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Assessment of ratio of parents preferring general anesthesia in treating children more than 5 years indicated for full mouth rehabilitation

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Abstract: When it comes to pediatric patients, the challenge is greater in terms of compliance of the patient, as patient satisfaction is directly related to quality of care while efficiently managing the fear and anxiety of the child. Sometimes, children require treatment for dental caries to be carried out under general anaesthetic (GA) in a hospital setting. Many parents view DGA (Dental general anaesthesia) as an acceptable and often convenient method of treatment to address their child's oral health needs. The aim of this study was to evaluate parent's preference for general or local anesthesia in their children's dental treatments. This was a retrospective study conducted by evaluating data of 1005 patients who underwent invasive treatments in a private dental college between June 2019 to March 2020. To fulfil the inclusion criteria, patients between the age group of 1-17 years (pediatric patients) should have been provided with dental treatment like pulpectomy, SS crowns or strip crowns or FMR etc. The coding was done in MS excel. The data was transferred to a host computer and processed using SPSS software version 20.0 (SPSS Inc., Chicago, IL, USA) by tabulation and graphical illustration. Descriptive statistics was used to study the data collected and to analyse frequency and percentage distribution. Chi square test was used to assess association at 5% significance level ($P< 0.05$). The results showed that within the limitations of the study, it can be concluded that strong association is seen between age and preference for full mouth rehabilitation under GA. There is however no significant association between gender and preference for full mouth rehabilitation under GA. Of those who underwent FMR under GA, 80% were male and 51% belonged to the 5 years and above age group showing a new trend where patients above 5 years are increasingly opting for treatment under GA.

Keywords: Full mouth rehabilitation; General anesthesia; Innovation; Local anaesthesia; Oral health; Parent preference

INTRODUCTION

Early childhood caries is a global healthcare concern in developing and industrialized countries. If left untreated, it leads to immediate and long-term complications that affect the well-being and quality of life of concerned families. Despite the declining prevalence of dental caries in recent decades, there are still a substantial number of children with early childhood caries. Caries was stated to be high among children in a study which was done in rural India (Reddy et al., 2017). Age group 8 to 10 years showed higher caries than age group 6 to 7 years. Nowadays it is possible to identify ECC using salivary biomarkers (Subramanyam et al., 2018). Poor oral health, in particular children with chronic illness, can be a risk factor for severe, even life threatening complications(Gurunathan and Shanmugaavel, 2016). Adequate fluoride is essential to fight early childhood caries, this can be in the form of toothpastes or drinking water sources. Chewable toothbrushes are another tool to promote hygiene in children (Somasundaram, Ravi and Rajapandian, 2015; GovinDaraju and Gurunathan, 2017; 'Fluoride, Fluoridated Toothpaste Efficacy And Its Safety In Children - Review', 2018). Another frequently reported cause of treatment in children are traumatic injuries (Ravikumar and Jeevanandan, 2017). Children are also prone to treatments like surgical excision of ranula, correction of frenal attachments (Christabel and Linda Christabel, 2015; Packiri and Gurunathan, 2017).

Good oral health and dentition is important for efficient mastication, speaking and of course, cosmetically for smiling. Many children may not verbalize feelings of chronic pain (Low, Tan and Schwartz, 1999) as a result of their immaturity, and perhaps, the consistency of the pain over a long period. This pain may, however, be manifest in other aspects of their daily living, especially through problems with eating, sleeping, concentration and behaviour. Caries if untreated, may result in aggravated problems, such as pain, suffering, odontogenic infection, early loss of teeth and space loss that might later on require more extensive and expensive treatments (Thomas and Primosch, 2002).

It has been observed that Pediatric patients most often pose a problem with behavior management when prolonged or multiple visits for dental treatment are needed. The crucial stages for the development of dental fear occur during childhood and adolescent years (Locker et al., 1999). To combat this there are numerous behavioural and therapeutic approaches which are coupled with the use of local anesthesia. for successful treatment in the conventional dental clinic set up. However, the various behavior management techniques used must be tailored to the individual patient and practitioner. Some parents and dental practitioners prefer the presence of a parent with their child during the delivery of in-office dental care (Eaton et al., 2005). Therefore, an objective of dental care is to lead children step-by-step through the provision of dental care so that they can develop a positive attitude toward dentistry. When techniques fail or when treatment needs are extensive, general anesthesia for dental care in children is sometimes necessary to provide safe, and effective treatment.

