KNOWLEDGE, ATTITUDE AND PRACTICES OF DENTAL STUDENTS AND PRACTITIONERS TOWARDS CONSCIOUS SEDATION - A CROSS-SECTIONAL STUDY

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ABSTRACT

BACKGROUND: Dental professionals work effectively and efficiently to impart a positive behavioral attitude towards dental treatment in children with oral health care needs. The main objective of sedation in pediatric dentistry is to reduce fear, minimize physical discomfort and control behavior for dental procedures. The present study was carried out to evaluate the knowledge, attitude and practices of dental students and practitioners towards conscious sedation.

METHODS: A descriptive cross-sectional survey was conducted among 384 dental professionals that included undergraduate, postgraduate dental students and dental practitioners across Tamil Nadu, India. The data was collected through self-constructed questionnaires consisting of 28 questions in English and circulated via online platform on account of COVID-19 pandemic. Every respondent was informed of the purpose of the study and participation was purely voluntary.

RESULTS: The mean age of the study participants was found to be 25.99 ± 12.34 years (mean ± S.D) comprising of 184 (48%) males and 200 (52%) females. Majority of the study participants acquired knowledge about conscious sedation through dental curriculum only. About 46.1% considered conscious sedation over general anesthesia for all dental procedures like restoration, scaling, minor bone fractures and minor surgeries, 40.1% preferred midazolam and 78.4% recommend Nitrous oxide sedation as effective technique. Most of the study participants believed oral sedation was easier to administer, required less expertise and skill with minimal or no complication.

CONCLUSION: This study reveals lacunae in adequate knowledge and understanding among the practitioners. The result of this study thus provides an insight on need for strategies like incorporating guidelines in dental curriculum, organizing continuing dental education programs and workshops to provide knowledge and incorporate positive attitude among the dental professionals to offer effective conscious sedation in children necessitating oral health care.

KEYWORDS: Dental anxiety, Midazolam, Pediatric dentistry, general

INTRODUCTION:

Management of oral health care needs among children is a demanding task owing to several factors such as anxiety, fear associated with anticipation of pain and age-specific behavioral patterns^{1,2}. The process by which dental health care professionals work effectively and efficiently to impart positive behavior attitude towards dental treatment in children is often termed as behavior management³. Behavioral modification during dental treatment can be achieved by non-pharmacological methods like communication techniques, contingency management, coping, assimilation, behavioral shaping and modeling methods⁴ as well as pharmacological methods such as pre-medications, deep sedations, conscious sedations, general anesthesia and anxiolytic or minimal sedation methods^{5, 6}. The AAPD (American Academy of Pediatric Dentistry) recommends use of general anesthesia or conscious sedation techniques in acute anxiety situation, extensive dental rehabilitation procedure of longer duration, severe treatment procedural situations, extremely uncooperative child behavior, and an immature cognitive pattern in a child or in case of children with physical or physiological impairments^{7,8}. Thus the main objective of sedation in pediatric dentistry is to reduce fear, minimize physical discomfort and control behavior for dental procedures.

General anesthesia is preferred in children less than 4 years of age, patients with special health care needs, medically compromised conditions including respiratory illness, hepatic and renal diseases, epilepsy and with communicating incapability. However, the major drawback of this technique includes prolonged unconsciousness, depressed vital signs and protective reflexes and need for specific equipment and well trained anesthetic team^{9, 10, 11}. In order to overcome these serious complications, conscious sedation was introduced to perform high quality dental care treatment with use of drugs that produce a state of CNS (Central nervous system) depression with maintained verbal contact through the entire treatment period of sedation. Conscious sedation is commonly preferred to reduce anxiety, increase pain threshold, to maintain stable vitals and reflexes and to achieve mood alteration. It is indicated in patients with severe dental anxiety and phobia, stress inducing medical conditions, children lacking psychological or emotional maturity requiring prolonged traumatic dental procedures^{12, 13} but contraindicated in uncooperative and medically compromised children^{14, 15}. It is highly suggested that pediatric dental professionals and dental students should have a comprehensive theoretical knowledge on anatomic and physiological differences in children,

prerequisites for conscious sedation with some practical understanding of patient selection, assessment and preparation with familiarity towards various sedation techniques such as inhalation, oral, intramuscular, sub-mucosal and several other recommended modes of administration as required. Thus, the present study was carried out to evaluate the knowledge, attitude and practices of undergraduate and post graduate dental students and dental practitioners towards conscious sedation.

