Aim: To assess knowledge, attitude and practices about paediatric dental apps among paediatric dentists in India.

Materials and Methods: This cross-sectional questionnaire-based study was conducted among 450 paediatric dentists in India. The study was conducted over a span of one month. A 16-item validated questionnaire with Cronbach's alpha coefficient value of 0.82, containing professional demographic data, knowledge, attitude, and practices about dental apps were distributed among

the participants. The collected data was subjected to descriptive analysis was done using IBM Statistical Package for the Social Sciences (SPSS) software (version 20.0 Chicago IL, USA).

Results: The study included (N=370) out of which 159 (42.97%) were female respondents and 211 (57.03%) were male respondents. The mean age of the surveyed professionals was 34.14±9.11 years. The results showed that the correlation between knowledge and attitude was found to be highly statistically significant ($p=0.0001$) however, no statistically significant results were found when a comparison was made between knowledge and practices ($p\text{-value}=0.7684$) and also attitude and practices ($p\text{-value}=0.0930$).

Conclusion: The study concludes that, there is a need for creating awareness about the use of dental apps as an adjunct with conventional behaviour modification techniques among paediatric dentists in our country.

Keywords: Applications, Artificial intelligence, Fear, Google form, Perception

INTRODUCTION

The science of today could be the technology of tomorrow, with the advancement in technology a smartphone has gone from being a simple two-way pager to a Global Positioning System (GPS) Navigation device-embedded web browser, instant messaging device and a game console. It is seen that children from all age groups be it a toddler to a teenager are all stuck up to smartphones playing games or browsing the internet. With such an influential platform the question arises that why paediatric dentists could not use these dental apps for educating the patients about the procedure of the treatment which can help to reduce their fear or apprehension. A child's first dental visit is pivotal for the reduction of dental anxiety and the success of treatment in the future. If this is not managed, it might continue in their adolescence [1].

Dental anxiety is of prime concern for the paediatric dentist as it can prevent a child from seeking effective dental care by creating the most challenging and uncooperative environment. Some children express fear and anxiety while others exhibit reluctant behaviour such as crying, rage, cessation of talking, and playing or attempting to run away from dental chairs which in turn also leads the fluctuations in blood pressure and heart rate [2].

Treatment of anxious children is stressful as it could consume more time and resources which then lead to an unpleasant experience for both dentists as-well-as the child. Thus, anxiety could ultimately reduce the efficacy and quality of overall treatment in children [3].

The ultimate success of paediatric dental treatment depends on behaviour management involving interaction between the dentist and the patient which then builds trust and helps to alleviate anxiety

and overall fear of treatment. Thus, it enhances the child's effective coping skills for acceptance of dental treatment [4].

Tell-Show-Do modelling, positive and negative reinforcement, are the most frequently used techniques by the dentist to alleviate a child's fear and anxiety, of which, Tell-Show-Do developed by Addlestone in 1959, is a cornerstone of behaviour modification techniques. It is based on the principle of learning and helps the children to familiarise to dental procedure thus reducing the anticipatory anxiety [5].

In India, the frequency of mobile phone use is 68.6%, the rate of use by children is 56.6%. The rate also shows that 40% of them were below 10 years of age [6]. Fear of dental treatment is a common problem in children and adolescents worldwide; hence, new strategies are being constantly developed to manage the anxiety-provoking situation. Smartphone apps have been used for behaviour guidance by developing virtual reality immersion. This being a promising distraction technique helps them to adapt to the dental environment and also been proved for allowing them to develop excellent rapport between the dentist and paediatric patients [7].

Dental apps like "my lovely dentist", "doctor kids: dentist", "Baby bus dentist", are useful in reducing the anxiety and can be installed on the Android/ IOS/Windows platform. These apps are user-friendly and animated thus, the children would love playing the game and watching step by step procedure an animated dentist performs [8].

