Dentists' and Parents' Attitude Toward Nitrous Oxide Use in Kuwait

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The aim of this study was to investigate the attitude of dentists in Kuwait toward the use of nitrous oxide sedation as a behavior management technique (BMT) for pediatric patients and assess their training in nitrous oxide sedation. In addition, we assessed parents' knowledge of and attitude toward the use of nitrous oxide as a BMT for their children. The objective was to determine if nitrous oxide sedation is being provided and utilized as a means to enhance dental care for pediatric patients. A cross-sectional survey was randomly distributed to both groups of interest: parents accompanying their children to the dentist and licensed dentists in Kuwait. Participants had to meet certain inclusion criteria to be included in the survey and had to complete the entire questionnaire to be part of the analysis. A total of 381 parents completed the questionnaires. The majority of parents responded that they were unaware of nitrous oxide sedation and were not aware of it as a BMT (79%). Two thirds of the parent would accept nitrous oxide sedation if recommended by a dentist treating their children. Two hundred and one dentists completed the survey and met the inclusion criteria. The majority (74.5%) of dentists were willing to use nitrous oxide as a BMT. However, only 6% were utilizing nitrous oxide sedation and providing it to their child patient if indicated. The main reasons for this huge gap are lack of facilities/equipment and lack of training as indicated by the dentists. This study showed that parents are accepting nitrous oxide sedation as a BMT for their children. It also showed the willingness of the dentists to provide such BMT to their patients. The lack of training and lack of equipment are the main barriers to providing such service to the patients. More training courses and more facilities should be provided to eliminate such barriers.

Key Words: Nitrous oxide; Kuwait; Minimal sedation.

Managing a child's behavior during dental treatment is an important factor in delivering safe and effective dental care. Various nonpharmacological and pharmacological techniques are recommended by the American Academy of Pediatric Dentistry to enable the

dental practitioner to perform quality oral health care for the uncooperative pediatric patient, and at the same time alleviate fear and anxiety, guide the child to be cooperative, and nurture a positive dental attitude in him/her.¹ In addition to tailoring various behavior management techniques (BMTs) to the individual child, it is also important for dental practitioners to utilize techniques consistent with their level of professional education and clinical experience.²

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Nitrous oxide sedation has a long history of safe use in dentistry and offers the clinician predictable clinical outcomes.³ It is considered a preferred technique for the pharmacological management of anxiety in pediatric dental patients in the dental office.^{4,5}

Nitrous oxide sedation has been accepted as a popular pharmacological BMT in many Western countries, including the United States.^{6,7} In 1996, a survey of the American Academy of Pediatric Dentistry membership revealed that 89% of pediatric dentists utilize nitrous oxide sedation, with most of them using it more than 5 times per week.⁸ Moreover, this sedation technique is the second most accepted BMT by parents in the United States.⁹ On the contrary, several studies showed that the majority of parents in Middle East countries did not accept nitrous oxide sedation as a BMT. One study, which was conducted in 2009, demonstrated that most parents in Kuwait prefer nonpharmacological techniques over pharmacological ones, and nitrous oxide sedation was rated as one of the least acceptable techniques.¹⁰ Similar findings were found by Al-Shalan and Alammouri for Saudi Arabian and Jordanian parents, respectively.^{11,12}

In 2010, nitrous oxide sedation was officially approved and regulated by the Kuwaiti Dental Board. Prior to that date, dentists were unable to administer nitrous oxide in their dental offices despite training in its use. Many dentists referred patients to have general anesthesia if the patient needed pharmacological anxiety management. Therefore, 3 years after the approval of its use by dentists, the aim was to investigate the attitude of dentists in Kuwait toward the use of nitrous oxide sedation as a BMT for pediatric patients and assess their training in nitrous oxide sedation. In addition, parents' knowledge and attitude toward the use of nitrous oxide as a BMT for their children was also assessed.

