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Evaluating the Knowledge, Awareness and Exposure of Malaysian Dentists in Conscious Sedation for Dentistry in Relation to their Current Practice and Future Expectations

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ABSTRACT

Introduction: Conscious sedation (CS) in dentistry becoming more popular in Malaysia nowadays. However, the knowledge, exposure and practice of CS in dental setting has rarely been explored. Therefore, this study aimed to evaluate the knowledge awareness and exposure of Malaysian dentists about CS for dentistry and their association with sociodemographic profile.

Materials and Methods: A cross-sectional study using an online questionnaire (Qualtrics@ Software) was conducted among Malaysian registered dentists. Questions on sociodemographic profile, knowledge, awareness, exposure and practice on CS were collected. Chi square test was used to analyse the associated factors for knowledge, exposure and practice.

Results: A total of 166 responses received, resulting in response rate of 43.1%. Majority agreed that CS is beneficial in allaying dental anxiety and knows at least 3 types of CS. More than half had been exposed in inhalation sedation (IS) with less than half had CS exposure during undergraduate (UG). However, only a quarter practicing CS in their dental practice.

Discussion: Malaysian dentists were familiar with the indications of CS in dentistry which corroborates with other studies. Meanwhile, the exposure to CS during undergraduate study were dependant on the availability and the program structure.

Conclusions: Majority of respondents know, but only some are practicing oral and inhalation sedation. Only a few of respondents know about other types of CS. Thus, there is a need for more exposure and training of CS during undergraduate to cater the need of patients with dental anxiety.

Key words: *Conscious sedation,* dentistry, knowledge.

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Introduction

Conscious sedation (CS) is a technique in which the use of a drug or drugs produce a state of depression of the central nervous system enabling treatment to be carried out, but verbal contact with the patient is maintained throughout the period of sedation.[1] Conscious sedation (CS) in dentistry is the pharmacological approach usually offered after non-pharmacological behavioural modification techniques proof to be no avail. This method is found to be successful in managing patients with dental anxiety or patients with challenging behaviour in order to deliver dental treatment safely.[2,3]

CS in dentistry is still new for Malaysian dentists. The technique of CS that is widely used among dentists in Malaysia is inhalation sedation using mixture of nitrous oxide and oxygen. It was first introduced by a company named Tiensen& Tiensen Sdn. Bhd about fifteen years ago in Malaysia to manage children with dental anxiety. However, the usage of nitrous oxide among adults with special needs was recently introduced after Special Care/ Needs Dentistry service was established in 2011 in the Ministry of Health, Malaysia.[4]

Using sedation agents other than nitrous oxide such as midazolam in dental clinics has always been a controversial issue due to the cross-intervention between medical and dental fraternities.[3,5] Even though, techniques of CS such as inhalation and oral sedation have been widely used among children in the paediatric dental clinic by the specialists, many clinicians are sceptical about performing intravenous sedation (IVS) in dental clinics.[14] Lack of knowledge, exposures and experience could be the contributing factors to this 'fear'.[14] However, little is known about the knowledge and exposure that the Malaysian dentists have in regards to CS. To date, there is no study exploring this option among the Malaysian dentists. Lack of knowledge and exposure may pose some stigma in performing the procedure. The results of the

study will indicate the readiness and acceptance of CS to be practiced in dental setting in Malaysia. The need for training in CS can also be justified to be incorporated in undergraduate and postgraduate curriculum in the future.

