Original Article

Assessment of dental health in patients requiring general anesthesia – An observational study

ABSTRACT

Introduction: Anesthesiologists frequently work with the oral cavity, but may lack in-depth knowledge of oral health, including anatomy, symptoms, and dental prostheses.

Materials and Methods: An oral health questionnaire was developed for preanesthesia checkups to facilitate the process. A prospective observational study was conducted over a period of 18 months, which included 200 patients of different genders, aged 10 years or older, and with a physical status ranging from ASA 1 to ASA 3, who were scheduled for elective surgery. The data was collected, compiled, and analyzed using Epi Info (version 7.2).

Results: The study included subjects with a mean age of 41.65 ± 11.85 years, with most falling in the age range of 40-50 years. Of all the participants, around 58% were male. The study discovered a significant relationship between addiction habits and oral health problems such as bad breath, missing teeth, gum bleeding or pain on chewing, and loose teeth. It was found that those who used pan and tobacco had visited a dentist the most. Additionally, the use of certain drugs was associated with gum bleeding, pain on chewing, and loose teeth. Patients with systemic diseases such as diabetes mellitus, cancer, and liver diseases also reported poor oral health.

Conclusion: The study revealed that the Indian population tends to visit dentists only when experiencing pain or seeking treatment rather than for preventive care.

Keywords: Anesthesia, orodental injuries, perioperative period

INTRODUCTION

During the process of endotracheal intubation and general anesthesia, it is common for dental damage to occur. This can happen at different stages of the anesthesia process, such as during intubation, during the surgery, during extubation, or after the surgery. The likelihood of damage increases if there are preexisting oral health issues because teeth and surrounding soft tissues[1,2] can be more vulnerable to harm. Oral cavity lesions can occur due to the use of instruments such as the laryngoscope, suction, and oral airway. Tracheal intubation using a direct laryngoscope[3] is a necessary skill for anesthesiologists, but it is also the primary cause of dental damage during endotracheal intubation.[3] The upper left maxillary incisors are the teeth that are most commonly damaged.[4] While dental injuries can happen during any stage of anesthesia, they are less likely to happen during the maintenance phase and more likely to occur during intubation and extubation.[1,4,5]

Enamel fracture, subluxation, luxation, avulsion, crown fracture, crown and root fracture, damage to dental restorations and prostheses, and missing teeth are the types of dental injuries that occur due to anesthesia.[6] Claims against

Shruti Meshram[1], Pallavi Waghalkar[1], Alhad Mulkalwar[1], Vikram Kate[1], Vikram Waghalkar[2]

[1]Department of Anesthesia, Seth Gordhandas Sunderdas Medical College and King Edward Memorial Hospital, Parel, Mumbai, Maharashtra, India, [2]Consultant Anesthesiologist, Apollo Hospital, Navi Mumbai, Maharashtra, India

Address for correspondence: Dr. Alhad Mulkalwar, Seth Gordhandas Sunderdas Medical College and King Edward Memorial Hospital, Acharya Donde Marg, Parel, Mumbai - 400 012, Maharashtra, India.
E-mail: alhad.mulkalwar@gmail.com

Submitted: 01-Mar-2023, **Accepted in Revised Form:** 12-Sep-2023, **Published:** 03-Apr-2024.

Access this article online	
Website: https://journals.lww.com/sidj	Quick Response Code
DOI: 10.4103/sidj.sidj_5_23	

How to cite this article: Meshram S, Waghalkar P, Mulkalwar A, Kate V, Waghalkar V. Assessment of dental health in patients requiring general anesthesia – An observational study. Saint Int Dent J 2023;7:39-46.

anesthesiologists include dental damage during intubation, extubation, and electroconvulsive therapy.[7] Forensic claims against anesthesiologists are anesthesia-induced dental injuries.[1] Dental injuries are the least common injuries caused by general anesthesia. However, dental injuries are the most common complaint and litigation against anesthesiologists.[8] Minimizing orodental injuries due to anesthesia starts right from preoperative detail assessment by anesthesiologist.[9] A thorough assessment of dental health is important for anesthesiologists to minimize dental injuries. Ideally, an oral health examination should be done by a dentist, but it is not feasible to send every patient to the dentist before surgery. Hence, a simple guidance tool such as a questionnaire will help the anesthesiologist for the preoperative evaluation of dental health. It will also help in the identification of patients who are at high risk for dental injuries. This would alert the anesthesiologist to take the necessary precautions.[10,11] It will also reduce the complaints of medical malpractice against anesthesiologists. The questionnaire also assessed the awareness of patients about oral health importance in the perioperative period and its relation with systemic diseases. It also assessed their dental practices and hygiene awareness. The primary objective of this study was to identify the proportion of patients presenting with poor oral health among those coming for preanesthetic checkups using a questionnaire. The authors also aimed to assess patients according to dental injury risk to alert the anesthesiologist about complicated patients where additional precautions would be necessary during intubation and assess the oral health awareness and practices in patients coming for preanesthesia checkups.

