DOI: 10.7860/JCDR/2017/23699.9163

Original Article

Dentistry Section

Comparative Assessment of Oral Health Related Quality of Life of Children Before and After Full Mouth Rehabilitation under General Anaesthesia and Local Anaesthesia

JAAI VINOD RANE[1], JASMIN WINNIER[2], RUPINDER BHATIA[3]

ABSTRACT

Introduction: Early Childhood Caries (ECC) is an aggressive form of caries in a child who is 71 months of age or younger. If the child is cooperative, the treatment may be completed under Local Anaesthesia (LA). General Anaesthesia (GA) is considered if the child is uncooperative, medically compromised or if the parents are unable to return for regular visits and requests treatment under GA. Improved Oral health Related Quality of Life (OHRQoL) has been reported after dental treatment under GA.

Aim: To assess and compare the improvements in OHRQoL of children who have undergone dental treatment under GA or LA. To study the preoperative severity of events that may prompt the parents to consider treatment under GA.

Materials and Methods: Parents of paediatric patients who had to undergo full mouth rehabilitation under GA and LA were selected for this study. Parents were given a questionnaire to evaluate OHRQoL of children before and after completion of treatment. Preoperative and postoperative assessments were analyzed using paired t-test.

Results: Dental disease was found to have a significant impact on children's overall well being. There was a considerable improvement with relation to eating preferences, amount of food intake, sleep and pain relief before and after dental treatment. There was no significant difference if the child was treated under GA or LA.

Conclusion: Severe caries affects the quality of life of preschool children and improvement on quality of life is significant regardless of treatment performed under GA or LA.

Keywords: Early childhood caries, Early childhood oral health impact scale, Preschool children

INTRODUCTION

ECC is defined by the American Academy of Paediatric Dentistry as the presence of one or more decayed (noncavitated or cavitated lesions), missing (due to caries) or filled teeth surfaces in any primary tooth in a child 71 months of age or younger [1]. Dental pain and dental infections in children between one to five years of age is reported to be 70% and 48% respectively [2].

Treating very young children with multiple caries is usually a challenge for dentists and a source of stress for the parents and children. For infants and children who have not developed the ability to cope up with invasive and psychologically threatening procedure, GA represents the only treatment option to deliver effective and efficient oral health care. Advantages of dental treatment under GA is that it immediately improves the OHRQoL in children, facilitates dental access for very young children and provides an opportunity for education of parents and child positive oral health behaviours [3]. Despite various advantages, it has been reported that over 50% of children treated under GA presented with caries, requiring further treatment at six months recall and 17% required retreatment under GA within two years [4,5]. This may be due to lack of follow ups or poor cooperation in the dental setting.

Dental treatment under LA is performed in day-to-day practice. Age-appropriate euphemisms, distraction, topical anaesthetics, slow injection technique, provide the child to have a favourable experience during administration of LA [6]. But till date, not many studies have been conducted to evaluate if improvements in OHRQoL is present when children have undergone full mouth rehabilitation under LA also.

Against this background, the present study was conducted with the objective to assess and compare the OHRQoL in children who have undergone full mouth rehabilitation under GA and LA, and to compare and evaluate preoperative clinical symptoms of child which determined the parent's choice of anaesthesia for their children.

MATERIALS AND METHODS

This prospective observational study included a sample of 50 parents of two to six-year-old children who had ECC and required full mouth rehabilitation. The sampling was done by purposive sampling method. The sample size was calculated considering the difference in group means to be 20%, power of the study as 80%, at 95% confidence interval, a ratio of sample size (Group 1/ Group 2) as 1 and with the significance level set at 5%, a sample size of 50 was derived (i.e., 25 in each group). The purpose of the study was explained to the parents and informed consent was obtained from them. Ethical clearance to conduct the study was acquired from the concerned institutional ethical committee.

