Compliance of Saudi parents with follow-up preventive care following dental treatment under general anesthesia

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هدفت الدراسة إلى تقييم التزام الوالدين في إحضار أولادهم لزيارات المتابعة الوقائية بعد تقديم المعالجة السنية الشاملة لهم تحت تأثير التخدير الكامل.
تمت الدراسة بمراجعة ملفات ١٣٤ مريض تمت معالجتهم تحت التخدير الكامل في الأعوام من ١٩٩٠ إلى ٢٠٠٠ في كلية طب الأسنان / جامعة الملك سعود.
تكونت عينة الدراسة من ٧٦ طفل و ٥٨ طفله تراوحت أعمارهم بين سنتين إلى سبعة عشره سنه. متوسط العمر كان ٥,٤٣ سنه. ٧٤ % من الأطفال كانوا أصحاء بينما ٢٦% كانوا معاقين ذهنيا أو لديهم مشاكل صحية. أظهرت النتائج أن أكثر من نصف الأطفال المعالجين (٥٣,٧%) لم يلتزموا بالحضور لعيادات المتابعة التي تخصص للعلاج الوقائي وتقييم حالة الاسنان المعالجة. و٣٥% من الأطفال حضروا لموعد المتابعة الأول بعد العلاج الشامل تحت التخدير الكامل. بينما حضر ٢٩% من الأطفال المعالجين للزيارة المتابعة الثانية بعد العلاج الشامل. أما حضور كلا الزيارتين فلم يلتزم به سوى ١٨% من مجموع الأطفال المعالجين. أظهرت الدراسة أن حضور الأطفال الذين صنعت لهم أجهزه حافظ المسافات للزيارات المتابعة الوقائية كانت أكثر من غيرهم. فقط حضر ٦٨% منهم للزيارة الوقائية المباشرة بينما حضر ٥٧% للزيارة الوقائية الثانية وكلا الرقمين اظهرا تفوقاً إحصائيا بالنسبة لغيرهم (P<0.0001).
وجدت الدراسة كذلك أنه لم يكن للعوامل الأخرى مثل المشاكل الصحية لدى الأطفال المعالجين ومكان الإقامة أي تأثير على مدى التزام الأهل بالحضور إلى زيارات المتابعة الوقائية.
خلصت نتائج هذه الدراسة الى ان نسبة عالية من الوالدين لا يلتزمون باحضار اطفالهم الى زيارات المتابعة الوقائية بعد علاجهم تحت التخدير الكامل.

The aim of this study was to investigate the compliance of Saudi parents in bringing their children to follow-up dental care visits after full-mouth rehabilitation treatment under general anesthesia (GA). A retrospective study was undertaken by reviewing 134 dental records of children treated under GA between the years 1990 and 2000 at the College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia. The sample consisted of 76 males and 58 females. The ages of the children ranged from 2 to 17 years with a mean of 5.43 years. Seventy-four percent were healthy children and 26% had medical or developmental disability. Results showed that over half (53.7%) of treated children did not respond to follow-up dental care visits. Approximately 35% of children came for the post-operative visit, 29% came for the recall visit and only 18% of the treated children came for both visits. Results also showed that 68% of children who had space maintainers attended the post-operative visit while 57% of them came for the recall visit and both percentages were statistically significant (P<0.0001). Medical/developmental disabilities and place of residence were not found to be significant variables in parents' compliance with follow-up preventive dental care following GA. The findings of this study showed that a high percentage of Saudi parents did not comply with the recommended follow-up dental care visits.

Introduction

Behavior management is a major component in treating children. The majority of children can be treated efficiently with behavior modification techniques. Some children may need nitrous oxide or some other form of sedation. Very young children who require extensive dental treatment, children with management problems or who are medically compromised might require hospitalization to complete their treatment.[1, 2]

The expertise of the medical and dental team, and the ability of parents to comply with preventive dental measures and keep follow-up dental visits for their children are important factors in the success of the outcome of full-mouth rehabilitation for pediatric dental patients under GA.[1-5]

A follow-up preventive visit consists of dietary counseling, oral hygiene instructions, prophylaxis and topical fluoride application, in addition to re-evaluating the restored teeth, assessing the development of new caries, and the necessity of any re-treatment.[2]

Poor compliance with follow-up dental visits may lead to early relapse, and should be considered a potential "risk factor" in determining the type of treatment rendered during GA especially in the treatment of early childhood caries.[5,7,8]

Roberts[6] found that only few parents (26%) brought their children for follow-up visits after full mouth rehabilitation and did not consider the need for dental homecare. The suggested explanation for poor compliance with follow-up evaluations was the lack of proper communication with the dental care provider.[3, 5,6]

Berkowitz *et al*.[3] found that 50% of children with early childhood caries who returned for dental treatment following dental care after GA needed additional treatment in less than six months.

