



Original research:

Effect of personal protective equipment on dental anxiety of 5 to 10 year old children: An observational study

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Abstract

Purpose: The purpose of this study was to evaluate the effect of personal protective equipment on dental anxiety in 5- to 10-year-old children in dental offices.

Methods: 60 children aged 5 to 10 were randomly allocated to three study groups: CA group (colourful cartoon-printed attire, head cap, N95 mask, face shield, and hand gloves); C-PPE group (complete conventional PPE (gown, shoe covers, head cap, N95 mask, goggles, hand gloves, and face shield); and M-PPE group (modified colourful PPE (protective gown and face shield modified with cartoon pictures, shoe covers, head cap, N95 mask, goggles, hand gloves, and face shield). The child's anxiety was assessed at baseline and after showing a photograph of a pediatric dentist in particular attire using the facial image scale. Preference for attire was later evaluated.

Results: Intergroup comparison of mean anxiety scores after showing photographs in the three groups showed a statistically significant difference between the CA group and the M-PPE group ($p = 0.024$) and the C-PPE group and the M-PPE group ($p = 0.0001$). A statistically significant increase in anxiety in the C-PPE group and a decrease in the M-PPE group were observed. 88.8% of the children preferred modified PPE.

Conclusion: PPE decreases non-verbal communication, affecting the rapport between a paediatric dentist and patients. But modifying it with colourful, relatable content can allay children's anxiety.

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Introduction

Anxiety and/or fear are recurring feelings and a cause of concern in pediatric dental treatment. ^[1] Anxiety is a systemic response to an imminent danger, reflected in a combination of biochemical alterations. It is influenced by memory, personal history, and social context.^[3] Dental anxiety is an obstacle to achieving cooperation from the patient and having a stress-free relationship between the dentist and the patient. For a fearful patient, avoidance of dental treatment due to dental anxiety may lead to poor oral health.^[2] Thus, pediatric dentists should address this concern by seeking a satisfactory relationship with their patients and making it easier to deliver dental treatment for children. A dental surgeon's attire and body language are important components of non-verbal communication and play a key role in influencing the child's anxiety and behavior in the dental operation.^[3] Dentist attire and appearance are strongly associated with anxiety in children as young as 5 years old. The strong relationship between appearance and its effect on first impressions and interpersonal relationships has been stressed by psychologists and sociologists. This is important information for dentists to better shape their practices and meet the preferences and needs of children. ^[1]

The guidelines in the COVID-19 pandemic or similar situations dictate that dental professional wear N95 face masks, protective eyewear or face shields, and gloves, along with coveralls, for high-risk and very high-risk procedures.^[3,5] The appearance of a pediatric dentist in PPE potentially interferes with their communication process by decreasing the dentist's voice qualities and obstructing nonverbal cues.

This can have a direct impact on the dental anxiety of the child.^[6] Modifying the PPE with colourful and child-relatable content can be an alternative. A literature search shows no studies evaluating the effect of PPE on the dental anxiety of children. Hence, this study was planned to evaluate the effect of different PPE designs on the anxiety of 5- to 10-year-old children in dental settings.

Material and methods

The study was conducted in the Department of Paediatric and Preventive Dentistry from August 12, 2020, to January 12, 2021. Ethics committee approval was obtained from the institutional ethics committee prior to the beginning of the study. A 95% confidence level and 80% power yielded a total sample size of 60.

Five to ten-year-old healthy children visiting the department for dental check-ups in positive and definitely positive categories according to Frankl's behaviour rating scale were included in the study. Children with any past negative dental experience were excluded. The included children were randomly allocated to one of the three groups based on the paediatric dentist's attire by a computer-generated randomization sequence. CA group: colourful cartoon-printed attire, head cap, N95 mask, face shield, and hand gloves (Figure 1a). C-PPE group: conventional PPE kit including gown, shoe covers, head cap, N95 mask, goggles, hand gloves, and face shield (Figure 1b). M-PPE group: modified colourful PPE kit (protective gown and face shield modified with pictures of cartoon characters preferred by children and emojis, shoe covers, head cap, N95 mask, goggles, hand gloves) (Figure 1c)



Figure 1: Illustrating the attires of the three study groups.

While in the waiting area, the child’s anxiety at baseline was assessed using a facial image scale (Figure 4) (FIS at baseline). The child was then shown a photograph of a pediatric dentist supposed to carry out the dental procedure in the appropriate attire

according to the allocated group, and anxiety was assessed using a facial image scale (FIS after showing the photograph). To evaluate the preference for the attire, each child was shown a set of photographs of a pediatric dentist in the three different study attires.