METHODOLOGY:

A cross-sectional questionnaire survey was conducted among 384 dental professionals that included undergraduate and postgraduate dental students and dental practitioners across Tamil Nadu, India.

ETHICAL CLEARANCE

The study was conducted following the Helsinki declaration as revised in 2013. The protocol was submitted to the ethical committee before the start of the study and approval was obtained from Institutional Review Board.

QUESTIONNAIRE DEVELOPMENT:

The required information was collected through published scientific articles pertaining to the study and specially designed structured questionnaire, comprising of 28 questions divided into 2 sections was prepared. The first section was used to record the demographic details such as age, gender, qualification and year of study/experience of practice. The second section consisted a combination of selected responses to certain questions and also few close ended questions (Yes / No/ don't know) related to knowledge, attitude and practices towards conscious sedation.

SAMPLING METHODOLOGY AND DATA COLLECTION

A non-probabilistic convenient sampling methodology was used to recruit the participants for the present study. Since this study was conducted during COVID-19 Pandemic lockdown period, online Google forms were generated and distributed through social media platforms. The questionnaire encompassed a separate section which explained the nature and purpose of the study along with an informed consent form. The respondents were requested to provide appropriate answers and were assured of anonymity and confidentiality. The filled questionnaire was collected and evaluated.

STATISTICAL ANALYSIS

The data was analyzed using Statistical Package for Social Sciences, IBM Corporation, SPSS Inc., Chicago, IL, USA Version 21 software package (SPSS). Descriptive analysis with frequency, percentage, mean and standard deviation was computed. Pearson Chi-square test and Fisher's Exact test was used to assess the level of significance at $p < .05$.

RESULTS

The age of the participants in the present study ranged between 19 to 50 years with a mean age of 25.99 ± 12.34 years (mean $\pm$ S.D) comprising of 184(48%) males and 200(52%) females. Among the study participants, 89(23%) were BDS practitioners, 55(14%) were MDS practitioners, 178(47%) were UG students and 62(16%) were PG students. Around 70(18%) were studying in third year, 45 (12%) were studying in final year, 83(22%) were interns, 61(16%) were Post-graduate students, 80(21%) were dental practitioners under 5 years of experience, 31(8%) were practitioners with 5-10 years of experience, and 14(3%) were practitioners with more than 10 years of experience. The demographic details of the study participants is given in table 1.

Demographic character		
AGE	MEAN	25.99
	SD	12.339
		N (%)
GENDER	MALE	184(48%)
	FEMALE	200 (52%)
QUALIFICATION	BDS	89(23%)
	MDS	55(14%)

YEAR OF STUDY / EXPERIENCE OF PRACTICE	UG STUDENTS	178(47%)
	PG STUDENTS	62(16%)
	THIRD YEAR	70(18%)
	FINAL YEAR	45(12%)
	INTERN	83(22%)
	POST GRADUATE	61(16%)
	DENTAL PRACTITIONERS UNDER 5 EXPERIENCE	80(21%)
	5-10 YEARS OF EXPERIENCE	31(8%)
	MORE THEN 10 YEARS OF EXPERIENCE	14(3%)

Table 1: Demographic details of the study participants

When the genders were compared, it was observed that there were differences with respect to conscious sedation seminar attendance and monitoring of intravenous conscious sedation and these differences were statistically significant ($p < 0.05$) (Table 2 (a) and (b)).

The comparison of knowledge about conscious sedation based on educational qualification among the participants revealed that there was statistically significant differences for source of learning, alternative names, frequently used technique in dentistry, the fastest acting drug, stage of conscious sedation for performing dental treatment, indication, duration, period of pre-operative fasting and complications of conscious sedation ($p < 0.05$) (Table 2 (a) and (b)).