MATERIALS AND METHODS

The study was initiated only after obtaining permission from both the institutional review board and ethics committee. Patients of either sex, aged above 18 years, and undergoing elective surgery with physical status ranging from ASA 1 to ASA 3 were included in the study. Those who had intellectual limitations or did not consent to participate were excluded from the study. This was a prospective observational study that was conducted on 200 patients over a period of 18 months. A questionnaire was created and reviewed by five senior faculty members from the Department of Anesthesiology at the institute. They validated the questionnaire after analyzing similar studies conducted previously. The questionnaire was further validated by ten dentists using the content validity ratio (CVR) for validation and Cronbach's analysis for checking reliability, as per the institutional ethics committee's requirements. Patients were given a written informed consent form during their pre-anesthesia check, and only those who consented were given the questionnaire to fill out.

If the participants had any difficulties while solving the questionnaire, their doubts were cleared. They could solve the questionnaire at their speed and without any time limitations. The questionnaires were designed in various languages and the participants were asked to choose the language they were comfortable in. The questionnaire included demographic data and questions for evaluating their knowledge and dental practices. They were not allowed to discuss the answers with any other patients around. The data was entered in Microsoft Excel and analyzed using Epi Info (version 7.2) software (statistical software for epidemiology developed by Centers for Disease Control and Prevention in Atlanta, Georgia, USA). The qualitative variables were expressed in terms of percentages. The quantitative variables were both categorized and expressed in terms of percentages or in terms of mean and standard deviation. The difference between the two proportions was analyzed using the Chi-square test and Fisher's exact test. All analysis was two-tailed and the significance level was set at 0.05.

RESULTS

Table 1 summarizes the demographic and clinical characteristics of the study participants. The mean age of the subjects was 41.65 ± 11.85 years, with an age range of 17–64 years. The largest age range was 40–50 years, accounting for 27.5% of participants. Males constituted 58.0% of the participants. Among the participants, 68.5% were employed, 19.0% were homemakers, and 7.0% were students. Most of the participants had completed secondary school (65.0%), followed by graduation (16.5%) and postgraduation and above (9.5%). Among the 200 patients, 1.5% had a history of artificial teeth, 1.5% had a history of tooth trauma, 0.5% had a history of extraction, 1.0% had caries, 3.5% had a cap, 3.0% had broken teeth, and 4.5% had buck teeth. While most patients were not taking any medication (82.5%), some were consuming phenytoin (7.0%), metformin (4.5%), and steroids (3.5%). Similarly, most patients did not report any history of addiction (62.05%), but 7% were addicted to gutka, 9.5% to mishri (smokeless form of tobacco), 4.5% to pan, and 17.0% to tobacco.

According to the study, a small percentage of participants (3.0%) admitted that they do not brush their teeth regularly. The majority (91.8%) used toothpaste, powder, and a brush for cleaning the teeth. Some participants (2.1%) used charcoal powder and datum, while others (3.1%) still relied on their fingers to clean their teeth. In addition to brushing, 36.5% reported using toothpicks, neem, or interdental brushes for plaque control. However, a significant number of participants (61.5%) did not use any interdental aids. A percentage of participants (21.5%) reported having bad breath, while others (42.0%) had one or more missing teeth, and 24.5% experienced gum bleeding while chewing. Furthermore, 35.0% of participants had at least one loose tooth. Some participants also reported suffering from various health conditions,

Table 1: Demographic and clinical characteristics of recruited subjects ($n=200$)