Normal healthy children with no systemic disease, who presented with a minimum of five deeply carious teeth, which required pulpotomy or pulpectomy followed by stainless steel crowns or anterior strip crowns were selected for the study. The intraoral findings were recorded, radiographs were taken and the comprehensive treatment plan was decided.

Oral prophylaxis and restorations were attempted on the patient during initial visits to evaluate the behaviour of the patient according to the Frankel behaviour rating scale [7]. If the patient was found to be cooperative, then further treatment was carried out under LA. However, for very young children with extensive dental caries, parents wish to complete treatment in single session, and history of definitely negative behaviour, treatment under GA was recommended. Once parental consent was obtained for the same, the treatment was performed under GA. Fifty parents were selected depending on the

1	How often has your child had pain in the teeth, mouth or jaws
How often has your child, because of dental problems or treatment	
2	Had difficulty in drinking hot or cold bevarages
3	Had difficulty in eating some foods
4	Had difficulty in pronouncing any words
5	Missed preschool, day care or school
6	Had trouble while sleeping
7	Was irritable or frustrated
8	Avoided smiling or laughing when around other children
9	Avoided talking with other children
How often have you or another family member, because of your child's dental problems or dental treatment	
10	Been upset
11	Felt guilty
12	How often have you or another family member, taken time off from work because of your child's dental problems or treatment
13	How often has your child had dental problems or dental treatments that had a financial impact on your family

[Table/Fig-1]: Early childhood oral health impact scale.
Scores: 1-Never, 2-Hardly ever, 3-Occasionally, 4-Often, 5-Very often, 6-Don't know

mode of anaesthesia planned for their children and they were divided into two groups:

Group 1: Twenty five parents of children who underwent full mouth rehabilitation under LA;

Group 2: Twenty five parents of children who underwent full mouth rehabilitation under GA.

The questionnaire used to assess the preoperative and postoperative OHRQoL in children in the present study was Early Childhood Oral Health Impact Scale (ECOHIS) [8]. The ECOHIS is single questionnaire and it was filled by parents prior to commencement of the treatment. The questionnaire contains 13 questions in two sections, the child section and parent section. The reliability of the questionnaire has been established in previous study [8].

Responses to the ECOHIS ranged from 'Never', 'Hardly ever', 'Occasionally', 'Often', 'Very often', 'Don't know' having a score between 1 to 6.

Post-treatment questionnaire was administered to parents approximately one month after completion of treatment.

STATISTICAL ANALYSIS

All collected data was entered in excel sheet and statistical analysis was done using paired and unpaired t-test.

RESULTS

The ECOHIS is detailed in [Table/Fig-1].

[Table/Fig-2] shows the preoperative and postoperative values of the scale after completion of treatment under GA and LA. It can be noted that, there was a statistically significant improvement postoperatively and there was no financial impact on the family regardless of whether treatment was performed under GA or LA.

[Table/Fig-3] shows OHRQoL improvements of children treated under GA and LA. Though postoperatively there was no difference between GA and LA, it can be seen that statistically significant preoperative differences exist with regard to questions on whether the patient has had difficulty in having hot or cold food, if the child has had trouble while sleeping, if the child has avoided talking to