Question	Options	Total n(%)	Gender		P value	Qualification				P value
			Males n (%)	Females n (%)		BDS n (%)	MDS n (%)	UG student n (%)	PG student n (%)	
How did you learn about conscious sedation	Seminar	118(30.7%)	55(29.9%)	63(31.5%)	0.725	29(32.6%)	16(29.1%)	56(31.5%)	17(27.4%)	0.025
	Dental curriculum	195(50.8%)	95(51.1%)	100(50.0%)		54(60.7%)	30(54.4%)	77(43.3%)	34(54.8%)	
	Colleague	58(15.1%)	26(14.1%)	32(16.0%)		4(4.5%)	9(16.4%)	35(19.7%)	10(16.1%)	
	Don't know	13(3.4%)	8(4.3%)	5(2.5%)		2(2.2%)	0(0.0%)	10(5.6%)	1(1.6%)	
Have you attended any seminar regarding conscious sedation	Yes	219(57.0%)	115(62.5%)	104(52.0%)	0.038	53(59.6%)	44(80.0%)	81(45.5%)	41(66.1%)	0.000
	No	165(43.0%)	69(37.5%)	96(48.0%)		36(40.4%)	11(20.0%)	97(54.5%)	21(33.9)	
What are the other names for conscious sedation	Sleep dentistry	118(30.7%)	57(14.8%)	61(30.5%)	0.714	27(30.3%)	5(9.1%)	73(41.0%)	13(21.0%)	0.000
	Twilight sleep	69(18.0%)	37(20.1%)	32(16.0%)		18(20.2%)	9(16.4%)	23(12.9%)	19(30.6%)	
	Both a and b	172(44.8%)	78(42.4%)	94(47.0%)		39(43.8%)	41(74.5%)	65(36.5%)	27(43.5%)	

Vinita Mary et al: Knowledge, Attitude And Practices Of Dental Students And Practitioners

	Don't know	25(6.5%)	12(6.5%)	13(6.5%)		5(5.6%)	0(0.0%)	17(9.6%)	3(4.8%)	
Have you undergone conscious sedation yourself for your dental procedure	Yes	133(34.6%)	77(41.8%)	56(28.0%)	0.004	33(37.1%)	8(14.5%)	58(32.6%)	34(54.8%)	0.000
	No	251(65.4%)	107(58.2%)	144(72.0%)		56(62.9%)	47(85.5%)	120(67.4%)	28(45.2%)	
Which technique of conscious sedation is used in dentistry	Oral	86(22.4%)	34(18.5%)	52(26.0%)	0.493	15(16.9%)	4(7.3%)	58(32.6%)	9(14.5%)	0.000
	Intravenous	172(44.8%)	88(47.8%)	84(42.0%)		36(40.4%)	30(54.5%)	72(40.4%)	34(54.8%)	
	Inhalation	79(20.6%)	39(21.2%)	40(20.0%)		26(29.2%)	17(30.9%)	26(14.6%)	10(16.1%)	
	Intramuscular	30(7.8%)	14(7.6%)	16(8.0%)		9(10.1%)	4(7.3%)	10(5.6%)	7(11.3%)	
	Don't know	17(4.4%)	9(4.9%)	8(4.0%)		3(3.4%)	0(0.0%)	12(6.7%)	2(3.2%)	
At which stage of conscious sedation dental procedures are carried out	Minimal	169(44.0%)	82(44.6%)	87(43.5%)	0.336	46(51.7%)	21(38.2%)	79(44.4%)	23(37.1%)	0.074
	Moderate	167(43.5%)	75(40.8%)	92(46.0%)		35(39.3%)	28(50.9%)	70(39.3%)	34(54.8%)	
	Deep	34(8.9%)	21(11.4%)	13(6.5%)		7(7.9%)	6(10.9%)	17(9.6%)	4(6.5%)	