In the Western countries such as the UK and USA, CS can be provided at the primary and secondary dental care settings.[1,3,4] However, in the Ministry of Health Malaysia facilities, CS only provided in the hospital-based dentistry services such as the Oral and Maxillofacial, Paediatric Dentistry and Special Care Dentistry services.[6] As stated by several health departments around the world, the drugs and techniques used to provide CS for dental treatment should carry a margin of safety wide enough to render loss of consciousness unlikely (minimal to moderate level of sedation).[1,3,4,6] To that extent, the Ministry of Health Malaysia refers to the guideline proposed by the College of Anaesthesiologist Academy of Medicine Malaysia for the continuum of sedation depth as in Figure 1.[5]

The recommendation of the settings for CS in dentistry in Malaysia based on the guideline of CS for adult patients which was just recently published in April 2021.[6] This is very much similar to the recommendations set by several guidelines produced in the United Kingdom.[1,4]

CS is also offered by private dental clinics or general dental practice (GDP) for patients with dental anxiety. Most of them have undergone training in inhalation sedation with nitrous oxide organized by the Tiensen & Tiensen company. Those who offer intravenous sedation (IVS) have medical practitioner in the practice who act as the seditionist, whilst the dentist focuses on dental treatments as recommended by the local guideline.[5]

Thus, this study aimed to explore the knowledge, awareness and exposure of Malaysian dentists about CS for dentistry and how this is practised in Malaysian dental setting while identifying their expectations on this aspect in the future.

Research Methodology

Research ethical approval

This project was registered and approved by the National Malaysian Medical Research Registry (NMRR) in compliance with current Ministry of Health, National Institute of Health (MOH NIH) research guideline and Helsinki Declaration of 1975.The approval number is NMRR-20-799-54299 (IIR).

Inclusion and exclusion criteria

This was a cross sectional, online survey conducted among 11,607 registered Malaysian dentists who registered with Malaysian Dental Council (MDC) in 2020. The inclusion criteria were dental practitioners who held current Annual Practicing Certificate (APC) in Malaysia. Those who had less than 1 year of working experience and did not hold current APC were excluded in this study.

The power sample calculated for this study was 385 using Kisch formula with confidence rate was set at 95%. A total of 166 responses received, resulting in the response rate of 43.1

Research tools

This study involved the distribution of survey questionnaires online using Qualtrics@software through their emails and social media. The survey consists of four sections whereby the first section covers the sociodemographic information about the participants. The second section concentrates on the awareness and knowledge that the participants have in CS. The third section focuses on the exposure and practice of CS based on their experience. The online survey took about 5 -8 minutes to complete. Face and content validation of the questionnaires were done with two experts in the related field and 27 dentists who attended a course entitled “Awareness in Conscious Sedation for Dentistry” in 2019. Some minor amendments made based on the responses given by the participants.

Data entry and analysis

The data collected from Qualtrics©software application was entered and analyzed using SPSS version 26.0 IBM Corp with a 5% level of significance. Years of service was categorized into two categories within 10 years of service and more than 10 years. Place of practice also were further dichotomized into government and private practice.[7]

Results

Table 1 illustrates the sociodemographic profile of the respondents. Out of 166 responses, 2 respondents did not answer the questions on gender and work place. Majority of respondents were female dentists (n=129, 78.7%). Only n=35, 21.3% were male dentists. The median age of the respondents were 33 years old. Junior dentists with less than 5 years of service were the highest group of respondents (n=56, 34.3%). In contrast, senior dentists with more than 20 years of service comprised the least number of respondents (n=31, 18.7%). The rest represented the group of 5 to 20 years of service. About 90 percent (n= 149) of them work in the government sector which includes Ministry of Health (MOH), Ministry of Higher Education (MOHE) and Ministry of Defence (MOD).

Table 2 shows majority (n=147, 88.6%) of respondents were aware of CS in dentistry. Among 130 respondents who answered the question on the source of exposure, more than one third (n= 60, 46.1%) had their CS exposure during undergraduate. For the third and fourth questions in this section, participants were allowed to give more than one response. Majority out of 140 participants responded to the former question agreed that the purpose of performing CS was to alleviate anxiety (n=113, 80.7%) with only minority (n=57, 40.7%) said CS could reduce gagging reflex. From 141 respondents who claimed that they were familiar with several types of CS (fourth question), majority knew about 3 techniques of CS which could be performed in dental settings, which was inhalation (n=128, 90.8%), oral (n=113, 80.1%) and intravenous (n=108, 76.6%) being the most common ones.

