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RESEARCH ARTICLE

PARENTS AND CHILDREN PERCEPTION TOWARDS THE NITROUS OXIDE INHALATION SEDATION AS BEHAVIOURAL MANAGEMENT TECHNIQUE DURING PEDIATRIC DENTAL CARE

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ABSTRACT

Aim: Nitrous oxide-oxygen sedation offers the clinician a more predictable clinical outcome. The aim of the study was to find the opinion, attitude, beliefs, and existing knowledge of parents about nitrous oxide inhalation sedation. **Methods:** 50 parents aged 20 to 60 years accompanying a single child aged five to nine years were included in the study. Both parents and children were shown a video in separate rooms regarding nitrous oxide sedation as a pharmacological aid in regular dental treatment. A pretested questionnaire consisting of 21 questions with multiple choice type responses was asked to fill by all participants after the video presentation. **Results:** Completed questionnaires were statistically analysed using chi square test ($P < 0.05$). A significant declining trend in parental acceptance was noticed with increasing age of parents ($P = .001$). Parental education also showed a significant association with their acceptance of this sedation technique ($P = .024$). 93.3% of children liked the content of the video and, would like to get their treatment done in the same way. **Conclusion:** Education played a role in existing knowledge about sedation and perception about the safety of nitrous oxide sedation. Parents feel sedation is safe in the dental office.

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INTRODUCTION

A high percentage of children presenting to dental office are restless and agitated due to the fear of dental procedures¹. Different negative behaviours e.g. fear of the unknown, fear of parental separation, anxiety, timidity and resistance, by children during dental visits should be managed differently which is an important factor in delivering safe, effective and pleasant dental care. Thus, behaviour management is the cornerstone of treatment in pediatric dentistry. The success of treatment largely depends on the establishment of good rapport between dentist and child, whether in terms of the child's co-operation in undergoing treatment or in following prevention advice.² Various non-pharmacological and pharmacological techniques are recommended by the American Academy of Pediatric Dentistry (AAPD). They are to enable the dental practitioner to perform quality oral health care on uncooperative pediatric patient. The techniques alleviate fear and anxiety, guide the child to be cooperative and nurture a positive dental attitude in them.³

When the non-pharmacological approaches, such as age-appropriate communication, tell-show-do, nonverbal communication, positive reinforcement, voice control, distraction and parental separation, cease to function or are not accepted by parents, the pharmacological techniques become the available option. Of the various pharmacological approaches used, nitrous oxide sedation offers the clinician a more predictable clinical outcome.⁴ Its use is not limited to hospital settings, unlike deep sedation or general anesthesia.⁵ Nitrous oxide sedation is a safe and enhances effective communication.⁶ The one advantage unique to N₂O is the rapid recoverability of the drug from the patient as its action is characterized by a rapid onset and fast recovery. In addition to that, the gas is easily titrated accordingly until the desired sedation is achieved. Both the AAPD and the European Academy of Paediatric Dentistry (EAPD) recommended a titration technique, which includes the administration of 100% oxygen for one to two minutes, followed by titration of nitrous oxide in 5-10% increments every one minute or so and a minimum of 30% oxygen is delivered all the time.⁷

The most common noted adverse effects are nausea and vomiting (seen in 0.5% of patients). Nitrous oxide sedation has been accepted as a popular pharmacological behaviour management technique (BMT) in many Western countries. In 2004, a survey of the AAPD revealed that 89% of pediatric dentists utilize nitrous oxide sedation, with most of them using it more than 5 times per week.⁸ Moreover; this sedation technique is the second most accepted BMT by parents in the United States.⁹ On the contrary, several studies showed that the majority of parents in Middle East countries did not accept nitrous oxide sedation as a BMT.¹⁰ In India most parents prefer non pharmacological techniques over pharmacological ones, and nitrous oxide sedation was rated as one of the less acceptable techniques.¹¹ To improve the awareness, the display of attention-grabbing videotaped dental procedure performed under nitrous oxide sedation might incorporate a sense of calmness after watching and make the parents realise that their child was safe. The purpose of this study was (1) to find the opinion, attitude, beliefs, and existing knowledge of parents about nitrous oxide inhalation sedation after watching a videotape of a dental procedure done under nitrous oxide inhalation sedation and (2) to know the effect of education of parents and prior sedation experience of a child on knowledge of parents about nitrous oxide inhalation sedation.