	Don't know	14(3.6%)	6(3.3%)	8(4.0%)		1(1.1%)	0(0.0%)	12(6.7%)	1(1.6%)	
For which all procedures conscious sedation can be used	General dentistry such as restoration & scaling	80(20.8%)	43(23.4%)	37(18.5%)	0.267	18(20.2%)	5(9.1%)	37(20.8%)	20(32.3%)	0.002
	Minor surgery	74(19.3%)	35(19.0%)	39(19.5%)		14(15.7%)	5(9.1%)	38(21.3%)	17(27.4%)	
	Minor bone fracture	37(9.6%)	20(10.9%)	17(8.5%)		10(11.2%)	7(12.7%)	18(10.1%)	2(3.2%)	
	All the above	177(46.1%)	82(44.6%)	95(47.5%)		46(51.7%)	37(67.3%)	74(41.6%)	20(32.3%)	
	Don't know	16(4.2%)	4(2.2%)	12(6.0%)		1(1.1%)	1(1.8%)	11(6.2%)	3(4.8%)	
Conscious sedation in dental practice can be given by	Anesthetist	151(39.3%)	71(38.6%)	80(40.0%)	0.983	33(37.1%)	32(58.2%)	55(30.9%)	31(50.0%)	0.000
	Dentist	95(24.7%)	45(24.5%)	50(25.0%)		22(24.7%)	3(5.5%)	51(28.7%)	19(30.6%)	
	Both a and b	126(32.8%)	62(33.7%)	64(32.0%)		34(38.2%)	18(32.7%)	64(36.0%)	10(16.1%)	
	Don't know	12(3.1%)	6(3.3%)	6(3.0%)		0(0.0%)	2(3.6%)	8(4.5%)	2(3.2%)	
In which of the conditions conscious sedation is indicated	Mild to moderate dental anxiety	179(46.6%)	84(45.9%)	95(47.5%)	0.886	45(50.6%)	29(52.7%)	87(48.9%)	18(29.0%)	0.009
	Moderate to severe dental anxiety	139(36.2%)	70(38.0%)	69(34.5%)		29(32.6%)	19(34.5%)	55(30.9%)	36(58.1%)	
	Severe dental anxiety	45(11.7%)	21(11.4%)	24(12.0%)		11(12.4%)	7(12.7%)	21(11.8%)	6(9.7%)	
	Don't know	21(5.5%)	9(4.9%)	12(6.0%)		4(4.5%)	0(0.0%)	15(8.4%)	2(3.2%)	
Under which age conscious sedation is contraindicated	Below 6 months	218(56.8%)	108(58.7%)	110(55.0%)	0.247	56(62.9%)	35(63.6%)	100(56.2%)	27(43.5%)	0.025
	Below 10 months	70(18.2%)	36(20.7%)	32(16.0%)		16(18.0%)	13(23.6%)	26(14.6%)	15(24.2%)	
	Below 1 year	65(16.9%)	25(13.6%)	40(20.0%)		13(14.6%)	7(12.7%)	30(16.9%)	15(24.2%)	
	Don't know	31(8.1%)	13(7.1%)	18(9.0%)		4(4.5%)	0(0.0%)	22(12.4%)	5(8.1%)	
In which of the conditions conscious sedation is contraindicated	Extreme anxiety	250(65.1%)	119(64.7%)	131(65.5%)	0.184	65(73.0%)	40(72.7%)	110(61.8%)	35(56.5%)	0.002
	Needle phobia	56(14.6%)	27(14.7%)	29(14.5%)		16(18.0%)	8(14.5%)	17(9.6%)	15(24.2%)	
	Traumatic procedure in uncooperative patient	50(13.0%)	29(15.8%)	21(10.5%)		6(6.7%)	6(10.9%)	29(16.3%)	9(14.5%)	
	Don't know	28(7.3%)	9(4.9%)	19(9.5%)		2(2.2%)	1(1.8%)	22(12.4%)	3(4.8%)	