After the literature search was carried out, there were no studies found regarding knowledge, attitude and practices of the concept of dental apps among paediatric dentists in India. This study aims to assess and understand the gap between knowledge, attitude, and practices regarding the concept of anxiety-reducing dental apps.

MATERIALS AND METHODS

A cross-sectional questionnaire-based study that was conducted in the Department of Paediatric and Preventive Dentistry in the month of August 2020. Ethical approval was obtained from the Research and Ethics Committee KLE VK Institute of Dental Sciences, Belagavi with approval number 1387.

Inclusion criteria:

- Practicing paediatric dentists
- Faculty members (academicians)
- Postgraduate students.

Exclusion criteria:

- Participants who gave an incomplete questionnaire.
- Those who did not consent for the study and those who did not respond in the time frame of one month.

Sample size calculation: Sample size was calculated using standard sample size calculating formula [9]:

$n = Z^2 pq/d^2$ where,

- n = Total sample size
- p = 11.67% (percentage of perception)
- q = 88.33% (other than perception)
- d = 5% (acceptable error)
- z = 2.576 at 99% confidence (standard normal variable)

Hence, $n = 450$

Questionnaire

A 16-item questionnaire was formed on the basis of questions that are needed to be asked to obtain the knowledge, attitude and practice components. The questionnaire was validated with Cronbach's alpha coefficient value of 0.82. The questionnaire consisted of four components;

- The first component asked the participants to provide the demographic data.
- Second component contained eight knowledge questions about dental apps.
- The third component that contained five questions dealt with the attitude.
- The fourth component that contained three questions dealt with the practices for the use of dental apps.

The responses to the questions were measured on a two-point Likert scale "yes" and "no". The mean knowledge, attitude, practice scores were calculated by adding all the number of correct entries and dividing by the number of respondents.

The participants were instructed regarding the filling of the questionnaire. Written informed consent was taken. A pilot study was conducted among 70 subjects. In the pilot study, the suggestions made by the respondents were considered, after suitable modifications and validation of the questionnaire the final questionnaire was finalised. Time given to fill the questionnaire was seven days. The e-questionnaire was sent through google forms to respective email ids of paediatric dentists in India. Ten incomplete questionnaires were removed from the sample size. Thus the final sample size available for statistical analysis was $n = 370$.

STATISTICAL ANALYSIS

The data were entered into an MS Excel sheet (Microsoft Corp.) and statistically analysed, the data were then entered using IBM SPSS software (version 20.0 Chicago IL, USA) and percentages were calculated. Based on test the reliability, Cronbach's alpha coefficient of 0.82 was calculated which indicated acceptability and internal consistency. Descriptive statistics were generated for all questions and each answer frequency distribution and percentages were examined. Correlations among knowledge, attitude, and practice scores were calculated using Karl Pearson's correlation coefficient.

RESULTS

The study included ($N = 370$) out of which 159 (42.97%) were female respondents and 211 (57.03%) were male respondents. The mean age of the surveyed professionals was 34.14 ± 9.11 years. The number of respondents that participated was 129 practicing paediatric dentists, 139 postgraduate students, 102 faculty members that constituted about 34.86%, 37.57%, 27.57%, respectively.

The e-questionnaire distributed among the professionals focused on questions related to knowledge, attitude, practices regarding the use of dental apps. The mean scores with the standard deviation of knowledge, attitude, practice were 6.07 ± 0.54 , 4.95 ± 0.23 and 2.06 ± 1.10 , respectively.

The analysis showed that 98.11% of participants agreed that dental apps could be used as an adjunct with behaviour modification technique to reduce preappointment anxiety of child and 100% agreed that dental apps could be a useful tool in the future to treat paediatric patients [Table/Fig-1].