Variable	Total subjects, *n* (%)
Age (years)	
10–20	5 (2.5)
20–30	27 (13.5)
30–40	52 (26.0)
40–50	55 (27.5)
50–60	49 (24.5)
≥60	12 (6.0)
Gender	
Female	84 (42.0)
Male	116 (58.0)
Occupation	
Business	7 (3.5)
Housewife	38 (19.0)
Retired	4 (2.0)
Student	14 (7.0)
Working	137 (68.5)
Education	
Uneducated	4 (2.0)
Primary school	14 (7.0)
Secondary school	130 (65.0)
Graduate	33 (16.5)
Postgraduate and above	19 (9.5)
Dental history	
Artificial teeth	3 (1.5)
Broken teeth	6 (3.0)
Buck teeth	9 (4.5)
Cap	7 (3.5)
Caries	2 (1.0)
Extraction	1 (0.5)
Trauma	3 (1.5)
Nil	169 (84.5)
Medication	
Anticancer drugs	1 (0.5)
Immunosuppressant	2 (1.0)
Metformin	9 (4.5)
Phenytoin	14 (7.0)
Steroids	7 (3.5)
Tamoxifen	1 (0.5)
Thyronorm	1 (0.5)
Nil	165 (82.5)
Addiction	
Gutaka	14 (7.0)
Mishri	19 (9.5)
Pan	9 (4.5)
Tobacco	34 (17.0)
None	124 (62.0)
Oral health	
Smell from mouth	43 (21.5)
Missing tooth	84 (42.0)
Gum bleed and pain on chewing	49 (24.5)
Loose teeth	70 (35.0)
Previous visit to dentist	147 (73.5)
Systemic disease	
Cancer	8 (4.0)
Diabetes	34 (17.0)
Liver disease	11 (5.5)
Seizure disorders	10 (5.0)
Aplastic anemia	6 (3.0)
None	131 (65.5)

including diabetes mellitus (17.0%), seizure disorder (5.0%), liver disease (5.50%), cancer (4%), and aplastic anemia (3.0%).

Out of all the study participants, only 29.5% patients had accurate knowledge about the correlation between oral health and systemic health. About 27% of the patients had never visited a dentist before. A small proportion (10.0%) of the patients claimed to visit their dentist once every 1–2 years, while an even smaller percentage (2.5%) did so once every 3 months. A total of 29.5% of participants had undergone treatment and follow-up for procedures such as root canal treatment, tooth extraction, placement of crowns, bridges, or prostheses. In addition, 13.0% patients had sought consultation and advice, while 23.0% had visited the dentist due to tooth pain, gum trouble, or mouth issues. Not a single patient had visited a dentist for a routine checkup in the past. Only 7.0% of subjects knew the importance of good dental health during the perioperative period. As many as 82.5% of patients who came for preanesthesia checkup had poor oral health, with symptoms such as missing teeth, bad breath, loose teeth, pain while chewing, gum bleeding, or a history of dental treatments such as restoration, root canal, or tooth extraction.

Statistical analysis showed that the prevalence of bad breath ($\chi^2 = 12.08, P = 0.034$), missing tooth ($\chi^2 = 20.34, P = 0.001$), gum bleeding or pain on chewing ($\chi^2 = 12.87, P = 0.025$), and frequency of previous visit to dentists ($\chi^2 = 34.42, P < 0.001$) was significantly associated with increasing age [Table 2]. The frequency of dentist visits by males was significantly more (13.8% higher) than females ($\chi^2 = 4.79, P = 0.029$) [Table 3]. The educational status of the patient was found to be significantly associated with knowledge of oral health related to systemic health. 42.4% of graduate patients were unaware of the fact that oral health was related to systemic health same. While about 79.0% of the postgraduate population was aware of the same, 57.9% of them were unaware of oral health's importance in the perioperative period. However, even then, 57.9% of postgraduate people were not aware of oral health's importance in the perioperative period. There was a significant association between the addiction habits with the presence of bad breath ($\chi^2 = 16.50$, $P = 0.002$),

missing tooth ($\chi^2 = 12.50$, $P = 0.014$), gum bleeding or pain on chewing ($\chi^2 = 14.25$, $P = 0.007$), loose tooth ($\chi^2 = 24.40$, $P < 0.001$), and previous visit to dentist ($\chi^2 = 12.44$, $P = 0.014$) [Table 4]. The use of different drugs was significantly associated with gum bleeding or pain on chewing ($\chi^2 = 25.24$, $P < 0.001$) and loose tooth ($\chi^2 = 23.75$, $P = 0.001$) [Table 5]. The analysis also showed a significant association of different systemic diseases on missing teeth ($\chi^2 = 11.53$, $P = 0.042$), gum bleeding or pain on chewing ($\chi^2 = 31.05$, $P < 0.001$), and loose teeth ($\chi^2 = 28.46$, $P < 0.001$) [Table 6].