METHODS

Parents

After approval by the Health Sciences Center's Ethical Committee, 400 precoded questionnaires were distributed among a random sample of parents who accompanied their children to (a) the Kuwait University Dental Center, (b) pediatric dental clinics at the specialty dental centers (Al-Amiri, Benaïd Al-Gar, Al-Farwaniya, Adan, and Al-Jahra), (c) pediatric dental clinics at the general practice dental centers (polyclinics) (Al-Salmiya Al-Garby, Fahad Al-Ahmad, and Al-Nezha), and (d) 4 private clinics advertising for pediatric dental care. Parents were randomly recruited from the waiting room of those dental clinics. Inclusion criteria included

parenthood of the accompanying child, literacy for the questionnaire, and minimum age of 21 years.

All parents who agreed to participate received verbal and written information about the nature and purposes of the study. Upon their approval to participate, an informed consent was obtained from each subject. Participants were handed a self-administered questionnaire, and were instructed to answer all questions, which involved the following independent variables: (a) demographic data of the child and the accompanying parent such as age, gender, nationality, government (administrative districts in Kuwait), and child's birth order in the family; (b) parent's educational and income levels; (c) reason for the dental visit and child's usual behavior; and (d) parent's knowledge and attitude toward the use of nitrous oxide as a BMT for their children.

Dentists

A cross-sectional survey of the licensed dentists in the country was approved by the Health Sciences Center's Ethical Committee. Two hundred eighty precoded questionnaires were distributed among a random sample of the 1723 licensed dentists in Kuwait. The dentists were practicing in specialty practices located in the following: (a) Kuwait University Dental Center; (b) specialty dental centers (Al-Amiri, Benaïd Al-Gar, Al-Farwaniya, Adan, and Al-Jahra); (c) 5 randomly selected polyclinics, 1 from each of the residential areas in which the specialty centers were located; and (d) 5 randomly selected private dental clinics advertising for pediatric dental care. The inclusion criteria for this group were dentist with a valid dental license, currently residing and practicing in Kuwait, minimum age of 21 years, and treating pediatric patients.

All dentists who agreed to participate received verbal and written information about the nature and purposes of the study. Upon their approval to participate, an informed consent was obtained from each subject. Participants were handed self-administered questionnaires, and were instructed to answer all questions, which involved the following independent variables: (a) demographic data such as age, gender, nationality, and marital status; (b) years of dental practice, specialty, and level of training; (c) training in nitrous oxide sedation; and (d) attitude and knowledge toward the use of nitrous oxide sedation as a BMT for pediatric patients. Data entry, management, analysis, and presentation of results were performed using statistical software, Statistical Package for Social Sciences (SPSS) version 20. A probability value of $<.05$ was used as the cutoff level for statistical significance. Frequency, percentage, mean

Table 1. Demographics of Parents (*N* = 376)*

Demographic	No.	%
Age, mean $\pm$ SD (range), y	35.69 $\pm$ 6.42 (23–65)	
Gender		
Male	179	47.6
Female	197	52.4
Nationality		
Kuwaiti	201	53.5
Non-Kuwaiti	175	46.5
Government		
Hawalli	109	29.0
Capital	68	18.1
Jahra	45	12.0
Farwania	75	19.9
Ahmadi/Mubarak Alkabeer	79	21
Education		
Less than high school	30	8.0
High school graduate	112	29.8
College or university graduate	189	50.3
Higher educational degrees	45	12.0
Income, KD		
<500	120	31.9
500–999	110	29.3
1000–2000	101	26.9
>2000	45	12.0

* KD indicates Kuwaiti dinar.

$\pm$ SD, and range were used to present descriptive statistics. Pearson's chi-square was used to assess the association of different characteristics with parents' or dentists' attitudes.

