Knowledge, Attitude and Practice on Dental Sedation among Pediatric Dentists in Nepal

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ABSTRACT

Introduction: Recent years have evidenced an increase in the use of sedation in children for their dental treatment, with a wide variation in the global practice among the pediatric dentists.

Objective: The purpose of this study was to assess the knowledge, attitude, and practice on dental sedation amongst the pediatric dentists of Nepal.

Methods: This was an online-based questionnaire survey conducted from May to June 2021 among 29 pediatric dentists practicing in Nepal using a census sampling. Data were analyzed and presented in percentage, mean, and standard deviation along with charts and tabular forms.

Results: Majority of the respondents 26 (89.7%) had adequate knowledge and 22 (76%) had adequate practice on sedation with a total positive mindset. The mean (Mean ± Standard Deviation) scores for knowledge, attitude, and practice were 3.759 ± 0.9124, 6.897 ± 1.1131, and 3.414 ± 1.3501, respectively. Nineteen (65.5%) of them practiced dental sedation that included general anesthesia, oral, inhalational, intravenous and intra-nasal routes.

Conclusions: The study showed satisfactory knowledge, attitude, and practice of dental sedation among the pediatric dentists in Nepal. There was lack of training on emergency skills and formal sedation courses other than for inhalational sedation among the participants, and these were cited as the major barriers to their practice along with lack of adequate facilities. Hence, regular conduction of sedation trainings and life support skills targeting the pediatric dentists in Nepal is deemed essential.

Keywords:*Anesthesia, children,dental sedation, Nepal, pediatric dentist.*

INTRODUCTION

Sedation is generally administered to allow for a safe completion of dental procedure in children with low coping ability, and those presenting with emergency or complicated treatment needs. Its use in children helps in the relief of pain and anxiety as well as modification of their behavior during dental procedures. However, children can pass from the intended level of sedation to a deeper, unintended level quite easily, resulting in adverse life-threatening events even. Therefore, the practicing dentist must have appropriate training on basic and advanced level sedation courses along with medical emergency skills (MES), drugs, monitors and equipment use for patient rescue until the emergency medical service (EMS) arrives. The practitioner should have sound knowledge on the structured sedation protocol and practice accordingly.[1-6] Literature suggests a wide variation worldwide in the attitude and practice of pediatric dentists towards sedation.[9-18] The increasing trend of administering sedation for dental treatment of younger children outside the hospital settings have been linked to variable numbers of morbidity and mortality, primarily due to the lack of immediate medical back up service.[18-20] However, there has been no research on this aspect with regard to pediatric dentists of Nepal. Hence, this national baseline survey was conducted to assess the knowledge, attitude, and practice

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Citation

Shrestha S, Koirala B, Dali M, Birajee G. Knowledge, Attitude and Practice on Dental Sedation among Pediatric Dentists in Nepal. J Nepal Assoc Pediatr Dent. 2022;3(1):20-7.

(KAP) towards dental sedation amongst pediatric dentists of Nepal.

METHODS

A cross-sectional online-based questionnaire survey was carried out from May to June 2021, which included altogether 29 pediatric dentists practicing in Nepal based on the census sampling. There were 30 cumulative pediatric dentists practicing in Nepal during the time of study and one was excluded for being the principal investigator of the study. Ethical clearance was obtained from the ethical committee of the institute of B.P. Koirala Institute of Health Sciences (IRC no. 612/077/778). The email details were obtained through local professional contacts and the questionnaire link (google form) was emailed to the participants along with an electronic informed consent. The validity of the self-constructed questionnaire was assessed by the subject experts. The questionnaire consisted of socio-demographic details, education and training background, with five questions based on knowledge, six on attitude, and the other five based on their practice (from which KAP scores were calculated). Other general questions related to their sedation practice included past practice, administration practice, routes performed under and without medical supervision, in hospital or clinic-settings along with practice on inhalational or oral sedations with monitors and equipment available and used in their setup. Scores for knowledge, attitude, and practice responses ranged from 0 to 5, 0 to 6, and 0 to 5, respectively. Scores for KAP of ≤ 40 were considered inadequate and > 40 were considered adequate. Responses consisted of multiple-choice questions, closed-ended and open-ended questions. The data was entered into MS Excel 2007 and then converted to the Statistical Package for Social Sciences (SPSS) 23.0 version for statistical analysis. Descriptive statistics were presented in percentage, mean, and standard deviation along with the tabular and chart forms.