Studies by Almeida *et al*.[9] and Eidelman *et al*.[10] reported that 17% to 59% of the studied population needed further treatment in less than two years after full-mouth rehabilitation under GA.

The distance traveled and child compromised health have been mentioned in the literatures as a potential variables affecting parental compliance to follow-up evaluation after GA. Enger and Mourino[1] performed a study on two-hundred patients in Richmond, Virginia, USA and they

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reported that a significant difference in follow-up compliance was found between patients living within and outside of Richmond where the dental clinic was located. However, Primosch *et al*.[7] found that both the travel time and compromised health of the child were not related to follow-up compliance of parents.

The aim of this study was to investigate the rate of compliance of Saudi parents with follow-up dental visits and to assess variables contributing to the degree of compliance after full-mouth rehabilitation using GA for children.

Materials and Methods

A retrospective study was completed by reviewing 134 dental records of children who received full-mouth rehabilitation under general anesthesia during the years 1990-2000. The last cases assessed were treated at the end of 2000, so by the end of 2001 a sufficient time had passed for a follow-up period of at least one year.

Those patients were treated either by a pediatric dentist or by graduate students under the supervision of a faculty in the pediatric dentistry postgraduate program at King Saud University in Riyadh, Saudi Arabia.

The protocol of treating children under GA in King Saud University was carried out by admitting the patient to the hospital the night before and discharged the following morning. The dental treatment offered was complete oral rehabilitation. If a space maintainer was required, it was usually constructed and cemented at the time of the dental treatment if time permitted, otherwise cementation was delayed until the post-operative visit.

Records were reviewed to determine the following:

1. Patient's sex
2. Age of the patient at the time of surgery
3. Procedure date
4. Medical status
5. Parental compliance in bringing their children for a post-operative visit after 5-7 days and recall visits within 3-4 months
6. Residence of the child
7. Placement of space maintainer, if any
8. Date of further treatment needed, if any, and behavioral management used during re-treatment.

Statistical Analysis

Chi-square test was performed to assess variables contributing to the degree of parent's compliance with preventive dental visits after full-mouth rehabilitation using GA.

Results

Of the 134 children treated, 76 (56.7%) were males and 58 (43.4%) were females.

Table 1 showed that the age of the children ranged from 2 to 17 years with the mean age of 5.43 (±2.97). The mean age of the males was 5.43 (± 2.84) and 5.41 (±3.16) for the females. Over 65% of the patients were 5 years or under. One hundred twenty-nine (96.3%) of children were from Riyadh city while 5 (3.7%) were from other areas.

Table 1. Distribution of child dental patients treated under general anesthesia by age and sex.

Sex	Age in years				
	2-5 No. (%)	6-10 No. (%)	11-17 No. (%)	x (SD)	Total No. (%)
Male	51 (67.1)	22 (28.9)	3 (3.9)	5.43 (2.84)	76 (100)
Female	37 (63.8)	17 (29.3)	4 (6.9)	5.41 (3.16)	58 (100)
Total	88 (65.7)	39 (29.1)	7 (5.2)	5.43 (2.97)	134 (100)

Table 2 showed the reasons for treatment under GA. Some patients had more than one reason for being admitted for treatment under GA but only the main reason of admission was presented in the table. Ninety-nine (73.9%) of the children were healthy but had behavioral management problems (45.52%) or had early childhood caries and required extensive treatment (28.36%). Thirty-five of the children (26.12%) had medical/developmental disabilities.

Table 2. Reasons for treatment under general anesthesia

Reason	Number of Patients	(%)
Management problem	61	45.52
Extensive caries	38	28.36
Medical/developmental disabilities	35	26.12

Medical reasons for being treated under GA are shown in Table 3. These were cerebral palsy, Down syndrome, respiratory problem, epilepsy, diabetes and deafness. Other medical problems were asthma, cleft lip and palate (3 cases), cardiac problem (2 cases) and one case of cancer.

Table 4 showed the compliance of patients

with follow-up dental visits after GA. Only 48 (35.8%) of the treated children came for post-operative visit while 39 (29.1%) returned for recall visits and only 25 (18.7%) of the children came for both visits. Over half of the treated patients (53.7%) did not return for post-operative or recall dental visits.