RESULTS

Parent BMT Survey

A total of 381 parents completed the questionnaire with a response rate of 95.25%; 5 respondents did not complete the questionnaire and were omitted from data analysis. The profile of the parents and their child-patients are summarized in Tables 1 and 2 respectively. Parents' mean age was 35.7 years, ranging between 23 and 65 years. Mothers and fathers accompanied the child-patient in almost equal numbers (male to female ratio = 0.9 : 1). Half of the parents (50.3%) had university education, followed by high school (29.8%); higher education degrees, ie, master, PhD (12%); and less than high school (8%). The mean age of the child-patient was 5.9 years, ranging between 1 and 15 years, with almost equal number of boys and girls (male to female ratio = 0.9 : 1). More than half of the children (68.6%) were seeking dental clinic for restorative treatment. The parents rated their child as usually highly cooperative or cooperative (71.5%) but at the same time

Table 2. Demographics of Child-Patient (*N* = 376)

Demographic	No.	%
Age, mean $\pm$ SD (range), y	5.88 $\pm$ 2.69 (1–15)	
Gender		
Male	184	49.1
Female	192	50.9
Order among siblings		
First	137	36.4
Middle	120	31.9
Last	119	31.6
Reason for today's dental visit		
First visit	50	13.3
Prevention	41	10.9
Restorative	258	68.6
Emergency	18	4.8
Orthodontic	9	2.4
Usual cooperation		
Highly cooperative	72	19.1
Cooperative	196	52.4
Uncooperative	92	24.5
Highly uncooperative	16	4.0
Usual behavior		
Happy	42	11.3
Fearful	184	48.8
Anxious	117	31.1
Apprehensive	28	7.5
Aggressive	5	1.3

usually fearful, anxious, or apprehensive (87.4%) regarding dental treatment.

The majority of parents in this study were neither aware of nitrous oxide sedation (79%) nor aware that it was an option as a BMT (75%). The majority were also unaware of its recent acceptance as a BMT for dental pediatric patients in Kuwait (86%).

More than half of parents (66%) in our study would accept nitrous oxide sedation as a BMT for their children if it was recommended by the treating dentist (Figure 1). In addition, a similar percentage of them would prefer nitrous oxide over general anesthesia if both were suggested by the treating dentist (Figure 2).

Nineteen pediatric patients (5%) had undergone nitrous oxide sedation with dental treatments during this analysis. Table 3 shows that the majority of parents were satisfied about their child's experience of this sedation technique.

Table 4 demonstrates the association of different parental and child characteristics with parents' acceptance of nitrous oxide sedation. A significant declining trend in parental acceptance was noticed with increasing age of parents ($P = .001$). Parental education also showed a significant association with their acceptance of this sedation technique: the higher their education level, the more accepting parents were toward the use of nitrous oxide sedation for their children ($P = .031$). Moreover, gender had a significant association, as

Figure 1. Parental acceptance of nitrous oxide (N₂O) sedation as a behavioral management technique.

mothers accepted this BMT slightly more compared to fathers ($P = .006$). Nationality had no significant effect on acceptance of nitrous oxide as a BMT ($P = .085$). Furthermore, as income of parents increased, their acceptance of nitrous oxide sedation seemed to increase only slightly, and this was not significant ($P = .573$). It was also found that parents seeking private-sector dental treatment of their children tended to accept this sedation more than those seeking public-sector treatment; this association was significant ($P = .006$). No association was found between parents' acceptance and child-patient's age, gender, birth order, usual cooperation, or usual behavior.

Provider BMT Survey

Of 280 dentists, 238 responded to the study questionnaire (response rate: 85%); of those, 201 respondents met the inclusion criteria. As demonstrated in Table 5, the greatest percentage of respondent dentists in this study were 20 to 29 years old (40.3%), with slightly more male (57.2%) than female dentists (42.8%). Most respondents had been practicing dentistry more than 10 years (38%) and categorized themselves as general dentists (59.2%). Overall, 60.5% of dentists stated that they treated 1 to 5 pediatric patients per week, with 49.5% of respondents reporting seeing 1 to 5 uncooperative pediatric patients per week (Table 5).

