

Comparative evaluation of dental anxiety level in children towards different PPE attire in COVID-19 pandemic-A Clinical Study

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Abstract

Aim: This study aimed to evaluate dental anxiety level in children towards different PPE (personal protective equipment) attire in COVID-19 pandemic.

Materials & Methods: A total of 66 children (6-9 years age), undergoing first dental visit were allocated into three groups. Child’s initial anxiety levels were evaluated using facial image scale (FIS) and pulse rate using pulse oximeter in the waiting area (baseline). In

the clinical area child encountered the dentist in PPE attire (conventional white PPE or blue coloured PPE or cartoon printed blue PPE). Pre-intervention, child’s anxiety level was re-assessed. Followed by oral examination, introduction to procedures at the dental clinic, oral hygiene instructions and tooth brushing technique were demonstrated. At the end of the intervention child’s anxiety levels (post-intervention) were assessed.

Results: The results showed a significant difference of FIS score with higher mean values during the pre-intervention in group I (4.14) and group II (3.23) when compared to group III (2.36). There was a statistically significant difference seen for the values of pulse rate for group I (100.73) and group II (98.77) with higher values during the pre-intervention when compared to group III (93.91). While considering the gender wise comparison of FIS and pulse rate, there was statistically non-significant difference was observed in the values ($p>0.05$) for all the three groups.

Conclusion: we can conclude that cartoon printed blue PPE can be a game changer during the COVID – 19 pandemic in reducing the anxiety levels of the children and can lead to maximum patient cooperation.

Keywords: COVID – 19, Dental anxiety, Dentist attire, Pediatric dentistry, PPE

Introduction

The first dental visit plays a vital role in development of the child's attitude towards dental procedures and upcoming treatment success. [1] The first impression about a dentist may be formed from various sources prior to verbal communication, among which attire is a key constituent. Psychologists emphasize the role of appearance and its outcome upon first impression of a person and the progress of their social relationship. [2]

Dental appointment is considered as a stressful event, which elevates child's anxiety level and avoidance behavior. Especially, during this COVID - 19 scenario it is a challenge for a pedodontist in the dental office to treat a child patient using personal protective equipment from head to toe. [1]

Barrett and Booth were the first to mention negative outlook of the traditional white coat attire, and noticed that children regard doctors in formal attire as qualified but not pleasant. [3]

The American Academy of Pediatric Dentistry (AAPD) endorsed more about focusing on non-pharmacologic behavior management for upcoming studies. [4] With the beginning of novel concepts and increasing expectations of the parents, the dentists are fortified towards better “child-friendly” techniques. [2]

As a part of patient care, especially during COVID - 19 pandemic the prevention of cross infection is of supreme importance and the dental team should ensure use of personal protective equipment (PPE) and suitable dressing including hand gloves, surgical gown, face shields or glasses and face masks. However, the appearance of the white protective attire may provoke fear or anxiety in some children who has been sensitized previously and have related such event with a discomforting experience. In order to subdue their pre-existing fears and anxiety an alternative attire like colored and cartoon wears have been suggested and should be used exclusively by health care employees who deal with kids. [5]

Various physiological as well as non-physiological parameters are available for assessing the fear or anxiety in the dental setup. Physiological parameters like pulse rate, blood pressure, and oxygen saturation and non-physiological parameters like Facial Image Scale (FIS), Venham's Clinical Anxiety Rating Scale and Venham's Picture Test (VPT), etc are frequently used. [6]

On exploration of the literature, very few studies could be found on the role of the dentist's attire in reducing the anxiety of the children. COVID -19 is considered as novel beta coronavirus that has potential to cause severe acute respiratory syndrome with a high fatality rate. Considering numerous types of dental apparatus, such as ultrasonic scalers, handpieces and air-water syringes, that produce significant amounts of aerosols of blood, saliva and other fluids, the probability for the spread of

contagions from patients to dentists or dental assistants is high. These factors demand the use of fully enhanced Personal Protective Equipment (PPE) mandatory during treatment procedures. During the COVID - 19 scenario the main problem associated with the children in the dentistry is the difficulty to endure personal protective equipment during the dental visits. So, in order to make the child relaxed in the dental environment the dentist should think of alternative ways to make the child's visit pleasant and comfortable. [7-9]

Considering all these factors, the present study aimed to evaluate the effectiveness of three different personal protective equipment kit attire which include conventional white PPE, blue colored PPE and cartoon printed blue PPE in reducing the child's anxiety level during the dental practice. The main objective of our study is comparative evaluation of dental anxiety level in children towards conventional white PPE, blue colored PPE and cartoon printed blue PPE used by the dentist and to compare dental anxiety level among boys and girls towards dentist in conventional white PPE, blue colored PPE and cartoon printed blue PPE attire.