More than 80% from 139 respondents claimed that they knew how to manage medical emergency related to CS in dental settings. Lastly, more than half (n=81, 57.9%) of the respondents out of 140 responses were aware of the legislation code for CS that is available in Malaysia.

Table 3 illustrates the exposure received by the respondents on CS. More than half (n=73, 52.5%) of 139 respondents had been exposed to inhalation sedation (IHS) with n=112 agreed that CS was safe to be performed in dental settings. More than half of the respondents received undergraduate exposure on CS (n= 57, 85.1) in the form of theory and clinical observation whilst on the other hand, half of the respondents (50.7%) received postgraduate exposure on CS in the form of theory, observation and practical. Majority (n=128, 92.1%) agreed that more exposure on CS should be given during their undergraduate study. Apart from that, 123 participants claimed that they underwent training on Basic Life Support (BLS).

Table 4 illustrates that less than one third of respondents (n=39, 28.9%) offered CS in their practices with two third provided inhalation sedation (IHS) (76.9%) followed by oral sedation (66.7%). Majority (n= 132, 98.5%) agreed that CS is helpful for carrying out dental treatments and perceived the needs for CS (n=107, 82.9%) for their patients. Only a small number of respondents (n=10, 7.7%) had encountered emergency events while performing CS.

Table 5 shows the prospective of CS in Malaysia where majority (n=127, 92.0%) showed interest to have training in CS and n=108 (77.7%) respondents perceived that CS is needed for their dental patients. Most of the respondents (n=130, 93.5%) also would like to have CS available in their practice.

Discussion

Knowledge and awareness in this study were evaluated in three subjects, how familiar the participants with the CS, knowing how to react to medical emergency in dental settings and awareness on the legislation and code for CS. In a study done among dentists in Brazil, about 75% reported to be familiar about CS with 70% of the dentists claimed they knew how to react in the event of emergency in dental settings.[8] Meanwhile in this study, 88.6% of the respondents agreed on having some knowledge and awareness on CS and 82.7% knew how to react during emergency events. However, this study did not explore on the confidence level of the respondents when it comes to emergency events. Our study also corroborates with the findings in the previous studies done in Brazil and in the UK in which mentioned that patients with dental anxiety were more likely to be referred for sedation. [9,10]

Figure 1. Continuum of Depth of Sedation

	Minimal Sedation (Anxiolysis)	Moderate Sedation/ Analgesia (Conscious Sedation)	Deep Sedation/ Analgesia	General Anaesthesia
Responsiveness	Normal response to verbal stimulation	Purposeful response to verbal or tactile stimulation	Purposeful response after repeated or painful stimulation	Unarousable even with painful stimulation
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular Function	Unaffected	Usually maintained	Usually maintained	May be impaired

Table 1. Sociodemographic profile of the respondents

Gender(n=164)	N (%)
Male	35 (21.3)
Female	129 (78.7)
Age (median (IQR))	33 (13)
Years of service (n=166)	
<5	57 (34.3)
5-10	40 (24.1)
11-20	38 (22.9)
>20	31 (18.7)
Current practice place (n=164)	
Stand-alone dental clinic MOH/MOHE	11 (6.7)
Dental clinic in health clinic MOH/MOHE	77 (47.0)
Hospital based dental clinic MOH/MOHE	60 (36.6)
Stand-alone private dental practice	9 (5.5)
Dental clinic in private health clinic	3 (1.8)
Private dental hospital	3 (1.8)
Dental specialist polyclinic/clinic in MOD	1 (0.6)

MOH – Ministry of Health, MOHE – Ministry of Higher Education, MOD- Ministry of Defence