Table 6 assesses the respondent dentists' knowledge and attitude toward nitrous oxide sedation as a BMT. More than half of the dentists in this study were aware of the acceptance of nitrous oxide sedation as a BMT in Kuwait. Despite the fact that 94% of dentists did not use

Figure 2. Parental preference.

nitrous oxide sedation as a BMT for their pediatric patients, 74.5% were willing to use it. However, dentists who did not have appropriate training for the use of nitrous oxide (64.2%) significantly outnumbered dentists who did (35.8%). Figure 3 demonstrates the types of training respondents received. Although only 23.9% of dentists were aware of regulations about nitrous oxide

Table 3. Parents' Attitude Toward N₂O Sedation Experience as a BMT for Their Child-Patient (N = 19)*

Parameter	No.	%
The use of N ₂ O sedation was successful for my child in that dental visit		
Agree	18	94.7
Neutral	1	5.3
Disagree	0	0.0
The use of N ₂ O sedation, in that visit, was very helpful and necessary to do the dentistry		
Agree	16	84.2
Neutral	3	15.8
Disagree	0	0.0
The use of N ₂ O sedation made my child more comfortable during that visit		
Agree	19	100
Neutral	0	0.0
Disagree	0	0.0
The use of N ₂ O sedation, in that visit, had a negative effect on my child later		
Agree	1	5.3
Neutral	3	15.8
Disagree	15	78.9
How was the informed consent taken?		
No consent was taken	1	5.3
Verbally	5	26.3
Written	6	31.6
Both verbally and written	7	36.8

* N₂O indicates nitrous oxide; BMT, behavior management technique.

Table 4. Characteristics of Parents and Child-Patient and Parental Acceptance of N₂O Sedation as a BMT

Parameter	Parental Acceptance, No. (%)		P
	Yes (N = 250)	No (N = 126)	
Parent age, y			.001
20–29	55 (85.9)	9 (14.1)	
30–39	127 (66.1)	65 (33.9)	
40–49	57 (57.6)	42 (42.4)	
50	10 (52.6)	9 (47.4)	
Parent gender			.006
Male	106 (59.6)	72 (40.4)	
Female	143 (73.0)	53 (27.0)	
Nationality			.085
Kuwaiti	141 (70.5)	59 (29.5)	
Non-Kuwaiti	108 (62.1)	66 (37.9)	
Government			.487
Hawali	76 (69.7)	33 (30.3)	
Capital	47 (70.1)	20 (29.9)	
Jahra	26 (57.8)	19 (42.2)	
Farwania	52 (69.3)	23 (30.7)	
Ahmadi	34 (58.6)	24 (41.4)	
Mubarak Alkabeer	14 (70.0)	6 (30.0)	
Parent education level			.031
Less than high school	8 (26.7)	22 (73.3)	
High school graduate	64 (57.1)	48 (42.9)	
University graduate	127 (67.9)	60 (32.1)	
Higher education	36 (80.0)	9 (20.0)	
Parent income level, KD			.573
<500	75 (62.5)	45 (37.5)	
500–999	72 (66.1)	37 (33.9)	
1000–2000	70 (69.3)	31 (30.7)	
>2000	32 (72.7)	12 (27.3)	
Dental setting			.006
Private	50 (86.2)	8 (13.8)	
Governmental polyclinic	51 (60.7)	33 (39.3)	
Governmental specialty center	107 (64.8)	58 (35.2)	
KUDC	41 (61.2)	26 (38.8)	
Child age, y			.715
1–3	38 (62.3)	23 (37.7)	
4–6	127 (66.8)	63 (33.2)	
7	84 (68.3)	39 (31.7)	
Child gender			.742
Male	120 (65.9)	62 (34.1)	
Female	129 (67.5)	62 (32.5)	
Birth order			.579
First	94 (69.1)	42 (30.9)	
Middle	80 (67.2)	39 (32.8)	
Last	75 (63.0)	44 (37.0)	
Reason for today's dental visit			.213
First visit	37 (75.5)	12 (24.5)	
Prevention	31 (77.5)	9 (22.5)	
Restorative	162 (62.8)	96 (37.2)	
Emergency	13 (72.2)	5 (27.8)	
Orthodontic	6 (66.7)	3 (33.3)	
Usual cooperation			.344
Highly cooperative	45 (63.4)	26 (36.6)	
Cooperative	131 (67.2)	64 (32.8)	
Uncooperative	57 (64.0)	32 (36.0)	
Highly uncooperative	13 (86.7)	2 (13.3)	

Table 4. Continued.