Parents play an important role in dental care and especially when it comes to decisions on treatment preferred for the overall well being of the child. The parents are well educated by the dentist about the procedures and the local vs general anesthesia to be administered. Being aware of their child's previous dental experiences, child's interest and fear, parents prefer general anesthesia, especially in children less than 3 years of age, (Vellingiri and Gurunathan, 2015) when a child presents with extensive teeth damage and exhibits a lack of cooperation (Milgrom et al., 1988) that is incompatible with conventional dental office care. The advantages of GA include: providing treatment that is safe, efficient and convenient; extensive high quality treatment (Anderson, Drummond and Thomson, 2004) being provided in a single visit, with minimal discomfort to the patient; and less physical and mental stress for both the patient and dentist. (Savanheimo et al., 2005)

Our department is passionate about research we have published numerous high quality articles in this domain over the past years ((Kavitha et al., 2014) , (Praveen et al., 2001),(Devi and Gnanavel, 2014), (Putchala et al., 2013), (Vijayakumar et al., 2010), (Lekha et al., 2014a, 2014b) (Danda, 2010) (Danda, 2010) (Parthasarathy et al., 2016) (Gopalakannan, Senthilvelan and Ranganathan, 2012), (Rajendran et al., 2019), (Govindaraju, Neelakantan and Gutmann, 2017), (P. Neelakantan et al., 2015), (PradeepKumar et al., 2016), (Sajan et al., 2011), (Lekha et al., 2014a), (Neelakantan, Grotra and Sharma, 2013), (Patil et al., 2017), (Jeevanandan and Govindaraju, 2018a), (Abdul Wahab et al., 2017), (Eapen, Baig and Avinash, 2017), (Menon et al., 2018), (Wahab et al., 2018), (Vishnu Prasad et al., 2018), (Uthrakumar et al., 2010), (Ashok, Ajith and Sivanesan, 2017), (Prasanna Neelakantan et al., 2015).

Therefore the aim of the study was to evaluate the parental preference in opting for GA over LA for dental procedures for children above the age of 5 and factors that influence them in making the decision.

MATERIALS AND METHODS

Study setting

In this retrospective study, data from 1005 patients within the Department of Paediatric and Preventive Dentistry were collected from dental records. At data extraction, all information was anonymized and tabulated onto a spreadsheet. The study was commenced after approval from the Institutional Review Board. The ethical approval number for the study was SDC/SIHEC/2020/DIASDATA/0619-0320.

Data collection

To fulfil the inclusion criteria, patients between the age group of 1-17 years (pediatric patients) should have been provided with dental treatment like pulpectomy, SS crowns or strip crowns or FMR etc. Systemically compromised children and those unwilling for the study have been excluded from the study

Sampling

Data were collected from June 2019 to March 2020 for 1005 patients who underwent dental treatment under either local or general anesthesia. The following data were retrieved from the dental records: patient age, gender, type of anesthesia used for the intervention. The records were examined for the type of anesthesia employed to treat the child by the post graduates.

Statistical analysis

The data was transferred to a host computer and processed using SPSS software version 21.0 (SPSS Inc., Chicago, IL, USA). Descriptive and inferential statistics was used to compare the type of anesthesia with age and gender of the patient. The significance level was set at 5% for the present study.

RESULTS AND DISCUSSION

The data collected was analysed using IBM SPSS software. The results are as follows. Total number of participants in the study is 1005 (sample size n=1005). Descriptive statistics was used to analyse the frequency distribution of Gender among the population. It was found that 56% were male and 44% were female participants (Figure 1). The choice of anaesthesia used by the pedodontist was analysed. General Anaesthesia was used in 5% of the cases and local anaesthesia in 95% of the cases making it more widely preferred (Figure 2). However, it must be noted that only 20% of the FMR was done under LA and GA was preferred in cases of FMR. The frequency distribution of Age was categorised into <5 years which was 36% of the population and as 5 years and above which included the remaining 64% (Figure 3).

