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DENTAL STAFF ATTITUDE TOWARDS GENERAL ANESTHESIA AND PROCEDURAL SEDATION IN TBILISI, GEORGIA

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თბილისის სტომატოლოგიური პერსონალის დამოკიდებულება ზოგადი ანესთეზიისა და პროცედურული სედაციის მიმართ

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რეზიუმე

შესავალი: დენტოფობია წარმოადგენს ფართოდ გავრცელებულ პრობლემას მსოფლიოში და ერთ-ერთი მიზეზს, რომლის გამოც პაციენტები უარს ამბობენ სტომატოლოგიური მომსახურების მიღებაზე. დენტოფობიის მენეჯმენტი მოიცავს საბაზისო და უფრო ღრმა ტექნიკებს, რომელშიც შედის პროცედურული სედაცია და ზოგადი ანესთეზია. ჩვენი კვლევა მიზნად ისახავდა თბილისის სტომატოლოგიური პერსონალის დამოკიდებულების შესწავლას პროცედურული სედაციისა და ზოგადი ანესთეზიის ამბულატორიულ სტომატოლოგიაში გამოყენების მიმართ.

მეთოდოლოგია: ჯვარედინ-სექციური კვლევა ჩატარდა 2023 წლის ივნისიდან 2024 წლის აპრილამდე პერიოდში თბილისის 20 სტომატოლოგიურ კლინიკაში, რომელთაგან 4 იყენებდა ზოგად ანესთეზიას. კვლევაში მონაწილე პირებმა შეავსეს ქართულ ენაზე ადაპტირებული სპეციალური კითხვარი. მონაცემების სტატისტიკური დამუშავება მოხდა სტატისტიკური პროგრამით IBM SPSS Statistics 26.0. ასოციაციების საპოვნელად გამოყენებულ იქნა Chi-square და ფიშერის ტესტი, ხოლო სტომატოლოგიური პერსონალის სამსახურეობრივი გამოცდილების ეფექტი მათ დამოკიდებულებაზე შეფასდა ლოჯისტიკური რეგრესიით.

შედეგები: ჩვენმა კვლევამ მოიცვა 250 სტომატოლოგიური პერსონალი, რომელთაგან 220 არ იყენებდა ანესთეზიის არც ერთ მეთოდს, ხოლო 30 იყენებდა ზოგად ანესთეზიას. მონაწილეთა აბსოლუტურმა უმრავლესობამ (n = 207, 92.5%) იცოდა განსხვავება პროცედურულ სედაციასა და ზოგად ანესთეზიას შორის. 80%-ზე მეტმა იცოდა, თუ რა საანესთეზიო საშუალებები გამოიყენება პროცედურული სედაციის დროს, ხოლო დაახლოებით 70%-მა იცოდა ზოგადი ანესთეზიის დროს გამოყენებული საანესთეზიო საშუალებები. ამასთანავე, მათ, ვისაც ჰქონდათ 10 წელზე მეტი სამსახურეობრივი გამოცდილება, ჰქონდათ უკეთესი ცოდნა აღნიშნული საკითხების მიმართ. მონაწილეთა უმეტესობას მიაჩნდა, რომ აღნიშნული ტექნიკები საჭიროებენ ანესთეზიოლოგის მუდმივ მეთვალყურეობას. სტომატოლოგიური პერსონალის დაახლოებით 70%-ს არაერთხელ სთხოვეს პროცედურული სედაციის ან ზოგადი ანესთეზიის ჩატარება. ამასთანავე, 80%-ზე მეტმა აღნიშნა, რომ ჰყოლია პაციენტი დენტოფობიით, ხოლო 70%-მა, რომ ჰყოლია სპეციალური საჭიროების პაციენტი. გამოკითხული სტომატოლოგიური პერსონალის 80%-ზე მეტმა მხარი დაუჭირა პროცედურული სედაციის დანერგვას საქართველოში.

დისკუსია/დასკვნა: ჩვენმა კვლევამ აჩვენა, რომ თბილისის სტომატოლოგიური პერსონალის უმრავლესობა მხარს უჭერს პროცედურული სედაციის დანერგვას ამბულატორიულ სტომატოლოგიაში და მიაჩნია, რომ საჭიროა გაიღრმავოს აღნიშნული ტექნიკის, როგორც თეორიული, ასევე პრაქტიკული ცოდნა.