Parameter	Parental Acceptance, No. (%)		P
	Yes (N = 250)	No (N = 126)	
Usual behavior			.476
Happy	29 (69.0)	13 (31.0)	
Fearful	127 (69.8)	55 (30.2)	
Anxious	73 (64.0)	41 (36.0)	
Apprehensive	15 (53.6)	13 (46.4)	
Aggressive	3 (60.0)	2 (40.0)	

* N₂O indicates nitrous oxide; BMT, behavior management technique, KD, Kuwaiti dinar; and KUDC, Kuwait University Dental Center.

sedation usage for pediatric patients in Kuwait, over half (55.2%) were aware of regulations about its usage internationally. When dentists were asked about the main reasons for lack of nitrous oxide use in Kuwait, the majority of respondents answered lack of facilities/equipment and lack of training/knowledge. Moreover, the majority of dentists in this study (73.1%) thought that parents were not aware of nitrous oxide sedation as a BMT for their children.

When cross-tabulation was done (Table 7), female dentists seemed to be significantly more willing to use nitrous oxide sedation than males ($P = .001$). In addition, the willingness of the dentists to use nitrous oxide sedation increased with higher numbers of uncooperative patients being treated ($P = .00001$). Moreover, the dentists who had been trained to use nitrous oxide sedation were more willing to utilize it ($P = .00001$). Furthermore, the surveyed dentists in different specialties were more willing to utilize nitrous oxide sedation, except in orthodontics, where none showed willingness ($P = .00001$).

There was no significance with regards to dentists' age, nationality, years of dental practice, main practice setting, or treated pediatric patient nationality toward the willingness to use nitrous oxide sedation. Dentists who worked in Hawalli showed a trend to be more willing to use nitrous oxide sedation than those in other governments ($P = .059$).

DISCUSSION

This study showed that the majority of parents in Kuwait are unaware of nitrous oxide sedation as a BMT or the recent approval and regulation of the agent in dental practice. When this BMT is recommended by the treating dentist, more than half of parents would accept its usage for their children. Younger parents and increasing education level were the main factors

Table 5. Demographics of Dentists (N = 201)*

Demographic	No.	%
Age, y		
20–29	81	40.3
30–39	62	30.8
40–49	32	15.9
≥ 50	26	12.9
Gender		
Male	115	57.2
Female	86	42.8
Nationality		
Kuwaiti	126	62.7
Non-Kuwaiti	75	37.3
Time practiced, y		
<1	25	12.4
1–5	61	30.3
6–10	38	18.9
>10	77	38.3
Specialty		
General dentistry	119	59.2
Pediatric dentistry	28	13.9
OMFS	11	5.5
Periodontology	10	5
Orthodontics	14	7
Endodontics	19	9.5
Level of training		
Trainee	40	20.3
Assistant registrar	40	20.3
Registrar	40	20.3
Senior registrar	38	19.3
Specialist	27	13.7
Consultant	12	6.1
Main practice setting		
Private clinic	7	3.5
Governmental polyclinic	105	52.2
Governmental specialty center	73	36.3
Governmental hospital	1	0.5
Educational institute (KUDC)	15	7.5
Government practiced in		
Hawalli	55	27.8
Capital	59	29.8
Jahra	17	8.6
Farwania	26	13.1
Ahmadi/Mubarak Alkabeer	41	20.7
Nationality of pediatric patients treated		
Mostly Kuwaitis	90	44.8
Mostly non-Kuwaitis	58	28.9
Almost equal number	53	26.4
No. of uncooperative pediatric patients treated per wk (average)		
None	60	30
1–5	99	49.5
6–10	25	12.5
>10	16	8

* OMFS indicates oral maxillofacial surgery; KUDC, Kuwait University Dental Center.

patients should be encouraged to educate and inform parents of nitrous oxide as a BMT and offer it as a service to pediatric patients whenever it is suitable and indicated. This study also demonstrated that parental acceptance of nitrous oxide sedation is higher compared to previous studies conducted in Middle East countries including Kuwait.^{10–12} This might be due to differences in the method by which these studies were conducted and the sample size used in each study.