RESULT

There was 100% response rate from the participants. Among the 29 respondents, six (20.7%) were males and 23 (79.3%) were females having institutional and/or clinical practices (Table 1).

The present study showed 26 (89.7%) and 22 (76%) of the practicing pediatric dentists having adequate knowledge and practice, respectively, with all having a positive attitude towards dental sedation. The mean (Mean ± Standard Deviation) scores for knowledge, attitude, and practice thus were 3.759 ± 0.9124, 6.897 ± 1.1131, and 3.414 ± 1.3501, respectively.

Table 1. Socio-demographic and professional characteristics of the respondents.

Sociodemographic characteristics	Characteristics	n (29)	n%
Gender	Male	6	20.7
	Female	23	79.3
Age (year) M=36.31 SD=4.53	≤36	17	58.6
	>36	12	41.4
Years of experience (M±SD) (5.866±4.25)	≤6 years	17	58.6
	>6 years	12	41.4
Practicing Province	1	5	17.2
	2	3	10.3
	3	1	62.1
	4	2	6.9
	6	1	3.4
Current Practice	Dental Clinic	2	6.9
	Hospital	13	44.8
	Both Dental clinic and Hospital	14	48.3

Table 2. Responses to questions assessing knowledge of the participants towards sedation.

S.No.	Questions	Correct answer	n (29)	n%
1	Are children at increased risk of over sedation?	Yes	19	65.5
2	Prior to moderate sedation, pediatric patients should remain NPO (Nothing by mouth) for a minimum of 2 hours.	True	28	96.6
3	Is it permissible for routine necessary medications (e.g., antiseizure medications) to be taken with a sip of clear liquid or water on the day of the procedure?	Yes	23	79.3
4	Children with developmental disabilities have been shown to have a similar incidence of desaturation compared with children without developmental disabilities.	False	10	34.5
5	Do you think a dental practitioner is responsible for life support measures while awaiting Emergency Medicine Service (EMS) arrival?	Yes	29	100

Table 3. Education and training background of the respondents on sedation/anesthesia and medical emergency skills (MES).

Characteristics	Categories	n (29)	n%
Formal training or certified courses in dental sedation/anesthesia	Yes	21	72.4
	No	8	27.6
Postgraduate exposure to or experience with sedation and anesthesia	Yes	27	93.1
	No	2	6.9
BLS training	Yes	28	96.6
	No	1	3.4
BLS retraining (out of 28)	Every 2 year	10	34.5
	Irregular	18	62.1
ACLS training	Yes	8	27.6
	No	21	72.4
PALS training	Yes	4	13.8
	No	25	86.2
PALS retraining (out of 4)	No retraining yet	3	10.3
	Irregular	1	3.4
Sedation training mandatory in residency curriculum	Yes	11	37.9
	No	18	62.1
MES training mandatory in residency curriculum	Yes	12	41.4
	No	17	58.6

Table 4. Responses to questions assessing attitude of the participants towards sedation.

S.No.	Questions	Categories	n (29)	n%
1	Percentage of patients who would benefit from sedation and anesthesia for dental treatment	<10%	14	48.3
		10-50%	12	41.4
		≥50%	3	10.3
2	Preference to behavior guidance techniques	Pharmacological	1	3.4
		Non-pharmacological	23	79.3
		Both equal	5	17.2
3	Medical supervision requirement for all sedation and anesthesia routes	Yes	25	86.2
		No	4	13.8
4	Requirement of assent from child patient	Yes	26	89.7
		No	3	10.3
5	Interest on CDE on sedation	Yes	29	100
6	Interest on CDE on medical emergency skills (MES)	Yes	29	100

The responses to questions assessing knowledge of the respondents towards sedation are detailed in Table 2. Regarding education and training background (Table 3), only 21 (72.4%) participants had received formal training (certified course) which was on inhalational sedation route. The training was obtained by 13 (61.9%) during the residency program (MDS), 3 (14.3%) after completion of MDS and 5 (23.8%). received it both during and after MDS. Among the respondents, two (9.5%) participants had received the training based on their curriculum, 16 (76.2%) from continuing dental education programs (CDE), and 3 (14.3%) through both the curriculum and CDE programs. When asked about their training place, 12 (57.1%) of them responded for having been trained in Nepal itself. Also, when asked about the presence of a regulatory body for supervising the sedation practice of pediatric dentists in Nepal, all of them said that they were unaware of it.