METHODS

The present study was conducted with prior approval from the ethical committee of the institute (Ghaziabad, Uttar Pradesh, India). All parents who agreed to participate received verbal and written information about the purpose of the study. Upon their approval to participate, informed consent was obtained from each parent. The criteria for participation were parenthood, literacy, enthusiasm to participate, ability to view the videotape and minimum age of 20 years. A total of 50 parents aged 20 to 60 years accompanying a single child aged five to nine years were included in the study. The mentioned sample size in the study calculated according to the following formula:

$$n = \frac{2S_p^2 [Z_{1-\alpha/2} + Z_{1-\beta}]^2}{\mu_d^2}$$

$$S_p^2 = \frac{S_1^2 + S_2^2}{2}$$

S_1 = Standard deviation of Group 1, S_2 = Standard deviation of group 2, μ_d^2 = Mean difference between the samples, α = Level of significance and $1-\beta$ = Power. All the participants visiting to the department for dental treatment were shown a video of a dental procedure in which, administration of local anaesthesia for pulp therapy was done under nitrous oxide inhalation sedation for a child who was indicated for pharmacological behaviour management. The video was clipped in a separate room which comprises of a sedation unit (Matrx, USA) along with scavenging system and audiovisual distraction. The language used in the videotape was Hindi. Following the demonstration of the video, questionnaires in English/Hindi were distributed to the parents who accompanied their child for the treatment. The questionnaire developed by the authors consisted of 21 questions or statements with multiple choice type responses. The questionnaire was pretested to ensure that respondents could understand the questions and respond in a consistent manner.

Basic demographic information (age and education level) was collected along with past sedation experience with categorical response types. Few set of another questions included likeliness of the content of the video which was shown to the participants, acceptance of treatment under nitrous oxide in future. The last question was specified for the child if they liked the content of the video and would like to undergo any treatment under similar conditions. To prevent bias in the study, the video was shown separately to children and parents and were asked to fill the questionnaire together in a room. However, an examiner was present at all times while participants filled the questionnaire, to assist them regarding any queries.

Statistical analysis: Only complete questionnaires were used. Data were entered into a spreadsheet and statistics was generated using SPSS 16.0 (SPSS Inc. Chicago, IL, USA). Percentage Statistics was generated for all categorical variables. Cross tabulations and independent Chi square statistics were used to examine relationships between categorical variables in the questionnaire. $P < 0.05$ was considered statistically significant.

RESULTS

Of the 50 parents who agreed to participate in the study, 45 returned completed questionnaires answering all acceptability questions. The results reported are from those 45 parents. Thirty-eight parents were female and seven were male. The mean age of parents was 39 years. When asked to report the highest level of education they had completed, 18 parents reported earning a graduation degree, 3 indicated completing post graduation, 21 reported completion of high school, 3 revealed completing less than the sixth grade. Each parent's social status was calculated according to Muhammad S et al.¹, which includes age, gender, education, nationality and socioeconomic status. The details and demographics of the survey study group are shown in Table 1. The majority of these patients were accompanied by their mother who were in their third decade of life (51.1%). Lack of awareness about nitrous oxide sedation (79%) was seen by the parents. Most parents were not even aware that it was an option as a BMT (75%). More than half of parents who had prior information about the general anaesthesia procedure (66%) in our study would prefer nitrous oxide over general anesthesia if both were suggested by the treating dentist. Statistically significant results were observed in parental acceptance of Nitrous oxide sedation ($P = .001$). A declining trend followed as the parental age increased. Parental education also showed a significant association with their acceptance of this sedation technique: the higher their education level, the more accepting parents were toward the use of nitrous oxide sedation for their children ($P = .024$). Parents who were postgraduate found it to be acceptable if their child sleeps, cries or scream during the procedure. Furthermore, socioeconomic status of parents had no relation with their acceptance of nitrous oxide sedation ($P > .001$). Parents whose children had well past dental experience (66.7%) found nitrous oxide inhalation sedation safe and would liked to get the treatment under similar conditions which was statistically highly significant ($p < 0.001$). Previously sedated children were 26.5 % of total patients and 100% of them agreed to get their treatment done under nitrous oxide inhalation sedation. Parents, who liked the content of the video, which was scored using Visual Analog Scale (VAS),