The association between age and FMR under GA was analysed using chi square test (Figure 4). The results showed a strong significant association (P value = 0.00, $p<0.05$) between age and preference of FMR under GA, the younger the patient the more inclination towards preferring FMR under GA by the parents. The reason could be that younger children lack cognition and also possess higher fear and anxiety levels. They are dominated by the fear of the unknown. In such cases, behavioural management becomes impossible. There has been increased emphasis on communication and empathy with children who cannot be made to co-operate with behavioral management techniques (Lee and Roberts, 2003). When these strategies prove ineffective, the dentist shifts to pharmacological management by treating the child under general anesthesia (GA)which provides a safer environment (Brill, 2002). The use of rotary instruments in pulpectomy can increase the fear factor and lower tolerance threshold of the child. This can further reduce the efficiency of the treatment leading to decreased quality of obturation. (Govindaraju and Jeevanandan, 2017a, 2017b; Govindaraju, Jeevanandan and Subramanian, 2017; JeevananDan, 2017; Lakshmanan et al., 2020) When multiple teeth require pulpectomy, rotary is the preferred choice for cleaning and shaping of canals (Jeevanandan and Govindaraju, 2018b; Panchal, Jeevanandan and Subramanian, 2019). Post-operative complications after GA are inability to eat, sleepiness, pain, drowsiness, dental bleeding, vomiting, sore throat, psychological changes, nausea, coughing, and fever (Farsi et al., 2009). Recently, there is an increase in the preference of GA in treating children under GD. Supporting studies show a 65% increase of children receiving dental treatment under GA (Malden et al., 2008). As the child grows up, Confidence in coping with dental care can be rebuilt with a preventive programme afterwards, so as to minimize their future treatment requirements (Legault, 1972). However, GA should not be considered for healthy cooperative children, very young children with minimal dental needs, or in the presence of any general condition with contraindications (Duangthip et al., 2016). There are risks and complications associated with general anaesthetic procedures, and because of these, it has been considered to be a last resort for providing dental treatment. This is also related to cost and parental acceptability (Enger and Mourino, 1985).

The association between gender and FMR under GA was analysed using chi square test (Figure 5) and no significant association (P value = 0.33, $p>0.05$) was found between gender and preference of FMR under GA (Table I). This could be due to the fat that both boys and girls are equally anxious. Another factor contributing to this could be the White coat syndrome frequently associated with needles and painful memories. The new environment could be another factor. Public acceptance of GA has changed over the decades leading to an increased preference of parents to GA when compared to negative behavioral management(Almaz, Oba and Sonmez, 2019). However, less complicated interventions at a more advanced age do not require GA as the child is able to comprehend and understand better (Lee and Roberts, 2003) There has been an 88% increase in demand of anesthesiologist services by pediatric dentists over the past decade (Hicks et al., 2012). Retrospective reviews in Australasia have confirmed a trend of increasing numbers of children receiving treatment under GA. Because of this greater demand, waiting times have increased substantially, with many children waiting over 3 months before receiving treatment (Alcaino, Kilpatrick and Kingsford Smith, 2001). Quality of restorations are better under GA and also it reduces the possibility of further retreatment in the future(Eidelman, Faibis and Peretz, 2000) The absence of movement allows better results reporting only 59% follow up for procedures done under GA in contrast to a 74% follow up in patients treated under sedation (Almeida et al., 2000). Studies contradicting this report that, of the 79% treated under GA, 17% required a repeat GA intervention within two years (Oubenyahya and Bouhabba, 2019).

Small sample size, geographic isolation, socio economic factors, systemic complications contribute to the limitations of the study. Dentists prefer carrying out FMR in children under GA. There's an reported increase in children 5 years and above preferring GA for addressing their dental needs. This could be a future scope for administering general anaesthesia for dental treatments. Factors such as previous dental experiences, child's fear levels can be successfully managed this way and improved functional outcomes of treatment with no discomfort or pain during treatment. It also has the added advantage of being able to address all the needs in a single visit

Author Contributions

Author 1 (Jerusha Santa Packyanathan) carried out the retrospective study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (EMG Subramanian) aided in the

conception of the topic, participated in the study design, statistical analysis, supervised in the preparation of the manuscript and Author 3 (Ganesh Jeevanandan) helped in study design and coordinated in developing the manuscript. All the authors have equally contributed in developing the manuscript.