Table 2: Distribution and association of different dental problems with age of study subjects

Oral health	10–20 (*n*=5), *n* (%)	20–30 (*n*=27), *n* (%)	30–40 (*n*=52), *n* (%)	40–50 (*n*=55), *n* (%)	50–60 (*n*=49), *n* (%)	≥60 (*n*=12), *n* (%)	χ2	*P*
Smell from mouth	2 (40.0)	5 (18.5)	12 (23.1)	7 (12.7)	17 (34.7)	0	12.08	0.034
Missing tooth	0	4 (14.8)	23 (44.2)	25 (45.5)	29 (59.2)	3 (25.0)	20.34	0.001
Gum bleed or pain on chewing	0	1 (3.7)	10 (19.2)	14 (25.5)	23 (46.9)	1 (8.3)	12.87	0.025
Loose tooth	2 (40.0)	11 (40.7)	9 (17.3)	20 (36.4)	27 (55.1)	1 (8.3)	9.99	0.076
Previous visit to dentist	2 (40.0)	22 (81.5)	42 (80.8)	37 (67.3)	41 (83.7)	3 (25.0)	34.42	<0.001

Table 3: Distribution and association of different dental problems with gender of study subjects

Oral health	Female (*n*=84), *n* (%)	Male (*n*=116), *n* (%)	χ2	*P*
Smell from mouth	18 (21.4)	25 (21.6)	0.00	0.983
Missing tooth	31 (36.9)	53 (45.7)	1.54	0.214
Gum bleed or pain on chewing	22 (26.2)	27 (23.3)	0.22	0.636
Loose tooth	31 (36.9)	39 (33.6)	0.23	0.631
Previous visit to dentist	55 (65.5)	92 (79.3)	4.79	0.029

Table 4: Distribution and association of different dental problems with addiction of study subjects

Oral health	Gutaka (*n*=14), *n* (%)	Mishri (*n*=19), *n* (%)	Paan (*n*=9), *n* (%)	Tobacco (*n*=34), *n* (%)	None (*n*=124), *n* (%)	χ2	*P*
Smell from mouth	8 (57.1)	4 (21.1)	2 (22.2)	11 (32.4)	18 (14.5)	16.50	0.002
Missing tooth	4 (28.6)	14 (73.7)	4 (44.4)	20 (58.8)	42 (33.9)	12.50	0.014
Gum bleed or pain on chewing	7 (50.0)	7 (36.8)	4 (44.4)	11 (32.4)	20 (16.1)	14.25	0.007
Loose tooth	8 (57.1)	11 (57.9)	8 (88.9)	12 (35.3)	31 (25.0)	24.40	<0.001
Previous visit to dentist	12 (85.7)	13 (68.4)	8 (88.9)	23 (67.6)	91 (73.4)	12.44	0.014

Table 5: Distribution and association of different dental problems with medications of study subjects

Oral health	Anti cancer drugs (*n*=1), *n* (%)	Immunosuppressant (*n*=2), *n* (%)	Metformin (*n*=9), *n* (%)	Phenytoin (*n*=14), *n* (%)	Steriods (*n*=7), *n* (%)	Tamoxifen (*n*=1), *n* (%)	Thyronorm (*n*=1), *n* (%)	Nil (*n*=165), *n* (%)	χ2	*P*
Smell from mouth	1 (100.0)	0	4 (44.4)	2 (14.3)	1 (14.3)	0	0	35 (21.2)	8.21	0.315
Missing tooth	0	1 (50.0)	4 (44.4)	8 (57.1)	3 (42.9)	0	0	68 (41.2)	3.61	0.824
Gum bleed or pain on chewing	1 (100.0)	2 (100.0)	4 (44.4)	7 (50.0)	2 (28.6)	1 (100.0)	1 (100.0)	31 (18.8)	25.24	<0.001
Loose tooth	1 (100.0)	2 (100.0)	7 (77.8)	9 (64.3)	3 (42.9)	0	1 (100.0)	47 (28.5)	23.75	0.001
Previous visit to dentist	1 (100.0)	2 (100.0)	7 (77.8)	13 (92.9)	7 (100.0)	1 (100.0)	1 (100.0)	115 (69.7)	8.33	0.304

Table 6: Distribution and association of different dental problems with systemic disease of study subjects

Oral health	Cancer (*n*=8), *n* (%)	Diabetes (*n*=34), *n* (%)	Liver disease (*n*=11), *n* (%)	Seizure disorders (*n*=10), *n* (%)	Aplastic anemia (*n*=6), *n* (%)	None (*n*=131), *n* (%)	χ2	*P*
Smell from mouth	3 (37.5)	12 (35.3)	2 (18.2)	2 (20.0)	0	24 (18.3)	7.56	0.182
Missing tooth	3 (37.5)	21 (61.8)	5 (45.5)	7 (70.0)	2 (33.3)	46 (35.1)	11.53	0.042
Gum bleed or pain on chewing	6 (75.0)	12 (35.3)	5 (45.5)	6 (60.0)	2 (33.3)	18 (13.7)	31.05	<0.001
Loose tooth	6 (75.0)	19 (55.9)	4 (36.4)	8 (80.0)	2 (33.3)	31 (23.7)	28.46	<0.001
Previous visit to dentist	6 (75.0)	27 (79.4)	10 (90.9)	10 (100.0)	4 (66.7)	90 (68.7)	7.63	0.178