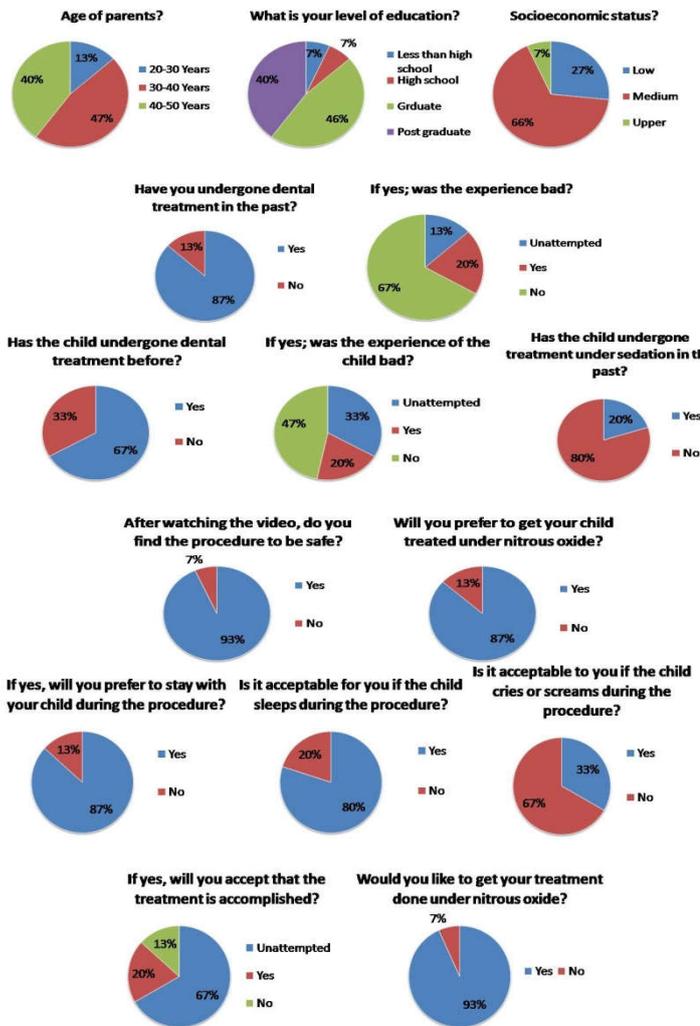


Figure 1, 2, and 3: Questionnaire on parental perception for nitrous oxide sedation

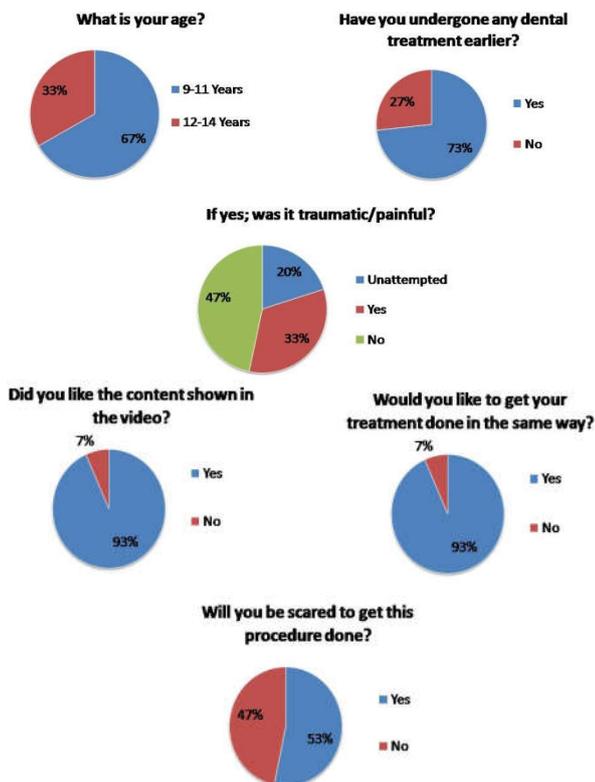


Figure 4 and 5: Questionnaire on children's perception for nitrous oxide sedation

Table 1. Demographic information of the parents participating in the study. According to Muhammad *et al.* (2011)

Variables	n	(%)
Age		
20-30 years	4	8.9
30-40 years	23	51.1
40-50 years	18	40
Gender		
Male	7	15.5
Female	38	84.4
Education		
Less than high school	3	6.7
High school	21	46.7
Graduate	18	40
Post Graduate	3	6.7
Socioeconomic status (On basis of income)		
Low	12	26.7
Medium	30	66.7
High	3	6.7
Nationality		
Indian	45	100
Non-Indian	0	0

were willing to get the treatment done under nitrous oxide sedation in their future visits and this association was found to be statistically significant. 93.3% of children liked the content of the video, which was scored using VAS, would like to get their treatment done in the same way, but 53.3% amongst them were scared to get the same procedure (administration of local anaesthesia) done as shown in the video.