Twenty-eight (20%) of the children had a space maintainer fabricated during the treatment procedure and about 20 (15%) of the treated children required further treatment after the GA.

Table 3. Medical reasons for restorative treatment under general anesthesia.

Reason	Number of children	(%)
Down syndrome	7	5.2
Cerebral palsy	7	5.2
Respiratory problem	3	2.2
Epilepsy	3	2.2
Diabetic	3	2.2
Deafness	3	2.2
Asthma	3	2.2
Cleft lip/palate	3	2.2
Cardiac problem	2	1.5
Cancer	1	0.7
TOTAL	35	

Table 4. Patients' compliance with follow-up dental visits after general anesthesia (N=134)

Follow-up Dental Visit	N (%)
Post-operative only	48 (35.8)
Recall only	39 (29.1)
Post-operative and recall	25 (18.7)
No post-operative no recall	72 (53.7)

Some patients came for more than one visit

Medical Status and Follow-up Dental Visits

Sixty-eight percent (24/35) of the children with medical/developmental disabilities and 62% (62/99) of the healthy children did not make their post-operative visit. This difference was not significant (p=0.367).

Regarding recall visit, 80% (28/35) of the children with medical/developmental disabilities and 67% (67/99) of the healthy children did not come for recall visit. This difference was not significant (p=0.89).

Place of Residence and Follow-Up Dental Visits

None of the treated children who came from outside Riyadh and who constituted 3.7% of total studied population came to the post-operative visit or to the recall visit.

Space Maintainer and Follow-up Dental Visits

Sixty-eight percent (19/28) of the patients who had a space maintainer came for the post-operative visit while only 27% (29/115) of the children who had no space maintainer came for that visit. Chi-square test showed significant difference between the two groups ($p < .0001$).

For the recall visit, 57% (16/28) of the children with space maintainer came for that visit compared to only 21% (23/115) of those with no space maintainer made the recall visit. Chi-square test showed significant difference between the two groups ($p < .0001$).

Further Treatment Needed and Follow-Up Dental Visits

Out of 134 treated children, 20 (14.9%) came back for further treatment after the GA procedure. About 21% (10/48) of those who attended post-operative appointment needed additional treatment compared to 11.6% (10/86) of those who did not make the post-operative visit needed any further treatment. Chi-square test showed no significant difference between the two groups ($p = 0.152$)

Out of the 20 children who needed further treatment, it was found that 28% (11/39) of those who attended recall evaluation visit needed further treatment compared to 24.6% (28/114) who came for that visit did not require any additional treatment. Chi-square test showed significant difference between the two groups ($p < .006$).

All the patients who needed further treatment were re-treated using pre-medication or psychological behavior management. It was found that all these children required restorative treatment or extractions at the follow-up visits in an average of 14 months after treatment under GA.

None of these patients required the re-treatment to be carried out under GA.

Discussion

Knowing the rate of compliance of parents with follow-up dental visits is extremely important in order to provide proper types of treatment, select proper patient and improve the success of the outcome rate of full-mouth rehabilitation for children under GA. Educating and motivating the parents to enhance compliance is necessary before subjecting any child to treatment under GA. The findings of this study indicated that a high percentage of children (53.7%) who were treated under GA were non-responsive to follow-up dental visits. This poor compliance has been reported in other studies.[1, 2,3,6]

Enger and Mourino's study[1] found that the recall rate was 52%. Worthen and Mueller[5] found that the post-operative dental care visit rate was 36% and the recall rate was 3% while both post-operative and recall were 12%. Roberts[6] found that 26% of the treated patients returned for follow-up preventive visit. The suggested explanation of this behavior was the parent's beliefs and attitudes toward the importance of follow-up visits or it could be a result of poor communication between the dental care provider and the parents.[1,6] However, this study did not investigate the reasons for the poor rate of compliance with follow-up dental visit especially if we exclude the financial reason because dental treatment is available free of charge for all populations in Saudi Arabia.

A high relapse and need for further treatment was observed for children who made post-operative (20%) and for those who returned for recall preventive visits (28%). These findings could be underestimated, as we do not have information about more than half of the studied population who did not respond to any follow-up preventive visit. This may suggest that parents may have inadequate information about oral health so they did not appreciate the importance of coming after GA treatment for re-evaluation and application of preventive measures. A high relapse rate was reported in other studies.[3, 8,10]

The high relapse rate found in this study and previous studies necessitate the importance of providing more comprehensive treatment. Full coverage restoration such as SSC and strip crowns are recommended as these are significantly better than amalgam and composite or glass ionomer restorations.[4,8,13]

In this study the average time in which children required re-treatment was 14 months. This finding was similar to the results reported in other studies.[2, 9,10,14]

The protocol implemented in this school, however, was the use of radical approach in the treatment in order to avoid the need for further treatment in 6 or 12 months.[4]

None of the patients required the re-treatment to be carried out under GA indicating that the objectives of GA are being achieved by training and preparing the children to accept dental treatment in the normal way. This finding was in agreement with several other studies.[3,4,11] Mitchell *et al.*[12] reported that re-treatment under GA was seldom required at least in the four years following the treatment under GA.