Regarding the responses to questions assessing attitude of the respondents towards sedation techniques (Table 4), 23 (79.3%) preferred non-pharmacological, only 1 (3.4%) preferred pharmacological; and 5 (17.2%) had inclination towards both the behavior guidance techniques. Many participants, 25 (86.2%) believed that all dental sedation procedures must be administered under medical supervision, 4 (13.8%) respondent did not feel the requirement for medical supervision for inhalational, and 1 (13.4%) respondent also responded no need of medical supervision for oral and subcutaneous (SC) routes. All participants expressed interest in sedation and MES trainings, with 22 (75.9%) showing interest in inhalational, 18 (62.1%) in intravenous (IV), 17 (58.6%) in oral, 16 (55.2%) in general anesthesia (GA), 10 (34.5%) in intramuscular (IM), 9 (31%) in intranasal, 5 (17.2%) in subcutaneous (SC) and 3 (10.3%) in rectal routes, while 26 (89.7%) were interested in Pediatric advanced life

Table 5. Responses to questions assessing practice of the participants.

S.No.	Questions	Categories	n (29)	n%
1	Taking written informed consent prior to the dental sedation procedure (out of 19)	Yes	18	94.7
		No	1	5.3
2	Referred to another dentist for sedation	Yes	12	41.4
		No	17	58.6
3	Post residency provided dental treatment under sedation and GA (past practice)	Yes	24	82.8
		No	5	17.2
4	Ever administered sedation in their practice	Yes	13	44.8
		No	16	55.2
5	Current practice on sedation and general anesthesia	Yes	19	65.5
		No	10	34.5

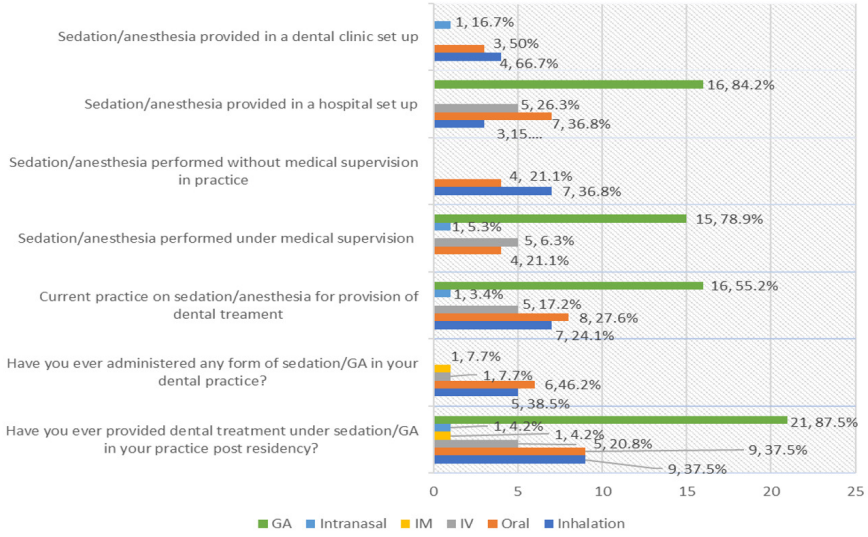

Figure 1. Responses of the participants on their routes of dental sedation practice.

Table 6. Responses of the participants to the usage and availability of monitor and equipment in their dental sedation practice.

S.No.	Equipment	Dental clinic setting (n1=6)		Inhalation sedation (n2=7)	
		n	%	n	%
1	Emergency drugs	5	83.3	7	100
2	Oxygen	5	83.3	7	100
3	Face mask	3	50	3	42.9
4	Big valve ventilation Device (BVVD)	2	33.3	-	-
5	Intravenous (IV) fluids	1	16.7	2	22.86
6	Laryngoscope set	1	16.7	-	-
7	Endotracheal tube	1	16.7	-	-
8	Intravenous (IV) cannula	1	16.7	3	42.9
9	Glucose Testing Machine (GTM)	1	16.7	1	14.3
10	Defibrillator	11	16.7	-	-
11	None	1	16.7	-	-

S. No.	Monitors	Oral sedation (n3=8)		Inhalation sedation (n2=7)	
		n	%	n	%
1	Pulse Oximeter	6	75	7	100
2	Blood Pressure	4	50	3	42.9
3	Heart Rate	45	50	3	42.9
4	Thermometer	1	12.5	1	14.3
5	Precordial stethoscope	1	12.5	-	-

Table 7. Barriers faced by the pediatric dentists on practicing sedation/anesthesia in Nepal.