Materials and methods

After obtaining the ethical clearance from the institutional review board [BV(DU) MC&H/ Sangli/ IEC/D-52/ 21], a total of 66 children between the age group 6 to 9 years (± 4 months) who were undergoing first dental visit were randomly allocated into three groups of 22 each (11 boys and 11 girls). Child's parents or guardians were explained in detail about the study. They were informed about their rights to refuse or discontinue their participation at any time and then signed consent from the parents and assent from the children were taken.

Inclusion criteria

- Healthy children with first dental visit

- No previous history of hospitalization.

Exclusion criteria

- Children with history of systemic disease that have an effect on normal physiology.
- Children with history of anxiety disorders.

Study design

Study subjects were randomly allocated into three groups, on their first visit:

Group I: Children were examined and intervened by using conventional white PPE.

Group II: Children were examined and intervened by using blue colored PPE.

Group III: Children were examined and intervened by using cartoon printed blue PPE.

During the first dental visit, the child's initial anxiety levels (baseline) in the waiting area were evaluated by measuring pulse rate using Gibson finger oximeter and facial image scale (FIS). Then, the child was directed to the clinical area where the child comes in contact with the dentist in respective PPE kit attire either conventional white PPE or blue colored PPE or cartoon printed blue PPE. Before starting with the oral examination, the dentist re-assessed the child's anxiety level (pre-intervention) using pulse oximeter and FIS. [10] (The PPE used in this study has passed the Synthetic Blood Penetration Resistance Test conducted as per ISO 16603 and confirms to the technical requirement of Ministry of Health & Family Welfare guidelines) [Fig 1].

Subsequently, the child underwent oral examination to determine their current dental state (e.g., oral hygiene, cavities, number of dental fillings and missing teeth). The children were introduced to the procedures at the dental clinic. In addition, oral hygiene instructions and tooth brushing technique were demonstrated. At the end of the intervention child's anxiety levels (post-

intervention) using FIS and pulse oximeter were assessed. [10]



Figure 1: Image showing Conventional white PPE, Blue colored PPE and Cartoon printed blue PPE

Statistical analysis

Data collected was compiled on a MS Office Excel Sheet (v 2019, Microsoft Redmond Campus, Redmond, Washington, United States) and was subjected to statistical analysis using Statistical package for social sciences (SPSS v 26.0, IBM). Inter group comparison (>2 groups) for pulse rate was completed using one way ANOVA followed by pair wise comparison using post hoc test. Inter group comparison (>2 groups) of FIS was done using Kruskal Wallis ANOVA followed by pair wise comparison using Mann Whitney U test. For all the statistical tests, $p < 0.05$ was considered to be statistically significant.

Results

A total of 66 children participated in the study and randomly allocated into three groups, i.e., conventional white PPE (n = 22), blue colored PPE (n= 22), and cartoon printed blue PPE (n= 22). Data revealed that all the three groups were same in their demographic characteristics.

In the group I, FIS score has shown a statistically significant difference with higher mean values in the

pre-intervention (mean: 4.14) and post-intervention (mean:3.18) when compared to the baseline (mean: 2.82). In the group II, there was a statistically significant difference seen in the FIS score with higher mean values in the pre-intervention (3.23) compared to the baseline (2.95). In the group III, there was a statistically significant difference observed in the FIS score with higher mean values in the baseline (3.25) when compared to the pre-intervention (2.36) and post-intervention (1.82), indicating a greater reduction of dental anxiety. The results showed a significant difference ($p < 0.01$) of FIS score with higher mean values seen during the pre-intervention in group I (4.14) and group II (3.23) when compared to group III (2.36) [Fig. 2]. While considering the comparison of FIS score and gender, there was a statistically non-significant difference was observed ($p > 0.05$) for baseline, pre-intervention and post-intervention in all the three groups.

