

Characteristics and Comparison of Dental Treatment under General Anesthesia in Healthy Children and Children with Special Healthcare Needs: A Retrospective Study

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ABSTRACT

Aim and objective: To evaluate the characteristics and treatment modalities performed under general anesthesia in very young children and children with special healthcare needs (SHCN) from January 2016 to December 2018.

Materials and methods: The data was retrospectively collected from the records of the patients who underwent dental rehabilitation under general anesthesia from January 2016 to December 2018. The healthy patients were assigned to group H and children with SHCN were assigned to group S. Comprehensive dental treatment included preventive (oral prophylaxis, fluoride, pit, and fissure sealant), restorations, pulp therapies, and surgical procedures, which were compared.

Results: A total of 46 patients were comprehensively treated under dental general anesthesia (DGA) during the study period. There were 34 males (73.91%) and 12 females (26.08%) with M:F ratio of 2.8:1. The patients in group H were significantly younger than group S. Extraction and restoration were more frequently performed in group S ($p < 0.01$, $p < 0.05$). While pulpectomy, pulpotomy, and stainless steel crown (SSC) were more frequently performed in group H ($p < 0.01$, $p < 0.01$, $p < 0.05$).

Conclusion: There was more number of extraction and less number of pulpectomies, pulpotomies, and SSC performed in children with special healthcare needs.

Clinical significance: Dental management of very young children and children with SHCN is a challenging task. DGA is an excellent alternative to undergo full mouth rehabilitation in such patients. Every effort should be made towards restoring oral health of children.

Keywords: Child behavior, Dental care for children, Dental care for disabled, General anesthesia.

International Journal of Clinical Pediatric Dentistry (2021): 10.5005/jp-journals-10005-2098

INTRODUCTION

The dental treatment of young children and children with special healthcare needs (SHCN) is a challenging situation for clinicians. Many of the children are often anxious in dental situations and their cooperation level is limited.¹ Majority of children can be adequately treated with nonpharmacologic behavior modification techniques.² Unfortunately, very young children (lacking in cooperative ability) display highly uncooperative behavior towards dental treatment.³ These children cannot cooperate due to lack of psychological and emotional maturity. Oral rehabilitation of such children has to be performed under general anesthesia.⁴

Children with SHCN (those who are chronically ill, home bound, developmentally disabled, emotionally impaired) are unable to cooperate for extensive dental rehabilitation.⁵ It has been reported that these children consistently show poor oral hygiene, high level of periodontal diseases, and dental caries.⁶ Multiple factors such as uncoordinated chewing, lack of manual dexterity in performing tooth brushing, fermentable diet intake, intake of flavored medications, crowding of teeth, and poor cooperation can be attributed.⁷

Ibricevic H et al. have suggested that dental treatment under sedation or general anesthesia is a solution for those who are unable to adapt their coping skills, such as very young children or children with SHCN.⁸

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How to cite this article: Sevekar S, Jha MN, Avanti A. Characteristics and Comparison of Dental Treatment under General Anesthesia in Healthy Children and Children with Special Healthcare Needs: A Retrospective Study. *Int J Clin Pediatr Dent* 2021;14(S-2):S157-S161.

Source of support: Nil

Conflict of interest: None

Dental general anesthesia (DGA) is a very efficient treatment modality taking single appointment requiring little or no cooperation of the child.⁹ A certain degree of amnesia can be advantageous in managing the patient postoperatively.¹⁰ Availability of rapid and short-acting anesthetics such as sevoflurane, propofol has improved the general anesthesia techniques. It has facilitated the early recovery of patients with reduced adverse events resulting in increased patient satisfaction.^{11,12}

The objectives of this retrospective study were to describe the characteristics of the patient, treated modalities provided under general anesthesia, and comparison of dental treatment needs

between healthy and patients with SHCN under DGA at Department of Pediatric and Preventive Dentistry, MGM Dental College and Hospital between January 2016 and December 2018.

MATERIALS AND METHODS

This retrospective study was carried out at the Department of Pediatric and Preventive Dentistry, MGM Dental College and Hospital, Kamothe, Navi Mumbai, through assessment of past dental records available in the department.

A total of 46 patients who received comprehensive dental treatment under general anesthesia between January 2016 and December 2018 were assessed in the study.