		Local Anaesthesia				General Anaesthesia			
Questions		Mean (SD)	Mean diff	t-value	p-value	Mean (SD)	Mean diff	t-value	p-value
1	Pre op	3.24 (0.9)	2	10.445	<0.001**	3.72 (1.1)	2.480	11.431	<0.001**
	Post op	1.24 (0.4)				1.24 (0.4)			
2	Pre op	2.60 (1.4)	1.480	5.578	<0.001**	3.60 (1.4)	2.200	7.945	<0.001**
	Post op	1.12 (0.3)				1.40 (0.5)			
3	Pre op	3.20 (1.3)	1.880	7.224	<0.001**	3.72 (1.1)	2.400	12.534	<0.001**
	Post op	1.32 (0.6)				1.30 (0.5)			
4	Pre op	1.72 (1.2)	0.240	1.186	0.247	2.12 (0.8)	0.600	3.286	0.003*
	Post op	1.48 (0.6)				1.52 (0.5)			
5	Pre op	2.24 (1.0)	1.120	6.354	<0.001**	1.92 (1.2)	0.920	3.874	<0.001**
	Post op	1.12 (0.3)				1 (0)			
6	Pre op	2.64 (1.4)	1.640	5.938	<0.001**	3.72 (1.1)	2.680	12.099	<0.001**
	Post op	1 (0)				1.04 (0.2)			
7	Pre op	2.20 (1.1)	1.120	5.315	<0.001**	2.80 (1.3)	1.720	6.577	<0.001**
	Post op	1.08 (0.3)				1.08 (0.3)			
8	Pre op	1.44 (0.6)	0.200	1.549	0.134	1.92 (1.1)	0.440	1.963	0.061
	Post op	1.24 (0.4)				1.48 (0.5)			
9	Pre op	1.48 (0.6)	0.280	2.585	0.016*	1.96 (0.9)	0.680	3.989	<0.001**
	Post op	1.20 (0.4)				1.28 (0.5)			
10	Pre op	2 (1)	0.960	4.908	<0.001**	3.52 (1.2)	2.520	10.871	<0.001**
	Post op	1.04 (0.2)				1 (0)			
11	Pre op	1.96 (1.3)	0.920	3.663	<0.001**	3.56 (1.1)	2.560	11.418	<0.001**
	Post op	1.04 (0.2)				1 (0)			
12	Pre op	2.52 (0.9)	1.480	7.687	<0.001**	2.28 (1.1)	1.240	5.684	<0.001**
	Post op	1.04 (0.2)				1.04 (0.2)			
13	Pre op	1.44 (0.8)	0.160	1.163	0.256	1.80 (1.2)	0.120	1.809	0.083
	Post op	1.28 (0.5)				1.68 (1.0)			

[Table/Fig-2]: Intragroup comparison of pre and post operative values using paired t-test.
(p <0.05 - Significant*, p < 0.001- Highly significant**), Pre op- Preoperative, Post op- Postoperative.
All the questions showed highly significant-values in both groups except for child social interaction and financial status of parents which showed no significant-values

Variable		LA Mean (SD)	GA Mean (SD)	t-value	p-value
Q 1	Pre op	3.24 (0.9)	3.72 (1.1)	1.637	0.108
	Post op	1.24 (0.4)	1.24 (0.4)	0	1
Q 2	Pre op	2.60 (1.4)	3.60 (1.4)	2.554	0.014*
	Post op	1.12 (0.3)	1.4 (0.5)	2.333	0.124
Q 3	Pre op	3.20 (1.3)	3.72 (1.1)	1.556	0.126
	Post op	1.32 (0.6)	1.32 (0.5)	0	1
Q 4	Pre op	1.72 (1.2)	2.12 (0.8)	1.419	0.162
	Post op	1.48 (0.7)	1.52 (0.5)	0.241	0.810
Q 5	Pre op	2.24 (1.0)	1.92 (1.2)	1.026	0.310
	Post op	1.12 (0.3)	1 (0)	1.809	0.077
Q 6	Pre op	2.64 (1.4)	3.72 (1.1)	3.019	0.004*
	Post op	1 (0)	1.04 (0.2)	1	0.322
Q 7	Pre op	2.20 (1.1)	2.80 (1.3)	1.782	0.081
	Post op	1.08 (0.3)	1.08 (0.3)	0	1
Q 8	Pre op	1.44 (0.7)	1.92 (1.1)	1.859	0.069
	Post op	1.24 (0.4)	1.48 (0.5)	1.789	0.080
Q 9	Pre op	1.48 (0.7)	1.96 (0.9)	2.105	0.041*
	Post op	1.20 (0.4)	1.28 (0.5)	0.652	0.518
Q 10	Pre op	2 (1.0)	3.52 (1.2)	4.879	<0.001**
	Post op	1.04 (0.2)	1 (0)	1	0.322
Q 11	Pre op	1.96 (1.3)	3.56 (1.1)	4.714	<0.001
	Post op	1.04 (0.2)	1 (0)	1	0.322
Q 12	Pre op	2.52 (0.9)	2.28 (1.1)	0.805	0.425
	Post op	1.04 (0.2)	1.04 (0.2)	0	1
Q 13	Pre op	1.44 (0.8)	1.80 (1.2)	1.221	0.228
	Post op	1.28 (0.5)	1.68 (1.0)	1.719	0.092