Table2 (a).Comparison of Knowledge and Practice of Conscious Sedation among Genders and Qualification

Vinita Mary et al: Knowledge, Attitude And Practices Of Dental Students And Practitioners

Question	Options	Total n(%)	Gender		P value	Qualification				P value
			Males n (%)	Females n (%)		BDS n (%)	MDS n (%)	UG student n (%)	PG student n (%)	
Is intravenous conscious sedation monitored continuously	Yes	237(61.7%)	114(62.0%)	123(61.5%)	0.005	66(74.2%)	37(67.3%)	97(54.5%)	37(59.7%)	0.000
	No	76(19.8%)	46(25.0%)	30(15.0%)		13(14.6%)	16(29.1%)	30(16.9%)	17(27.4%)	
	Don't know	71(18.5%)	24(13.0%)	47(23.5%)		10(11.2%)	2(3.6%)	51(28.7%)	8(12.9%)	
Do you know the armamentarium used in conscious sedation	Yes	240(62.5%)	118(64.1%)	122(61.0%)	0.527	56(62.9%)	41(74.5%)	96(53.9%)	47(75.8%)	0.003
	No	144(37.5%)	66(35.9%)	78(39.0%)		33(37.1%)	14(25.5%)	82(46.1%)	15(24.2%)	
Which is the fastest action drug for conscious sedation	Midazolam	154(40.1%)	69(37.5%)	85(42.5%)	0.633	34(38.2%)	20(36.4%)	79(44.4%)	21(33.9%)	0.001
	Benzodiazepam	135(35.2%)	70(38.0%)	65(32.5%)		33(37.1%)	25(45.5%)	52(29.2%)	25(40.3%)	
	Barbiturates	48(12.5%)	24(13.0%)	24(12.0%)		14(15.7%)	7(12.7%)	13(7.3%)	14(22.6%)	
	Don't know	47(12.2%)	21(11.4%)	26(13.0%)		8(9.0%)	3(5.5%)	34(19.1%)	2(3.2%)	
Which gas is used for conscious sedation	Nitrous oxide	301(78.4%)	141(76.6%)	160(80.0%)	0.354	72(80.9%)	51(92.7%)	139(78.1%)	39(62.9%)	0.000
	Carbon dioxide	34(8.9%)	18(9.8%)	16(8.0%)		11(12.4%)	0(0.0%)	11(6.2%)	12(19.4%)	
	Oxygen	32(8.3%)	19(10.3%)	13(6.5%)		6(6.7%)	2(3.6%)	14(7.9%)	10(16.1%)	
	Don't know	17(4.4%)	6(3.3%)	11(5.5%)		0(0.0%)	2(3.6%)	14(7.9%)	1(1.6%)	
How long does conscious sedation last	2-8 hours	203(52.9%)	99(53.8%)	104(52.0%)	0.094	48(53.9%)	42(76.4%)	84(48.3%)	27(43.5%)	0.000
	1-4 hours	106(27.6%)	55(29.9%)	51(25.5%)		30(33.7%)	9(16.4%)	43(24.2%)	24(38.7%)	
	2-5 hours	37(9.6%)	19(10.3%)	18(9.0%)		6(6.7%)	4(7.3%)	17(9.6%)	10(16.1%)	
	Don't know	38(9.9%)	11(6.0%)	27(13.5%)		5(5.6%)	0(0.0%)	32(18.0%)	1(1.6%)	
What is the complications of conscious sedation	Hypoxia	252(65.6%)	112(60.9%)	140(70.0%)	0.029	60(67.4%)	40(72.7%)	119(66.9%)	33(53.2%)	0.000
	Patient retrieval	64(16.7%)	36(9.6%)	28(14.0%)		19(21.3%)	8(14.5%)	17(9.6%)	20(32.3%)	
	Anxiety	38(9.9%)	22(12.0%)	16(8.0%)		8(9.0%)	6(10.9%)	19(10.7%)	5(8.1%)	
	Don't know	30(7.8%)	14(7.6%)	16(8.0%)		2(2.2%)	1(1.8%)	23(12.9%)	4(6.5%)	
Is oral sedation safer than other modes of sedation	Yes	231(60.2%)	110(59.8%)	121(60.5%)	0.088	59(66.3%)	43(78.2%)	92(51.7%)	37(59.7%)	0.000
	No	79(20.6%)	45(24.5%)	34(17.0%)		14(15.7%)	8(14.5%)	36(20.2%)	21(33.9%)	
	Don't know	74(19.3%)	29(15.8%)	45(22.5%)		16(18.0%)	4(7.3%)	50(28.1%)	4(6.5%)	
Is conscious sedation safe during pregnancy	Yes	92(24.0%)	46(25.0%)	46(23.0%)	0.900	30(33.7%)	6(10.9%)	39(21.9%)	17(27.4%)	0.032
	No	249(62.8%)	114(62.0%)	127(63.5%)		51(57.3%)	43(78.2%)	113(63.5%)	34(54.8%)	
	Don't know	51(13.3%)	24(13.0%)	27(13.5%)		8(9.0%)	6(10.9%)	26(14.6%)	11(17.7%)	
Can you eat or drink before and after conscious sedation	Yes	173(45.1%)	83(45.1%)	90(45.0%)	0.988	46(51.7%)	30(54.5%)	71(39.9%)	26(41.9%)	0.250
	No	155(40.4%)	74(40.2%)	81(40.5%)		33(37.1%)	21(38.2%)	75(42.1%)	26(41.9%)	
	Don't know	56(14.6%)	27(14.7%)	29(14.5%)		10(11.2%)	4(7.3%)	32(18.0%)	10(16.1%)	
How many hours should you not eat and drink before conscious sedation	2 hours for fluids and 6 hours for solids	184(47.9%)	85(46.2%)	99(49.5%)	0.308	53(59.6%)	24(43.6%)	77(43.3%)	30(48.4%)	0.000
	6 hours for fluids and 6 hours for solids	106(27.6%)	58(31.5%)	48(24.0%)		21(23.6%)	23(41.8%)	41(23.0%)	21(33.9%)	
	3 hours for fluids and 5 hours for solids	30(7.8%)	15(8.2%)	15(7.5%)		7(7.9%)	3(5.5%)	13(7.3%)	7(11.3%)	
	Don't Know	64(16.7%)	26(14.1%)	38(19.0%)		8(9.0%)	5(9.1%)	47(26.4%)	4(6.4%)	
Do you aware of the crash cart equipment for conscious sedation	Yes	235(61.2%)	119(64.7%)	116(58.0%)	0.180	53(59.6%)	34(61.8%)	96(53.9%)	52(83.9%)	0.001
	No	149(38.8%)	65(35.3%)	84(42.0%)		36(40.4%)	21(38.2%)	82(46.1%)	10(16.1%)	