S.No.	Barriers	n (29)	n%
1.	Lack of training on dental sedation/anesthesia	22	75.9
2.	Lack of regular conduction of trainings/certified courses in Nepal	19	65.5
3.	Lack of facilities in our setting (well-equipped dental clinic/hospital with medical personnel and emergency equipment)	25	86.2
4.	Patient factors (unaware or unwilling parents due to risk and expenses)	17	58.6
5.	Lack of confidence	7	24.1
6.	Lack of regular emergency skills trainings/retraining	18	62.1

support (PALS) and 18 (62.1%) each in Basic life support (BLS) and Advanced cardiac life support (ACLS).

The responses for assessing practice (past and present) of the respondents towards sedation are given in Table 5,6 and Figure 1. Regarding patients request for sedation in their clinical practice, 26 participants reported less than 10 % patients while 3 reported 10-50 % of their patients wanted it. Majority of them 18 (94.7%) commented to have already taken BLS training before starting their dental sedation practice. At the time of the study, 19 (65.5%) pediatric dentists practiced sedation in Nepal. All of them expressed providing dental sedation in a hospital setting and six (31.6%) of them provided it even in dental clinics. They used different routes like; 16 (55.2%) provided dental treatment under GA, 7 (24.1%) used inhalational, 8 (27.6%) oral, 5 (17.2%) used IV, and 1 (3.4%) used intranasal routes. One (14.3%) participant even used nitrous oxide sedation with other oral sedative. Among those who used oral sedation, 3 (37.5%) used benadryl, 3 (37.5%) midazolam, while 2 (25%) used chloralhydrate, whereas hydroxyzine, ketamine, and promethazine were used by one each (12.5%), respectively. Only one participant (12.5%) had re-dosed oral sedative in their practice. However, the respondents revealed that no medical emergencies had ever occurred during their sedation practice.

Regarding the availability and usage of monitors and equipment in their practice set up (Table 6), pulse

oximeter was found to be the most popular monitoring method in both inhalational (100%) and oral sedation (75%) practices while emergency drugs and oxygen, each were the most commonly available equipment in dental clinic settings (83%) and inhalational sedation practice of the respondents (100%), respectively. However, one of the participant's dental clinical practices set up unfortunately did not have any emergency equipment. The major barriers to their sedation practice were lack of facilities in their setting (86.2%) and lack of training on dental sedation/ anesthesia (75.9%) (Table 7).

DISCUSSION

This is one of the first nation-wide survey that aims to assess KAP on dental sedation among the pediatric dentists in Nepal. The current study will serve as a baseline study that can be used to provide insights into the knowledge, attitude, and past and existing trends in sedation and anesthesia related dental practices of the pediatric dentists in Nepal. More specifically, it would help to identify any challenges faced by them and the areas that need further improvement in this field so that future health policies can be targeted to improve their knowledge, attitude and practice towards dental sedation for the provision of a safe and standard pediatric dental care. The study showed that majority of the pediatric dentists in Nepal had adequate knowledge (89.7%) and practice (76%), and all showed positive attitude towards dental sedation.

Sedation in children is different from that in adults as they are at increased risk of both over and undersedation.[6] Surprisingly, only 19 (65.5%) respondents in this study were aware of this fundamental fact. Children younger than 6 years, those with developmental delay and complicated medical history are even at an increased risk of sedation related adverse events. This is mainly due to their effect on respiratory drive, airway patency, and protective airway reflexes. Sedation-induced impairment of airway reflexes can result in aspiration of gastric contents that may lead to pulmonary injury.[6] Hence, the practitioners should have sound knowledge regarding the appropriate fasting guidelines prior to administering sedation. Majority of the respondents were aware regarding this fasting guideline but there was lack of knowledge regarding the increased vulnerability of children with developmental disabilities to desaturation, as compared to those without.