Introduction

Dental fear and anxiety are widespread phenomena worldwide that prevent patients from receiving proper oral healthcare. Both are elicited by dental procedures and are associated with previous painful dental experiences, but differ in terms of severity. Dental fear is a common, unpleasant reaction to dental procedure [1], while dental anxiety is usually an unreasonable and exaggerated emotional

response [2]. Dental fear and anxiety are present in all age groups, but children and adolescents with special needs and those aged 5 to 10 years old are more likely to experience dental fear and anxiety [1], which often persists into adulthood.

Dental fear and anxiety can be managed by basic or advanced behavior guidance techniques. Basic behavior guidance techniques include communication guidance such as positive imagery and reinforcement, distraction, desensitization, and the tell-show-do method, while advanced behavior guidance techniques include patient movement restriction, Procedural Sedation (PS), and General Anesthesia (GA) [3].

PS causes drug-induced reversible depression of the central nervous system while allowing patients to maintain the ability to independently breathe and respond to verbal commands [4]. The purpose of PS in dentistry is to reduce anxiety, minimize pain and discomfort, and provide safe and effective dental care [3]. PS can be performed in ambulatory settings, ideally by two dental professionals who have received proper education in advanced sedation techniques in dentistry [5]. Various anesthetics can be used in PS, including midazolam, fentanyl, ketamine, etomidate, propofol, dexmedetomidine, methohexital, and nitrous oxide [4].

GA also causes drug-induced reversible CNS depression, but it results in complete loss of consciousness and the loss of all protective reflexes and the ability to independently maintain respiration. Due to the risk of complications, GA should only be performed in hospital or ambulatory settings by a well-trained dentist-anesthesiologist [3]. GA is mainly used in certain conditions: (i) in patients who have severe forms of dental anxiety, being extremely fearful, anxious, or uncooperative; (ii) in children or adolescents who are unable to communicate verbally; (iii) to reduce the number of anesthetic procedures in patients requiring several dental interventions; and (iv) in patients with acute inflammation/infection or an anatomical variation where local anesthesia is ineffective [3].

Dental professionals are usually aware of advanced sedation techniques used in dentistry. Knowledge and acceptance of these techniques are higher among dental staff who received special training in sedation techniques during their undergraduate education or residency [6,7]. Moreover, they view the management of anxious patients as a positive challenge and are less concerned about their treatment [8]. Despite solid knowledge and a positive attitude towards GA and PS in dentistry, Costa and coauthors found that only 15% of dental staff were using advanced sedation techniques in their actual practice [9].

In Georgia, GA is performed in ten stationary clinics: “Tbilisi State Medical University Pediatric Academic Clinic named after Givi Jvania” LLC “VIP Dentistry,” “New Vision University hospital”, “American Hospital Network”, “Aleksandre Aladashvili Clinic”, LLC “Viani”, LLC “VIP dentistry” - Tbilisi, LLC “Khozrevanidze Clinic,” LLC “Viani”- Batumi, “Saint Nicholas Medical and Rehabilitation Center”- Kutaisi [10], while there is no official data about the clinics where PS is performed. In our study, we aimed to assess the attitudes and knowledge of dental healthcare professionals in Georgia towards the use of PS and GA in ambulatory dentistry, both among dental staff who use GA in their daily practice and those who do not.

Methods

Study settings, instrument and participants. Cross-sectional study was conducted from June 2023 to April 2024, data was collected from twenty dental clinics of Tbilisi, Georgia, among them four being stationary clinic where they provide GA. Clinics were equally distributed in different districts of Tbilisi, Georgia to be representative of the whole city. Self-Administered Questionnaires were developed and adapted in Georgian language using IOSN tool [11]. Study participants included dental staff of those twenty clinics aged more than 18 and being able to read and comprehend in Georgian language.

Statistical analysis. Statistical Analysis was performed in IBM SPSS Statistics 26.0. Firstly, we performed descriptive analysis to assess the distribution of values and compare dental staff attitudes based on their work experience. Cut off value for work experience was calculated using median work experience, 10 years for the staff who was not using GA or PS in their practice and 13.5 years for those who were using GA in their Dental Practice. Chi square test and Fisher's exact test was used to find associations.