Questions	Items	Yes	%	No	%
Do you think management of child's behaviour is an integral component of paediatric dental practice?	K1	369	99.73	1	0.27
Could child's anxiety be overcome by a combination of any of non pharmacological behaviour modification techniques?	K2	367	99.19	3	0.81
Could self-directed learning be promoted through smartphone based dental apps?	K3	364	98.38	6	1.62
Do you think dental apps involves playful way of dental treatment showcased using animation?	K4	364	98.38	6	1.62
Do you think dental apps when used as adjunct with behaviour modification technique improves behaviour of child?	K5	363	98.11	7	1.89
Do you think dental apps is for the use of parents and cannot be used by children?	K6	26	7.03	344	92.97
Should dental apps be used only in anxious children?	K7	31	8.38	339	91.62
Do you think audio-visual aid reduces anxiety to optimum level like other behaviour modification techniques?	K8	361	97.57	9	2.43
Would you like to know more regarding paediatric dental apps?	A9	370	100	0	0
Could dental apps bridge the technological gap between dentist and patient?	A10	366	98.92	4	1.08
Could newer dental apps be developed from paediatric dentist point of view?	A11	369	99.73	1	0.27
Could dental apps be a useful tool in the future for treating paediatric dental patients?	A12	370	100	0	0
Do you regularly use non pharmacological behavioural modification techniques in your practice?	A13	356	96.22	14	3.78
Have you attempted to educate parents and guardians about newer technological advancements in paediatric dentistry?	P14	282	76.22	88	23.78
Have you been successful in reducing anxiety of paediatric patients by using dental apps?	P15	297	80.27	73	19.73
Do you regularly use dental apps as a preappointment behavioural modification technique?	P16	185	50	185	50

[Table/Fig-1]: Table showing question wise responses of respondents.

Concerning the various age groups evaluated using one-way ANOVA, it was found out that experienced professionals aged above 61 years had better knowledge as compared to other age groups with an F-value of 0.4049 and p-value of 0.7495 when the comparison was carried out for attitude it was found out that the professionals aged from 41-50 years had a better attitude as compared to other age groups with F-value of 4.7314 which was highly statistically significant with the p-value of 0.0030 (p-value <0.05). However, when the comparison was done based on practices related to

dental apps it was found out that professionals aged between 31-40 years were better as compared to other age groups with F-value of 0.1846 and p-value of 0.90681 [Table/Fig-2].

Age groups (years)	Knowledge	Attitude	Practice
	Mean±SD	Mean±SD	Mean±SD
21-30	6.07±0.68	4.90±0.32	2.07±1.03
31-40	6.03±0.36	4.99±0.10	2.10±1.04
41-50	6.09±0.38	5.00±0.00	2.05±1.24
≥61	6.16±0.50	4.95±0.23	1.89±1.37
Total	6.07±0.54	4.95±0.23	2.06±1.10
F-value	0.4049	4.7314	0.1846
p-value	0.7495	0.0030	0.9068

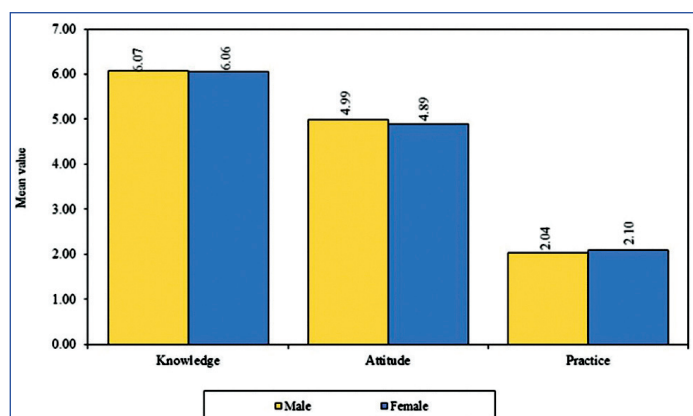
[Table/Fig-2]: Comparison of age groups with responses of respondents in each question.

When a comparison of knowledge attitude and practices was made between the three groups of paediatric dental professionals using one-way ANOVA test the practicing paediatric dentists had better knowledge, attitude, practice scores as compared to faculty and postgraduate students. Especially when the attitude was compared, the practicing paediatric dentists had a better attitude with a statistically significant p-value of 0.0203 (p-value <0.05) and F-value 3.9407 [Table/Fig-3].