[Table/Fig-3]: Intergroup comparison of mean (SD) scores of both the groups. (N=25 in each group), using unpaired t-test. Pre op- Preoperative, Post op- Postoperative. (p<0.05 - Significant*, p<0.001-Highly significant**)

other children and if the parent or another family member was upset due to the child's dental problem or treatment.

DISCUSSION

ECC is the most common dental disease among preschool children. The National Health and Nutrition Examination Survey showed that, between 1999 and 2002, 41% of two to 11-year-old children had primary teeth caries experience [9]. The psychological and social impact of such diseases on their daily life is easily comprehensible which makes them of considerable importance [10].

Severe caries adversely affects the growth of the body, especially weight and height [11]. For a potentially co-operative child, with the help of various behaviour modification techniques, full mouth rehabilitation may be completed under LA. There is a higher possibility of better follow up examinations, since the patient gets accustomed to dental procedures. However, treatment under LA may be ineffective because of acute infection, anatomic variation and may be unmanageable in an extremely uncooperative, fearful, anxious or uncommunicative child [3]. Dental treatment under GA has an exceptional safety record and is an efficient way to provide the required dental treatment to children who may be cognitively immature, highly anxious or fearful and have special care needs [3]. However, it has also been reported that children have a higher incidence (three times) of cardiac arrest under GA when compared to adults and most of the complications are either due to inadequate ventilation or anaesthetic overdose [12]. Therefore, the choice of anaesthesia highly depends upon parent's concern or distress for their child's dental health.

OHRQoL is a concept that describes the impact of oral health status on general health and everyday life. Questionnaires developed to evaluate the same, initially focused on adult and geriatric populations; however, recently, interest has shifted to such assessments in children and adolescents also [13]. Though it has been suggested that children as young as 36 months of age are able to answer questions about their dental health in a valid fashion, it is also believed that for preschoolers, no self-report measure was reliable due to the children's inability to accurately report their dental health [9,14]. However, if the questionnaire is filled by the parents, the results profoundly rely on parent's ability to provide an objective assessment of the child's well being [15]. Nonetheless, considering the developmental stage and corresponding cognitive abilities of preschool-aged children, OHRQoL measurement in children requires a proxy rater [16].

Pahel BT developed the, the ECOHIS that was used in the present study [8]. This questionnaire was derived from the Child Oral Health Quality of Life (COHQoL) instrument, developed by Jokovic A and Locker D [17]. The nature of ECOHIS allows more informative answers, which increases questionnaire's reliability and it has been validated in various languages [18-22].

In the present study, significant improvements were observed in both child and parent sections regardless of whether treatment was performed under GA or LA. This implies that, caries in its severe form has considerable impact on children's daily function. Previous studies conducted on parent's perspective on child's quality of life have reported that pain relief was foremost followed by improvement in sleeping and eating habits post dental treatment under GA [23,24]. It was also observed that the children were more social, smiled more and paid more attention in school [25]. The findings of our study also confirmed that postoperative eating, sleeping, school attendance, talking etc., improved drastically post dental treatment. Also, it is seen that this improvement is consistent regardless of whether treatment was done under GA or LA. Comparative studies with respect to the same were not available in the literature.