Ethical approval and permission to carry out the study was obtained from Institutional Ethical Review Committee (IERC) of MGM Dental College and Hospital, Kamothe, Navi Mumbai (Approved by Directorate General of Health Services, Ethics Committee Registration Division File no. EC/19/000,122). Data obtained from the records included age of the patient at the time of surgery, sex of the patient, medical history, physical status, indication for treatment under general anesthesia, and nature of treatment carried out.

All the patients received dental and anesthetic preoperative assessment. Dental assessment included past dental history, intraoral examination, and dental radiographs.

Anesthetic assessment included routine laboratory tests consisting of CBC, (complete blood count) chest X-ray, routine urine analysis, PT, (prothrombin time) PTT, (partial thromboplastin time) INR, (INternational normalization ratio) and ECG (electrocardiogram). EEG (electroencephalogram) was advised in cases of epileptic patients. Pre-anesthetic evaluation of the patient was done by in house anesthesiologist to assess the fitness of the patient for general anesthesia. Parents were given written and verbal preprocedural instructions about nil per os [NPO (nothing by mouth)] for recommended time.

Children were admitted to hospital on the same day of surgery. Final preoperative assessment was carried out and written consent was obtained. A nasoendotracheal route was preferred for intubation. After securing pharyngeal throat pack, intraoral radiographs were taken (when not possible preoperatively). Antiseptic solution, Povidine iodine IP 5% (Bipson Surgical Pvt. Ltd, India) anticeptic solution was painted periorally and intraorally to decrease the incidence of bacteremia. With all the aseptic precautions, patient was properly draped. Dental prophylaxis was carried out initially.

Any extraction or surgical intervention was carried out at the end of treatment to maintain asepsis of surgical site. Principles of quadrant dentistry were followed. All the procedures carried out were performed by one of the three pediatric dental faculties. Once the patient was awake, displayed appropriate behavior, stable vital signs, no uncontrolled bleeding or pain, maintained his/her own airway, and had no retention of liquids, a decision was made to discharge him/her. Instructions for postoperative care were given to parents before discharging the patients. Patients were reviewed after 1 week, 1 month, and 6 months by the same operating faculty. Follow up preventive care consisted of dietary counseling, oral hygiene instructions, prophylaxis, and topical fluoride applications.

The data from the patient's personal profile were retrospectively reviewed which included general history, medical history, reason for general anesthesia, and multiple treatment carried out in deciduous and permanent teeth. Various treatment modalities were classified. (Restorative procedure, Sealant procedure, Extraction etc). Patients were divided into group H (Healthy patients with behavioral consideration) and group S (Patients with mental, physical disability, and medical conditions).

The data was collected and analyzed using Z test for proportions, with $p < 0.05$ indicating significance using SPSS statistical package (version 26) on personal computer.

RESULTS

A total of 46 patients were comprehensively treated under DGA during the study period. There were 34 males (73.91%) and 12 females (26.08%) with M:F ratio of 2.8:1 in our study (Table 1). The age of the patient studied ranged from 2 to 26 years (Table 1). The patients were divided into two groups, group H (behavioral problem) and group S (children with special healthcare needs). A total of 21 healthy patients with behavioral problem (45.65%) were in group H, while 25 patients (54.34%) were in group S with SHCN (Table 2). Out of 21 healthy patients (group H), 12 patients (57.14%) were below 4 years, nine patients (42.85%) between 4 and 6 age groups. Out of 25 patients (group S), two patients (8%) were below 4 years, six patients (24%) were in the age group of 4–6 and 17 patients (68%) were above 6 years (Table 3).

Out of 711 procedures, extraction (34.17%) was the most frequently performed procedure followed by pulpectomy (15.04%) and restoration (14.34%). The restorations provided were tooth colored restorations [GIC, (glass ionomer cement) Composite]. A total of 94 stainless steel crowns (SSC) (13.2%)

Table 1: Distribution of patients treated under general anesthesia based on gender and age

Gender	Age (years)			Total (%)
	<4	4–6	>6	
Male	10	11	13	34 (73.91)
Female	4	4	4	12 (26.08)
Total	14	15	17	46

Table 2: Distribution of patients treated under general anesthesia with behavioral and SHCN

Children with behavioral problem	Children with special healthcare needs				
	25 (54.34%)				
21 (45.46%)	Cerebral palsy	Deaf blind	Mental retardation	Down syndrome	Autism
		13	2	7	1



were placed on teeth which included 63 pulpectomized teeth, four pulpotomized teeth, and 27 multisurface carious vital teeth. The other types of procedures carried out included in descending frequency were: 43 fluoride application (6.04 %), 40 oral prophylaxis (5.6%), 40 pit, and fissure sealant (5.6%), 22 root canal treatment (RCT) (3.09%), nine anterior strip crown (1.2%), four pulpotomy (0.5%), two pulp capping (0.2%), two porcelain fused to metal crowns (PFM) (0.2%), two gingivectomy (0.2%), one crown lengthening (0.1%) (Table 4).