Table 2 (b) Comparison of Knowledge and Practice of Conscious Sedation among Genders and Qualification

DISCUSSION

Management of pediatric patients during dental procedures plays a crucial role to establish ideal communication, eliminate fear and anxiety, build trust between the dentist, child, and parent, promote and enhance child's positive attitude towards dental health by

successfully incorporating behavioral guidance thus providing quality oral health care. In the present study it was observed more than half of the study participants learned about conscious sedation (CS) through dental curriculum (50.8%) comparable to study by Thomas P et al¹⁶ where the majority of the participants were aware of

Vinita Mary et al: Knowledge, Attitude And Practices Of Dental Students And Practitioners

conscious sedation (80.1%) through their curriculum yet over 69.4% among them also preferred short certified courses to enhance their practice in conscious sedation^{1,3,17,18}.

It is evident that advanced behavior guidance techniques such as conscious sedation, General anesthesia (GA), and protective stabilization were commonly taught and practiced in postgraduate/masters pediatric dental training programs. A study done by Monisha K et al (90%), reported that more than half of the pediatric dental surgeons reported the use of conscious sedation over GA¹⁸ comparable to the present study where 46.1% considered conscious sedation over GA for all dental procedures like restoration, scaling, minor bone fractures and minor surgeries. A higher prevalence might be attributed to observations done only on dental professionals in the present study whereas previous study involved parents as well as other health care professionals also. In contrast, some studies suggest that dental surgeons working in hospitals preferred the utilization of GA^{18, 19, 20}.

In our study, 44.8 % preferred intravenous conscious sedation over oral sedation which is almost similar to the study by Tingey et al (49.8%)²¹ but much higher than the study by Sivakumar N et al (3 %)²². This variation can be due to case preferences as sedation in children is different from the sedation methods in adults. Cunha et al stated that sedation in children is often used to control behavior and permit safe completion of the dental procedure and it depended on chronological as well as developmental age of the child^{1, 18, 23}.

In this present study, the participants preferred to treat patients in minimal or moderate conscious sedation state. But few studies suggest that moderate sedation was comfortable to diagnose and treat uncooperative or anxious patients, decreased the pain and discomfort compared to minimum sedation and also maximized the effectiveness of amnesia, and controlling the anxiety, movement, and behavior of the child during dental procedures^{23, 24, 25, 26}.

We observed that 56.8% of the participants considered that conscious sedation was contraindicated in children below 6 months of age and with extreme fear and anxiety. Likewise, Veeramachaneni et al²⁴ states that the Council of European Dentist and AAPD (American association of Pediatric dentistry) has recommended that this technique of behavior control should not be administered in severely compromised patients and in children less than 1 year¹³.

In the present study, more than half of the study participants 78.4% preferred Nitrous oxide sedation which is similar to study by Sivakumar N et al (72%)²² and Wali et al (73%)¹. These studies have shown that care must be taken when Nitrous oxide sedation is used in addition to other sedatives where the chances of attaining deep sedation in a short span of time are relatively high¹.

In the present study, 39.3% preferred that general anesthetist should be present during conscious sedation technique. In a study by Thomas P et al¹⁶, it was observed that the dentist experienced difficulties in managing sedation in the absence of anesthesiologists resulting in anxiety and forced and hasty completion of the treatment. However, in presence of anesthesiologists, dentist failed to experience such nervousness thus providing quality dental treatment while the anesthesiologists took care of the vital signs and related complications. Also, AAPD recommends that Pediatric dentists must be well-qualified and skilled for incorporating specific training in their practice to integrate a multidisciplinary team approach which permits the recognition of the need of general anesthesia thus providing a quality oral health care^{9,24,27}.