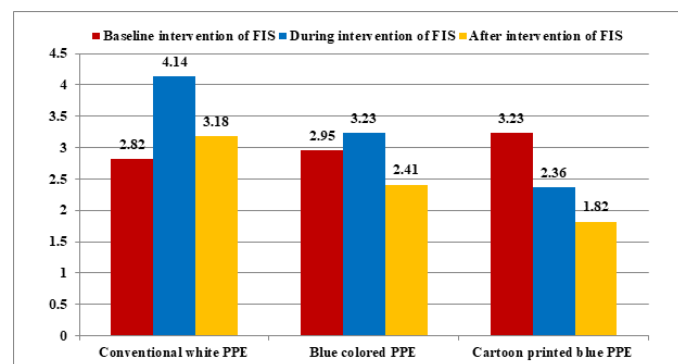


Figure 2: Comparison of mean changes in the FIS among the three groups

In the group I and group II, pulse rate has shown a statistically significant difference with higher mean values in the pre-intervention (100.73; 98.77) and post-intervention (97.50; 95.59) when compared to the baseline (90.32; 91.41) respectively. In the group III, there was a statistically non-significant difference was observed in the pulse rate with slightly higher mean values ($p > 0.05$) in the baseline (94.23) when compared

to the pre-intervention (93.91) and post-intervention (91.27). There was a statistically significant difference seen for the mean values ($p < 0.01$) of pulse rate for group I (100.73) and group II (98.77) with higher values seen during the pre-intervention when compared to group III (93.91) [Fig 3]. While considering the comparison of pulse rate and gender, there was a statistically non-significant difference was observed in the mean values ($p > 0.05$) for baseline, pre-intervention and post-intervention in all the three groups.

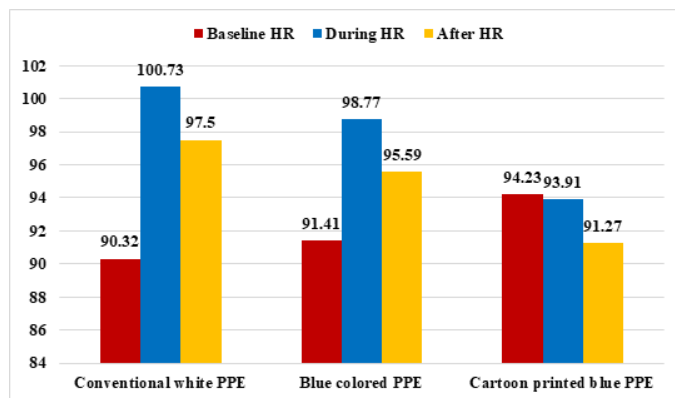


Figure 3: Comparison of mean changes in the pulse rate among the three groups

Discussion

Dental fear is a crucial problem among children as well as adolescents. Fear of the unknown provoke anxiety in the dental office. It is one of the foremost reasons for evading behavior towards dental care in children. [11]

The attire is considered to be a form of non-verbal communication and has a behavior guiding influence with respect to improving the interaction between the child and the dentist. [5] Children usually start judging about their dentist based on his or her first appearance. The pediatric dental practice is dependent on the technical skills on one hand and on the other hand major part of it is dependent on establishing a strong bond and a friendly rapport with a child on his/her first dental visit in order to create a pleasant atmosphere and making the child cooperative during dental treatment in which the

child do not feel vulnerable. As a result, the child will be more prospective to visit the dentist in the future appointments and this will eventually lead to successful treatment and better oral health. [12-14]

The symbol of the qualified medical team, the doctor's white coat, has been reported to exhibit professionalism, self-respect, cleanliness and healing. During the COVID – 19 pandemic the doctor's white attire has set a huge trauma in the society physically as well as mentally. However, the fear of cross infection and transmission of the disease through aerosols during various dental procedures has made use of PPE mandatory in the clinical set up. Eig bobo et al. in 2019 conducted a cross-sectional study to assess the preferences of the dentist's attire among parents and reported that huge number of parents desired that the dentist must use a protective wear. Protective coats and gloves were anticipated by all the parents and majority of them preferred their dentist to wear facemask in order to avoid transmission of microorganisms. [5]

However, several studies have shown that the dentist white attire may elicit anxiety in children which may further leads to uncooperative behavior. [5] So, it is essential to find alternative attire in order to make the child's first dental visit pleasant. Hence, in the present study conventional white PPE kit attire is taken as a gold standard and was compared with blue coloured PPE kit attire and cartoon printed blue PPE kit attire in evaluating the reduction in the child's anxiety level during the dental procedure. In the present study conventional white PPE has shown significant increase in child's anxiety level in terms of pulse rate and FIS score, which is in contrast to a questionnaire-based study on children's and parent's attitudes towards dental attire conducted by Mistry et al. in 2009 comprising of 100 children (4 – 16 years age) in which the data was

obtained using a questionnaire showing a series of photographs of male and female dental students in various modes of attire and concluded that parents preferred traditional white attire and children favored dental students in casual attire, whereas both children's and parent's graded formal white in favor of a pediatric attire. [15]