DISCUSSION

Dental injuries are a possible consequence during general anesthetic procedures or endotracheal intubation. They can occur at a frequency of 0.02% to 0.07% according to retrospective studies. The risk of dental injuries increases if patients have preexisting oral pathologies. To prevent such injuries, it is recommended to evaluate patients' oral health during their preanesthesia consultation. Some studies have developed questionnaires to assess oral health, such as the one designed by Ruíz-López Del Prado *et al*. in 2017.[12] However, their scoring system is not practical for hospitals with a majority of patients from low education backgrounds. Anesthesiologists also may struggle to fill out standardized dental charts due to their lack of dental knowledge.[13] To address this issue, Kapoor *et al*., in 2014, developed a self-made questionnaire to evaluate patients' oral hygiene practices and knowledge.[14] Jain *et al*. 2012 distributed a 16-item questionnaire to assess oral health awareness and educate patients on proper oral hygiene practices.[15] These tools can be useful for evaluating oral health, but it is important to also consider anesthetic considerations during the evaluation process.

The authors aimed to create a straightforward questionnaire that would be easy for patients to comprehend. The questionnaire included various social factors such as age, sex, education, and addictions, and also covered the patient's medical history and systemic diseases. Additionally, it had questions regarding the patient's oral health practices and dental visits. This simple tool was designed to assess the patient's awareness regarding the importance of oral health. In the study, the mean age of the subjects was 41.65 ± 11.85 years, with ages ranging from 17 to 64 years. The majority of the subjects were between 40 and 50 years old. A similar study by Kapoor *et al*.[14] in 2014 reported that the majority of the population was in the age group of 20-30 years. In the present study, males made up the majority of the subjects (58%). However, females had a significantly higher proportion of dentist visits than males.

Factors such as artificial teeth, traumatic teeth, history of extraction and caries, and cap make patients prone to more dental injuries. These weaken oral dental health. Buck teeth make laryngoscopy difficult, thereby causing trauma leading to injury. Out of 200, 3 cases had a history of artificial teeth, 3 patients had trauma to teeth, 1 case had a history of extraction, 2 cases had caries, 7 cases had a cap, 6 cases had broken teeth, and 9 patients had buck teeth. Addictions such as tobacco and its various forms such as gutkha, mishri, and smoke cause inflammatory reactions leading to the destruction of protective plaque biofilm. Various works of literature show severe gingivitis, loss of alveolar bone or epithelial attachment, and plaque and calculus formation in smokers.[16-18] Many drugs cause a reduction in saliva (dry mouth), leading to dental problems. Syrup containing sugar can lead to more chances of infections. Drugs such as bisphosphonates can lead to impairment in bone function and reduced blood supply to the bone, especially of the maxilla and mandible (jaw bones). Some drugs such as corticosteroids cause immunosuppression. Antiepileptic drugs cause inflammation of the mucosa.[19-24] Because of these drug-induced insults to orodental health, orodental injuries become more common injuries during the perioperative period, even with minimum trauma caused by anesthesia-related factors. In one case each, there was a history of use of anti-cancer drugs, thyronorm and tamoxifen. About 7% of the patients had a history of phenytoin use, 1% had consumed immunosuppressants, 3.50%. steroids and 4.50%, metformin. Depending on the detailed data analysis of responses given by the participants to the questions, the following results were found.

Awareness among people about oral cleanliness is quite low. About 3% (6 out of 200) of the subjects claimed that they did not clean their teeth regularly. These patients are more prone for dental infections, making patient prone to orodental injuries. Brushing is the most commonly used method of tooth cleaning. In the present study, majority of them used toothpaste, powder, and brush to clean their teeth (91.75%). About 2.06% of them use charcoal powder and neem/babool chewing sticks (datum) to clean their teeth. About 3.61% still used their fingers to clean their teeth. A similar study done by Daljit Kapoor *et al*. in 2014 found that 90.3% used toothbrushes, 4.8% used toothpowder, and 4.4% of subjects used datum and fingers for cleaning their teeth.[14] The study conducted by Jain *et al*. in 2012 concluded that toothbrush was used by 58% of participants for cleaning their teeth. Whereas 17% used salt with fingers, 18% used neem sticks, 23% used charcoal, 34% used toothpowder with fingers, and 8% used brick powder with fingers.[15] Plaque control methods are recommended to remove plaques and reduce inflammation, thereby reducing the chances of gingivitis. Interdental aids include interdental brushes, floss, dental wood sticks, and oral irrigators. There is in general, no practice of using interdental aids for prevention in the Indian population. In our study, as secondary methods (interdental aid), 36.50% use toothpicks, and minority (2%) of them use neem sticks, agarbatti kadi, and interdental brushes for cleaning their teeth.