Table 2. Knowledge and awareness on conscious sedation

Familiar with conscious sedation (CS) (n=166)	N (%)
Yes	147(88.6)
No	19 (11.4)
Source of information on CS (n=130)	
Undergraduate	60(46.1)
Postgraduate	30(23.1)
Continuous Dental Education (CDE)	11(8.5)
Hospital training	17(13.1)
Complimentary reading	12(9.2)
Purpose of CS (n=140) *	
Alleviate anxiety	113(80.7)
To reduce gag reflex	57 (40.7)
As alternative for GA	68(48.6)
Part of behaviour guidance	80(57.1)
To help dentist deliver treatment easier	87(62.1)
Types of CS that you know (n=141)*	
Oral	113(80.1)
Inhalation (IHS)	128(90.8)
Intravenous (IVS)	108(76.6)
Intranasal (INS)	49(34.8)
Intramuscular (IM)	38(27.0)
General anaesthesia (GA)	13(9.2)
Know how to react to medical emergency in dental settings? (n=139)	
Yes	115(82.7)
No	24(17.3)
Aware of the legislation and code for CS?(n=140)	
Yes	81(57.9)
No	59(42.1)

*Respondents can answer more than one

Table 3. Exposure or training on conscious sedation

The most common type of CS you have seen (n=139)	N (%)
Oral	32(23.0)
Inhalation (IHS)	73(52.5)
Intravenous (IVS)	28(20.1)
Intranasal (INS)	2(1.4)
Intramuscular (IM)	1(0.7)
General anaesthesia (GA)	3(2.2)
Safe to perform CS in dental settings (n=134)	
Yes	112(83.6)
No	22(16.4)
Last training on BLS/ALS/ACLS (n=123)	
Within 5 years ago	91(74.0)
More than 5 years ago	32(26.0)
Exposure on CS:	
Exposure during undergraduate (n=141)	
Yes	67(46.8)
Theory only	19(28.4)
Theory and observation	38(56.7)
Theory, observation and practical	10(14.9)
No	74(52.9)
Exposure during postgraduate (n=115)	
Yes	59(51.3)
Theory only	10(16.9)
Theory and observation	19(32.2)
Theory, observation and practical	30(50.8)
No	56(49.7)
Should you get more exposure during UG? (n=139)	
Yes	128(92.1)
No	11(7.9)

Table 4. Practice in conscious sedation

Offer CS in your practice(n=135)	N (%)
Yes	39(28.9)
No	96(71.1)
Types of CS offered in your practice	
Oral (n=39)	26(66.7)
Inhalation (IHS) (n=39)	30(76.9)
Intravenous (IVS) (n=39)	13(33.3)
Intranasal (INS) (n=39)	5(12.8)
Intramuscular (IM) (n=39)	3(7.7)
General anaesthesia (GA) (n=39)	8(20.5)
Helpful to carry out dental treatment under CS?(n=134)	
Yes	132(98.5)
No	2(1.5)
Perceived need for your patients to CS?(n=129)	
Yes	107(82.9)
No	22(17.1)
Encountered emergency events during CS for your patients?(n=130)	
Yes	10(7.7)
No	120(92.3)

Table 5: Conscious sedation prospective

Interest in training in CS if it is available in Malaysia?(n=138)	N(%)
Yes	127(92.0)
No	11(8.0)
Perceived need of CS for dental patients in Malaysia(n=139)	
Needed	108(77.7)
Maybe	30(21.6)
Not needed	1(0.7)
Would like to have CS service(s) available in your practice(n=139)	
Yes	130(93.5)
No	9(6.5)

At the time when the questionnaire was distributed, there was no specific guideline with regards to CS in dentistry in Malaysia. However, more than half of the respondents reported that they were aware of the legislation and regulation pertaining to CS that was available in Malaysia. Presumably, they were referring to one and only document, Recommendations for Sedation And Analgesia By Non-Anaesthesiologists proposed by the College of Anaesthesiologist Academy of Medicine Malaysia in 2012.[5] However, this recommendation is not specific for dentistry and the information related to dental sedation is very limited. Nevertheless, in April 2021, the Oral Health Programme, Ministry of Health Malaysia had published a guideline on Conscious Sedation in Dentistry for Adult Patients which was more specific and relevant to the practice of dentistry.[6] Adherence and compliance to the local guidelines and regulations pertaining to CS in dental service are crucial to ensure patients' safety and to protect the dental professionals. Every country, state, municipal or even department may have different rules and concerns.[1,4,6] Awareness on the existence of the local code of practice in CS in dentistry will prevent the dental practitioners from practicing techniques that are against the local laws.

