



## EVALUATION OF KNOWLEDGE, ATTITUDE AND PRACTICE OF INHALATION SEDATION IN CHILDREN AMONGST PEDODONTISTS AND GENERAL DENTAL PRACTITIONERS IN MANGALORE, INDIA

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**ABSTRACT** Inhalation sedation is a minimally depressed level of consciousness that retains the patient's ability to maintain an airway independently and continuously and respond to stimulation and command. Found to be safe for use in dentistry with positive outcomes, it is used to manage anxiety in pediatric patients during procedures. Aim of our study was to determine the frequency of usage of inhalation sedation as adjunctive management technique in children by Dentists.

A Cross sectional study was conducted with pre-structured questionnaire given to Pedodontists and General dental practitioners in various Dental colleges and clinics in and around Mangalore. Total sample size was 72. Data was collected and analyzed using SPSS version 17.0 with the Test of Proportions. 32 out of 72 participants were trained in usage of Inhalation Sedation, out of which 14 used it regularly. Out of the 80.56% dentists not using it, majority said that expensive equipment, increased cost of treatment and potential complications were the main reasons for not using it. 59.72% of participants wanted to gain information, knowledge and undergo training in the usage of Inhalation Sedation. 58.33% agreed to use it in their future dental career.

70.83% believed that knowledge and training to use Inhalation Sedation is integral part of dental curriculum for undergraduates. This study showed willingness of the dentists to provide Inhalation Sedation as a behavior management technique to their patients. The lack of training, costly equipment, increased cost of treatment are the main barriers to providing such services to the patients.

**KEYWORDS :** Nitrous oxide, Conscious Sedation, Oral health, Anxiety

### INTRODUCTION

Conscious sedation is a minimally depressed level of consciousness that retains the patient's ability to maintain an airway independently and continuously and respond appropriately to physical stimulation and verbal command.<sup>1</sup> It can be inhaled, administered orally or parentally. Inhalation sedation is indicated in patients with fear and anxiety, medically compromised patients (cardiovascular diseases, cerebrovascular diseases, hepatic diseases, epilepsy and seizures) and gagging. It is also indicated in uncooperative patients, children with multiple dental procedures and children with special health care needs. It is used to alter the patient's mood, improve patient cooperation and elevation of pain threshold.<sup>2,3</sup> Inhalation Sedation is used in Restorative dentistry, scaling, root planning and curettage procedures, minor surgical procedures and extractions, endodontic and prosthodontic procedures.

Inhalation sedation has a long history of safe use in dentistry and offers the clinician predictable clinical outcomes<sup>4</sup> It is considered a preferred technique for the pharmacological management of anxiety in pediatric dental patients in the dental office.<sup>5,6</sup> We aim to analyze the percentage of dental professionals using inhalation sedation as their management technique, the reason behind its usage, and frequency. And also to make a note of the percentage of dental professionals not using this technique and why they aren't using it, irrespective of the various advantages and the emerging trend of inhalation sedation.

### MATERIALS AND METHODS

The study was conducted in the Dakshin Kannada district, Mangalore, Karnataka and the protocol was approved by the Institutional Ethics Committee of Manipal College of Dental Sciences, Mangalore. The evaluation of knowledge, attitude and practice of inhalation sedation was done among the general dental practitioners and pedodontists of different dental colleges and private practices in Mangalore. The undergraduate and postgraduate students were exempted from the study.