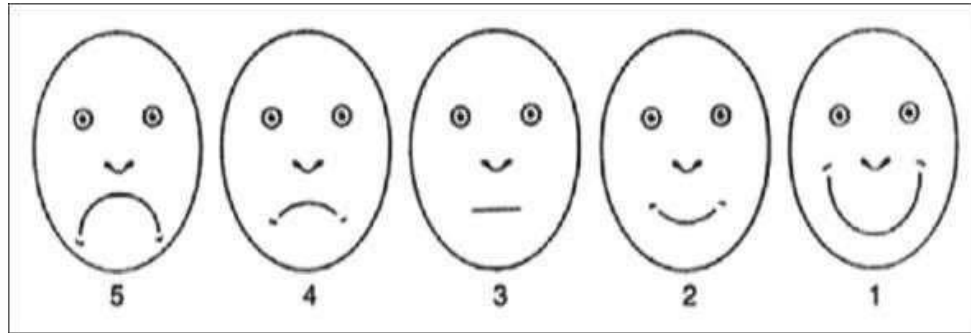


Figure 4. Facial image scale

Statistical analysis

The collected data was tabulated and statistically analyzed using SPSS Statistical software version 24.0 and GraphPad Prism version 7.0. Student’s unpaired t-test, Chi-square test, and Tukey’s multiple comparison tests were used for descriptive and inferential statistics.

Results

Among the three groups there was no statistically significant difference with respect to age, gender and mean FIS scores at baseline (Figure 3). On comparing the mean FIS scores at baseline by using Tukey’s test there was no statistically significant difference among the three groups (Table I).

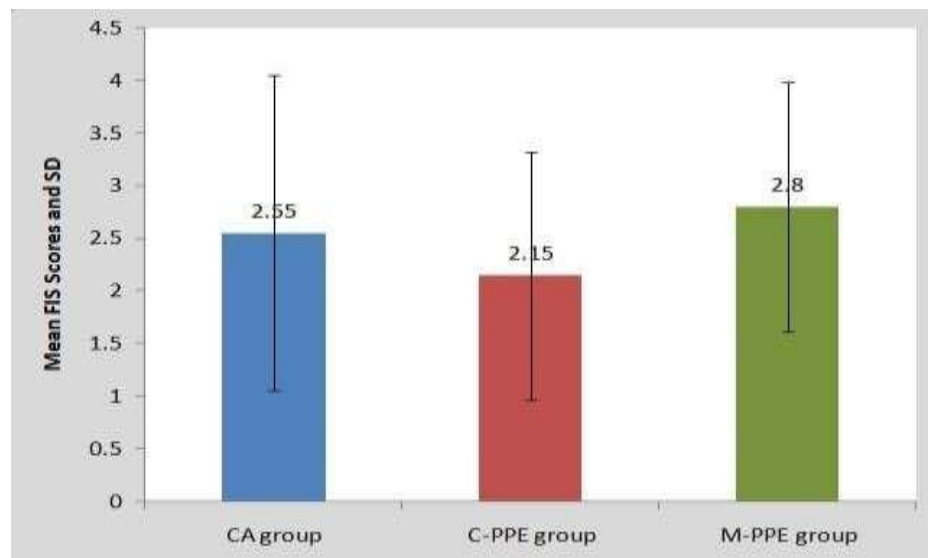


Figure 3. Comparison of FIS scores at baseline in three groups

Table I: Comparison of FIS scores at baseline in three groups

Groups		Mean (I-J)	Difference	Std. Error	p-value	95% Confidence Interval	
						Lower Bound	Upper Bound
CA	C-PPE	0.40		0.41	0.598 ^{NS}	-0.59	1.39
	M-PPE	-0.25		0.41	0.817 ^{NS}	-1.24	0.74
C-PPE	M-PPE	-0.65		0.41	0.263 ^{NS}	-1.64	0.34

CA= Colorful cartoon printed attire; C-PPE=Conventional PPE; M-PPE=Modified cartoon printed PPE. Tukey’s test; NS: statistically not significant

photographs in the three groups. Intergroup comparison of mean FIS scores after showing photographs in the three groups (Table II) showed a statistically significant difference between the CA

group and M-PPE group and the C-PPE group and M-PPE group; whereas no statistically significant difference was found in the CA group and C-PPE group.

