

Paedodontic general anaesthesia and compliance with follow-up visits at a tertiary oral and dental hospital, South Africa

SADJ June 2013, Vol 68 no 5 p206 - p212

Y Kolisa,¹ OA Ayo-Yusuf,² DC Makobe³

ABSTRACT

Objectives: The study aimed to describe the demographic profile of children receiving dental general anaesthesia (DGA) at the Pretoria Oral-and-Dental Hospital, South Africa, the type of treatment received and the level of compliance with the six-month preventive follow-up visit.

Methods: Retrospective review of records of children treated under DGA between January 2009 and December 2010.

Results: The study group contained 78-children. Of these, 79.5% were between one and four years of age (mean 3.7-years; SD: 2.01), and 54% were female. The parents of more than half the sample (56.4%) were unemployed. The majority (55.2%) recorded no medical condition prior to undergoing DGA. Of the treatments performed, 63% were extractions (mean = 4.7 teeth/child), 51% involved placement of composite restorations (mean = 3.4 teeth) and 18% were fitting of stainless steel crowns (mean = 2.1 teeth). No preventive treatment was performed under DGA. Only 14 children (18%) returned within 15-months for follow-ups. Seven returnees were re-booked for a second DGA appointment for severely carious teeth; the rest received preventive treatment. Female children (Odds Ratio (OR): 0.28; $p = 0.04$) and children with no medical-condition (OR: 0.20; $p = 0.03$) were less likely to return for a follow-up visit. Children with employed parents were more likely (OR: 3.50; $p = 0.09$) to return for follow-ups.

Conclusion: This study highlights the importance of preventive treatment prior to and during DGA, especially in a setting where the caries disease burden and unemployment are high.

Key words: children, dental treatment, compliance, prevention, dental general anaesthesia, paedodontics

ACRONYMS

DGA: Dental General Anaesthesia

ECC: Early Childhood Caries

OR: Odds Ratio

INTRODUCTION

Early childhood caries (ECC) is a public health problem in South Africa,¹ affecting the quality of life of both the child and the caregiver. Vast input from already constrained public resources is required to manage the condition.

Dental general anaesthesia (DGA) is used predominantly in the treatment of ECC.² Comprehensive dental treatment can be extensive and may be difficult to perform on children younger than the age of 12 years. For this age group, DGA can be valuable and may be justified when providing restorative treatment and extractions in very young children or for those who are unable to cooperate or too afraid.³ An anxious, fearful child with rampant caries can benefit when comprehensive dental treatment is performed at one visit under general anaesthesia (GA).⁴ Resorting to the use of DGA has therefore been shown to facilitate the immediate improvement of the oral health and oral health-related quality of life of the child.³ A single visit for multiple treatment is also convenient for parents, especially for those from peripheral locations, avoiding repeated days off work and reducing travel costs. It has been estimated that where multiple treatment is involved, up to six regular dental appointments may be required to complete the planned attention.⁴

Most studies on comprehensive dental treatment on children under GA have been conducted in developed countries, with only a small number in developing countries such as Taiwan⁵ and the Islands of Trinidad and Tobago.⁶ A few studies have also been carried out in the Middle East.^{7,8} A paper regarding compliance of Saudi parents with follow-up preventive care after DGA showed failure in nearly 54% of cases.⁹ Jamjoom *et al*⁷ also showed that of the children treated under DGA mainly for the management of rampant caries in Jeddah, Saudi Arabia, only 10% returned for recall visits within one year.

A South African study which evaluated the self-reported compliance with a preventive dental care programme of families whose children had received dental attention under

1. **Y Kolisa:** BDS, MPH, MDent. Senior Specialist: Dept. of Community Dentistry, School of Dentistry, Faculty of Health Sciences, University of Pretoria.

2. **OA Ayo-Yusuf:** BDS, MSc, MPH, DHSM, PhD. Associate Professor, Dept. of Community Dentistry, School of Dentistry, Faculty of Health Sciences, University of Pretoria.

3. **DC Makobe:** BDS, Dip.Odont (Paedo). Lecturer - Paedodontics: Dept. of Odontology, School of Dentistry, Faculty of Health Sciences, University of Pretoria.