When the preoperative responses in the parent and child section were evaluated, it was noted that 8% of parents in LA group and 60% of parents in GA group were often or very often upset due to dental problems or dental treatment of their children. This difference was highly statistically significant (p<0.001). It could therefore be derived that, the more upset the parent is due to their dental problems, they may prefer to get complete mouth rehabilitation under GA. This is in comparison to the study conducted by Cunnion DT et al., [9]. Also, statistically significant difference (p<0.05) was noted with regard to preoperative questions on the child having trouble in sleeping (LA – 24%, GA – 68%), avoided talking to other children (LA 0%, GA – 4%) and having trouble in taking hot or cold beverages (LA 40%, GA – 64%). To the best of our knowledge the present study is the first to explore and evaluate preoperative symptom assessment of children undergoing treatment under GA and LA, thus, further studies are warranted in this regard.

From the results of the present study it can be concluded that improvements in OHRQoL is present regardless of whether treatment is performed under GA or LA. Furthermore, it can possibly be implied that the predominant factors determining the choice of anaesthesia seem to be parental distress towards disturbed sleep in children due to dental pain, trouble in taking hot and cold beverages and child's social behaviour including talking to other children.

LIMITATION

The limitations of the present study are that the postoperative questionnaire was given after one month of dental treatment. It would be preferable to have a complete follow up of the child until the development of permanent dentition to establish consistent improvements in Quality of Life. Also purposive sampling was used in the study which is often not representative of the larger population. Hence, more studies need to be conducted with larger sample sizes and in different cultural background and geographic locations to

determine the preoperative concerns other than behavioural issues which may determine preference of parent towards GA or LA.

CONCLUSION

The following conclusions were drawn from the results of the present study. Improvements in OHRQoL were seen post full mouth rehabilitation in children. Preoperative assessments showed that the parent being upset of child's dental problems, the child having trouble while sleeping, having hot or cold beverages and avoidance of talking to other children possibly determined the type of anaesthesia the parent opted for their children. There was no statistically significant difference postoperatively when treatment was performed under LA or GA.