Then we performed, Binary Logistic Regression and Ordinal Regression to see the effect of work experience on the outcome variables. P value <0.05 was considered as statistically significant. Binary logistic regression analysis was conducted to find the effect of work experience, measured in years on (1) the knowledge of PS and GA (2) ability to distinguish PS and GA, knowledge of Anesthetics used in (3) PS and (4) GA, knowledge about the safety of knowledge of Anesthetics used in (5) PS and (6) GA, Having a patient with special needs, (6) Having a patient with Dental Fear, (7) desire to gain more knowledge in PS and GA, (8) necessity of a special training in PS and GA and (9) Necessity of implementing PS and GA in the ambulatory settings of Georgia.

An ordinal logistic regression analysis was conducted to examine the relationship between work experience and (1) number of times patients asked dentists to perform PS or GA, "only once" was used as a reference category, and (2) number of complications during GA, "Never" was set as a reference category.

Ethical Approval. The study protocol was ethically approved by the Institutional Review Board of National Center for Disease control of Georgia, approve number 2023-042.

Results

Background characteristics of study participants. Our study included 250 dental staff, among them 220 were not using PS or GA in their practice and 30 dental staff were using in GA in their actual practice. Mean age of Dental Practitioners not using advanced sedation techniques was 38, 5 (SD=10.8), mean working experience 12,1 years (SD=10,3), they were predominantly female (female n=180 (81,8%)), while the mean age of those using GA was 42,6 (SD=12,2) and mean working experience was 18,3 years (SD=12,7) and similarly, 80% of them were female. (Table 1,2,3)

Attitudes of dental staff not using Procedural Sedation or General Anesthesia in their practice. Most dental staff who did not use PS or GA in their ambulatory settings were familiar with both techniques, regardless of their work experience. A vast majority of the dental staff (n=207, 92.5%) understood the difference between PS and GA. However, those with ≥10 years of experience were more likely to know this difference (p value=0.059). Additionally, more than 80% of the dental staff were familiar with the anesthetics used during PS; significantly better knowledge was found among those with ≥10 years of experience (p=0.026). The majority of participants (n=122, 52.2%) believed that PS should be performed under the supervision of an anesthesiologist, and around 40% considered the drugs used in PS to be safe.

To what concerns GA, more than 70% of the study participants knew the anesthetics used during GA, however significantly better knowledge was observed in those with ≥10 years of experience (p=0.046). Most participants believed that GA should only be performed under the supervision of an anesthesiologist, and about one-quarter of them considered its use in ambulatory settings to be safe, and there was no statistically significant difference among less and more experienced dental staff. Over half of the participants would recommend PS to their patients in ambulatory settings, while only 6% would recommend GA. More than 70% of participants had patients with special needs (e.g., Down Syndrome, Autism Spectrum Disorder) in their clinical practice, and those with more experience were more likely to have treated such patients (p < 0.001). Additionally, more than 80% of participants had treated patients with dental anxiety.

Approximately 70% of the dental staff had been requested to perform PS or GA more than once, with more experienced practitioners being asked more frequently (p=0.012, 0.042, 0.007). The vast majority of participants felt a need for further knowledge in PS and GA and believed that special training was required. Similarly, over 85% of participants supported the implementation of PS techniques in Georgia, with work experience having no significant influence on their attitudes (Table 2).

Table 1. Sociodemographic and work-related characteristics of all study participants

Variable	Dental Staff not using PS or GA					Dental Staff using GA				
	Mean	SD	Median	Min	Max	Mean	Median	SD	Min	Max
Age (Years)	38.5	10.8	38.9	19.5	76.4	42.6	39.5	12.2	25.6	66.1
Work Experience (Years)	12.1	10.3	10	0	50	18.3	13.5	12.7	2	47

Table 2. Descriptive Statistics of Dental Staff's (Not Using Procedural Sedation or General Anesthesia) Attitudes Towards the Use of Procedural Sedation and General Anesthesia in Ambulatory Dentistry by work experience (median work experience used as cut off value)