Corresponding author

Y Kolisa:

Senior Specialist: Dept. of Community Dentistry, School of Dentistry, Faculty of Health Sciences, University of Pretoria, Cell: 083 780 0907,

Tel: 012 319 2531, Fax: 086 560 1552, E-mail: yolanda.kolisa@up.ac.za

GA showed that the majority of parents (51%) reported that there was no change in their child's frequency of sugar consumption following the treatment. Inappropriate sugar habits continued after DGA. About 63% of the children treated under DGA returned for the one-week follow-up, but only 22% returned for the three-month follow-up appointment.¹⁰ An additional study in the same region highlighted the possibility of re-treatment under DGA because of a lack of preventive measures, which resulted in repeated severe caries.¹¹ Primary prevention is deemed an important and economically viable intervention in managing ECC.¹² According to Gussy *et al*¹⁹ the premise behind the prevention of ECC lies under four tenets: reducing the causative agent (by tooth brushing, xylitol teeth wipes, parental example in maintaining oral health); reducing the substrate (by diet modification); increasing the resistance of teeth (by use of fluoride dentifrices) and a combination of any of these approaches.¹⁹ Social factors rather than health variables are most often responsible for poor compliance with follow-up appointments, according to a study reported by Elliott Brown *et al*¹² and have a greater impact in predicting that subjects would miss appointments. Unemployed parents were most likely to be at risk for missing recall clinic appointments, independent of health insurance.¹²

Despite overall financial viability, DGA itself can indeed be very costly, considering the fees for theatre, a hospital day-bed, nursing personnel, anaesthetists, dentists and the dental consumables and materials. Therefore, it is not unlikely that even those who have some form of health insurance may have to face co-payment to the medical facility to cover costs. It is important that preventive treatment such as fissure sealant and fluoride treatment is emphasised to the families of young patients to avoid the repeated need¹¹ for costly comprehensive treatment, even when DGA is deemed advantageous because it allows for single-visit treatment.²

Most of the comprehensive dental treatment in patients under the age of 12 years is successfully performed in the dental chair, using normal local anaesthesia and even conscious sedation. However, for a minority of children paedodontic treatment under GA is the only way essential comprehensive dental treatment can be performed. Limited information is currently available on the socio-demographic characteristics of these children, including the treatment received and their compliance regarding follow-up visits.

AIMS

The aim of this retrospective analytic study was therefore to determine the characteristics of paedodontic patients treated under GA and the compliance regarding a recall visit following DGA at the Pretoria Oral and Dental Hospital in South Africa.

SAMPLE AND METHOD

Data was collected retrospectively from the hospital records of paedodontic patients who had received their first dental treatment under GA at the Pretoria Oral and Dental Hospital in Pretoria, South Africa, between January 2009 and December 2010. The study excluded disabled patients and children over the age of 12 years. Collation of the collected data took place in September 2011, thereby providing adequate time for even the last patient treated by the end of 2010 to have returned for the routinely scheduled six-month follow-up visit after the DGA.

The Pretoria Oral and Dental Hospital is an academic hospital that serves the catchment area within the central business district and adjacent suburbs in Pretoria. The protocol for paedodontic treatment under GA at the Pretoria Oral and Dental Hospital is the following: children are evaluated by dentists in the paediatric department, and during this consultation, all relevant medical and dental history is taken. Oral hygiene education on the prevention of ECC including diet modification is delivered to both parent and child. Those children who require extensive dental treatment (restorative and pain-relieving), and on whom attempts at behavioural management to enable treatment on the dental chair under local anaesthesia have been unsuccessful, are booked for a GA appointment. Three DGA sessions are scheduled every week for comprehensive dental treatment, as determined by the financial and logistic constraints of the Pretoria Oral and Dental Hospital. A total of 12 disabled and young patients are thus booked in a normal month without disruptions (144 per year).

In the period under review, fewer child patients were actually treated than the maximum number that could have been accommodated. This was mostly related to the fact that some children did not show up for treatment due to illness or to the parents' or guardians' inability to honour the appointment. Other reasons include the periodic non-availability of anaesthetists, or the fact that a booked child was deemed not fit for anaesthesia on the booked appointment day because of acute infection. Consequently, the records of only 80 DGA children seen during the study period were reviewed and analysed.

The following information was retrieved from the records:

- Parents: employment status, marital status, age;
- Patient:
 - age at time of the first assessment visit prior to GA;
 - gender, ethnicity, area of residence which was recorded as 'suburb'* or 'township'*;
 - medical history;
 - date of first assessment visit;
 - date of first GA appointment;
 - treatment done under GA (categorised as extraction, restoration, stainless steel crown, pulpotomy);
 - date returned for first follow-up visit after GA treatment; and
 - treatment performed at the first follow-up visit.