CONCLUSION

Within the limitations of the study, it can be concluded that strong association is seen between age and preference for full mouth rehabilitation under GA. There is however no significant association between gender and preference for full mouth rehabilitation under GA. Of those who underwent FMR under GA, 80% were male and 51% belonged to the 5 years and above age group showing a new trend where patients above 5 years are increasingly opting for treatment under GA.

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Conflict of Interest

The authors state no conflict of interest.

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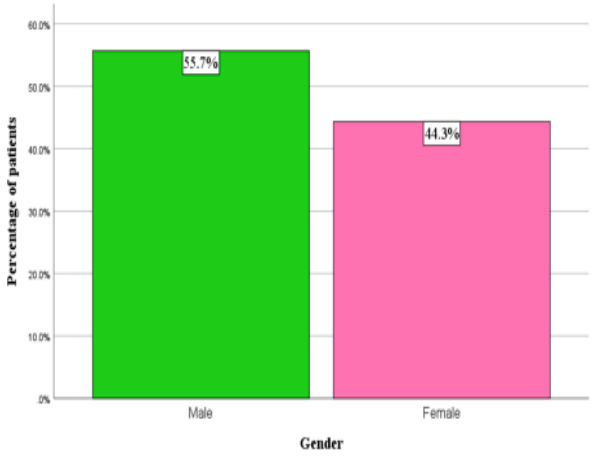

Fig.1: Bar diagram representing gender distribution of patients undergoing FMR. X-Axis represents the gender group distribution of patients undergoing FMR and Y axis represents the percentage of patients. The green column represents boys and pink column represents girls. The percentage distribution shows 55.7% were boys and 44.3% were girls.

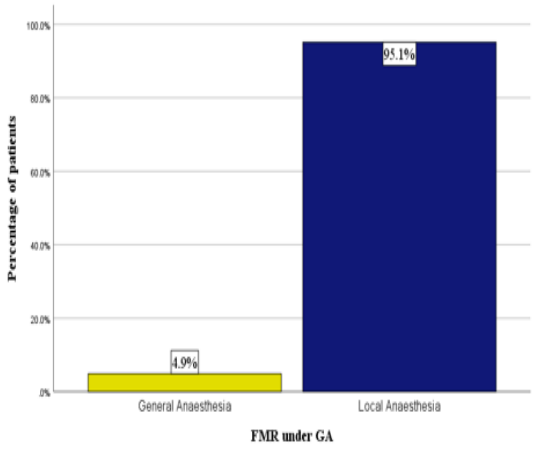

Fig.2: Bar diagram representing type of anaesthesia used in patients undergoing FMR. X-Axis represents the type of anaesthesia used in patients undergoing FMR and Y axis represents the percentage of patients. The blue column represents administration of local anaesthesia and yellow column represents administration of general anaesthesia. The percentage distribution shows 4.9% were treated under general anaesthesia and 95.1% were treated with local anaesthesia.