Variable	Total	Work experience <10 years n (%)	Work experience ≥ 10 years n (%)	P value
Gender				
Female	180 (81.8%)	81 (80.1%)	99 (83.2%)	0.602
Male	40 (18.2%)	20 (19.9%)	20 (16.8%)	
Do you know about the use of Procedural Sedation and General Anesthesia in Dentistry?				
Yes	213 (97.5%)	97 (96.0%)	116 (97.5%)	0.544
No	7 (2.5%)	4 (4.0%)	3 (2.5%)	
Do you know the difference between Procedural Sedation and General Anesthesia used in Dentistry?				
Yes	207 (92.5%)	92 (94.8%)	115 (99.1%)	**0.059**
No	13 (7.5%)	5 (5.2%)	1 (0.9%)	
Do you know which anesthetics are used during Procedural Sedation?				
Yes	174 (79.1%)	73 (75.3%)	101 (87.1%)	**0.026**
No	39 (20.9%)	24 (24.7%)	15 (12.9%)	
How safe are the drugs used during Procedural Sedation, in your opinion?				
They are safe	122 (59.3%)	59 (60.8%)	63 (54.3%)	0.338
They are not safe	91 (40.7%)	38 (39.2%)	53 (45.7%)	
Do you know which anesthetics are used during General Anesthesia?				
Yes	156 (73.6%)	65 (67.0%)	91 (79.1%)	**0.046**
No	56 (26.4%)	32 (33.0%)	24 (20.9%)	
How safe are the drugs used during General Anesthesia, in your opinion?				
Anesthesiologist supervision is required	153 (71.8%)	70 (72.2%)	83 (71.6%)	0.921
They are safe	60 (28.2%)	27 (27.8%)	33 (28.4%)	
Which method would you advice to your patient in the ambulatory settings?				
Procedural Sedation	113 (53.1%)	47 (46.5%)	66 (56.9%)	0.157
General Anesthesia	13 (6.1%)	7 (6.9%)	6 (5.2%)	0.767
Neither of them	73 (33.2%)	34 (33.7%)	39 (33.6%)	1.000
Refused to answer	14 (6.6%)	9 (8.9%)	5 (4.3%)	0.152
During your dental practice, have you ever had a patient with special needs (Autistic Individual, Patient with Down Syndrome)?				
Yes	161 (73.2%)	56 (55.4%)	105 (88.2%)	**<0.000**
No	59 (26.8%)	45 (44.6%)	14 (11.8%)	

During your dental practice, have you ever had a patient with Dental Fear?				
Yes	189 (85.9%)	84 (83.2%)	105 (88.2%)	0.282
No	31 (14.1%)	17 (16.8%)	14 (11.8%)	
During your dental practice, how many times has a patient or accompanying person requested Procedural Sedation/General Anesthesia for dental manipulations?				
Once	68 (30.9%)	36 (35.6%)	32 (26.9%)	0.171
2-5 times	76 (34.5%)	44 (43.6%)	32 (26.9%)	**0.012**
6-10 times	32 (14.5%)	9 (8.9%)	23 (19.3%)	**0.042**
More than 10 times	44 (20.1%)	12 (11.9%)	32 (26.9%)	**0.007**
Main reasons why the patient or accompanying persons requested dental treatment with Procedural Sedation or General Anesthesia?				
Dental Fear and Anxiety	208 (65.6%)	97 (68.3%)	111 (63.4%)	0.550
Special Needs (including disability)	80 (25.2%)	38 (26.8%)	42 (24.0%)	0.564
Complex Treatment	12 (3.9%)	2 (1.4%)	10 (5.7%)	0.279
Comorbidities	17 (5.5%)	5 (3.5%)	12 (6.9%)	0.537
Would you deepen your knowledge in performing dental manipulations under Procedural Sedation/General Anesthesia in ambulatory Settings?				
Yes	205 (93.6%)	95 (95.0%)	110 (92.4%)	0.440
No	14 (6.4%)	5 (5.0%)	9 (7.6%)	
Do you think that special training is necessary in order to perform Procedural Sedation/General Anesthesia?				
Yes	217 (99.5%)	99 (98%)	118 (99.2%)	0.468
No	3 (0.5%)	2 (2.0%)	1 (0.8%)	
Do you think that Procedural Sedation should be implemented in ambulatory dentistry in Georgia?				
Yes	189 (85.9%)	90 (89.1%)	99 (83.2%)	0.209
No	31 (14.1%)	11 (10.9%)	20 (16.8%)	

Attitudes of dental staff using Procedural Sedation or General Anesthesia in their practice. A high proportion (96.6%) of dental staff knew the difference between PS and GA used in dentistry. Similarly, 96.6% knew which anesthetics are used during PS. Absolute majority of study participants considered that anesthesiologist's supervision is required during PS (60.0%) and GA (73.3%), work experience had no significant influence on these variables.