In the present study, 40.1% recommended midazolam as a fast acting drug for conscious sedation which is in contrast to the study by Sivakumar N et al (76%)². It can be observed that higher preference of midazolam might be due to its short duration of action with potent anxiolytic and anticonvulsant property over other drugs such as propofol. Also, midazolam has lower incidence of complications like nausea, vomiting and prolonged discharge time when compared to other drugs given orally and/or nasally^{28, 29, 30}.

About 60.2% opted for oral route as the safer mode of sedation which is similar to study by Perumal K et al (58%)⁸. Most of the study participants believed oral sedatives were easier to administer, required less expertise and skill, avoided needle usage and adequate sedation was achieved with minimal or no complications³¹.

RECOMMENDATION

It is recommended that dental curriculum should include guidelines and advanced sedation techniques to train the dental students at the undergraduate level. Subsequently dental practitioners should be encouraged to attend workshops, continuing dental education programs on conscious sedation technique by experts in the field to improve their skills and confidence.

CONCLUSION

The present clearly shows lacunae in adequate knowledge, attitude and practices towards conscious sedation among dental practitioners. One must be also aware of patient related factors like perceptions, preferences and treatment needs nonetheless managing an uncooperative or anxious child is always challenging that requires skill and expertise with sufficient knowledge and awareness. The results of this study thus provide an insight on need for strategies to provide knowledge and incorporate positive attitude among the Dental professionals to offer effective conscious sedation in children necessitating oral health care.

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CONFLICTS OF INTEREST

There are no conflicts of interest.

REFERENCES

1. Wali A, Siddiqui TM, Khan R, Batool K. Knowledge, Attitude, and Practices of Dental Surgeons in managing Child Patients. *Int J Clin Pediatr Dent*. 2016 Oct-Dec; 9(4):372-378.
2. Merdad L, El-Housseiny AA. Do children's previous dental experience and fear affect their perceived oral health-related quality of life (OHRQoL). *BMC Oral Health* 2017 Dec; 17(1):1-9.
3. Bhandari R, Thakur S, Singhal P, Chauhan D, Jayam C, Jain T. Parental awareness, knowledge, and attitude toward conscious sedation in North Indian children population: A questionnaire-based study. *Indian J Dent Res* 2018;29:693-7
4. Anthonappa RP, Ashley PF, Bonetti DL, Lombardo G, Riley P. Non-pharmacological interventions for managing dental anxiety in children. *The Cochrane Database of Systematic Reviews*. 2017 Jun; 2017(6).
5. Costa LR, Bendo CB, Daher A, Heidari E, Rocha RS, Moreira AP, Moura LS, Banerjee A, Newton JT, Hosey MT. A curriculum for behaviour and oral healthcare management for dentally anxious children—Recommendations from the Children Experiencing Dental Anxiety: Collaboration on Research and Education (CEDACORE). *International journal of paediatric dentistry*. 2020 Sep; 30(5):556-69.
6. Armfield JM, Heaton LJ. Management of fear and anxiety in the dental clinic: a review. *Australian dental journal*. 2013 Dec; 58(4):390-407.
7. American Academy of Pediatric Dentistry. Guideline on use of Anesthesia Personnel in the Administration of Office-based Deep Sedation/General Anesthesia to the Pediatric Dental Patient. *Pediatr Dent*. 2013; 34(5):170-2.
8. Perumal K, Santhosh Kumar M.P. Knowledge and Attitude among Dental Undergraduate Students towards Sedation in Dental Practice. *Int. J. Pharm. Sci. Rev. Res.*, 44(1), May - June 2017; 62-65
9. Silva CC, Lavado C, Areias C, Mourão J, Andrade DD. Conscious sedation vs general anesthesia in pediatric dentistry—a review. *Medical Express*. (São Paulo, online) Feb 2015; 2(1).
10. Dougherty N. The dental patient with special needs: a review of indications for treatment under general anesthesia. *Special Care in Dentistry*. 2009 Jan; 29(1):17-20.
11. Baghdadi ZD, Jbara S, Muhajarine N. Children's drawing as a projective measure to understand their experiences of dental treatment under general anesthesia. *Children*. 2020 Jul; 7(7):73.
12. Attri JP, Sharan R, Makkar V, Gupta KK, Khetarpal R, Kataria AP. Conscious sedation: Emerging trends in pediatric dentistry. *Anesthesia, essays and researches*. 2017 Apr; 11(2):277.
13. Hallonsten AL, Jensen B, Raadal M, Veerkamp J, Hosey MT, Poulsen S. EAPD guidelines on sedation in paediatric dentistry. *European Academy of Paediatric Dentistry Im Internet*: <http://www.eapd.gr/dat/5CF03741/file.pdf> Stand. 2013; 7:12.
14. Rai K, Hegde A, Goel K. Sedation in uncooperative children undergoing dental procedures: A comparative evaluation of midazolam, propofol and ketamine. *Journal of Clinical Pediatric Dentistry*. 2007 Sep 1; 32(1):1-4.
15. Heard C, Smith J, Creighton P, Joshi P, Feldman D, Lerman J. A comparison of four sedation techniques for pediatric dental surgery. *Pediatric Anesthesia*. 2010 Oct; 20(10):924-30
16. Princy Thomas, Bhavna Dave, Seema Bargale, Poonacha, KS., Parth Joshi and Brijesh Tailor, 2018. "Perception among dentists of gujarat state regarding the use of conscious sedation in pediatric dental practice " *International Journal of Current Research in Life Sciences*, 7, (05), 2004-2009.