Extraction and restoration were more frequently performed in group S which was statistically significant ($p < 0.01$, $p < 0.05$, respectively). RCT, PFM, gingivectomy/gingivoplasty, and crown

lengthening were carried out exclusively in group S. While pulpectomy, pulpotomy, and SSC were more frequently performed in group H which was statistically significant ($p < 0.01$, $p < 0.01$, $p < 0.05$, respectively). Anterior strip crowns were exclusively performed in group H. There was no statistically significant difference seen for pulp capping, pit, and fissure sealant, fluoride treatment, and oral prophylaxis in both groups (Table 4).

A higher number of children with special needs had higher frequency of extraction. Children with SHCN were 5.57 times more likely had undergone extraction as compared to healthy children [odds ratio (OR) = 5.570, (95% CI 1.044–31.670)]. Children with SHCN underwent 0.132 times less pulpectomy [OR = 0.132 (95% CI 0.034–0.516)], 0.750 times less restorations [OR = 0.750 (95% CI 0.224–2.514)], 0.134 times less SSC as compared to healthy children [OR = 0.134 (95% CI 0.026–0.703)] (Table 5).

Table 3: Distribution of patients treated under general anesthesia based on age and health status

Age	Normal child	Medically compromised
<4	12	2
4–6	9	6
>6	0	17

DISCUSSION

The use of general anesthesia for dental care in children is at times essential to provide safe, efficient, effective care. Indication for dental care under anesthesia includes patients with SHCN,

Table 4: Distribution and comparison of various treatment procedures between healthy and children with SHCN

Procedures	Number of procedure (%)	Group H (healthy)	Group S (special)	Z value	p value
Extraction	243 (34.17)	84	159	-6.804	0.001
Pulpectomy	107 (15.04)	71	36	4.785	0.001
Pulpotomy	4 (0.56)	4	0	2.828	0.004
Root canal treatment	22 (3.09)	0	22	-6.633	0.001
Restorations	102 (14.34)	42	60	-2.520	0.012
Pulp capping	2 (0.2)	1	1	0.000	1.000
Stainless steel crown	94 (13.2)	55	39	2.333	0.020
Pit and fissure sealant	40 (5.62)	19	21	-0.447	0.652
Crown lengthening	1 (0.14)	0	1	-1.414	0.158
Anterior strip crowns	9 (1.26)	9	0	-4.242	0.001
Porcelain fused to metal crowns	2 (0.28)	0	2	-2.000	0.045
Ginvectomy/gingivoplasty	2 (0.28)	0	2	-2.000	0.045
Fluoride application	43 (6.04)	18	26	-1.705	0.087
Oral prophylaxis	40 (5.6)	21	19	0.3623	0.718

Table 5: OR for extraction, pulpectomy, restoration, and SSC

Factors	Disease				OR
	Present/absent	SHCN children	Healthy children	Total	
Extraction	Yes	23	14	37	5.570 (95% CI 1.044–31.670)
	No	2	7	9	
	Total	25	21	6	
Pulpectomy	Yes	9	17	26	0.132 (95% CI 0.034–0.516)
	No	16	4	20	
	Total	5	21	46	
Restoration	Yes	15	14	29	0.750 (95% CI 0.224–2.514)
	No	10	7	17	
	Total	25	21	46	
SSC	Yes	14	19	33	0.134 (95% CI 0.026–0.703)
	No	11	2	3	
	Total	25	21	46	

OR, odds ratio; SSC, stainless steel crown

extremely uncooperative, fearful, anxious, physically resistant, or uncommunicative child or adolescent with substantial dental needs.⁵ The advantage of oral rehabilitation under general anesthesia lies in comprehensive management of dental disease in single visit that provides immediate relief of pain and little or no cooperation by the child.¹³

The aim of this retrospective study was to describe the characteristics of the patient, treatment, modalities provided under general anesthesia and comparison of dental treatment needs between healthy and patients with SHCN under DGA.