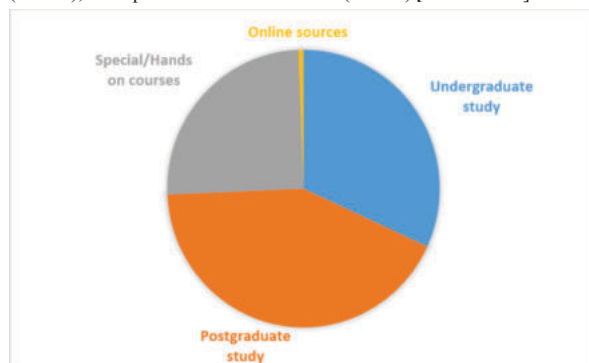
Ethical clearance was obtained and a validated questionnaire with informed consent was distributed which consisted of 16 questions. Based on the sample size formula keeping the power of 80%,  $\alpha_2$  is 1.96. On calculation we arrive at a sample size requirement of 71 for

the analysis of inhalation sedation, this was based on the article titled: "Dentists and Parents' Attitude toward Nitrous Oxide Use in Kuwait", the proportion which related to the training as lack of use of inhalation sedation is 13.8%. Keeping this as a proportion and assuming that we have 8% better training, we arrived at the following sample size. The answers provided by the members were analyzed statistically. The data collected was analyzed using SPSS version 17.0, with the help of Test of Proportions.

### RESULTS

72 dentists completed the survey out of which 35 were General Dental Practitioners and 37 were Pedodontists.

All of the Dentists in the study were aware about usage of Inhalation Sedation technique in children and main source of knowledge were found to be Undergraduate study (45.83%), Postgraduate study (61.1%), and Special/Hands-on courses (36.1%) [FIGURE-1]

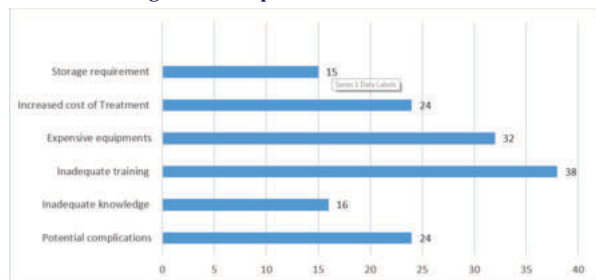


**Figure 1: Sources of Inhalation Sedation training**

Out of 72 participants only 32 were trained in the use of inhalation sedation amongst them there were only 5 (14%) of General dental practitioners and 27 (74%) of pedodontists. However it was seen that none of the General dental practitioners were using inhalation sedation in their practice and only 14 Pedodontists were using it in their

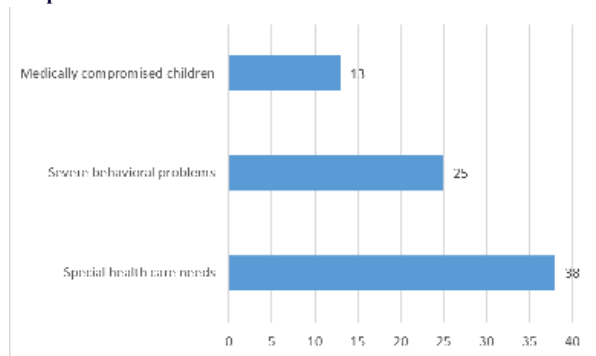
practice. Considering the frequency of use, pedodontists rarely used inhalation sedation. . When Dentists were asked about the main reason for the lack of use of Nitrous oxide inhalation sedation, the majority of respondents answered expensive equipment, increase in cost of treatment for the patients, potential complications and inadequate knowledge, moreover 52.77% of dentists in the study believed that Inadequate training of the technique is the main reason for lack of utilization of the technique. [GRAPH-1]

**Graph 1: Most common reasons for not using Inhalation Sedation in children in regular dental practice:**



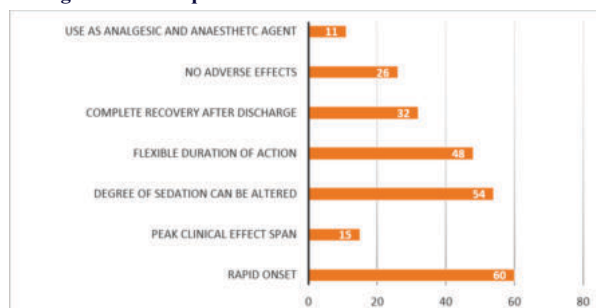
For the circumstances which require inhalation sedation being used in children, the Dentists were willing to use the technique in children with special health care needs (P=0.032) severe behavioral problems (P=0.04). [GRAPH-2].