Studies have shown that there is a positive association between mood tones with particular colors. Umamaheshwar et al. in 2013 and Babaji et al. in 2017 stated that the blue color indicates calm, secure, happy and comforting environment and white color indicates fear. They have concluded that there is a highly significant relationship between colors with emotion and use of the "child friendly" colors in the dental work place could yield a positive behavior in the child's attitude. [12,16] Therefore, in the present study blue color has been selected as one of the attire due to its nature of providing peaceful environment. In the present study the results concluded that, there was a significant reduction in the anxiety level in terms of pulse rate and FIS score during the pre-intervention with respect to blue colored PPE compared over conventional white PPE. These results were in accordance with the Asokan et al. who conducted questionnaire-based study on 1155 children (9 – 12 years age) who were requested to fill a questionnaire comprising children's fear survey schedule - dental subscale (CFSS-DS) and asked to choose dental attire from four different images which include two of the attires in formal dentist attire (white colored long and short) and the other two were in colored attire (green and blue color). They found that 502 (69.9%) anxious children choose colored attire of the dentist, with both boys and girls showing higher preference for colored attire. So, he concluded that the use of child-friendly colors in attire can aid in releasing dental anxiety. [17]

During this COVID – 19 pandemic, the use of PPE with disinfection and safety protocols is inevitable. Sailaja DN et al. in 2020 in an article mentioned that the child was surprised and frightened by the dentist's white PPE kit attire and in order to reduce the fear she emphasized on incorporation of cartoon characters into the conventional PPE kit and stated that there was an overwhelming response from the child.[18] Cartoons are the most loved by majority of the children. By using this simple resource, a positive behavior molding of the child is possible, which ultimately guide the child towards better oral health. Sanguida et al. in 2019 conducted a cross-sectional descriptive study comprising 385 children (4-15 years age) in which the children were shown a series of photographs and asked to point their preference with regard to the type of dress (traditional white coat, formal attire, professional attire—green scrub, cartoon attire), color of mask (white, blue, green, and pink), and type of mask and reported that child-friendly cartoon attire was second most favoured attire among younger age-group and concluded by stating that child-friendly dressing of dentist would be more pertinent for children and may be used for those visiting the dentist for the first time. [19] So, in the present study most commonly preferred cartoons by the children were incorporated into the PPE in order to evaluate dental anxiety of the children. The results of our study revealed that cartoon printed blue PPE has shown a significant reduction in dental anxiety of children in terms of pulse rate and FIS score compared to blue colored PPE and conventional white PPE.

In the present study when the results were evaluated in relation to gender, there was no statistically significant differences were observed with respect to pulse rate and FIS scores in all the three groups. These results were in accordance with Jafarzadeh et al. in 2016, who

conducted an experimental study among 103 children (6-12 years age) in which the children in the control group were examined by dentist wearing white coat, while the children in the study group were examined by dentist wearing white coat with either Angry Bird or Winnie the Pooh cartoon characters printed on them. They designed two questionnaires; one was supposed to be answered by the parents prior to the dental visit and one by the children after the visit. They reported that the children preferred the coat with Winnie the Pooh cartoon the most and there was no significant difference between boys and girls with regards to preference for the dentist's attire and their treatment acceptance. [13]

Hence, from the present study we emphasize that the use of cartoon printed blue PPE can be regarded as a child friendly attire which is evidently helpful in reducing the child's initial anxiety levels. However, in the present study, a small number of patients were included. Hence, further studies involving larger sample size are required for assessing the success rate of cartoon printed attire in reducing the dental anxiety in children dental care.

Conclusion

COVID - 19 pandemic is a big challenging task for the pediatric dentist to deal with the child patient by using PPE. In order to make the child's visit comfortable alternative attire modification that will allow the child cope with the situation and the methods to reduce their anxiety should be assessed. Based on the results of the present study, we can conclude that the cartoon printed blue PPE can be a game changer during the COVID – 19 pandemic in reducing the anxiety levels of the children and can lead to maximum patient cooperation, by making the child comfortable and pleasant in the dental operatory which will enhance the further treatment outcome.

Clinical significance

Cartoon printed PPE can be used as an alternative to conventional white PPE for managing the child's anxious behavior during COVID – 19 pandemic.

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