As sedation is a continuum, patient can pass from the minimal sedation level to moderate, deep or even general anesthesia (GA) quite easily. Hence, the operating dentist and/or the sedationist need to be vigilant and prepared to rescue the patient from complications such as apnea, laryngospasm, and/or airway obstruction, including the ability to open the airway, suction secretions, provide continuous positive airway pressure (CPAP), and perform successful BVVD in case the child progress to a level of deep sedation. The guidelines recommend training in the appropriate advanced sedation courses and current certification in medical emergency skills (MES) such as BLS, ACLS and PALS prior to the start of any sedation practice. The practice should follow proper sedation protocol and also should include adequate facilities, on-site monitors with rescue drugs and necessary equipments.[1-6]

The study showed that majority of the pediatric dentists were trained in life support measures such as BLS, while only few in ACLS and PALS. This was in contrast to a reported study where 49% were trained in ACLS and 82% in PALS.[7] Also, there seemed inadequate maintenance of these skills through regular updated retraining among the participants. As medical emergencies may occur anytime even during simpler dental procedures, all the dental personnels need to acquire training on these basic life-saving skills. However, this study showed only less than half of the respondents' residency curricula mandating the MES trainings. Additionally, a clinical simulation-based trainings on these practical skills might prove to be more beneficial than any theoretical lectures.[18]

As pediatric dentists, one should always try to imply on non-pharmacological behavior guidance techniques first, considering all the positive reasons cited in the literature.[21] Positively, majority (79.3%) of the participating dentists in this study also preferred non-pharmacological behavior guidance techniques. This was similar to a study where the dentists in Asia preferred more of the non-pharmacological behavior guidance methods.[11] Additionally, all the participants showed an interest in attending CDE programs on dental sedation which was higher as compared to the other studies.[7,11] Interest in attending the MES trainings were also overwhelming for all, particularly, the newer skill, PALS.

Pediatric dental patients can be sedated using various routes such as inhalational, oral, intravenous (IV), intramuscular (IM), submucosal (SC), transmucosal (intranasal, buccal, rectal), or even general anesthesia (GA).[7-17] Literature reveals varied theoretical and practical sedation trainings worldwide for pediatric dentists.[11,22] The present study

showed majority (72.4%) of the pediatric dentists in Nepal received formal training in sedation through CDE which was higher than other reported studies.[7,13] More than half (61.9%) of them had received it during their residency programs. This was higher than that reported in a study by Vanderbilt AA et al.[7] where 49% received it during residency, but lower than that reported by Boynes[13] where 94% were trained during their residency. Though less than half of the respondents reported to have had mandatory sedation trainings in their postgraduate curricula, more than 90% of them had some exposure to or experience with various sedation routes during their residency. However, the respondents had received formal training only on inhalation sedation. Wilson et al.[11] study showed that nitrous oxide sedation route was the most taught one (49%) followed by oral, mucosal and intramuscular. Hicks et al.[22] study showed that the pediatric dentistry residents even administered deep sedation and GA in the operating rooms as well as clinic-based settings.

Only 19 (65.5%) pediatric dentists in this study provided sedation in their dental practice. This finding was more than that reported in a study by Vanderbilt et al.[7] where only 36.06% provided the service. In the present study, 55.2% practiced under GA, 27.6% used oral, 24.1% used inhalation, 17.2% used IV and 3.4% used intranasal sedation routes. Nonetheless, variations are observed in the dental sedation practices worldwide.[11,18] A study by Wilson et al.[11] showed 52% practiced pediatric dental treatment under GA, 46% used nitrous oxide and 44% oral sedation. Another study showed nitrous oxide as the most frequent route of sedative administration followed by oral (93%), intranasal (1%), IV (2%) and IM (1%).[15] Few studies showed oral sedation as the most popular route among the pediatric dentists.[7,13,18] A study by Vanderbilt et al.[7] reported 45.86% used oral, 24.81% IV and 9.02% inhalation sedation.