**Graph 2: Circumstances to use Inhalation Sedation in children**



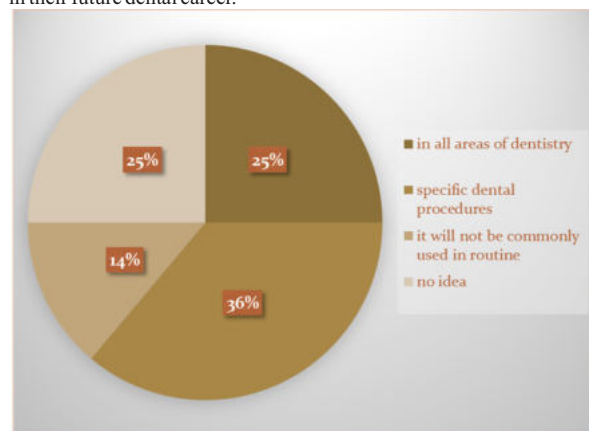
The advantage of inhalation sedation over other management techniques, was the alteration of degree of sedation, flexible duration of action and complete recovery after discharge. [GRAPH-3]

**Graph 3: Advantages of inhalation sedation over other management techniques**



77.10% practitioners in our study were aware of the possible potential complications of Inhalation Sedation and 29.9% were unaware. It was determined that inhalation sedation can be significantly used in children undergoing restorative procedure, endodontic procedure and minor surgical procedures, whereas its use for scaling, initial examination, orthodontic treatment was found to be insignificant. Only 13 (35.1%) practitioners said that they will suggest the use of inhalation sedation in children, whereas 56 practitioners were not in agreement of it. Out of 72 subjects only 15 practitioners agreed to the use of inhalation sedation as an anti-anxiety tool in adults 70.83% of the participants who completed the survey think that knowledge and training in usage of Inhalation Sedation is an important part of dental curriculum necessary for under graduate students. 59.72% were ready to receive further information, knowledge and undergo training in the

usage of Inhalation Sedation. 58.33% said that they are willing to use it in their future dental career.



**Figure 2: Participants' opinion of usage of Inhalation sedation in routine Paediatric practices in the near future.**

**DISCUSSION**

The result of this study showed that Conscious Sedation with Nitrous Oxide and oxygen can be effectively used for providing high quality dental health care in paediatric patients with special health care needs and severe behavioural problems, these results are comparable with other studies reporting success rate of 93% and 83.9% respectively.<sup>10,11</sup>

Holroyd declared that conscious sedation was a viable and cost-effective alternative to general anesthesia for children requiring extractions, especially orthodontic extractions. Instead, in the present study, dentist performed several types of dental procedures, both in deciduous and in permanent dentition, expanding the field of use, with the aim of restoring all aspects of oral health.<sup>12</sup>

88.8% Practitioners in our study were aware about the potential complications of inhalation sedation, which is similar to the results obtained by Galeotti A.<sup>2</sup>

Inhalation Sedation is not commonly used by the practitioners because of possibility of potential complications , inadequate knowledge and training provided to and acquired by the dental practitioners, Alkandari SA etal in their study also reported a similar finding and the reasons being a shortage of facilities/equipment and lack of dentist training/knowledge <sup>7</sup>. Concerning nitrous oxide sedation safety, the majority of dentists agreed on its safety, which is consistent with previously published reports <sup>7</sup>. Our analysis revealed that , the utilization of Inhalation sedation as a single agent provides effective and safe conscious sedation for pediatric patients , Possible reasons for its effectiveness are that inhalation sedation calms agitated pediatric patients, suppresses their anxiety, and decreases unpleasant dental care memories and there is complete recovery after discharge<sup>8</sup>.