DISCUSSION

The relationship between the child–parent–dentist triangle is dynamic.¹² Parents have autonomy over treatment decisions such as the treatment options and the methods of delivering it; likewise, child's expectations and attitudes toward oral health can be shaped by parents' words and actions.¹² In addition, to accomplish treatment successfully, dentists use a variety of techniques to manage the behaviour of children. Hence, it is critical to recognize that which of the various treatment techniques are acceptable to the parent and also to determine factors that have an impact on approval or disapproval of that particular technique. Modern parents are willing to abdicate disciplinary actions and opt for pharmacological techniques. In a study by Eaton *et al* the most acceptable pharmacological BMT by parents was nitrous oxide inhalation sedation over general anaesthesia.¹³ Even though there is an impressive increase in parental acceptance for pharmacological behaviour management techniques in the United States, studies conducted in different parts of the world did not accordingly follow the trend. In Jordan, tell show do technique, positive reinforcement, and distraction were profoundly approved by parents whereas hand over mouth, nitrous oxide, conscious sedation and general anaesthesia were least approved.¹⁴ In the view of above, Bhandari R. et al conducted a study to find the opinion, attitude, beliefs, and the existing knowledge of parents of North India (Himachal Pradesh suburban city) about conscious sedation and concluded that parents feel sedation is safe in the dental office as an adjunct to dental treatment.⁹ Our present study showed the lack of awareness in majority of parents residing in Ghaziabad (Uttar Pradesh, India) that nitrous oxide sedation is used as a BMT. Yet, when this BMT is recommended by the treating dentist, more than half of parents accept its usage for their children.

Younger parents and increasing education level were the main factors associated with improved acceptance rates.¹⁵ In our study majority of participants were in their third decade of life and 86.9% amongst them accepted the nitrous oxide sedation as a behaviour management technique. The reason for this might be that the younger generations feel perfectly comfortable in accepting newer technologies. Almost all parents in our study, who reported that their child had nitrous oxide sedation before, were pleased with their child's experience. All previously sedated children agreed to get their treatment done under nitrous oxide inhalation sedation (26.5%). Therefore, it is the role of the dentist treating pediatric patients to explain this sedation as a BMT and offer it to parents whenever it is suitable and indicated. The social status of the subjects in the present study was middle class and was not significantly related to the acceptance of nitrous oxide inhalation sedation. In concordance with several previous studies, our study has also considered a VAS rating of less than 50 mm (based on a 100-mm line) to indicate that the procedure is acceptable to parents.¹⁶ Both Murphy et al and Lawrence et al found that the VAS scale was reliable in measuring parental acceptance.^{14,15} Audio visual aids are effective tool in providing realistic experience to the learners.

As said "one seeing is worth than a hundred words" so, showing a videotape was used as a strategy to manage parents with dental anxiety and dental phobia. In view of the above, Peretz and Zadik concluded that most parents preferred an explanation before behaviour management was considered for their children, so that a detailed explanation would increase the parent's acceptance to firm techniques.¹⁷ Also, Scott and Garcia-Godoy reported that an informed parent was more likely to show greater acceptance of a BMT and that hand over mouth and papoose board showed a statistically greater degree of no acceptance than all other BMT.¹⁸ Lastly, nitrous oxide produces a mild analgesic effect at subanesthetic concentrations, unlike other anesthetics. Nitrous oxide indirectly binds to opioid receptors by stimulating the release of enkephalins, thus trigger the descending noradrenergic pathways.¹⁹ Analgesic efficacy suggests that 30% nitrous oxide delivered by full mask is equivalent to 10 to 15 mg morphine.²⁰ With its long history of safety in medicine and dentistry, nitrous oxide sedation can be used safely for almost all patients routinely treated in the ambulatory dental setting. Larger samples of a population are required for making a recommendation on how nitrous oxide oxygen inhalation sedation is perceived by parents and children in India for regular pediatric dental care.

CONCLUSION

- Parents feel sedation is safe in the dental office.
- Education played a role in existing knowledge about sedation and perception about the safety of nitrous oxide sedation.
- Knowledge is better about nitrous oxide sedation among previously sedated child's parent than those whose child has never been sedated before.

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