Various oral sedatives have been used for dental management of children of which midazolam is considered to be the safest and most frequently used.[9,12] The present study showed midazolam and diphenhydramine (benadryl) as the most frequently used oral sedatives. This finding was similar to a study reporting midazolam as the most commonly used oral sedative.[13]

The likelihood of exceeding the intended sedation level is more when oral sedatives are re-dosed or when nitrous oxide oxygen inhalation is combined with other oral sedatives,[6] which was observed in this study as well. Further, few participants practiced oral sedations without medical supervision and/or in private dental clinic settings, with inadequate monitors and rescue equipments. The most frequently used monitor was pulse oximeter which is similar to the findings from other studies.[11] However, the respondents in this study reported no occurrence of any medical emergencies in their sedation practice. Alarmingly, one respondent reported of not taking an informed written consent prior to the sedation procedure, reflecting the lack of awareness of the practitioner regarding the risk of medico-legal lawsuits.

The present study showed that the general population in Nepal are already aware regarding dental sedation though only few of them have requested for it to their pediatric dentists. As the practitioners lack formal sedation training on routes other than inhalational sedation, their practice varied. The participants were not sufficiently trained on medical emergency skills apart from the BLS, and the redrills were also inadequate. A decrease in the number of practitioners who provide sedation to children was also observed in this survey along with 41.4% even having had to refer their patients to other dentists. This could be attributed to various barriers to their sedation practices like lack of facilities (well-equipped dental clinic/hospital with medical personnel and emergency equipment) in their setting (86.2%) and training on dental sedation/GA (75.9%). Other impediments included lack of conduction of regular trainings on sedation and MES in Nepal, followed by unaware or unwilling patients due to either risk or high-cost factors, and lack of confidence among the participants as too reported in other studies.[23] As sedation is an important adjunct in the dental treatment of children, regular trainings on different sedation routes and medical emergency skills need to be conducted in Nepal more frequently.

Though being a census study, a small sample size might limit the accuracy of the result and this might not have reflected the true practice as it was a questionnaire-based study. The information gathered in this study has helped in understanding the knowledge, attitude, and past and existing trends in the sedation practices, challenges faced by the pediatric dentists in Nepal, along with the areas of improvement needed for a standard pediatric dental care. Nonetheless, future researches are required for obtaining detailed data on their sedation practices.

CONCLUSIONS

The study showed satisfactory knowledge (89.7%), attitude (100%), and practice (76%) of dental sedation among the pediatric dentists in Nepal. However, there was lack of training on emergency skills and formal sedation courses other than for inhalational route among the participants. Lack of facilities and trainings on sedation were the major barriers to their practice. Hence, regular conduction of different sedation trainings and life support skills targeting the pediatric dentists in Nepal is required. Further, a regulatory body that supervises their sedation practice need to be formed as well.

ACKNOWLEDGEMENTS

The authors would like to thank all the pediatric dentists participating in this study for their valuable time and response, Mr. Dharanidhar Baral (School of Public health and Community Medicine) and Dr. Santosh Kumari Agrawal (Public Health Dentistry) for their guidance in statistical analysis, patients and their parents, and all those who have provided their support for the completion of this study.

