



ASSESSMENT OF LONG-TERM EFFECTS OF ADENOTONSILLECTOMY ON THE QUALITY OF LIFE IN INDIAN PEDIATRIC POPULATION

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ABSTRACT

Background: The surgical procedures to treat recurrent tonsillitis and tonsillar hypertrophy is performed in affected children to allow continued normal physical and mental growth in children along with improvement of their quality of life. **Aims:** The present clinical trial was conducted to compare and assess symptoms presented clinically after tonsillectomy, adenoidectomy, or adenotonsillectomy in pediatric subjects. The study also aimed to assess the impact of these surgical procedures on the quality of life in affected children. **Methods:** In 110 subjects within the age range of 3 years to 15 years, following complete examination of the head and neck region was performed. Questionnaire assessment was done from the parents of the included subjects concerning tonsillitis frequency, doctor visit frequency, sleep frequency, absence from their work/school, feeling of well-being, and sleep apnea at 3 months before and after the surgical procedures. The collected data were subjected to statistical evaluation for results formulation. **Results:** In 110 study subjects, 16.36% (n=18) were treated by adenoidectomy. In 47.27% (n=52) study subjects, tonsillectomy was done, and in 36.36% (n=40) subjects adenoidectomy and tonsillectomy combined were performed (Adenotonsillectomy). Sleep apnea was reduced significantly from 3.01 ± 0.98 to 0.01 ± 0.96 in the study subjects ($p < 0.001$). The frequency of throat pain and absence from school also decreased significantly from 3 months pre-operatively to 3 months postoperatively ($p < 0.001$). Visits to the doctors also decreased from 5.08 ± 2.12 to 0.30 ± 2.14 , with the p-value of < 0.001 . Also, the feeling of well-being was increased significantly. **Conclusion:** Within its limitations, the present study concludes that surgical procedures such as tonsillectomy, adenoidectomy, or adenotonsillectomy performed for treating recurrent tonsillitis or tonsillar hypertrophy improves the quality of life significantly in affected subjects.

KEYWORDS: Adenoidectomy, Pediatric patients, quality of life, recurrent tonsillitis, tonsillectomy

INTRODUCTION

Adenoidectomy, tonsillectomy, and adenotonsillectomy are procedures that are commonly done in children and adolescents as elective surgical procedures. These surgeries are carried out in day-care units and candidates are not admitted to the hospital. Following these procedures, children are treated and discharged on the same day. Only in cases with post-operative complications, the subjects are not discharged on the same day as surgery. The benefits need from these surgeries are

controversial among researchers. These surgeries are beneficial to the candidates requiring these surgeries, however, their indications are still controversial for the researchers.¹

Sleep apnea, mouth breathing, and/or recurrent tonsillitis comprise the common reason for which adenotonsillectomy, tonsillectomy, or adenoidectomy is performed in children. These indications along with palatine tonsillar hypertrophy and recurrent tonsillitis are commonly seen in pediatric subjects.² Hypertrophy of

palatine tonsils/ adenoids in children usually leads to respiratory difficulties, secondary to obstruction of the upper respiratory tract. Adenotonsillar hypertrophy is also one of the most common etiologic factors associated with OSAS (obstructive sleep apnea syndrome) in children. Recurrent tonsillar infections also lead to pain in the throat affecting their quality of life.³

To reduce throat pain and improve the quality of life, tonsillectomy plays a significant role in children with recurrent tonsillar infections and tonsillitis. Chronic tonsillitis has been diagnosed with the criteria of having at least 3 months of persistent palatine tonsils inflammation along with sore throat. The surgical procedures to improve these conditions, including tonsillectomy, adenoidectomy, and/or adenotonsillectomy are performed in children more than 3 years of age.⁴

The surgical procedures to treat recurrent tonsillitis and tonsillar hypertrophy are performed in affected children to allow continued normal physical and mental growth in children along with improvement of their quality of life. However, the indications, advantages, and associated complications of these surgical procedures are well-described in the literature. Appropriate data concerning their effect on the quality of life is still scarce in the Indian population.⁵ Hence, the present clinical trial was conducted to compare and assess symptoms presented clinically after tonsillectomy, adenoidectomy, or adenotonsillectomy in pediatric subjects. The study also aimed to assess the impact of these surgical procedures on the quality of life in affected children.

MATERIALS AND METHODS

The present observational retrospective study was carried out at.....from.....to.....and included the subjects visiting the Outpatient Department, Department of Pediatrics. The study included 110 subjects within the age range of 3 years to 15 years, both males and females with a mean age of 7.4 years. The included patients were referred from the Pediatrics department for the suspected airway obstruction secondary to adenotonsillar hypertrophy.