The present study showed the mean age of children with SHCN was 8.3 years (8 years and 3 months), with oldest patient being 26 years of age. This finding agrees with Haubek D et al. who stated that children with SHCN were older when treated as compared to healthy children.¹⁴ This can be explained as most SHCN children have complex health needs with high priority for the family. Children with disabilities present challenges that necessitate special preparation by the dentist and healthcare center to provide satisfactory care. Further, parental anxiety pertaining to the medical problems associated with child's disabilities recurrently delays the dental care until considerable oral disease has developed. Many a time, dentists feel uncomfortable providing treatment for children with disabilities ensuing further loss in time in accessing greatly needed services.⁵ Also, SHCN children do not have easy access to dental services due to parental financial constraints and difficulty in transportation.^{15,16} Nevertheless, Giddon, Rude, Belton suggests that accessibility, availability, and acceptability are not the only reasons that determine the treatment meted by dentist but also the perception of the situation gauged by dentist and parent and their willingness to undertake the procedure also matters.¹⁷

In our study, mean age of healthy children treated was 3.7 year (3 years and 7 months), with oldest child not above the age of 5 years. This was due to the obvious reason that communication and behavior of the child improves with age. Also, various nonpharmacological behavior modification techniques can be successfully implemented with improved maturity of child.⁴

In this study, we had more male than female patients (M: F = 2.8:1). This finding is consistent with previous studies.^{18,19} But this finding is in disagreement with Messieha Z, Atan S et al. where female ratio is more than male.^{20,21} There is no clear explanation for this difference but it has been suggested that higher prevalence of neuropsychiatric disorders among boys could explain the predominance in males.¹⁴

This study revealed that dental care received by the patients under DGA was comprehensive which included preventive, restorative as well as surgical intervention (extractions, gingivectomy, etc). Various studies around the globe have reported either conservative approach such as filling therapy^{19,22,23} or surgical interventions^{4,13,24,25} in dental rehabilitation under DGA. Our study acknowledges that with changing time a more comprehensive treatment care should be done under DGA. We observed that greater number of extractions were carried out in children with SHCN than in healthy children. We are in agreement with Harrison et al. and Pei Ying Lee et al. that in dental management of children with SHCN, certainty of the outcome for dental treatment is essential. Any doubt in prognosis of the tooth should be an indication for extraction.^{4,25} The reason behind greater number of extraction in special healthcare group lies in poor oral hygiene that may affect the treatment modality provided. The pediatric dentist may prefer less complex

dental procedure for child with SHCN to avoid future complication or need of retreatment.²⁴⁻²⁶ Most often treatment decisions made by pediatric dentist under DGA are complex but it was apparent that mere clinical considerations was not the only factor that influences the treatment provided. It was observed in our study, the higher rate of extraction was due to caregiver demand. Expectations of caregiver played an important role in decision to retain or remove the teeth. This was based on multiple factors like child's compliance with oral hygiene, priority of oral health to family members in children of SHCN.¹³ In our study, 5.57 times more extractions were performed in children with SHCN as compared to healthy children (OR). Ibresevic et al. did not find any difference in extraction between healthy children and children with SHCN.⁸

Pulpectomy is one of the most universal and uncomplicated procedure performed with higher success rate in children.²⁷ In our study out of 107 pulpectomized teeth, 71 teeth (66.65%) were treated in healthy children while 36 teeth (33.64%) were treated in children with SHCN. This was statistically significant ($p < 0.01$). Holt et al. mentioned that in medically compromised children, sepsis due to failed restoration/pulp therapy itself could be life-threatening situation and may demand additional medical intervention.²³ Therefore, in this study the number of pulp therapy is lesser in children with SHCN. Also, in our study, all the healthy children who were treated under DGA were below 6 years of age, whereas 68% (17 cases) of children with SHCN were in late mixed dentition to permanent dentition stage. Therefore, these patients were not indicated for pulpectomy procedures. In our study pulpectomy was performed 0.132 times lesser in group S than group H (OR).