Although nitrous oxide sedation has become a routine BMT for pediatric patients in contemporary American dental practice,⁸ only 12 out of 201 (6%) surveyed dentists in Kuwait utilize it. Nitrous oxide is not commonly used in Kuwait because of a shortage of facilities/equipment and lack of dentist training/knowledge.¹³ Concerning nitrous oxide sedation safety, the majority of dentists agreed on its safety, which is consistent with previously published reports.^{14,15} An analysis completed by Hulland et al¹⁶ revealed that on the basis of a 10-year retrospective study, the utilization of nitrous oxide–oxygen sedation as a single agent provides effective and safe conscious sedation for pediatric patients. Possible reasons for its effectiveness are that nitrous oxide sedation calms agitated pediatric patients, suppresses their anxiety, and decreases unpleasant dental care memories.¹⁶ In addition, the dentist can work more quickly and in a more focused manner, diminishing the chance of mechanical error and improving the quality of dental care; consequently, there are fewer dental appointments and fewer missed school days for the child.¹⁵

Dental providers in Kuwait have used general anesthesia as their main means of pharmacologic behavior management for the administration of dental procedures.^{13,17} This process requires a hospital operating theater, bears substantial cost on the Kuwaiti health care system, and can act as a barrier to care because of limited access for appointment times. The need for sedation services for dental care in Kuwait was demonstrated by a recent study that found a significant portion of the population, 60%, preferred a method in which anxiety and fear can be reduced for dental appointments.¹³ Given that nitrous oxide has the highest safety margin of any anxiolysis or sedation modality in dentistry and has a long history of efficacy, the use of this modality by Kuwaiti dental providers may improve access to care and the patient experience.¹⁸

CONCLUSION

This study demonstrated that most parents in Kuwait are unaware of nitrous oxide sedation as a BMT, but more

associated with improved acceptance rates. Almost all parents in our study who reported that their child had had nitrous oxide sedation before were pleased with their child's experience. Thus, dentists treating pediatric

Table 6. Dentists' Knowledge and Attitude Toward N₂O Sedation as a BMT (N = 201)*

<i>Parameter</i>	<i>No.</i>	<i>%</i>
Do you use N ₂ O as a BMT?		
Yes	12	6
No	189	94
Are you willing to use N ₂ O?		
Yes	149	74.5
No	51	25.5
Did you get training on N ₂ O?		
Yes	72	35.8
No	129	64.2
Do you know that the use of N ₂ O sedation as a BMT for pediatric patients has been accepted in Kuwait?		
Yes	128	63.7
No	73	36.3
Are you aware of any guidelines/regulations for the use of N ₂ O sedation for pediatric patients in Kuwait?		
Yes	48	23.9
No	153	76.1
Are you aware of any guidelines/regulations for the use of N ₂ O sedation for pediatric patients internationally?		
Yes	111	55.2
No	90	44.8
Do you think that the use of N ₂ O sedation as a BMT for pediatric patients is ethical?		
Yes	180	90.9
No	18	9.1
N ₂ O sedation as a BMT during pediatric dental care is safe		
Agree	136	67.7
Neutral	59	29.4
Disagree	6	3
N ₂ O sedation as a BMT during pediatric dental care is cost-effective		
Agree	88	44
Neutral	99	49.5
Disagree	13	6.5
Why do you think that N ₂ O sedation as a BMT during pediatric dental care is not commonly used in Kuwait?		
Lack of facilities/equipment	16	8.2
Serious side effects of N ₂ O sedation	4	2.1
Lack of training/knowledge of dentists	27	13.8
Parents' disagreement	6	3.1
Child's refusal	1	0.5
It is illegal	2	1
Staff safety	12	6.2
Lack of facilities/equipment and lack of training/knowledge	87	44.6
Lack of facilities/equipment and lack of training/knowledge of dentists and parents' disagreement	29	14.9
Lack of facilities/equipment and lack of training/knowledge of dentists and parents' disagreement and staff safety	11	5.6
Do you think that parents are aware of N ₂ O sedation as a BMT for their children		
Yes	52	26.9
No	141	73.1