**CONCLUSION**

Conscious sedation can be considered safe, practical and effective both for Pediatric very young and fearful patients with low pain tolerance and for patients with intellectual disability.

Evidence suggests that there is a need to deliver appropriate knowledge and provide hands on training to dental professionals so that this technique can be used as a useful alternative to General anesthesia even in pre cooperative children.

**REFERENCES**

1. D'Alessandro, G., Alkhamis, N., Mattarozzi, K., Mazzetti, M., & Piana, G. (2016). Fear of dental pain in Italian children: child personality traits and parental dental fear. *Journal of public health dentistry*, 76(3), 179–183. <https://doi.org/10.1111/jphd.12127>
2. Galeotti, A., Garret Bernardin, A., D'Antò, V., Ferrazzano, G. F., Gentile, T., Viarani, V., Cassabgi, G., & Cantile, T. (2016). Inhalation Conscious Sedation with Nitrous Oxide and Oxygen as Alternative to General Anesthesia in Preoperative, Fearful, and Disabled Pediatric Dental Patients: A Large Survey on 688 Working Sessions. *BioMed research international*, 2016, 7289310. <https://doi.org/10.1155/2016/7289310>
3. Ogawa, Y., & Misaki, T. (2011). *Masui. The Japanese journal of anesthesiology*, 60(3), 322–329.
4. American Academy of Pediatric Dentistry (2013). Guideline on use of nitrous oxide for pediatric dental patients. *Pediatric dentistry*, 35(5), E174–E178.
5. Hosey, M. T., & UK National Clinical Guidelines in Pediatric Dentistry (2002). UK National Clinical Guidelines in Paediatric Dentistry. Managing anxious children: the use of conscious sedation in paediatric dentistry. *International journal of paediatric dentistry*, 12(5), 359–372. <https://doi.org/10.1046/j.1365-263x.2002.03792.x>

6. Hallonsten, A. L., Koch, G., & Schröder, U. (1983). Nitrous oxide-oxygen sedation in dental care. *Community dentistry and oral epidemiology*, 11(6), 347–355. <https://doi.org/10.1111/j.1600-0528.1983.tb01390.x>
7. Alkandari, S. A., Almousa, F., Abdulwahab, M., & Boynes, S. G. (2016). Dentists' and Parents' Attitude Toward Nitrous Oxide Use in Kuwait. *Anesthesia progress*, 63(1), 8–16. <https://doi.org/10.2344/14-00008.1>
8. Hulland, S. A., Freilich, M. M., & Sándor, G. K. (2002). Nitrous oxide-oxygen or oral midazolam for pediatric outpatient sedation. *Oral surgery, oral medicine, oral pathology, oral radiology, and endodontics*, 93(6), 643–646. <https://doi.org/10.1067/moe.2002.124763>
9. Daher, A., Hanna, R. P., Costa, L. R., & Leles, C. R. (2012). Practices and opinions on nitrous oxide/oxygen sedation from dentists licensed to perform relative analgesia in Brazil. *BMC oral health*, 12, 21. <https://doi.org/10.1186/1472-6831-12-21>
10. Perumal, K., Kumar, S. (2017) Knowledge and Attitude among Dental Undergraduate Students towards Sedation in Dental Practice. *Int. J. Pharm. Sci. Rev. Res* 2017 Jun; 44(1):62-5
11. Lyratzopoulos, G., & Blain, K. M. (2003). Inhalation sedation with nitrous oxide as an alternative to dental general anaesthesia for children. *Journal of public health medicine*, 25(4), 303–312. <https://doi.org/10.1093/pubmed/fgd068>
12. Holroyd I. (2008). Conscious sedation in pediatric dentistry. A short review of the current UK guidelines and the technique of inhalational sedation with nitrous oxide. *Paediatric anaesthesia*, 18(1), 13–17. <https://doi.org/10.1111/j.1460-9592.2007.02387.x>