In the UK, there is a requirement for undergraduate dental students to have exposure in CS for at least 1 performed or assisted CS case during their undergraduate studies.[11] However, there is no requirement for exposure in CS for dental undergraduate in Malaysia.[12] Despite of no requirement for CS, some universities in Malaysia have given some exposure on CS to their undergraduates. Although less than 50% had exposure on CS during their undergraduate studies, it is a good indicator that majority of our dental undergraduates have had at least theoretical and observation on CS. It is crucial for dentists to undergo a proper post graduate training for performing CS to dental patients.[14,15] In the present study, 60% of specialists had exposure on CS during their postgraduate studies with more than 50% had their practical training. This could be due to the specialisation area whether CS is required as part of their postgraduate studies.[13,14] In Malaysia, only three specialisation areas that required for the postgraduates to have practical exposure on CS, which are; Special Care Dentistry, Paediatric Dentistry and Oral and Maxillofacial Surgery.[13]

Inhalation sedation using mixture of nitrous oxide and oxygen is the commonest type of CS being offered by the dentists in Malaysia. This is due to the properties of nitrous oxide which make it the safest form of CS to be delivered on dental chair.[16,17] Oral sedation is the second commonest method of CS offered by the participants perhaps because of its methods of delivery which is less invasive compared to intravenous sedation despite of its disadvantages which are delayed onset and prolonged

recovery.[18] Intravenous sedation was found to be helpful, cost effective, and less trauma to the patients as reported by previous researchers.[19-21]

Advantages and limitations

This particular study was able to capture the data on knowledge, awareness, practice and exposure of CS among Malaysian dentists. Since, there are no other local studies addressing these issues so far, the data collected acts as a baseline reference for future research in similar field. At the same time, it also creates awareness among the Malaysian dentists about the availability of CS in dental practice in Malaysia and how this may lead to curiosity and further research especially amongst those who have never encountered such services before. On the other hand, the study did not assess the level of competencies of the participants to respond to emergency event. The responses captured only based on their self-perception of their ability and the related theoretical knowledge they might have.

Conclusion

Majority of the Malaysian dentists were aware about CS in dentistry regardless of their background of training, age, length of experience as well as the place of practice. Unsurprisingly, postgraduate students in certain disciplines such as Oral Maxillofacial Surgery, Paediatric Dentistry and Special Care Dentistry had more exposure in CS. Although the training module may vary from one university to another, having such an exposure will certainly increase the confidence of the dental specialist to offer or at least suggest the service whenever it is indicated for the patients. It is motivating to conclude that majority of the respondents are interested to receive further training in CS if it is made available and expecting to offer the service in their practice in the future.

Recommendations

This study has suggested that training in CS in dentistry in Malaysia should be strengthened in the future either during undergraduate or postgraduate studies as well as in service training. The dental faculty of the local universities should be well prepared to include CS in various techniques as part of the training module in undergraduate or postgraduate curriculum. Therefore, a proper in-service training module should be developed, perhaps, in collaboration with the anaesthetic team at the initial stage to train a team in this field which may include specialists, general dental practitioners, dental nurses/therapists or dental surgery assistants instead of a training that focus on an individual desire. Performing CS requires a team to manage the patient either pre-operatively, during the operation or post-operatively. This will encourage more interests among the Malaysian general dental practitioners in offering the service to the public. On the other hand, the future research should explore on the demands of such services among the Malaysian population to support the needs of the service provision.

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Conflict of interest

All authors declare that they have no conflict of interest.

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