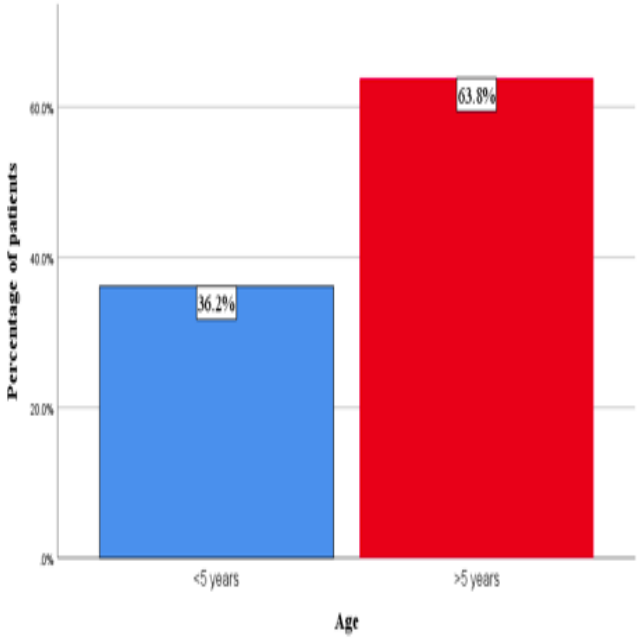

Fig.3: Bar diagram representing age distribution of patients undergoing FMR. X-Axis represents the age group distribution of patients undergoing FMR and Y axis represents the percentage of patients. The blue column represents less than 5 years of age and red column represents 5 years and above. The percentage distribution shows 36.2% were below 5 years of age and 63.8% were 5 years and above.

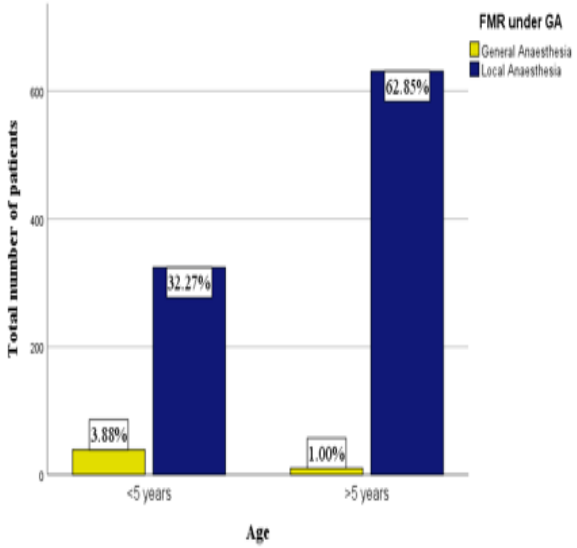

Fig.4: Bar diagram representing association between age distribution and the preference of parents in choice for anaesthesia used for children undergoing FMR. X-Axis represents the age group distribution of patients undergoing FMR and Y axis represents the total number of patients. The blue column represents general anaesthesia and red column represents local anaesthesia. This suggests that most children underwent FMR under local anaesthesia than under general anesthesia in both less than 5 years age group and in 5 years and above age group (32.27% and

62.85% respectively). This result is found to be statistically significant, Chi square test , p=0.00 (p<0.05) which is statistically significant.

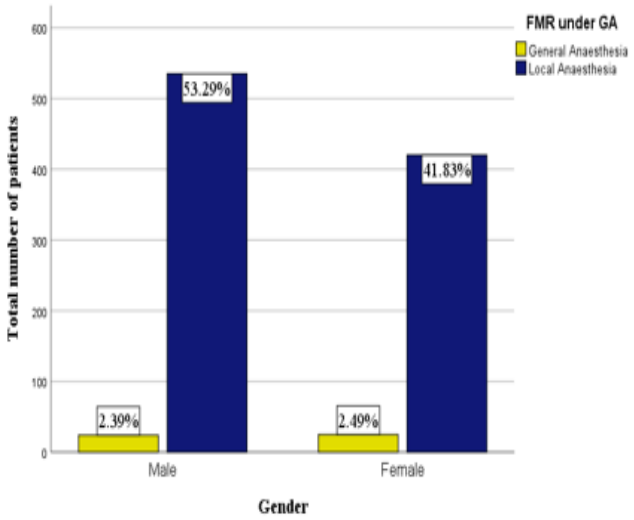

Fig.5: Bar diagram representing association between gender distribution and the preference of parents in choice for anaesthesia used for children undergoing FMR. X-Axis represents the gender group distribution of patients undergoing FMR and Y axis represents the total number of patients. The blue column represents general anaesthesia and red column represents local anaesthesia. This suggests that most children underwent FMR under local anaesthesia than under general anesthesia in both males and females (53.29% and 41.83% respectively). However, this result was not statistically significant, Chi square test , p=0.33 (p>0.05) which is not statistically significant.