Conflict of interest: None

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REFERENCES

1. Guidelines on Sedation in Paediatric Dentistry. European Academy of Pediatric Dentistry. 2005. [Full Text]
2. American Academy of Pediatric Dentistry. Recommendations: Best practices on Behavior Guidance for the Pediatric Dental Patient. Pediatric dentistry. 2015:266-79. [Full Text]
3. Guidelines for the Use of Sedation and General Anesthesia by Dentists. American Dental Association. 2016 [Full Text]
4. ASA Statement on Sedation & Anesthesia Administration in Dental Office-Based Settings. American Society of Anesthesiologists. 2017. [Full Text]
5. Practice Guidelines for Moderate Procedural Sedation and Analgesia 2018: A Report by the American Society of Anesthesiologists Task Force on Moderate Procedural Sedation and Analgesia, the American Association of Oral and Maxillofacial Surgeons, American College of Radiology, American Dental Association, American Society of Dentist Anesthesiologists, and Society of Interventional Radiology. Anesthesiology. 2018 Mar;128(3):437-479. [PubMed | Full Text | DOI]
6. Cote CJ, Wilson S. Guidelines for Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedures. Pediatr Dent. 2019 Jul 15;41(4):259-260. [PubMed]
7. Vanderbilt AA, Husson MM. Current sedation and anesthesia practices among dentists: a statewide survey. Oral Health Dent Manag. 2013 Dec;12(4):230-6. [PubMed]
8. Wilson S. Pharmacological management of the pediatric dental patient. Pediatr Dent. 2004 Mar-Apr;26(2):131-6. [PubMed]
9. Mittal N, Goyal A, Jain K, Gauba K. Pediatric Dental Sedation Research: Where Do We Stand Today? J Clin Pediatr Dent. 2015 Spring;39(3):284-91. doi: 10.17796/1053-4628-39.3.284. PMID: 26208076. [PubMed | Full Text | DOI]
10. Olabi NF, Jones JE, Saxen MA, Sanders BJ, Walker LA, Weddell JA, Schrader SM, Tomlin AM. The use of office-based sedation and general anesthesia by board certified pediatric dentists practicing in the United States. Anesth Prog. 2012 Spring;59(1):12-7. doi: 10.2344/11-15.1. PMID: 22428969; PMCID: PMC3309296. [PubMed | Full Text | DOI]
11. Wilson S, Alcaino EA. Survey on sedation in paediatric dentistry: a global perspective. Int J Paediatr Dent. 2011 Sep;21(5):321-32. [PubMed | DOI]
12. Lourenço-Matharu L, Ashley PF, Furness S. Sedation of children undergoing dental treatment. Cochrane Database Syst Rev. 2012 Mar 14;(3):CD003877. Update in: Cochrane Database Syst Rev. 2018 Dec 17;12:CD003877. [PubMed | Full Text | DOI]
13. Boynes SG, Moore PA, Tan PM Jr, Zovko J. Practice characteristics among dental anesthesia providers in the United States. Anesth Prog. 2010 Summer;57(2):52-8. [PubMed | Full Text | DOI]
14. Gazal G, Fareed WM, Zafar MS, Al-Samadani KH. Pain and anxiety management for pediatric dental procedures using various combinations of sedative drugs: A review. Saudi Pharm J. 2016 Jul;24(4):379-85. [DOI | Full Text | PubMed]
15. Wilson S, Houpt M. Project USAP 2010: Use of Sedative Agents in Pediatric Dentistry-a 25-year Follow-up Survey. Pediatr Dent. 2016 Mar-Apr;38(2):127-33. [PubMed]
16. Benzoni T, Cascella M. Procedural Sedation. StatPearls. Treasure Island (FL): StatPearls Publishing Copyright © 2022, StatPearls Publishing LLC.; 2022. [Updated 2022 Feb 5]. [Full Text]
17. Attri JP, Sharan R, Makkar V, Gupta KK, Khetarpal R, Kataria AP. Conscious Sedation: Emerging Trends in Pediatric Dentistry. Anesth Essays Res. 2017 Apr-Jun;11(2):277-281. [PubMed | Full Text | DOI]
18. Nelson TM, Xu Z. Pediatric dental sedation: challenges and opportunities. Clin CosmetInvestig Dent. 2015 Aug 26;7:97-106. [PubMed | Full Text | DOI]
19. Coté CJ, Notterman DA, Karl HW, Weinberg JA, McCloskey C. Adverse sedation events in pediatrics: a critical incident analysis of contributing factors. Pediatrics. 2000 Apr;105(4 Pt 1):805-14. [PubMed | Full Text | DOI]
20. Lee HH, Milgrom P, Starks H, Burke W. Trends in death associated with pediatric dental sedation and general anesthesia. PaediatrAnaesth. 2013 Aug;23(8):741-6. [PubMed | Full Text | DOI]
21. Wright GZ SJ. Nonpharmacologic management of children's behaviors. In: Dean JA AD, McDonald RE, editor. McDonald and Avery's Dentistry for the Child and Adolescent. 9th ed ed. Maryland Heights, Mo: Mosby-Elsevier; 2011. p.27-40. [Link]
22. Hicks CG, Jones JE, Saxen MA, Maupome G, Sanders BJ, Walker LA, Weddell JA, Tomlin A. Demand in pediatric dentistry for sedation and general anesthesia by dentist anesthesiologists: a survey of directors of dentist anesthesiologist and pediatric dentistry residencies. Anesth Prog. 2012 Spring;59(1):3-11. [PubMed | Full Text | DOI]
23. Adams A, Yarascavitch C, Quiñonez C, Azarpazhooh A. Use of and Access to Deep Sedation and General Anesthesia for Dental Patients: A Survey of Ontario Dentists. J Can Dent Assoc. 2017 Jul;83:h4. [PubMed | Full Text]