The majority (76.7%) reported that patients or accompanying persons requested PS or GA more than 10 times and the most common reason for this request was dental fear or anxiety (including Dental Fear, especially in Children, Fear of dental manipulation, and Anxiety), followed by special needs (including Disabled Person, Psychomotor Retardation, and Children up to 6 years old who have difficulty adjusting to the dentist) and comorbidities (including Chronic Diseases, Neurological Conditions, Congenital heart defects, and Allergy). More experienced dental staff were more likely to have patients with comorbidities (p value=0.024). The most commonly used anesthetic was Sevoflurane (27.3%), followed by Propofol (15.9%) and Midazolam (15.9%). 46.7% of staff reported never facing complications during GA, 43.3% faced complications once, and 10.0% faced them 2-5 times. In term of acceptance of the sedation methods where patients are conscious, 43.3% of the dental staff believed conscious sedation would be used more often by patients, 13.3% thought it is safer, 6.7% considered it the most acceptable method, 23.3% found it not acceptable. 56.7% supported the idea of implementation of PS in ambulatory dentistry in Georgia. (Table 3).

Table 3. Descriptive Statistics of Dental Staff's (Using General Anesthesia) Attitudes Towards the Use of Procedural Sedation and General Anesthesia in Ambulatory Dentistry by work experience

Variable	Total	Work Experience <13.5 years n (%)	Work Experience ≥ 13.5 years n (%)	P value
Gender				
Female	24 (80.0%)	13 (86.7%)	11 (73.3%)	0.6513
Male	6 (20.0%)	2 (13.3%)	4 (26.7%)	
Do you know the difference between Procedural Sedation and General Anesthesia used in Dentistry?				
Yes	29 (96.6%)	15 (100.0%)	14 (93.3%)	0.309
Refused to Answer	1 (3.4%)	0 (0.0%)	1 (6.7%)	
Do you know which anesthetics are used during Procedural Sedation?				
Yes	29 (96.6%)	15 (100.0%)	14 (93.3%)	0.309
No	1 (3.4%)	0 (0.0%)	1 (6.7%)	
How safe are the drugs used during Procedural Sedation, in your opinion?				
They are safe	12 (40.0%)	8 (53.3%)	4 (26.7%)	0.136
Anesthesiologist supervision is required	18 (60.0%)	7 (46.7%)	11 (73.3%)	
How safe are the drugs used during General Anesthesia, in your opinion?				
They are safe	8 (26.7%)	5 (33.3%)	3 (20.0%)	0.409
Anesthesiologist supervision is required	22 (73.3%)	10 (66.7%)	12 (80.0%)	
During your dental practice, how many times has a patient or accompanying person requested Procedural Sedation/General Anesthesia for dental manipulations?				
Once	1 (3.3%)	1 (6.7%)	0 (0.0%)	1.000
2-5 times	5 (16.7%)	3 (20.0%)	2 (13.3%)	1.000
6-10 times	1 (3.3%)	1 (6.7%)	0 (0.0%)	1.000
More than 10 times	23 (76.7%)	10 (66.7%)	13 (86.7%)	0.389
Main reasons why the patient or accompanying persons requested dental treatment with Procedural Sedation or General Anesthesia?				
Dental Fear and Anxiety	29 (56.9%)	16 (64.0%)	13 (50.0%)	0.567
Special Needs	12 (23.5%)	7 (28.0%)	5 (19.2%)	0.732
Comorbidities	8 (15.9%)	1 (4%)	7 (26.9%)	**0.024**
Complex Treatment	2 (3.9%)	1 (4%)	1 (3.8%)	1.000
Which anesthetics do you use during General Anesthesia?				
Sevoflurane	24 (27.3%)	14 (31.1%)	10 (23.3%)	0.477
Propofol	14 (15.9%)	8 (17.8%)	6 (13.9%)	0.624
Midazolam	14 (15.9%)	7 (15.6%)	7 (16.3%)	0.926
Fentanyl	11 (12.5%)	6 (13.3%)	5 (11.6%)	1.000
Diazepam	12 (13.6%)	5 (11.1%)	7 (16.3%)	0.545
Other Anesthetics*	13 (14.8%)	5 (11.1%)	8 (18.6%)	0.379
In your practice, how often do you face complications during the use of General Anesthesia?				
Never	14 (46.7%)	9 (60.0%)	5 (33.3%)	0.143
Once	13 (43.3%)	4 (26.7%)	9 (60.0%)	0.139
2-5 times	3 (10.0%)	2 (13.3%)	1 (6.7%)	1.000
What do you think about sedation methods when patients are kept conscious?				
The most acceptable method for dental Patients	2 (6.7%)	2 (13.3%)	0 (0.0%)	0.483
It's safer than other methods	4 (13.3%)	3 (20.0%)	1 (6.7%)	0.598