* N₂O indicates nitrous oxide; BMT, behavior management technique.

than half of them accept its usage for their children upon their dentist's advice and recommendation. In addition, it showed that the vast majority of dentists treating pediatric patients in Kuwait are willing to use nitrous oxide sedation as a BMT, but more than half of them

lack the training and equipment. This indicates that there is a need to provide nitrous oxide sedation as a BMT for pediatric patients and that the lack of training and equipment are barriers. Therefore, training courses on the use of nitrous oxide sedation should be offered to the

Table 7. Characteristics of Dentists and Their Willingness to Use N₂O as a BMT

<i>Parameter</i>	<i>Willingness of Dentists, No. (%)</i>		<i>P</i>
	<i>Yes (N = 149)</i>	<i>No (N = 51)</i>	
Age, y			.248
20–29	64 (79)	17 (21)	
30–39	48 (77.4)	14 (22.6)	
40–49	20 (62.5)	12 (37.5)	
≥50	17 (68)	8 (32)	
Gender			.001
Male	75 (65.8)	39 (34.2)	
Female	74 (86)	12 (14)	
Nationality			.293
Kuwaiti	97 (77)	29 (23)	
Non Kuwaiti	52 (70.3)	22 (29.7)	
Time practiced, y			.172
<1	18 (72)	7 (28)	
1–5	51 (83.6)	10 (16.4)	
6–10	29 (76.3)	9 (23.7)	
>10	51 (67.1)	25 (32.9)	
Specialty			0
General dentistry	94 (79)	25 (21)	
Pediatric dentistry	25 (89.3)	3 (10.7)	
OMFS	7 (70)	3 (30.0)	
Periodontology	9 (90)	1 (10)	
Orthodontics	0 (0)	14 (100)	
Endodontics	14 (73.7)	5 (26.3)	
Level of training			.022
Trainee	31 (77.5)	9 (22.5)	
Assistant registrar	35 (87.5)	5 (12.5)	
Registrar	25 (62.5)	15 (37.5)	
Senior registrar	24 (63.2)	14 (36.8)	
Specialist	20 (74)	7 (25)	
Consultant	11 (100)	0 (0)	
Main practice setting			.158
Private clinic	6 (85.7)	1 (14.3)	
Governmental polyclinic	81 (77.1)	24 (22.9)	
Governmental specialty center	48 (65.8)	25 (34.2)	
Educational institute (KUDC)	13 (92.9)	1 (7.1)	
Government practiced in			.059
Hawalli	45 (83.3)	9 (16.7)	
Capital	44 (74.6)	15 (25.4)	
Jahra	10 (58.8)	7 (41.2)	
Farwania	15 (57.7)	11 (42.3)	
Ahmadi/Mubarak AlKabeer	33 (80.5)	8 (19.5)	
No. of pediatric patients treated per wk			.329
1–5	94 (78.3)	26 (21.7)	
6–10	13 (65)	7 (35)	
>10	42 (71.2)	17 (28.8)	
Nationality of the pediatric patients treated			.141
Mostly Kuwaitis	61 (67.8)	29 (32.2)	
Mostly non-Kuwaitis	46 (79.3)	12 (20.7)	
Almost equal number	42 (80.8)	10 (19.2)	
No. of uncooperative pediatric patients treated per wk (average)			0
none	34 (56.7)	26 (43.3)	
1–5	77 (78.6)	21 (1.4)	
6–10	23 (92)	2 (8)	
>10	15 (93.8)	1 (6.2)	
Did you get training on N ₂ O?			0
Yes	65 (91.5)	6 (8.5)	
No	84 (65.1)	45 (34.9)	

* N₂O indicates nitrous oxide; BMT, behavior management technique; KUDC, Kuwait University Dental Center, and OMFS, oral maxillofacial surgery.

Figure 3. Types of nitrous oxide (N₂O) training.

dental community and the needed equipment should be provided in the clinics.

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