REFERENCES

[1] American Academy of Paediatric Dentistry. Definition of Early Childhood Caries (ECC) 2003.
[2] Low W, Tan S, Schwartz S. The effect of severe caries on the quality of life in young children. Paediatric Dentistry. 1998;21(6):325-26.
[3] An essential health benefit: General anaesthesia for treatment of early childhood caries. American Academy of Paediatric Dentistry. May 2012.
[4] Berkowitz RJ, Moss M, Billings RJ, Weinstein P. Clinical outcomes for nursing caries treated using general anaesthesia. J Dent Child. 1997;64:210-11.
[5] Almeida AG, Roseman MM, Sheff M, Huntington N, Hughes CV. Future caries susceptibility in children with early childhood caries following treatment under general anaesthesia. Paediatr Dent. 2000;22:302-06.
[6] Council O. Guideline on use of local anaesthesia for paediatric dental patients. 2005;32(6):10-11.
[7] Frankl SN, Shiere FR, Fogels HR. Should the parent remain with the child in the dental operatory. J Dent Child. 1962;29(2):150-62.
[8] Pahel BT, Rozier RG, Slade GD. Parental perceptions of children's oral health: The early childhood oral health impact scale (ECOHIS). Health Quali Life Outcomes. 2007;5:6.
[9] Cunnion DT, Spiro A, Jones JA, Rich SE, Papageorgiou CP, Tate A, et al. Paediatric oral health-related quality of life improvement after treatment of early childhood caries: A prospective multisite study. Journal of Dentistry for Children. 2010;77(1):4-11.
[10] Al Shamrany M. Oral health-related quality of life: A broader perspective. Eastern Mediterranean Health Journal. 2006;12(6):894-901.
[11] Ayhan H, Suskan E, Yildirim S. The effect of nursing or rampant caries on height, body weight and head circumference. J Clin Paediatr Dent. 1997;20:209-12.
[12] Ray M, Saha E. Complications following general anaesthesia in paediatric patients. Indian J Anaesth. 2004;48(5):400-05.
[13] Slade GD, Strauss RP, Atchison KA, Kressin NR, Locker D, Reisine ST. Conference summary: Assessing oral health outcomes-measuring health status and quality of life. Community Dental Health. 1998;15(1):3-7.
[14] Filstrup SL, Briskie D, Da Fonseca M, Lawrence L, Wandera A, Inglehart MR. Early childhood caries and quality of life: Child and parent perspectives. Paediatr Dent. 2003;25(5):431-40.
[15] Jankauskiene B, Narbutaite J. Changes in oral health-related quality of life among children following dental treatment under general anaesthesia. A systematic review. Stomatologija. 2010;12(2):60-64.
[16] Spuijbroek AT, Oostenbrink R, Landgraf JM, Rietveld E, de Goede-Bolder A, Van Beeck EF, et al. Health-related quality of life in preschool children in five health conditions. Quality of Life Research. 2011;20(5):779-86.
[17] Jokovic A, Locker D, Stephens M, Kenny D, Tompson B, Guyatt G. Measuring parental perceptions of child oral health-related quality of life. J Public Health Dent. 2003;63:67–72.
[18] Hashim AN, Yusof ZY, Esa R. The Malay version of the early childhood oral health impact scale (Malay-ECOHIS)-assessing validity and reliability. Health and Quality of Life Outcomes. 2015;13:190.
[19] Li S, Veronneau J, Allison PJ. Validation of a French language version of the early childhood oral health impact scale (ECOHIS). Health Quali Life Outcomes. 2008;6(1):9.
[20] Martins-Júnior PA, Ramos-Jorge J, Paiva SM, Marques LS, Ramos-Jorge ML. Validations of the Brazilian version of the early childhood oral health impact scale (ECOHIS). Cadernos de Saúde Pública. 2012;28(2):367-74.
[21] Jabarifar SE, Golkari A, Ijadi MH, Jafarzadeh M, Khadem P. Validation of a Farsi version of the early childhood oral health impact scale (F-ECOHIS). BMC Oral Health. 2010;10(1):4.
[22] Lee GH, McGrath C, Yiu CK, King NM. Translation and validation of a Chinese language version of the Early Childhood Oral Health Impact Scale (ECOHIS). Int J Paediatr Dent. 2009;19(6):399-405.
[23] Acs G, Pretzer S, Foley M, Ng MW. Perceived outcomes and parental satisfaction following dental rehabilitation under general anaesthesia. Paediatr Dent. 2001;23(5):419-23.
[24] Acs G, Shulman R, Ng MW, Chussid S. The effect of dental rehabilitation on the body weight of children with early childhood caries. Paediatr Dent. 1999;21(2):109–13.
[25] White H, Lee JY, Vann Jr WF. Parental evaluation of quality of life measures following paediatric dental treatment using general anaesthesia. Anaesthesia Progress. 2003;50(3):105.

PARTICULARS OF CONTRIBUTORS:
1. Postgraduate Student, Department of Paediatric and Preventive Dentistry, D Y Patil University School of Dentistry, Nerul, Maharashtra, India.
2. Associate Professor, Department of Paediatric and Preventive Dentistry, D Y Patil University School of Dentistry, Nerul, Maharashtra, India.
3. Professor, Department of Paediatric and Preventive Dentistry, D Y Patil University School of Dentistry, Nerul, Maharashtra, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Jaai Vinod Rane,
25/33 Ketki, Vasant Vihar, Pokhran Road 2, Thane West, Thane-400610, Maharashtra, India.
E-mail: jaai.rane8@gmail.com

FINANCIAL OR OTHER COMPETING INTERESTS: None.

Date of Submission: **Aug 29, 2016**
Date of Peer Review: **Oct 21, 2016**
Date of Acceptance: **Nov 19, 2016**
Date of Publishing: **Jan 01, 2017**