The patients will use this method more often	13 (43.3%)	4 (26.7%)	9 (60.0%)	0.139
Not an acceptable method for dental patients	7 (23.3%)	4 (26.7%)	3 (20.0%)	1.000
Other	4 (13.3%)	2 (13.4%)	2 (13.4%)	1.000
Do you think that Procedural Sedation should be implemented in ambulatory dentistry in Georgia?				
Yes	17 (56.7%)	7 (46.7%	10 (66.7%)	0.269
No	13 (43.3%)	8 (53.3%)	5 (33.3%)	

* Other anesthetics included Atracurium, Diphenhydramine, Rokuronil and Naloxone

Results of Binary and ordinal Regression. Work experience being predictor. Dental Staff not using Procedural Sedation or General Anesthesia in their Practice. The analysis demonstrated a significant positive association between work experience and knowledge of anesthetics used during PS. Specifically, for each additional year of work experience, the odds of knowing about the anesthetics used during PS increased by approximately 6% (Estimate=0.059, p-value=0.012), suggesting that greater work experience is associated with better knowledge of these anesthetics. However, there was no significant effect of work experience on knowledge of anesthetics used during GA (Estimate=0.024, p-value=0.147) (see Table 4).

Furthermore, the binary regression analysis showed that each additional year of work experience increases the odds of having a patient with special needs by 11.1% (Estimate=0.105, p-value=0.000), highlighting that work experience is an important factor associated with the likelihood of having patients with special needs. Additionally, work experience significantly impacted the number of times patients requested PS or GA. Specifically, more experience was associated with a higher likelihood of patients asking for these services more frequently. The likelihood of patients asking for PS or GA "6-10 times" (Estimate=1.237, p-value=0.000) or "more than 10 times" (Estimate=2.033, p-value=0.000) increased significantly with additional work experience compared to the reference category of "only once." The category "2-5 times" did not show a statistically significant difference. (Table 4)

Table 4. Results of Binary Logistic Regression Analysis in the dentists not using Procedural Sedation or General Anesthesia, Work Experience as the Predictor

Outcome Variable	Estimate	Standard Error (S.E.)	P value	Odds Ratio	95% Confidence Interval	
Having a patient with special needs	0.105	0.024	**0.000**	1.111	1.059	1.164
Number of times when patients asked for PS or GA (reference Category "Only Once")						
2-5 Times	-0.297	0.200	0.138		-0.689	0.095
6-10 Times	1.237	0.216	**0.000**		0.815	1.660
More than 10 times	2.033	0.245	**0.000**		1.553	2.513
Knowledge of anesthetics used during Procedural Sedation	0.059	0.023	**0.012**	1.061	1.013	1.110
Knowledge of anesthetics used during General Anesthesia	0.024	0.017	0.147	1.025	0.991	1.059
Knowing difference between Procedural Sedation and General Anesthesia	0.092	0.068	0.175	1.096	0.960	1.251
Knowledge about the Safety of Drugs used during General Anesthesia	0.021	0.016	0.191	1.021	0.990	1.054
Necessity of Special Training for PS and GA	0.124	0.111	0.262	1.132	0.911	1.406
Knowledge of Procedural Sedation and Anesthesia	0.045	0.049	0.362	1.046	0.950	1.152