Professions	Knowledge	Attitude	Practice
	Mean±SD	Mean±SD	Mean±SD
Faculty	6.04±0.51	4.94±0.24	1.97±1.25
Practicing paediatric dentist	6.08±0.37	4.99±0.09	2.11±0.99
Postgraduates	6.08±0.69	4.91±0.31	2.09±1.07
Total	6.07±0.54	4.95±0.23	2.06±1.10
F-value	0.1905	3.9407	0.5269
p-value	0.8266	0.0203	0.5909

[Table/Fig-3]: Comparison of professions with mean knowledge, attitude and practice scores by one-way ANOVA.

When seen in accordance to gender comparison using t-test, males had better knowledge, attitude scores than females with p-value of knowledge scores 0.8862, t-value of 0.1432, highly statistically significant attitude scores with p-value of 0.0001 (p-value <0.05) and t-value of 4.0659 and with p-value of practice scores 0.5862 and t-value of -0.5448. However, the practice scores of females were more than males [Table/Fig-4]. The correlation between knowledge, attitude and practices was done using Karl Pearson's correlation coefficient it was observed that the correlation between knowledge and attitude was highly statistically significant with r-value of 0.2198 and p-value of 0.0001. However, no statistically significant results were found when a comparison was made between knowledge and practices and also attitude and practices [Table/Fig-5].



[Table/Fig-4]: Comparison of male and female with mean knowledge, attitude and practice scores.

Variables	r (x,y)	t-value	p-value
Between knowledge and attitude	0.2198	4.3223	0.0001
Between knowledge and practice	0.0154	0.2947	0.7684
Between attitude and practice	0.0875	1.6843	0.0930

[Table/Fig-5]: Correlations among knowledge, attitude and practice scores by Karl Pearson's correlation coefficient.

DISCUSSION

The clear understanding of why and how we need to do something is knowledge. The desire to transform the knowledge into skills and ultimately into habits is attitude and skill is application of the knowledge acquired in any practical situation [10]. In the present study, 50% of respondents stated that they translate their knowledge in clinical practice too, by regularly using dental apps as a preappointment behaviour management technique.

Dental anxiety has been considered an important source of trouble in the management of anxious children during dental treatment [11]. It is considered as a major hurdle to provide efficient dental care and diagnosis of the pathological condition, which could significantly affect the child psychologically. A child's first dental visit is crucial as he or she might be apprehensive and exhibits poor behaviour at their appointment [12].

Anxiety could affect the effective delivery of oral care since it could express itself in descriptive and interruptive behaviours. The emotional quality of the first dental visit has more effect on anxiety than subsequent visits, where behaviour management plays an important role in building trust and alleviate the fear of treatment in future dental visits. The dental team should provide effective and efficient treatment by developing an overall positive attitude in the child by efficient behaviour guidance. Most comprehensive approaches aim to develop a good connection between child, dentist, parents by understanding the emotional, cognitive, and social development. Thus, a comprehensive approach is beneficial than the individualisation of techniques in building trust by elevating anxiety and fear of subsequent dental visits [13].

In the world, India is the third-largest user of smartphones. The World Health Organisation (WHO) has proposed a new term "mobile health" which is a component of e-health define as "medical and public health practice strengthened by mobile devices such as mobile phones, patient monitoring devices, and personal digital assistant". Thus, Healthcare professionals have been discovering innovative ways to provide services and teaching patients using smartphone apps designed for use in medical and dental fields [14].

Dental apps like "My lovely dentist", "Doctor kids: dentist", "Baby bus dentist" could be used to cope up with anxiety by educating the patients about dental treatment and hence reducing fear. Due to the limited availability of information regarding the use of smartphones in the reduction of dental anxiety, this study was conducted to create awareness among paediatric dentist about the use of anxiety-reducing dental apps as a preappointment behaviour management technique in children [15].

