RESEARCH PAPER

Evaluation of Various Treatments Done Under Nitrous Oxide Sedation in Pediatric Patients -A Retrospective Study

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ABSTRACT

Purpose - The aim of this study is to analyze dental treatment cases in the Department of Pediatric and Preventive Dentistry at ITS Dental College and Hospital, conducted under nitrous oxide sedation, over a 4-year period.

Methods- All the data was collected via Orion software and filtered through Microsoft excel by the author itself.

Results – There was a statistically highly significant difference seen for the frequencies between the groups ($p<0.01$) with higher frequency for PULPECTOMY with age group 1, EXTRACTION with age group 2 & 3

Conclusion: Nitrous oxide sedation is an effective tool for various treatment procedures in pediatric setup like extractions, pulpectomy, minor laser procedures, restorations etc. that can be done with ease and is more comfortable for the patient, the major advantage being reduction in the anxiety during any painful procedure.

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INTRODUCTION

One of the biggest challenges for any dentist is to treat a paediatric patient; as paediatric patient differs from adult patients not only psychologically but emotionally and physically as well.[1] The apprehension and anxiety a child perceives during the treatment become a deterrent in delivering quality treatment.[2] To instill a positive attitude in children following a dental visit is indeed a difficult task.[3]

Paediatric dentistry has over the years evolved the behaviour management techniques. Though innumerable researches have been undertaken, varied behaviour management techniques have been studied but ultimately there is no fixed formula which works on all paediatric patients and even on the same patient at different appointments.[4] The American Academy of Paediatric Dentistry

(AAPD) guidelines have divided the management approach for uncooperative child into basic and advanced while the basic behaviour guidance includes Tell Show Do, voice control, classical conditioning, positive reinforcement, and nitrous oxide and oxygen inhalation analgesia: the advanced behaviour guidance includes protective stabilization and General Anesthesia.

Both these kinds of techniques are equally important to alter the behaviour of an uncooperative child in the field of Paediatric Dentistry. However, it has been noted that there are a greater number of studies on pharmacological management techniques as compared to pharmacological techniques which have been addressed at the American Academy of Paediatric Dentistry conference 2003.[5]

The practice of using Nitrous oxide is notable because of its impeccable safety record. It has a very simple method for administration in the patients through the medium of a nasal hood. The gases that are used in inhalational sedation have minimal solubility in the body and are eliminated instantaneously within few minutes. When used as a mild analgesic and sedative, N2O is administered with oxygen from safe, modern equipment that allows no more than 70% N2O and no less than 30% O2 to be delivered at any time [6]. The patient is mildly sedated and responds to verbal commands. Protective defenses such as the cough and gag reflexes remain intact; clinical action and elimination are rapid. Recovery is complete over time.

Our knowledge is still at infancy about type of treatment procedures practiced under nitrous oxide inhalation sedation in retrospective way.

The aim of this study is to analyse dental treatment cases in Department of Paediatric and Preventive dentistry at ITS Dental college and Hospital done under nitrous oxide sedation during last 4 years.

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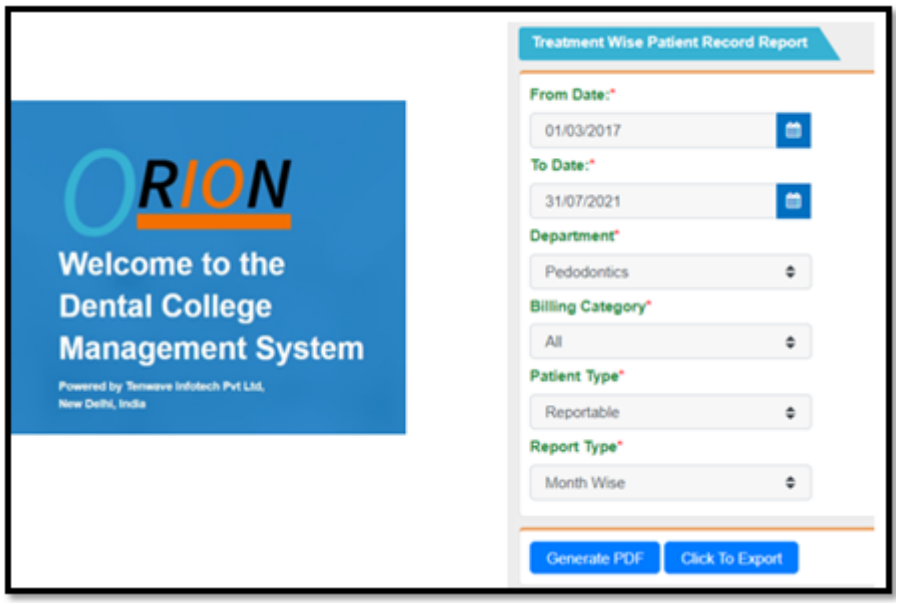
MATERIAL AND METHODOLOGY:

All the data was collected via Orion software and filtered through Microsoft excel by the author itself. (Fig 1)



RESULTS

On the basis of data obtained from January 2017 till April 2021, a total of 1498 individuals underwent various procedures under nitrous oxide inhalation sedation.

From the data collected, the frequency of nitrous oxide inhalational sedation used, based on gender is more in male,851(56.8%) than female, 647 (43.2%). (Table 1- 7)

Based upon the procedure undertaken under inhalational sedation it was observed that extraction was the procedure that was mostly done followed by pulpectomy and was used least for minor laser procedures. Thus, the more invasive and painful procedures that required more amount of local anaesthetic was more successfully done under inhalational sedation.

There was a statistically highly significant difference seen for the frequencies between the groups ($p<0.01$) with higher frequency for PULPECTOMY with age group 1, EXTRACTION with age group 2 & 3

There was a statistically nonsignificant difference seen for the frequencies between the groups ($p>0.05$)

DISCUSSION

Nitrous oxide is the only inhalation agent currently in routine use for conscious sedation in dental practice. It was discovered by Joseph Priestly in 1772 and first used as an anaesthetic agent for dental exodontias by Horace Wells in 1844. In the 1930's, nitrous oxide was used for sedation purposes.[7,8] It was not until the 1960's, when Harold Langa pioneered the modern practice of Relative Analgesia that nitrous oxide came into widespread use as an inhalation sedation agent in dentistry. Nitrous oxide is a sweet-smelling colourless gas inhaled in combination with oxygen. It is a weak anaesthetic agent and is extremely useful in relieving anxiety. The use of nitrous oxide offers the clinician a safe and relatively easy technique to use as an adjunct to clinical care. The inhalation of nitrous oxide gas combined with oxygen provides the patient with a sedative –euphoric state of being.[9] The use of inhalation sedation with nitrous oxide and oxygen is termed as relative analgesia. Many of paediatric dentists all over the world are nowadays using nitrous oxide and oxygen for sedation of patients.

The results of this study showed that conscious sedation with nitrous oxide and oxygen can be effectively used for providing high quality dental health care in a large pediatric sample constituting pre-cooperative and fearful patients and of disabled patients, who fail to accept dental treatment, in alternative to general anaesthesia.[10]

This is a retrospective study in which we collected the data from ORION the dental college OPD management software, on the basis of data obtained from January 2017 till April 2021, a total of 1498 individuals underwent various procedures under nitrous oxide inhalation sedation. The data was filtered out and divided according to the procedures which underwent nitrous oxide sedation like extractions, Pulpectomies, crowns, laser therapy etc. and were analysed statistically. The results clearly show that nitrous oxide sedation was used to modify the behaviour of the child and to make the child more comfortable during the treatment which needed local anaesthesia or were painful procedures.

In this study, when examining the differences in the tendency to use sedation between gender, it was found that male patients preferred to use sedation methods with a greater depth of sedation than female patients. There are differences in the results of various studies but there are studies that show no significant difference in the caries incidence between the two sexes. Therefore, it is thought

that psychological factors are the cause of the preference for treatment under deep sedation in boys than in girls, rather than due to the difference in the depth of dental caries. Choi and Park reported that as a result of a study of 35 children, boys showed higher anxiety than girls in a dental environment. In addition, Boyar and Cross found that the behaviour of boys before isolation from their parents was worse than that of girls. It should be kept in mind that caregivers and dentists consider the application of a deeper sedation method when treating boys due to the higher anxiety level and poor behaviour compared to girls. As a result of analysing whether pulpal treatment was performed and the use of sedation method, the frequency of pulpal treatment was higher among all treatments as the depth of sedation was greater.[11]

According to a study by Lytle and Lytle, pulpal treatment in adults caused greater fear in patients than when only restoration was performed. As such, dental pulp treatment is recognized as a situation that causes dental fear compared to general restorative treatment even for caregivers. Considering this, it is thought that the tendency to prefer a deeper sedation method when performing pulpal treatment is because parents are greatly concerned that their child will feel fear about endo- treatment.[11]

CONCLUSION

Nitrous oxide sedation is an effective tool for various treatment procedures in paediatric setup like extractions, pulpectomy, minor laser procedures, restorations etc. that can be done with ease and is more comfortable for the patient, the major advantage being reduction in the anxiety during any painful procedure.