In our study, all the RCTs were performed in children from group S, who were older than the children from group H. The healthy children who went under DGA were in the primary or early mixed dentition. The need for RCT in newly erupted teeth was fortunately not required.

In our study, number of restorations were more frequently performed in group S than group H ($p < 0.05$). This finding is in agreement with Brailo V et al. who stated that children with SHCN have high caries activity with increased number of restorations.¹⁰ Therefore more number of restorations per patient were performed in children with SHCN. Nonetheless, number of children who received restorations was not significantly different in group S and group H [OR= 0.750 (95% CI 0.224–2.514)].

Landes et al. have stated that children treated under GA for nursing caries have to undergo repeated dental treatment within 1 year. They have suggested a much aggressive approach in treating children under general anesthesia including more extraction, pulpotomies, and SSCs to prevent the early failure of treatment.²⁸ In our study, higher frequency of SSC restoration was seen in group H ($p < 0.05$) which is in agreement with Malienei et al. and Bello LL who stated that SSC are more reliable and cost-effective restoration for primary molar as compared to amalgam, composite, and GICs.^{29,30} SSC was performed 0.134 times lesser in group S than group H (OR). In our study maximum number of SSC were placed post pulp therapy and in multisurface caries restoration which is in close agreement with Landes et al.²⁸

Our study was a single center retrospective study with limited study duration. This might have restricted our number of participants. The follow-up time was relatively small to review our practices, analyze the treatment modalities and complications. Further long-term study is recommended.

CONCLUSION

Within the limitation of the study we conclude the following:

- Healthy children treated under general anesthesia were younger than children with SHCN.
- Higher number of extraction was carried out in children with SHCN than healthy children.
- Pulpectomy, pulpotomy, and SSC were carried out more in healthy children than children with SHCN.