A study conducted by Kapoor *et al*. in 2014[14] found that only 9.8% of participants used dental floss as an interdental aid, while 6.9% used toothpicks and 3.5% used another method

such as a brush. This means that only 20% of participants utilized interdental aids. In a separate study by Jain *et al.*,[15] no participants used dental floss. Noticing a foul odour from the mouth may indicate an infection or preexisting oral pathology. In the present survey, 21.5% of participants reported having noticed a bad breath, which is in contrast to the study by Jain *et al*.,[15] where 80% of the participants reported such a finding. In addition, 47.2% of participants experienced a bad breath in a study by Kapoor *et al*. in 2014.[14] Missing teeth are an important part of airway examination by an anesthesiologist. In this survey, 42% of participants reported having noticed missing teeth. Gum bleeding and painful chewing are symptoms of preexisting diseases associated with infected and inflamed oral mucosa, which can lead to more oral mucosa and dental damage during laryngoscopy and handling of the airway. In the present study, 24.5% of participants noticed gum bleeding and 38.69% reported pain while chewing. In contrast, the study by Jain *et al*.[15] reported that 40% of participants noticed gum bleeding. Loose teeth are also an integral part of airway examination by an anesthesiologist, as they are more vulnerable to falls during intubation. In this study, 35% of participants claimed to have a loose tooth. Oral hygiene is a commonly overlooked social issue that can have serious implications for overall health. Many systemic diseases[25-27] can manifest as oral symptoms and signs, but due to a lack of awareness, they often go unaddressed. In India, there is generally a poor understanding of the relationship between oral health and systemic health. In a recent study, only 29.5% of patients surveyed were aware of this connection, compared to 43.2% in a previous study from 2014. Various systemic diseases can have negative effects on oral health, including periodontitis, gingivitis, salivary dysfunction, and inflammation. In our study, we found that 17% of participants had diabetes mellitus, 5% had a seizure disorder, 5.5% had liver disease, 4% had cancer, and 0.5% had aplastic anemia. Unfortunately, oral health standards in India are generally poor, particularly among those in low socioeconomic groups with limited education. This often results in infrequent visits to the dentist,[14] with 26.5% of participants reporting that they had never visited a dentist and 73.5% reporting that they had.

Among the surveyed population, 73.5% reported visiting a dentist for dental issues. Of these individuals, 61% only seek dental care when they experience a problem, 2.5% visit once every 3 months, and 10% visit between 1 and 2 years. Similar results were found in studies conducted by Jain *et al*.[15] and Kapoor *et al*.,[14] with a significant percentage of participants only visiting a dentist when in pain. When asked about their last dental visit, 29.5% of subjects reported receiving treatment and follow-up, while 23% reported experiencing pain or trouble with their teeth, gums, or mouth. Routine checkups were not a popular choice. These findings suggest that many individuals in India only seek medical attention when facing a problem, rather than for preventive measures. Our study also revealed that only 7% of participants recognized the importance of oral health during the perioperative period. Therefore, it is crucial to implement educational programs to promote oral health awareness in the Indian population. Factors such as missing teeth, bad breath, loose teeth, pain while chewing, and gum bleeding indicate poor oral health. Our survey analysis showed that 82.5% of participants had poor oral health, with previous dental treatments such as tooth extraction, root canal, and restorations. After conducting a thorough statistical analysis of our study, we found that missing teeth, gum bleeding, pain while chewing, loose teeth, visits to the dentist, and frequency of dental visits all increase with age. We did not find any significant differences in the proportion of missing teeth, gum bleeding, loose teeth, and bad breath between genders. However, our study did find a significant correlation between gender and dental visits. About 62.59% of males reported visiting a dentist, while only 37.41% of females utilized dental services. A similar trend was observed in a study conducted by Daljit Kapoor *et al*.,[14] where male patients were found to use dental health services more than female patients. Furthermore, our study found a link between education status and knowledge of oral health about systemic health. Of the postgraduate population, 78.95% were aware of the relationship between oral health and systemic health, while only 42.42% of graduate patients were aware of this fact. In addition, our study showed a significant association between education status and knowledge about oral health in the perioperative period. Specifically, 57.89% of postgraduate individuals were unaware of the importance of oral health during the perioperative period.