Vinita Mary et al: Knowledge, Attitude And Practices Of Dental Students And Practitioners

17. Adair SM, Rockman RA, Schafer TE, Waller JL. Survey of behavior management teaching in pediatric dentistry advanced education programs. *Pediatr Dent*. 2004 Mar-Apr; 26(2):151–158.
18. Monisha.K et al. Knowledge, Attitude And Practice On Conscious sedation In Children Among Dental Practitioners', *International Journal of Current Advanced Research*, 2017; 06(04), 3033-3036.
19. Abushal MS, Adenubi JO. The use of behavior management techniques by dentists in Saudi Arabia: a survey. *Saudi Dent J*. 2000; 12(3):129–134.
20. McKnight-Hanes C, Myers DR, Dushku JC, Davis HC. The use of behavior management techniques by dentists across practitioner type, age, and geographic region. *Pediatr Dent*. 1993 Jul-Aug; 15(4):267–271.
21. Tingey BT, Clark SH, Humbert LA, et al. Use of Intravenous Sedation in Periodontal Practice: A National Survey. *J Periodontol*. 2012;83:830–835.
22. Sivakumar N, Dhanraj Ganapathy, Kiran Kumar, Pandurangan and Ashok Velayudhan ,Awareness on Commonly used Sedatives Hypnotic in Dental Practices among Dental Student ; *JPRI*. 2020 32(18): 188-196.
23. Wilson S, Farrell K, Griffen A, Coury D. Conscious sedation experiences in graduate pediatric dentistry programs. *Pediatric dentistry*. 2001 Jul 1; 23(4):307-14.
24. Veeramachaneni D, Dande D, Mohan D, Ajay T, Khan D, Muzammil M, Verma DS, Parhad D. Case Preferences In Choosing Conscious Sedation Versus General Anesthesia Amongst Pediatric Dentists: A Research Survey. *European Journal of Molecular & Clinical Medicine*. 2021 Jan 18; 8(1):1252-7.
25. Eaton JJ, McTigue DJ, Fields HW, Beck FM. Attitudes of contemporary parents toward behavior management techniques used in pediatric dentistry. *Pediatric Dentistry*. 2005; 27(2):107-113.
26. Gozal D, Drenger B, Levin PD, Kadari A, Gozal Y. A pediatric sedation/anesthesia program with dedicated care by anesthesiologists and nurses for procedures outside the operating room. *J Pediatr*. 2004; 145(1):47-52.
27. Silay E., et al. "Conscious sedation with midazolam for dental procedures be an alternative to general anesthesia?" *Nigerian Journal of Clinical Practice* 16.2: 2013; 211-215.
28. Averley PA, Girdler NM, Bond S, Steen N, Steele J. A randomised controlled trial of pediatric conscious sedation for dental treatment using intravenous midazolam combined with inhaled nitrous oxide or nitrous oxide/sevoflurane. *Anesthesia*. 2004; 59:844–52.
29. Jensen B, Matsson L. Oral versus rectal midazolam as a pre-anaesthetic sedative in children receiving dental treatment under general anaesthesia. *Acta Paediatr*. 2002; 91:920–5.
30. Arya VS, Damle SG. Comparative evaluation of midazolam and propofol as intravenous sedative agents in the management of unco-operative children. *J Indian Soc Pedod Prev Dent*. 2002; 20:6–8.
31. Alzahrani AM, Wyne AH. Use of Oral Midazolam Sedation in Pediatric Dentistry: A Review. *Pakistan Oral & Dental Journal*. 2012 Dec 1; 32(3).