REFERENCES

1. Vinckier F, Gizani S, Declerck D. Comprehensive dental care for children with rampant caries under general anesthesia. *Int J Paediatr Dent* 2001;11(1):25–32. DOI: 10.1046/j.1365-263x.2001.00204.x
2. The American Academy of Pediatric Dentistry, "Guideline on behavior guidance for the pediatric dental patients. Latest revision 2015. https://www.aapd.org/globalassets/media/policies_guidelines/bp_behavguide.pdf. Accessed: Aug 2020
3. Dean JA, Avery D, McDonald RE. McDonald and Avery's Dentistry for child and adolescent. Missouri: Elsevier 2016. p. 286–302.
4. Lee PY, Chou MY, Chen YL, Chen LP, Wang CJ, Huang WH. Comprehensive dental treatment under general anesthesia in healthy and disabled children. *Chang Gung Med J* 2009;32(6): 636–642. PMID: 20035643.
5. Dean JA, Avery D, McDonald RE. McDonald and Avery's Dentistry for child and adolescent. Missouri: Elsevier 2016. p. 513–539.
6. Altun C, Guven G, Akgun OM, et al. Oral health status of disabled individuals attending special schools. *Eur J Dent*. 2010;4(4):361–366.
7. Rajput S, Kumar A, Puranik MP, et al. Oral health inequalities between differently abled and healthy school children in Bengaluru-A cross-sectional study. *Spec Care Dentist*. 2020;40(1):55–61. DOI: 10.1111/scd.12432
8. Ibricevic H, Al-Jame Q, Honkala S. Pediatric dental procedures under general anesthesia at the Amiri Hospital in Kuwait. *J Clin Pediatr Dent* 2001;25(4):337–342. DOI: 10.17796/jcpd.25.4.fl062x558qtt4v69
9. Bader RM, Song G, Almuhtaseb E. A retrospective study of paediatric dental patients treated under general anesthesia. *Int J Clin Med* 2013;04:18–23. DOI: 10.4236/ijcm.2013.47A2005.
10. Brailo V, Janković B, Lozić M, et al. Dental treatment under general anesthesia in a day care surgery setting. *Acta Stomatol Croat* 2019;53(1):64–71. DOI: 10.15644/asc53/1/7
11. Manley MC, Skelly AM, Hamilton AG. Dental treatment for people with challenging behaviour: general anaesthesia or sedation? *Br Dent J* 2000;188(7):358–360. DOI: 10.1038/sj.bdj.4800480
12. Coyle TT, Helfrick JF, Gonzalez ML, et al. Office-based ambulatory anesthesia: factors that influence patient satisfaction or dissatisfaction with deep sedation/general anesthesia. *J Oral Maxillofac Surg* 2005;63(2):163–172. DOI: 10.1016/j.joms.2004.10.003
13. Jamieson LM, Roberts-Thomson KF. Dental general anaesthetic trends among Australian children. *BMC Oral Health* 2006;6:16. DOI: 10.1186/1472-6831-6-16
14. Haubek D, Fuglsang M, Poulsen S, et al. Dental treatment of children referred to general anaesthesia—association with country of origin and medical status. *Int J Paediatr Dent* 2006;16(4):239–246. DOI: 10.1111/j.1365-263X.2006.00737.x
15. Gadiyar A, Gaunkar R, Kamat AK, et al. Impact of oral health-related behaviors on dental caries among children with special health-care needs in Goa: a cross-sectional study. *J Indian Soc Pedod Prev Dent* 2018;36(1):33–37. DOI: 10.4103/JISPPD.JISPPD_214_17
16. Loyola-Rodriguez JP, Zavala-Alonso V, Gonzalez-Alvarez CL, et al. Dental treatment under general anesthesia in healthy and medically compromised developmentally disabled children: a comparative study. *J Clin Pediatr Dent* 2009;34(2):177–82. DOI: 10.17796/jcpd.34.2.u665328k4g467pg2
17. Giddon DB, Rudé CM, Belton DE. Psychological problems of the physically handicapped patient. *Int Dent J* 1975;25(3):199–205.
18. Vermeulen M, Vinckier F, Vandenbroucke J. Dental general anesthesia: clinical characteristics of 933 patients. *ASDC J Dent Child* 1991;58(1):27–30.
19. Jamjoom MM, al-Malik MI, Holt RD, et al. Dental treatment under general anaesthesia at a hospital in Jeddah, Saudi Arabia. *Int J Paediatr Dent* 2001;11(2):110–116. DOI: 10.1046/j.1365-263x.2001.00252.x
20. Messieha Z. Risks of general anesthesia for the special needs dental patient. *Spec Care Dentist* 2009;29(1):21–68. DOI: 10.1111/j.1754-4505.2008.00058.x
21. Atan S, Ashley P, Gilthorpe MS, et al. Morbidity following dental treatment of children under intubation general anaesthesia in a day-stay unit. *Int J Paediatr Dent* 2004;14(1):9–16. DOI: 10.1111/j.1365-263x.2004.00520.x
22. Kwok-Tung L, King NM. Retrospective audit of caries management techniques for children under general anesthesia over an 18-year period. *J Clin Pediatr Dent* 2006;31(1):58–62. DOI: 10.17796/jcpd.31.1.956272nw2864021p
23. Holt RD, Chidiac RH, Rule DC. Dental treatment for children under general anaesthesia in day care facilities at a London dental hospital. *Br Dent J* 1991;170(7):262–266. DOI: 10.1038/sj.bdj.4807504
24. Moles DR, Ashley P. Hospital admissions for dental care in children: England 1997–2006. *Br Dent J* 2009;206(7):E14–379. DOI: 10.1038/sj.bdj.2009.254
25. Harrison MG, Roberts GJ. Comprehensive dental treatment of healthy and chronically sick children under intubation general anaesthesia during a 5-year period. *Br Dent J* 1998;184(10):503–506. DOI: 10.1038/sj.bdj.4809675
26. Tsai CL, Tsai YL, Lin YT, et al. A retrospective study of dental treatment under general anesthesia of children with or without a chronic illness and/or a disability. *Chang Gung Med J* 2006;29(4):412–418.
27. Moskovitz M, Sammara E, Holan G. Success rate of root canal treatment in primary molars. *J Dent* 2005;33(1):41–47. DOI: 10.1016/j.jdent.2004.07.009
28. Landes DP, Bradnock G. Demand for dental extractions performed under general anaesthesia for children by Leicestershire Community Dental Service. *Community Dent Health* 1996;13(2):105–110.
29. Mallineni SK, Yiu CK. A retrospective review of outcomes of dental treatment performed for special needs patients under general anaesthesia: 2-year follow-up. *Sci World J* 2014;748353. DOI: 10.1155/2014/748353
30. Bello L L. A retrospective study of pediatric dental patients treated under general anesthesia. *Saudi Dent J* 2000;12(1):10–15.