Anxiety developed during dental treatment affects systolic and diastolic blood pressure and heart rate while maintaining a steady oxygen saturation level. Thus, the heart rate could be utilised to access dental anxiety and is considered safe physiological measurements to use during dental treatment [16,17].

A comparative study conducted with film modelling and Tell-Show-Do as a behaviour management technique to estimate anxiety levels in children found that, Tell-Show-Do being non playful and non interactive did not reduce heart rate in children than film modelling does. Thus, using anxiety-reducing dental apps as a preappointment behaviour management technique could significantly reduce anxiety, as a child would love playing and watching the dental procedure the animated dentist performs [18]. Similar study was conducted to

study the effectiveness of dental apps to reduce anxiety in children while performing dental procedure where they found smartphone as a modest and effective tool to reduce anxiety in children [19]. According to the results of the present study, almost all believed that new apps have to be developed in the future.

In the current study, it was found that males had better knowledge, attitude scores of dental apps while females had better practice scores than males when comparison was done using t-test. It was found that the female practitioners are likely to use these dental apps more frequently in their practice hence the practice score is likely to be more [20].

As currently available apps are developed by software engineers who have little or no knowledge of paediatric dentistry, hence newer apps could be developed from a paediatric dentist's point of view. The dental apps could be used as an adjunct to conventional behaviour management techniques and hence would help to alleviate anxiety and fear of treatment in the future. Dental apps can prove to emphasise overall patient health and aid in rendering quality treatment. Further educational seminars and/or workshops, if necessary, could be conducted for the paediatric dentists regarding awareness of dental apps if required.

Limitation(s)

A small sample size was the main limitation of this study. Also, most apps are available in English language only so there could be language barrier hence there is need to create apps in regional languages.

CONCLUSION(S)

Based on the current study, it may be concluded that there is a lack of awareness among paediatric dentists that anxiety-reducing dental apps could be used as an adjunct with conventional behaviour management techniques among paediatric dentists in India. Further educational seminars and/or workshops, if necessary, could be conducted for the paediatric dentists regarding awareness of dental apps newer apps could be developed in different regional languages too for apps to be more effective.

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PARTICULARS OF CONTRIBUTORS:

1. Postgraduate Student, Department of Paediatric and Preventive Dentistry, Kaher's Kle VK Institute of Dental Sciences, Belagavi, Karnataka, India.
2. Reader, Department of Paediatric and Preventive Dentistry, Kaher's Kle VK Institute of Dental Sciences, Belagavi, Karnataka, India.
3. Professor and Head, Department of Paediatric and Preventive Dentistry, Kaher's Kle VK Institute of Dental Sciences, Belagavi, Karnataka, India.
4. Former Postgraduate Student, Department of Paediatric and Preventive Dentistry, Kaher's Kle VK Institute of Dental Sciences, Belagavi, Karnataka, India.
5. Postgraduate Student, Department of Paediatric and Preventive Dentistry, Kaher's Kle VK Institute of Dental Sciences, Belagavi, Karnataka, India.
6. Postgraduate Student, Department of Paediatric and Preventive Dentistry, Kaher's Kle VK Institute of Dental Sciences, Belagavi, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Niraj Satish Gokhale,
Reader, Department of Paediatric and Preventive Dentistry, Kaher's Kle VK Institute of Dental Sciences, Belagavi, Karnataka, India.
E-mail: neerajpedo@gmail.com

AUTHOR DECLARATION:

- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? No
- For any images presented appropriate consent has been obtained from the subjects. NA

PLAGIARISM CHECKING METHODS: [Jan H et al.]

- Plagiarism X-checker: Oct 25, 2021
- Manual Googling: Dec 16, 2021
- iThenticate Software: Jan 18, 2022 (15%)

ETYMOLOGY: Author Origin

Date of Submission: **Oct 21, 2021**
Date of Peer Review: **Nov 23, 2021**
Date of Acceptance: **Dec 17, 2021**
Date of Publishing: **Mar 01, 2022**