Having a patient with Dental fear	0.014	0.020	0.485	1.014	0.975	1.056
Preference of using PS and GA	0.008	0.014	0.555	1.008	0.981	1.036
Necessity of Implementing PS in ambulatory dentistry settings	-0.009	0.018	0.622	0.991	0.956	1.027
Knowledge about the Safety of Drugs used during Procedural Sedation	0.002	0.014	0.869	1.002	0.976	1.029
Desire to gain more knowledge for PS and GA	0.000	0.027	0.997	1.000	0.949	1.054

Dental Staff using General Anesthesia in their Practice. Binary regression analysis indicated that work experience has a near-significant positive effect on the knowledge about the safety of drugs used during PS. Specifically, for each additional year of work experience, the odds of having this knowledge increase by approximately 7.3% (Estimate=0.073, p-value=0.058). (Table 5)

The analysis also revealed that work experience significantly influences the likelihood of experiencing complications during GA procedures. For individuals with more work experience, the odds of experiencing complications "2-5 times" are notably higher (Estimate=2.163, p-value=0.006). No other statistically significant findings were observed. (Table 5)

Table 5. Results of Binary Logistic Regression Analysis in the dentists using General Anesthesia, Work Experience as the Predictor

Outcome Variable	Estimate	Standard Error (S.E.)	P value	Odds Ratio	95% Confidence Interval	
Number of complications during GA procedure (Reverence Category - "0")						
Once	-0.167	0.631	0.791		-1.404	1.069
2-5 times	2.163	0.793	**0.006**		0.609	3.718
Knowledge about the Safety of Drugs used during Procedural Sedation	0.073	0.038	**0.058**	1.075	0.998	1.159
Number of times when patients asked for PS or GA (reference Category "Only Once")						
2-5 Times	-1.942	1.168	0.096		-4.231	0.347
6-10 Times	0.169	0.818	0.837		-1.435	1.772
More than 10 times	0.390	0.818	0.633		-1.212	1.993
Knowledge about the Safety of Drugs used during General Anesthesia	0.021	0.016	0.191	1.021	0.990	1.054
Knowledge of anesthetics used during Procedural Sedation	0.314	0.321	0.328	1.369	0.729	2.569
Knowing difference between Procedural Sedation and General Anesthesia	0.025	0.091	0.788	1.025	0.857	1.226
Necessity of Implementing PS and GA in ambulatory dentistry settings	0.003	0.030	0.922	1.003	0.947	1.063

Discussion

Our study demonstrated that dental staff of Tbilisi, Georgia has a good knowledge of PS and GA techniques, regardless of their experience or whether they currently use GA in their practice. However, extensive clinical experience was associated with a better knowledge of specific anesthetics used in PS or GA, each year of working experience increased the knowledge of anesthetics used in PS by 6%, suggesting the importance of detailed training and continues education for less experienced staff. Similarly, Wolley

and coauthors in their study found that more experienced dental staff had better knowledge of PS and were more comfortable while using this technique [7].

Although both groups of study participants were familiar with the techniques, the majority of dental staff not using GA or PS felt the need for additional knowledge and agreed on the necessity of special training to perform these procedures. This aligns with Dziedzic and co-authors, who discuss the need for enhanced training in dental PS to better prepare dental professionals for future challenges, improve patient care, and reduce pain and anxiety [12]. Dionne and collaborators also emphasize the need for adequate training and education to enhance dental staff skills in administering PS safely and effectively [13], which is in line with the understanding of Georgian dental staff about the importance of specialized training and continuous education.

The preference of anesthesia techniques differed among dental staff. Those working with GA would prefer to recommend GA to their patients, while majority of the staff not using PS or GA in our study would recommend PS, rather than GA. However, the most of the study participants from both groups using or GA in their practice, considered that both techniques should only be performed under the supervision of Anesthesiologist during the whole procedure, which is in line with protocols provided for GA use in dentistry, stating that anesthesiologist is responsible for the safe administration and monitoring of anesthesia, adjusting the dose of anesthetic and plan as required, ensuring the patient's vital signs and managing any potential complications. [14,15,16]. The presence of anesthesiologist is crucial for managing unexpected complications and providing immediate intervention. Moreover, team coordination plays a pivotal role in successful treatment [15], for which dental staff's correct attitude is essential.