In the present study, place of residence and child compromised health had no effect on compliance rate. This was in agreement with the findings of Primosch *et al.*[7] but not with the findings of Enger and Mourino[1] regarding the place of residence. It should be pointed out, however, that the number of treated children from outside Riyadh city was very small (3.7%) and may not be adequate to make a justified comparison.

This study showed that a high percentage of children who had space maintainers returned for both follow-up dental visits which was statistically significant ($P<.0001$) compared to children who had no space maintainers. This behavior maybe the result of parents' concern about seeking more information on these appliances or it could be a result of the dental provider instructions about the importance of periodic check-up of these appliances.

The results of this study also showed the importance of education and motivation of the parents towards better compliance with follow-up preventive visits, as well as, homecare oral hygiene before subjecting children to treatment using GA. Further studies are required to investigate the reasons of poor compliance of Saudi parents to follow-up dental care visits.

Conclusions

1. Most of treated patients were below 5 years of age and had extensive dental caries and/or behavior management problems.
2. A high percentage of Saudi parents did not comply with the recommended follow-up dental care visits.
3. A high relapse rate was shown at a short period after treatment under GA.
4. High percentage of children who had space

maintainers attended both post-operative and recall visits.
5. Medical/developmental disabilities and place of residence were not found to be significant variables in parents' compliance with follow-up preventive dental care following GA.
6. Patients who required further treatment after GA were treated using physiological behavior management techniques and/or sedation.

References

1. Enger DJ, Mourino AP. A survey of 200 pediatric dental general anesthesia cases. J Dent Child 1985; 52: 36-41.
2. Sheehy E, Hirayama K, Tsamtsouris A. A survey of parents whose children had full-mouth rehabilitation under general anesthesia regarding subsequent preventive dental care. Pediatr Dent 1994; 16(5): 362-364.
3. Berkowitz RJ, Moss M, Billings RJ. Clinical outcomes of nursing caries treated using general anesthesia. J Dent Child 1997; 64: 210-211.
4. Bello LL. A retrospective study of pediatric dental patients treated under general anesthesia. Saudi Dent J 2000; 12(1): 10-15.
5. Worthen TB, Mueller W. Implication of parental compliance on decision making in care provided using general anesthesia in a low-income population. J Dent Child 2000; 197-199.
6. Roberts GH. Caries and the preschool child. Treatment of the preschool child in the hospital service. J Dent 1990; 18: 321-324.
7. Primosch RE, Balsewich CM, Thomas CW. Outcomes assessment and intervention strategy to improve parental compliance to follow-up evaluations after treatment of early childhood caries using general anesthesia in a medical population. J Dent Child 2001; 103-108.
8. O'Sullivan EA, Curzon MEJ. The efficacy of comprehensive dental care for children under general anesthesia. Br Dent J 1991; 171: 56-58.
9. Almeida AG, Roseman MM, Sheff M. Further caries susceptibility in children with early childhood caries following treatment under general anesthesia. Pediatr Dent 2000; 22: 302-306.
10. Eidelman E, Faibis S, Peretz B. A comparison of restorations for children with early childhood caries treated under general anesthesia or conscious sedation. Pediatr Dent 2000; 22: 33-37.
11. Holt RD, Chidiac RH, Rule DC. Dental treatment for children under general anesthesia in daycare facilities at a London Dental Hospital. Br Dent J 1991; 170: 262-266.
12. Mitchell L, Murray JJ, Ryder W. Management of the handicapped and anxious child: A retrospective study of dental treatment carried out under general anesthesia. Pediatr Dent 1985; 1: 9-14.
13. Kilpatrick NM, Murray JJ, McCabe JF. The use of a reinforced glass ionomer cermet for the restoration of primary molars: A clinical trial. Br Dent J 1995; 175-179.
14. Legault JV, Dines MH, Auger R. Dental treatment of children in a general anesthesia clinic: Review of 300 cases. J Can Dent Assoc 1972; 6: 221-24.

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