**A township is defined as an often underdeveloped urban area of low socio-economic status and a suburb is defined as an area where reside people of middle to high income class.*

Statistical analysis

SPSS Statistics Version 19 was used for the statistical analysis. Bivariate Chi-square and t-tests were carried out to determine group differences. Analysis of variance (ANOVA) was applied where applicable, assuming non-equal variance *post hoc* tests. Multiple variable-adjusted logistic regression was performed to analyse the factors most likely to independently influence the degree of compliance regarding follow-up visits within the acceptable time of about eight months. All t-tests were two-tailed and the level of significance was set at $p < 0.05$, except where specified at 10%.

RESULTS

The mean waiting time from the date of the first assessment to the date of the DGA was 4.98 months (SD= 5.32).

Table 1: Treatment performed under DGA

Treatment under GA	Mean number of treatments by age group (SD)			No. of patients receiving specified treatment	Percentage of total number of patients receiving treatment (n = 78)	Range of the number of treatments delivered	p-values when comparing the number of treatments between age groups
	1-4 years N=62	5-8 years N=12	9-11 years N=4				
Extractions	3.2 (3.6)	1.5 (1.9)	4 (1.8)	49	62.8	1-18	#0.06 ^a 0.16 ^b 0.81 ^c
Composite fillings	1.6 (2.0)	3.1 (2.5)	1.3 (2.5)	40	51.3	1-8	0.18 ^a 0.99 ^b 0.54 ^c
Glass ionomer fillings	1.7(2.0)	0.1 (0.3)	2 (4.0)	36	46.2	1-8	0.00 ^a 0.99 ^b 0.73 ^c
Amalgam fillings	1.0 (1.6)	0.3 (0.9)	0 (0.0)	24	30.8	1-6	#0.07 ^a 0.00 ^b 0.69 ^c
Pulpotomies	1.3 (1.7)	1.2 (1.7)	0.3 (0.5)	39	50.0	1-6	0.99 ^a 0.03 ^b 0.30 ^c
Stainless steel crowns	0.3 (0.7)	1.1 (2.2)	0 (0.0)	14	17.9	1-7	0.52 ^a 0.00 ^b 0.29 ^c

No scale and polish procedure and no fissure sealants performed

#Significant at the 10% level
a = Differences between 1-4 years and 5-8 years.
b = Differences between 1-4 years and 9-12 years
c = Differences between 5-8 years and 9-12 years

Of the 80 patients' records, two were excluded from the analysis as they were of patients above the age of 12 years. Of the study participants, 79.5% (n= 62) were four years or younger. The mean age of the children was 3.67 years (SD=2.01). The males in the study were on average significantly younger than the females (3.36 years vs. 3.93 years; p<0.05).

Of the children treated, 53.8% (n=42) were female and 50% were white, 25.5% were black and the rest, either coloureds or Asians. Of all the paedodontic patients, 56.4% were from the suburban areas. The mean age of the parents was 34.10 years with a median of 32 years, and 39.7% were single parents. More than half (56.4%) were unemployed.

Just over half (55.2%) of the children did not have a medical condition prior to DGA, but 13 (16.7%) had respiratory problems, ranging from asthma, sinus problems to influenza at the time of GA. A few of the children had other medical conditions, such as jaundice (n=4), allergies, epilepsy and hearing problems and some needed cortisone treatment (n=3 for each condition). Further medical conditions were bleeding tendencies (n=2), heart valve disease (n=1), hydrocephalus (n=1), HIV (n=1) and TB (n=1).

Treatment performed during DGA

Children received more than one type of treatment under DGA. The preponderance of the treatment performed was extractions, most being undertaken on children between the ages of one and four years. The next most frequent type of treatment was composite and glass ionomer restorations.

The least common was the placement of a stainless steel crown (Table 1). There were significant mean differences between age groups in terms of the treatments performed under DGA (p<0.05). No primary preventive treatment was performed under DGA. There was a positive correlation between pulpotomies performed and the amalgam fillings placed (r=0.45; p<0.00).

Compliance with follow-up visit and treatment performed

The compliance by all the patients with the six-month follow-up visit was very poor: only 14 (18%) ever returned for a follow-up visit (nine children returned between one and seven months after the DGA and four children returned between eight and 15 months). Bivariate analysis revealed an association between a number of factors and compliance with follow-up within 15 months (Table 2).

Of the 14 children who returned for a consultation visit within 15 months of their DGA treatment, seven required a second DGA appointment, because additional extensive treatment was again required despite their having been successfully treated under the initial DGA. All returning children received more than one type of preventive treatment, including those re-booked for GA (Table 3).