A significant number of dental staff reported frequent requests for PS or GA, primarily due to dental fear and anxiety. Approximately 70% of dentists had been asked to perform PS or GA more than once. A similar Canadian population-based study found that most patients preferred PS or GA over local anesthesia, taking into account dental anxiety, procedural complexity, and previous negative experiences [17]. Our study also found that the need for PS or GA was primarily driven by patient factors, including dental fear and anxiety and patients with special needs. More than 80% of study participants had patients with dental fear and anxiety, which is higher than global statistics [18], highlighting the need for local research on the prevalence of dental fear and anxiety in Georgia. Over 70% of study participants had patients with special needs (e.g., Down Syndrome, Autism Spectrum Disorder) during their clinical practice. Each additional year of work experience increased the likelihood of having a patient with special needs by 12% and the likelihood of being asked to perform PS or GA. This finding aligns with Wang and colleagues' review, which indicates that more experienced dental staff are more likely to encounter and manage patients with special needs due to their continuous training and education [19]. Given that more experience increases the likelihood of treating patients with special needs and performing complex anesthesia techniques, less experienced staff should receive specialized training in advanced anesthesia techniques to improve their ability to manage these patients.

In both groups of dental staff there was a considerable support for implementing PS in Georgia in ambulatory dentistry. Regardless of experience level, suggesting a general agreement on the benefits and the need of PS in ambulatory settings. This indicates that policy or guideline changes supporting PS could be broadly supported by the dental community adhering to legal and ethical considerations related to administering sedation, including obtaining informed consent and having a plan for a continues training [20].

Overall, our study showed that dental staff of Tbilisi, Georgia has a good knowledge and understanding of advanced anesthesiology techniques, including PS and GA, they correctly evaluate the

need for the assistance of an anesthesiologist during procedure and the importance of team work. The knowledge of anesthetics used during PS increased with experience and the dental staff agreed on the necessity of special training and education for PS. Most of the study participants had been asked to perform PS or GA and the main reason for that was dental fear and anxiety and patients with special needs. The likelihood to have a patient with special needs and to be asked to perform PS or GA increased with experience. Emphasizing the importance of proper training for less experienced dental staff. Most of the study participants agreed that there is a need to implement P in the ambulatory dentistry in Georgia.

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DENTAL STAFF ATTITUDE TOWARDS GENERAL ANESTHESIA AND PROCEDURAL SEDATION IN TBILISI, GEORGIA

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SUMMARY

Introduction: Dental fear and anxiety are widespread phenomena worldwide that prevent patients from receiving proper oral healthcare. The management techniques of dental fear and anxiety include basic or advanced behavior guidance techniques, including Procedural Sedation and General Anesthesia. We aimed to assess the attitudes and knowledge of dental healthcare professionals in Georgia towards the use of procedural sedation and general anesthesia in ambulatory dentistry

Methods: Cross-sectional study was conducted in twenty dental clinics, four of them using General Anesthesia in their clinical practice, in Tbilisi, Georgia from June 2023 April 2024. A self-administered questionnaire was distributed to study participants. Data were analyzed in IBM SPSS Statistics 26.0. Chi-square and Fisher's exact test was used to find associations. Binary and ordinal logistic regression was used to find the effect of work experience on dental staff attitude.

Results: Our study included 250 dental staff, among them 220 were not using Procedural Sedation or General Anesthesia in their practice and 30 dental staff were using in General Anesthesia in their actual practice. A vast majority of the dental staff (n=207, 92.5%) understood the difference between Procedural Sedation and General Anesthesia. More than 80% of the dental staff were familiar with the anesthetics used during procedural sedation and around 70% knew the anesthetics used in General Anesthesia, significantly better knowledge was found among those with ≥10 years of experience. Majority of them believed that these techniques should be performed under the supervision of anesthesiologist. Approximately 70% of the dental staff had been requested to perform procedural sedation or general anesthesia more than once, with more experienced practitioners being asked more frequently. More than 80% of dental staff had a patient with dental fear and anxiety and 70% with special needs. Over 85% of participants supported the implementation of procedural sedation techniques in Georgia

Discussion/Conclusion: Our study found that majority of dental staff of Tbilisi Georgia supports implementation of Procedural Sedation in ambulatory dentistry and feels the necessity to improve their knowledge and hands-on experience in advanced anesthesiology techniques.

Keywords: dental staff, procedural sedation, general anesthesia, ambulatory dentistry, Georgia