Through a detailed study on addiction habits and oral health, we found a strong correlation between habits like tobacco, gutkha, and mishri, and dental issues like bad breath, missing teeth, gum bleeding, pain while chewing, and loose teeth. Interestingly, there was no noticeable difference in the addiction habits of people who visited the dentist frequently. In fact, the majority of paan chewers (88.89%) and tobacco chewers (67.65%) have visited the dentist regularly.[14] In our study, we found that 88.89% of paan chewers had loose teeth, while 73.68% of mishri users had missing teeth. Additionally, we observed that the use of certain drugs, such as phenytoin and corticosteroids, was significantly associated with gum bleeding, pain while chewing, and loose teeth. However, we did not find any significant association between bad breath, missing teeth, and dentist visits. Shockingly, 100% of patients on anticancer drugs had loose teeth and required

dental care, while 92.86% of phenytoin-taking patients and 100% of steroid-taking patients also needed dental attention. Our study also revealed a significant correlation between systemic diseases such as diabetes mellitus, cancer, and liver diseases and poor oral health. Missing teeth, loose teeth, dental symptoms such as gum bleeding and pain on chewing, smell from mouth, and previous dental visits for dental treatment such as root canalling, tooth extractions, and prosthesis are bad indicators of oral health. Furthermore, old age, tobacco addiction in any form, and systemic diseases such as diabetes, liver, and cancer are associated with poor oral health. Anesthesiologists should be more careful with patients having poor oral health during intubation. As these patients are at higher dental injury risk, anesthesiologists should take additional precautions such as using the proper type of laryngoscope, placing soft roller gauze on loose teeth, use of nasopharyngeal airways instead of oral airways, and use of mouth guards. The current study has confirmed that oral health is still a neglected social issue in India. Oral health programs for the general population have not yet been implemented, initiated, or followed. It is necessary to conduct various educational programs to raise awareness about oral health among the Indian population.

CONCLUSION

During general anesthesia procedures, patients with preexisting oral pathologies are more likely to experience dental injuries. In order to investigate this issue, we conducted a survey where patients were given a simple questionnaire during their anesthesia checkup. The questionnaire covered social factors, medical history, and oral health practices. Our survey revealed that 82.5% of patients coming for pre-anesthesia checkups had poor oral health. Such patients are more susceptible to orodental injuries, even with the slightest trauma or force during general anesthesia procedures. To prevent such injuries, anesthesiologists must take extra precautions when dealing with these patients. Interestingly, our study revealed that females used dental services more frequently than males. Furthermore, those with higher educational status exhibited greater knowledge of oral health and the importance of oral care during the perioperative period, as well as its link to systemic illnesses. Orodental injuries occurring during general anesthesia procedures are more common with preexisting oral pathologies. During the pre-anesthesia checkup, patients were given a simple questionnaire about socioeconomic variables, medical history, and oral health practices. According to our survey, 82.5% of patients who received the checkup had poor oral health. This means that these patients are at a higher risk of orodental injuries during general anesthesia procedures, even with minimal trauma or force. Anesthesiologists are needed to take extraprecautions to avoid orodental injuries in these patients. Surprisingly, in our study, the proportion of utilization of dental services by females was significantly higher than males. Educational status was associated significantly with the knowledge of oral health and its relation with systemic diseases and its importance during the perioperative period.

Addictive habits such as chewing gutkha, mishri, and pan can result in various oral health problems such as bad breath, bleeding gums, discomfort while chewing, loose teeth, and even tooth loss. A recent study has found that the use of phenytoin and corticosteroids is associated with poor dental health. In addition, our research has revealed a strong correlation between systemic disorders and deteriorating oral health. Our population also lacks the use of interdental aids, with only 21.50% of people noticing a smell through their mouth, 24.50% experiencing gum bleeding, and 38.69% feeling pain while chewing. Moreover, 35% of people have loose teeth. According to our study, it was found that the Indian population tends to ignore their dental health and only visit dentists when they experience pain or require treatment. Shockingly, only 29.5% of the population understands the connection between dental health and systemic disorders, and a mere 7% recognize its significance during the perioperative period. It is crucial that we raise awareness among the general population to ensure better dental health.

Limitations

Patients were not monitored until the operating room. Further research is required to determine the correlation between poor oral health and the incidence of orodental injuries during intubation or anesthesia.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. de Sousa JM, Mourão JI. Tooth injury in anaesthesiology. Braz J Anesthesiol 2015;65:511-8.
2. Adolphs N, Kessler B, von Heymann C, Achterberg E, Spies C, Menneking H, *et al*. Dentoalveolar injury related to general anaesthesia: A 14 years review and a statement from the surgical point of view based on a retrospective analysis of the documentation of a university hospital. Dent Traumatol 2011;27:10-4.
3. Mourão J, Neto J, Luís C, Moreno C, Barbosa J, Carvalho J, *et al*. Dental injury after conventional direct laryngoscopy: A prospective observational study. Anaesthesia 2013;68:1059-65.
4. Givol N, Gershtansky Y, Halamish-Shani T, Taicher S, Perel A, Segal E. Perianesthetic dental injuries: Analysis of incident reports. J Clin Anesth 2004;16:173-6.
5. Yasny JS. Perioperative dental considerations for the anesthesiologist. Anesth Analg 2009;108:1564-73.
6. Sahni V. Dental considerations in anaesthesia. JRSM Open 2016;7:2054270416675082.