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TABLES

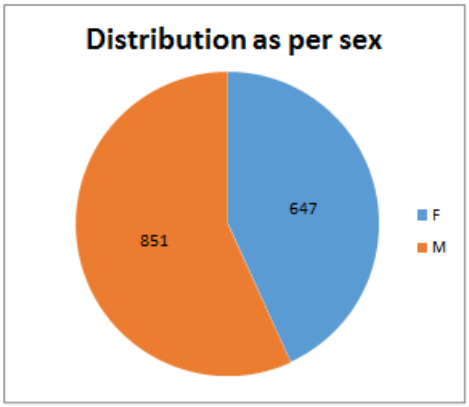

TABLE-1

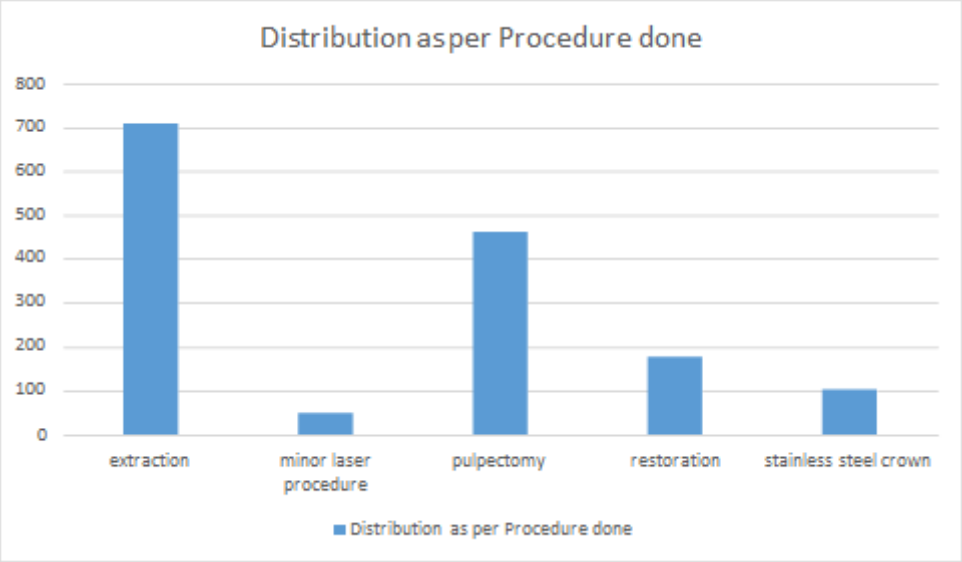

Table-2 (Distribution as per Procedure done)

	N	Minimum	Maximum	Mean	Std. Deviation
Age	1498	1	20	6.66	2.815

Table-3 (Table showing mean age of the patients)

Procedure done	**Age group**			
	1	2	3	Total
EXTRACTION	135	386	186	707
MINOR LASER PROCEDURE	13	28	9	50
PULPECTOMY	281	174	6	461
RESTORATION	102	54	21	177
STAINLESS STEEL CROWN	67	30	6	103
TOTAL	598	672	228	1498

TABLE-4 (Inter age comparison of number of procedures done)

	Value	**df**	**P value**
Chi-Square	319.188	8	.000

TABLE-5(Chi-Square Tests)

		SEX		
		F	M	Total
Procedure done	EXTRACTION	292	415	707
	MINOR LASER PROCEDURE	27	23	50
	PULPECTOMY	195	266	461
	RESTORATION	83	94	177
	STAINLESS STEEL CROWN	50	53	103
	Total	647	851	1498

TABLE-6 (Procedure done according to gender)

	Value	**df**	**P value**
Chi-Square	5.750	4	.219

TABLE-7 (Chi-Square Tests)