Predictors of compliance with the follow-up visit

A subsequent logistic regression analysis that controlled for potential confounders revealed independent relationships between compliance with the follow-up visit within 15

Table 2: Factors possibly associated with patients' compliance with follow-up visit after dental treatment under GA

		Compliance #				P-Value
		Compliant (returned within 15 months)		Non-compliant (never returned)		
		Mean	SD	Mean	SD	
Mean original waiting time in months		3.6	4.62	5.5	5.12	0.542
Mean child age in years		3.9	3.18	3.6	1.69	<u>0.004</u>
Mean parent age in years		34.8	13.08	34.0	11.39	0.859
Mean number of extractions per child		2.14	2.82	3.2	3.58	0.154
		Count	%	Count	%	
Child: Gender	Male	10	71.4%	26	41.3%	<u>0.04</u>
	Female	4	28.6%	37	58.7%	
Residence	Suburb	8	57.1%	35	55.6%	0.58
	Township	6	42.9%	28	44.4%	
Child: Medical history	Has a medical condition	10	71.4%	25	39.7%	<u>0.03</u>
	No medical condition	4	28.6%	38	60.3%	
Parent: Marital status#	Single	6	75.0%	25	80.6%	0.53
	Married	2	25.0%	6	19.4%	
Parent: Employment status	Unemployed	5	35.7%	38	60.3%	<u>0.08</u>
	Employed	9	64.3%	25	39.7%	
Race#	African black	6	42.9%	14	23.0%	0.12
	*Others	8	57.1%	47	77.2%	

P= 5% sig. level *White, Asian, Coloured

Totals do not equal initial sample size because not all participants responded to the questions and one file was disqualified due to the paucity of demographic information supplied

months and the following factors: gender, medical history and the employment status of the child's parents. Specifically, children who were female (OR: 0.28; CI= [0.06, 1.27]) and had no medical condition (OR: 0.20; CI= [0.05, 0.96]) were less likely to return for follow-up treatment ($p < 0.05$). Children with employed parents were more likely (OR: 3.50; CI= [0.81 – 15.1]) to return for a follow-up visit within 15 months ($p = 0.09$) (Table 4).

DISCUSSION

The aim of this study was to describe the characteristics of paedodontic patients and their compliance with follow-up visits after dental treatment under scheduled DGA at the academic hospital in the South African capital. The service chiefly provided comprehensive dental treatment in a single visit to uncooperative children, mostly four years and below, for severe early childhood caries. The findings are consistent with prior studies in Saudi Arabia⁷ and the United Kingdom.⁴

The mean age in this cohort of patients was lower than that reported in previous studies.^{2,4,7,8,10} This younger age probably reflects the differences in disease pattern and the high burden of severe ECC in South Africa¹ and the fact that most of this caries is untreated.¹³

The finding that the majority of the patients belong to the white race group may be related to the fact that the study site is located within the area where the catchment population is mostly local suburban communities historically known to be populated by people classified as white.

The waiting time of 4.98 months on average for a DGA appointment could be considered too long for a child in pain;

nevertheless, it was consistent with the usual long waiting times for appointments in public health facilities. Limited resources in terms of operating theatres, human resources and an increase in the demand for services may be factors associated with such delays.¹⁴ Chaollaí *et al*¹ reported maximum waiting times for children awaiting DGA appointments of up to 21 months in an audit in Yorkshire and the Humber Public Health Authority in Leeds in the United Kingdom.¹⁵ The waiting times in the current study were not associated with the patients' medical history, which is in contrast to the findings in another study, where co-morbidity was significantly associated with the treatment target date, within three months.¹⁶

The majority of the children in the study had teeth extracted, rather than restored, and the mean number of teeth extracted was more than that observed in similar studies in Saudi Arabia studies.^{2,7,8} It would thus appear that younger children (four years or below), in this study had more advanced untreated caries. This trend, reported locally,¹¹ of extractions being more frequent than restorations, is a matter of concern within the region, as it may indicate that children present late for pain relief and sepsis treatment.¹⁷ The current study noted that restorations with greater longevity such as stainless steel crowns were the least performed, in favour of the resin restorations. Stainless steel crowns are more likely to be longer-lasting and successful than composite and amalgam restorations in DGA.^{4,7,18} The most likely reason for the predilection for composite treatment is that possibly anterior teeth were mostly involved, because ECC invariably affects anterior teeth.¹⁹

Consistent with the other studies reviewed,^{7,8-10} compliance regarding preventive recall visits in this study was found to

Table 3: Treatment performed during a follow-up visit within 15 months

Treatment during the follow-up visit	No. of patients	n= 14 %*
Evaluation and booked for second GA and medicated	7	50
Oral hygiene education and parent motivation (OHI)	8	57.1
Scale and/or polishing	9	64.2
Fluoride treatment	4	28.6

NB*: % does not add up to 100% as a child could receive multiple treatment procedures.