7. Cook TM, Scott S, Mihai R. Litigation related to airway and respiratory complications of anaesthesia: An analysis of claims against the NHS in England 1995-2007. Anaesthesia 2010;65:556-63.
8. Contractor S, Hardman JG. Injury during anaesthesia. Contin Educ Anaesth Crit Care Pain 2006;6:67-70.
9. Abeysundara L, Creedon A, Soltanifar D. Dental knowledge for anaesthetists. BJA Educ 2016;16:362-8.
10. Sowmya B, Raghavendra P. Management of dental trauma to a developing permanent tooth during endotracheal intubation. J Anaesthesiol Clin Pharmacol 2011;27:266-8.
11. Tan Y, Loganathan N, Thinn KK, Liu EH, Loh NW. Dental injury in anaesthesia: A tertiary hospital's experience. BMC Anesthesiol 2018;18:108.
12. Ruíz-López Del Prado G, Blaya-Nováková V, Saz-Parkinson Z, Álvarez-Montero ÓL, Ayala A, Muñoz-Moreno MF, *et al*. Design and validation of an oral health questionnaire for preoperative anaesthetic evaluation. Braz J Anesthesiol 2017;67:6-14.
13. Gatt SP, Aurisch J, Wong K. A standardized, uniform and universal dental chart for documenting state of dentition before anaesthesia. Anaesth Intensive Care 2001;29:48-50.
14. Kapoor D, Gill S, Singh A, Kaur I, Kapoor P. Oral hygiene awareness and practice amongst patients visiting the department of periodontology at a dental college and hospital in North India. Indian J Dent 2014;5:64-8.
15. Jain N, Mitra D, Ashok KP, Dundappa J, Soni S, Ahmed S. Oral hygiene-awareness and practice among patients attending OPD at Vyas Dental College and Hospital, Jodhpur. J Indian Soc Periodontol 2012;16:524-8.
16. Chaffee BW, Couch ET, Ryder MI. The tobacco-using periodontal patient: Role of the dental practitioner in tobacco cessation and periodontal disease management. Periodontol 2000 2016;71:52-64.
17. Verma SK, Kumar BD, Singh S, Kumari P, Agarwal A, Singh TK, *et al*. Effect of gutkha chewing on periodontal health and oral hygiene of peoples in Delhi NCR region of North India: A cross-sectional multicentered study. J Family Med Prim Care 2019;8:564-7.
18. Mani A, Marawar PP, Shah S, Thorat V. Effect of duration of Mishri application on periodontitis. J Int Clin Dent Res Organ 2009;1:6-11.
19. Kalra S, Jain V. Dental complications and management of patients on bisphosphonate therapy: A review article. J Oral Biol Craniofac Res 2013;3:25-30.
20. Lowry J. Oral & intravenous bisphosphonate-induced osteonecrosis of the jaws: History, etiology, prevention, and treatment. Ann R Coll Surg Engl 2009;91:446.
21. Ghafoor PA, Rafeeq M, Dubey A. Assessment of oral side effects of antiepileptic drugs and traumatic oro-facial injuries encountered in epileptic children. J Int Oral Health 2014;6:126-8.
22. Fabiana CM, Frederick SR, Xavier M. Side effects of phenytoin in the oral cavity: A review. J Oral Health Dent Sci 2018;2:104.
23. Poulopoulos A, Papadopoulos P, Andreadis D. Chemotherapy: Oral side effects and dental interventions – A review of the literature. Stomatol Dis Sci 2017;1:35-49.
24. Beeraka SS, Natarajan K, Patil R, Manne RK, Prathi VS, Kolaparthi VS. Clinical and radiological assessment of effects of long-term corticosteroid therapy on oral health. Dent Res J (Isfahan) 2013;10:666-73.
25. Han P, Sun D, Yang J. Interaction between periodontitis and liver diseases. Biomed Rep 2016;5:267-76.
26. Sanchez P, Everett B, Salamonson Y, Redfern J, Ajwani S, Bhole S, *et al*. The oral health status, behaviours and knowledge of patients with cardiovascular disease in Sydney Australia: A cross-sectional survey. BMC Oral Health 2019;19:12.
27. Li X, Kolltveit KM, Tronstad L, Olsen I. Systemic diseases caused by oral infection. Clin Microbiol Rev 2000;13:547-58.