The study included the subjects of any age less than 17 years, any gender, who underwent adenoidectomy, tonsillectomy, or adenotonsillectomy for adenotonsillar hypertrophy/ recurrent tonsillitis. The inclusion criteria were subjects with recurrent tonsillitis defined as having 3-4 tonsillitis episodes in a year with Grade II, III, and IV tonsils and throat pain along with Obstructive sleep apnea, which was diagnosed if the tonsillar size was +3 or more with apnea. For upper airway obstruction, +3 tonsil size

(filling 50% of oropharynx) with loud snoring history was considered. The adenoid size was scored on a scale of 0-4 based on choanae obstruction where 0 showed no adenoids, 2 non-obstructive adenoids, 3- partially obstruction, and 4 having complete obstruction. Exclusion criteria were subjects who underwent tonsillectomy for causes other than obstructive sleep apnea or upper airway obstruction, bleeding disorders, immunodeficiency, craniofacial anomaly, and/or suspected tonsillar malignancy. Also, subjects were excluded if they had any syndrome, altered psychomotor and neurological development, congenital hearing loss, tonsillar tumors, and recurrent pharyngitis history.

After final inclusion, a complete examination of the head and neck region was performed by a single experienced examiner. The associated comorbidities including obesity, asthma, dysphagia, laryngomalacia, and reactive airway diseases were recorded.

Questionnaire assessment was done from the parents of the included subjects (n=110). The questionnaire comprised questions concerning tonsillitis frequency, doctor visit frequency, sleep frequency, absence from their work/school, feeling of well-being, and sleep apnea. The questionnaires were filled by the study subjects at two time periods, i.e. 3 months prior and after the adenoidectomy, adenotonsillectomy, or tonsillectomy procedure. All the surgical procedures were carried out by a single operator using the technique of coblation.

The collected data were subjected to the statistical evaluation using SPSS software version 21.0, 2012, Armonk, NY, ANOVA, and t-test. The results were formulated keeping the level of significance at $p < 0.05$.

RESULTS

The present observational retrospective study was carried out in 110 subjects within the age range of 3 years to 15 years, both males and females with a mean age of 7.4 years. The demographic study characteristics of the included subjects are described in Table 1. It was seen that there were 55.45% (n=61) males and 45.54% (n=49) females in the present study. There were 7.27% (n=8) children from the low socioeconomic group, 74.45% (n=83) from the middle socioeconomic background, and 17.27% (n=19) from the high socioeconomic background in the present study, where maximum subjects were from the middle socioeconomic background.

On assessing the disease symptoms, mouth breathing, snoring, disordered sleep, apnea, rhinitis, and gasping was seen in 84.54% (n=93), 80.90% (n=89), 58.18% (n=64),

Table 1: Demographic Characteristics of the Study Subjects			
S. No.	Demographic Characteristics	Percentage (%)	Number (n)
1.	Mean age (years)	7.4	
2.	Age Range (years)	3-15	
3.	Gender		
	a) Male 55.45	61	
	b) Female	45.54	49
4.	Socioeconomic status		
	a) Low 7.27	8	
	b) Middle	74.45	83
	c) High 17.27	19	
5.	Tonsillar Grades		
	a) Grade I	0	0
	b) Grade II	47.27	52
	c) Grade III	31.81	35
	d) Grade IV	20.90	23

17.27% (n=19), 40.90% (n=45), and 59.09% (n=65) subjects respectively. Concerning tonsillar hypertrophy, Grade 1, 2, 3 and 4 was seen respectively in 9.09% (n=10), 20% (n=22), 28.18% (n=31), and 24.54% (n=27) subjects, whereas, adenoid hypertrophy of Grade 2, 3, and 4 was found in 5.45% (n=6), 23.63% (n=26), and 22.72% (n=25) study subjects. Grade 0 tonsillar hypertrophy and Grade 0 and 1 adenoid hypertrophy was not seen in any study subject (Table 2).

The three surgeries performed in the study were adenoidectomy, tonsillectomy, and adenotonsillectomy. In total 110 study subjects, 16.36% (n=18) were treated by adenoidectomy. In 47.27% (n=52) study subjects, tonsillectomy was done, and in 36.36% (n=40) subjects adenoidectomy and tonsillectomy combined were performed (Adenotonsillectomy) as shown in Table 3. No postoperative complications were seen in any of the study subjects. However, 3 children needed clearance for pulmonary disease, for which clearance was given.

The present study also assessed the change in the quality of life in study subjects as answered by their parents based on the answers given to the questionnaire provided

(Table 4). The results showed that sleep apnea was reduced significantly from 3.01 ± 0.98 to 0.01 ± 0.96 in the study subjects ($p < 0.001$). The frequency of throat pain and absence from school also decreased significantly from 3 months pre-operatively to 3 months postoperatively ($p < 0.001$). Visits to the doctors also decreased from 5.08 ± 2.12 to 0.30 ± 2.14 , with the p-value of < 0.001 . Also, the feeling of well-being was increased significantly showing the improved quality of life after tonsillectomy, adenoidectomy, and adenotonsillectomy as shown in Table 4.