Table 4: Final logistic regression model of correlates of compliance to follow-up visit

		OR (95% CI)	P-value
Gender	Male	0.28 (0.06-1.27)	0.04
	Female		
Medical history	Yes	0.20 (0.05-0.96)	0.03
	No		
Parents Employed?	No	3.50(0.81-15.1)	0.09
	Yes		

be poor, with only about one out of every five children treated returning within 15 months. The significant predictors for compliance regarding follow-up were related to a child's gender and medical status: children who were male and who had a medical condition were found to be more likely to return for a scheduled visit, even though the DGA waiting time was not associated with medical history. An existing medical condition may mean that the child could be on some form of paediatric medication which may affect the child's dental health,²⁰ which in turn might require more regular treatment. This may explain why children with no medical condition were less likely to return for follow-up visit, possibly because they had no oral disease symptoms.

Another probable predictor for compliance was the employment status of parents. Children with unemployed parents tended to be more likely to not return for a follow-up visit. The region is characterised by a high unemployment rate, which would be linked to reduced affordability and thus limited access to the facility because of costs relating to transport. Although the facility is mostly used by the local community, it is a referral hospital. According to the South African government's policy, treatment is free for children under the age of six years,²¹ but there could have been barriers to accessibility in the form of distance and transport costs. Unemployment is a predictor for accessibility,¹² which therefore suggests a lack of funds for transport for returning to the facility. It is therefore important to enlist social support systems to encourage follow-up preventive care – this has the potential for improving the likelihood of honouring dental appointments even when a child experiences no symptoms.¹²

Half of the patients that returned for the follow-up visit presented with advanced dental disease again, requiring a second DGA appointment. This deterioration could be the result of the persistent poor oral hygiene control, for example, no change in the children's poor dietary habits following DGA.¹⁰ The readiness to facilitate change seemed to be an impor-

tant predictor of whether parents adopted and maintained preventive behaviours to improve their child's oral health.²² A lack of knowledge also may contribute to any non-compliance of parents regarding the follow-up visit.²² This is an indication that education and the motivation of parents is important, and that prior to the DGA appointment or treatment, it is vital to emphasise the necessity of preventive treatment to reduce the likelihood of the development of new disease.¹⁰ Parent motivation and education prior to DGA may therefore improve overall compliance.

Study limitations

Given the small proportion of children who returned for a follow-up visit, caution should be exercised in drawing conclusions on the reasons for compliance. However, poor compliance following DGA is a trend that has been described in numerous studies.^{2,7-10} It may be argued that this behaviour could render conventional preventative clinic-based methods (which depend on regular dental attendance) less likely to work in children with ECC. Alternative approaches which are not facility-based could complement or supplement these efforts.

The study design relied on a record review, which is not immune from reporting bias. However, precautions were taken in that the recorder followed up on the correctness of the data that was collated.

CONCLUSIONS AND RECOMMENDATIONS

It is apparent that there is a need for effective oral health promotion within the facility targeted firstly at the parents of children prior to the DGA, and secondly at the community in the region in general. This study highlights the importance of motivation and preventive treatment prior to, during and after DGA, especially in a setting where unemployment and the disease burden is high. It is recommended that more emphasis is placed on the prevention approaches as highlighted by Gussy *et al*,¹⁹ which relates to the use of fluoride, diet modification, removal of plaque and microbes by tooth brushing and the chewing of xylitol gum. Although the services at the academic hospital are free for children under six years, there may still be accessibility challenges which may require general social support. Further investigations are required to identify an intervention approach that improves follow-up compliance; for studies to measure the effectiveness of compliance regarding preventive visits; to assess the combination of both conventional facility-based preventive services and alternative supplementary preventive methods for patients with ECC, and to examine any changing patterns in the use of DGA in the Pretoria Oral and Dental Hospital. Given the current prevalence and severity of caries in South Africa, DGA services might remain a real necessity for a few vulnerable children.