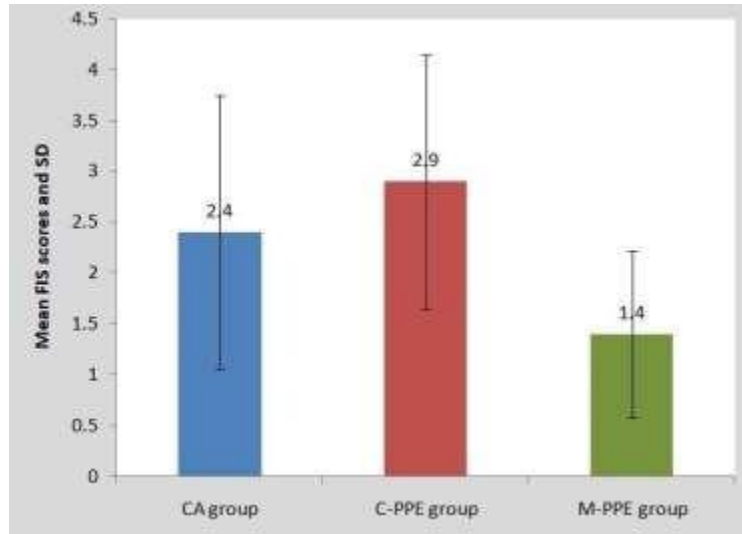


Figure 4. Comparison of FIS scores in three groups after showing photographs

Table II: Comparison of FIS scores after showing photograph in three groups

Groups		Mean Difference (I-J)	Std. Error	P-value	95% Confidence Interval	
					Lower Bound	Upper Bound
CA	C-PPE	-0.50	0.36	0.370 ^{NS}	-1.38	0.38
	M-PPE	1.00	0.36	0.024 ^S	0.11	1.88
C-PPE	M-PPE	1.50	0.36	0.0001 ^S	0.61	2.38

CA= Colorful cartoon printed attire; C-PPE=Conventional PPE; M-PPE=Modified cartoon printed PPE. Tukey Test; S: statistically significant; NS: statistically not significant

Table III gives the intra-group comparison of FIS scores at baseline and after showing photographs in three groups. A statistically significant increase in

anxiety in the C-PPE group and a decrease in the M-PPE group was observed. 88.8% of the children preferred modified PPE, 6.6% preferred colorful scrubs and 5% preferred conventional PPE (Diagram I).

Table III: Intra-group comparison of FIS scores at baseline and after showing photograph in three groups

Groups	FIS scores	Mean	N	Std. Deviation	Std. Error Mean	t-value	P value
Preference of attire CA	At baseline	2.55	20	1.50	0.33	1.83	0.083 ^{NS}
	After showing photograph	2.40	20	1.35	0.30		
C-PPE	At baseline	2.15	20	1.18	0.26	2.77	0.012 ^S
	After showing photograph	2.90	20	1.25	0.28		
M-PPE	At baseline	2.80	20	1.19	0.26	5.48	0.0001 ^S
	After showing photograph	1.40	20	0.82	0.18		

CA= Colorful cartoon printed attire; C-PPE=Conventional PPE; M-PPE=Modified cartoon printed PPE. Student's paired t-test; NS: statistically not significant; S: statistically significant

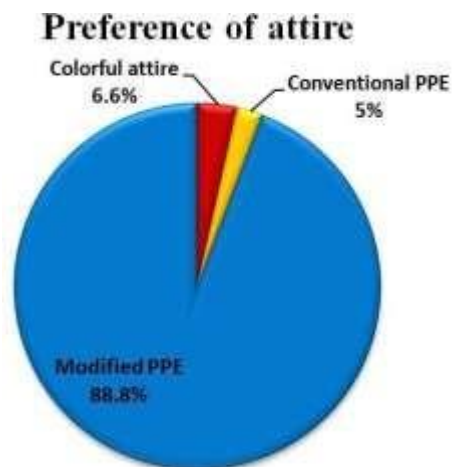


Figure 5. Preference of attire

Discussion

Age, gender, and baseline anxiety are confounding factors and can influence dental anxiety in children in the clinical setting.^[8,9] However, in the present study, there was no statistically significant difference amongst the three groups regarding these factors and hence the change in dental anxiety in the study setting can be attributed to the study parameter i.e. the attire of the pediatric dentist. Intra-group comparison of mean FIS scores in the CA group showed a reduction in anxiety but the difference was not statistically significant. The possible reason for the decrease in anxiety could be that the colorful attires are well accepted by children as seen in studies done by Leal et al^[2] and Asokan et al^[10] The anxiety in the C-PPE group significantly increased while in the M-PPE group, it significantly decreased. With the use of PPE the dentist's body language and nonverbal communication are not as effective behavior management tools as otherwise.^[3,6] However this issue can be overcome by modifying the PPE with colorful, relatable cartoon pictures and emojis making it look attractive and child friendly as done in the present study and reflected by the intergroup comparison of mean FIS scores after showing photographs inferring that the anxiety was least in M-PPE group followed by CA group and C-PPE group.

Tong et al^[11] studied the preference of five to seven-year-old children and their parents regarding dentists' appearance among six different study attires (formal attire, pediatric coat, scrubs, white coat, conventional PPE, and informal attire) and reported that conventional PPE was the most preferred attire for both parents and children. In the present study

preference of children was highest for the modified PPE followed by colorful attire and conventional PPE. Asokan^[10] did a survey to evaluate the dentist attire in nine to twelve-year-old dentally anxious children and reported that they showed higher preference for colored attires. Babaji et al^[11] found that 80% of six to ten-year-old children preferred cartoon-printed colorful attire. The limitation of the present study was that the anxiety and preference of the children were evaluated by only showing the photographs of dentists in different attires.

Conclusion

Even if we are no longer under the threat of COVID-19, such difficult situations may arise necessitating the use of PPE. A dentist's attire has a definite impact on a child's anxiety. Conventional PPE evoke greater dental anxiety in children and modifying it with colorful relatable cartoon content helps reduce it and also makes it preferable to children.

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