DISCUSSION

The present observational retrospective study was carried out in 110 subjects to compare and assess symptoms presented clinically after tonsillectomy, adenoidectomy, or adenotonsillectomy in pediatric subjects. The study also aimed to assess the impact of these surgical procedures on the quality of life in affected children. The study subjects were within the age range of 3 years to 15 years, both males and females with a mean age of 7.4 years. The demographic study characteristics of the included subjects were 55.45% (n=61) males and 45.54% (n=49)

S. No.	Disease Characteristics	Percentage (%)	Number (n)
1.	Presenting Symptoms		
	a) Mouth Breathing	84.54	93
	b) Snoring	80.90	89
	c) Disordered Sleep	58.18	64
	d) Apnea	17.27	19
	e) Rhinitis	40.90	45
	f) Gasping	59.09	65
2.	Tonsillar Hypertrophy		
	a) 0	0	0
	b) 1	9.09	10
	c) 2	20	22
	d) 3	28.18	31
	e) 4	24.54	27
3.	Adenoid Hypertrophy		
	a) 0	0	0
	b) 1	0	0
	c) 2	5.45	6
	d) 3	23.63	26
	e) 4	22.72	25

S. No	Surgical Procedure Performed	Percentage (%)	Number (n)
1.	Adenoidectomy	16.36	18
2.	Tonsillectomy	47.27	52
3.	Adenotonsillectomy (Adenoidectomy+ Tonsillectomy)	36.36	40

females in the present study. There were 7.27% (n=8) children from the low socioeconomic group, 74.45% (n=83) from the middle socioeconomic background, and 17.27% (n=19) from the high socioeconomic background in the present study, where maximum subjects were from the

middle socioeconomic background. These characteristics were in agreement with the studies by Bellussi LM et al⁶ in 2011 and Alho AP et al⁷ in 2007 where comparable characteristics of the subjects were considered by the authors.

Table 4: Change in Quality of Life in the Study Subjects After Surgical Procedures

S. No	Parameter	3 Months Pre-surgery	3 Months Post-surgery	p-value
1.	Sleep Apnea	3.01±0.98	0.01±0.96	< 0.001
2.	Throat Pain Frequency	7.43±1.24	1.33±1.26	< 0.001
3.	Feeling of well-being	0.49±0.28	8.06±3.14	< 0.001
4.	Absence from school	8.48±1.42	0.56±1.44	< 0.001
5.	Visit to Doctors	5.08±2.12	0.30±2.14	< 0.001

On assessing the disease symptoms, mouth breathing, snoring, disordered sleep, apnea, rhinitis, and gasping was seen in 84.54% (n=93), 80.90% (n=89), 58.18% (n=64), 17.27% (n=19), 40.90% (n=45), and 59.09% (n=65) subjects respectively. Concerning tonsillar hypertrophy, Grade 1, 2, 3 and 4 was seen respectively in 9.09% (n=10), 20% (n=22), 28.18% (n=31), and 24.54% (n=27) subjects, whereas, adenoid hypertrophy of Grade 2, 3, and 4 was found in 5.45% (n=6), 23.63% (n=26), and 22.72% (n=25) study subjects. Grade 0 tonsillar hypertrophy and Grade 0 and 1 adenoid hypertrophy was not seen in any study subject. Erosy B et al⁸ in 2005 also reported these symptoms as common presentations of recurrent tonsillitis and adenoid hypertrophy.

The three surgeries performed in the study were adenoidectomy, tonsillectomy, and adenotonsillectomy. In total 110 study subjects, 16.36% (n=18) were treated by adenoidectomy. In 47.27% (n=52) study subjects, tonsillectomy was done, and in 36.36% (n=40) subjects adenoidectomy and tonsillectomy combined were performed (Adenotonsillectomy). No postoperative complications were seen in any of the study subjects. However, 3 children needed clearance for pulmonary disease, for which clearance was given. These results were similar to the studies by Di Francesco RC et al⁹ in 2004 and Ikeda FH et al¹⁰ in 2012 where comparable results, with no postoperative complications, were reported by the authors.

The present study also assessed the change in the quality of life in study subjects as answered by their parents based on the answers given to the questionnaire provided. The results showed that sleep apnea was reduced significantly from 3.01±0.98 to 0.01±0.96 in the study subjects (p < 0.001). The frequency of throat pain and absence from school also decreased significantly from 3 months pre-operatively to 3 months postoperatively (p < 0.001). Visits to the doctors also decreased from 5.08±2.12 to 0.30±2.14, with the p-value of < 0.001. Also, the feeling of well-being was

increased significantly showing the improved quality of life after tonsillectomy, adenoidectomy, and adenotonsillectomy. These results were in agreement with the studies by Sans Capdevila O et al¹¹ in 2008 and Aydogan M et al¹² in 2007 where authors reported significant improvement in quality of life in subjects with recurrent tonsillitis and tonsillar hypertrophy after tonsillectomy procedures.

CONCLUSION

Within its limitations, the present study concludes that surgical procedures such as tonsillectomy, adenoidectomy, or adenotonsillectomy performed for treating recurrent tonsillitis or tonsillar hypertrophy improves the quality of life significantly in affected subjects. Fewer doctor visits, sleep apnea, absence from school, feeling of well-being, and throat pain frequency was significantly decreased in study subjects. Hence, early interventions in children with clear indications should be employed to improve physical, mental, and social improvement. However, the study had few limitations including a smaller sample size, short monitoring period, geographical area biases, and observational study nature. Hence, further longitudinal trials with a longer monitoring period and larger sample sizes are needed to reach a definitive conclusion.

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