Acknowledgement

The authors would like to express their appreciation to the Pretoria Oral and Dental Hospital and particularly the Departments of Community Dentistry and Odontology for allowing and facilitating the research.

Declaration: No conflict of interest declared.

References

1. Postma TC, Ayo-Yusuf OA, Van Wyk PJ. Socio-demographic correlates of early childhood caries prevalence and severity in a developing country- South Africa. *Int.Dent.Journal.* 2008;58:91-7.

2. Holt R, Chidiac R, Rule D. Dental treatment for children under general anaesthesia in day care facilities at a London dental hospital. *Br.Dent.Jl.* 1991;170:262-6.
3. Anderson H, Drummond B, Thomson W. Changes in aspects of children's oral-health-related quality of life following dental treatment under general anaesthesia. *Int.Jl Paed. Dent.* 2004;14:317-25.
4. O'Sullivan E, Curzon M. The efficacy of comprehensive dental care for children under general anaesthesia. *Br.Dent.J.* 1991;171:56-8.
5. Su HL, Chen PS. A clinical evaluation of comprehensive dental treatment for children under general anaesthesia. *Changggeng Yi Xue Za Zhi* 1992 Dec;15:188-92.
6. Naidu R, Davis L. Parents' views on factors influencing the dental health of Trinidadian pre-school children. *Com Dent. Health* 2008;25:44-9.
7. Jamjoom M, Al-Malik M, Holt R, El-Nassry A. Dental treatment under general anaesthesia at a hospital in Jeddah, Saudi Arabia. *Int J Paediatric Dent.* 2001;11:110-6.
8. Osuji OO, Assery MK. Dental treatment of children under general anaesthesia at a hospital in Taif, Saudi Arabia. *Saudi Dent. Jl* 2005;17:3.
9. Al-Hussyeen AJA. Compliance of Saudi parents with follow-up preventive care following dental treatment under general anaesthesia. *Saudi Dent. Jl* 2003;15:17-21.
10. Peerbhay FB. Compliance with preventive care following dental treatment of children under general anaesthesia. *South African Dental Journal* 2009 Nov;64:442, 444-5.
11. Peerbhay FB, Barrie RB. The burden of early childhood caries in the Western Cape Public Service in relation to dental general anaesthesia: implications for prevention. *South African Dental Journal* 2012;67:14-9.
12. Elliott Brown KA, Shetty V, Delrahim S, Belin T, Leathers R. Correlates of missed appointments in orofacial injury patients. *Oral Surg., Oral Med., Oral Path., Oral Rad., and Endo.* 1999;87:405-10.
13. Van Wyk PJ, Louw AJ, Du Plessis JB. Caries status and treatment needs in South Africa: report of the 1999-2002 National Children's Oral Health Survey. *South African Dental Journal* 2004 Jul;59:238, 240-2.
14. Cullinan K. Health services in South Africa: A basic introduction. *Health-e News Service* 2006.
15. Chacollá AN, Robertson S, Dyer T, Balmer R, Fayle S. An evaluation of paediatric dental general anaesthesia in Yorkshire and the Humber. *Br.Dent.J.* 2010;209:E20-E20.
16. Chung SS, Casas MJ, Kenny DJ, Barrett EJ. Clinical relevance of access targets for elective dental treatment under general anaesthesia in pediatrics. *J.Can.Dent.Assoc.* 2010;76:a116.
17. Jamieson L, Roberts-Thomson K. Dental general anaesthetic trends among Australian children. *BMC Oral Health* 2006;6:16.
18. Al-Eheideb AA, Herman NG. Outcomes of dental procedures performed on children under general anaesthesia. *J.Clin.Pediatr. Dent.* 2004;28:181-3.
19. Gussy MG, Waters EG, Walsh O, Kilpatrick NM. Early childhood caries: current evidence for aetiology and prevention. *J.Paediatr. Child Health* 2006;42:37-43.
20. Neves BG, Farah A, Lucas E, De Sousa VP, Maia LC. Are paediatric medicines risk factors for dental caries and dental erosion? *Comm. Dent.Health* 2010 Mar;27:46-51.
21. Wilkinson D, Gouws E, Sach M, Karim SSA. Effect of removing user fees on attendance for curative and preventive primary health care services in rural South Africa. *Bull.World Health Organ.* 2001;79:665-71.
22. Amin MS, Harrison RL. A conceptual model of parental behavior change following a child's dental general anaesthesia procedure. *Pediatr.Dent.* 2007;29 278-86.