

**Assessment of Symptomatic Improvement Following Adenotonsillectomy in Children with Adenotonsillar Hypertrophy**

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Abstract

Background: Adenotonsillar hypertrophy commonly causes upper airway obstruction and recurrent ENT symptoms in children, adversely affecting health-related quality of life. Adenotonsillectomy is frequently performed for symptomatic disease. Evaluating postoperative symptomatic improvement and quality-of-

life benefits helps determine its overall clinical effectiveness in affected children.

Objectives: To assess the effect of Adenotonsillectomy on sleep apnoea, recurrent tonsillitis, nasal obstruction, rhinitis, and chronic ear symptoms.

Methodology: A prospective observational-analytical study included 100 children aged 5–15 years undergoing Adenotonsillectomy at a tertiary care hospital from

October 2020 to September 2022. Parents completed modified Glasgow Children's Benefit Inventory-based questionnaires before surgery and after one year. Preoperative and postoperative symptoms and quality-of-life scores were compared using appropriate statistical tests.

Results: Among 100 children, 63% were aged 6–10 years and 62% were male. The mean quality-of-life questionnaire score improved significantly from -10.31 ± 11.30 preoperatively to 43.33 ± 8.77 postoperatively ($t=42.003$, $p<0.001$). Sleep apnoea improved significantly, with 53% reporting much better and 29% little better symptoms postoperatively ($p=0.0001$).

Recurrent tonsillitis also improved significantly, with 40% reporting much better and 50% little better outcomes ($p=0.0001$). Nasal blockage and rhinitis showed significant improvement, with 52% reporting much better and 38% little better outcomes ($p=0.0001$). Ear discharge improved significantly, with 8% reporting much better and 11% little better symptoms postoperatively ($p=0.0001$). Overall, substantial symptomatic and quality-of-life improvement was observed.

Conclusion: Adenotonsillectomy significantly improves health-related quality of life and reduces major symptoms associated with Adenotonsillar hypertrophy, including sleep apnoea, recurrent tonsillitis, nasal obstruction, rhinitis, and ear discharge. The procedure provides substantial clinical benefit during one-year postoperative follow-up in appropriately selected children.

Keywords: Adenotonsillar hypertrophy, Adenotonsillectomy, Quality of life, Sleep apnoea, Children

Introduction

The most frequent cause of persistent airway blockage in children is adenoid hypertrophy. The condition known as lymphoid hyperplasia, which can result in a partial or total obstruction of the naso pharynx, is brought on by persistent infection and all ergies¹. Oral respiration, snoring, and, in certain circumstances, obstructive sleep apnoea (OSA) are clinical signs of adenoid hypertrophy. Additionally, hypertrophy adenoids may block the Eustachian tube, which could cause recurrent otitis media or upper airway obstruction in youngsters².

Children's quality of life can be characterized as a decline in the frequency of recurring infections, an increase in academic achievement due to a decline in absenteeism, a reduction in snoring, and a reduction in mouth breathing. One of the most often performed surgeries on children to treat the symptoms of upper airway blockage is adenotonsillectomy³.

Pharyngitis is flare-ups frequently, persistent Otitis media with effusion, Obstructive sleep apnoea syndrome (OSAS), recurrent acute streptococcal pharyngotonsillitis, hearing loss, and, in rare cases, periodic fever with aphthous stomatitis, pharyngitis, and adenopathy are the prominent symptoms caused due to Adenotonsillar hypertrophy⁴. The quality of life (QoL) of patients and their families is significantly impacted by all of these disorders. The purpose of this review is to evaluate the effect of Adenotonsillectomy on the Quality of Life of paediatric patients, particularly in reducing the frequency of pharyngeal pain episodes and curing respiratory issues caused by OSAS⁵.

Objectives

To study the effect of Adenotonsillectomy surgery on Obstructive Sleep Apnea, Recurrent attacks of acute

tonsillitis, Nasal Obstruction, rhinitis and Chronic Otitis media in patient with Adenotonsillar hypertrophy.

Material and methods

This prospective observational-analytical study was conducted on children coming to our tertiary care hospital in Miraj, who underwent Adenotonsillectomy surgery in our institute from 1st October 2020 to 30th September 2022 for 1 or more of the complaints of Snoring or Ear discharge or Decreased hearing or Nasal discharge, nasal blockage or Recurrent tonsillitis.

A total of 100 paediatric patients whose parents gave valid informed consent and who filled the questionnaire for evaluation of parameters pre and post operatively and who followed up regularly for 1 year. Patients with Immunodeficiency, Craniofacial anomaly, suspected malignancy, Coagulopathies and children in whom adenoid hypertrophy was not seen on X-ray, were excluded.

A child 5 to 15 years of age complaining of snoring, ear discharge, decreased hearing, nasal discharge, recurrent cough and cold coming to our hospital were included in our study. Complete ENT Examination was carried out and X-ray naso pharynx lateral view was done and adenoid hypertrophy was confirmed.

On the basis of history, clinical examination and radiological examination Adenotonsillar hypertrophy in patients was confirmed and then they were considered for our study. A Questionnaire A was given to parents of these patients before operation. Questionnaire A was prepared by modifying the Glasgow children benefit inventory (GCBi) for preoperative evaluation according to the preoperative parameters available inpatient. The modification was mainly done so that we could compare the preoperative and postoperative study parameters.

Questionnaire A – Preoperative Assessment

Questionnaire A was administered to the parents before Adenotonsillectomy to assess the child's baseline health-related quality of life. It was prepared by modifying the Glasgow Children's Benefit Inventory according to the study's preoperative parameters. The questionnaire contained 24 items covering overall life, behaviour, sleep and snoring, growth and development, social interaction, learning, school absenteeism, concentration, nasal obstruction-related frustration, recurrent infections, doctor visits, medication requirements, daily activities, energy, appetite, self - consciousness, family relationships, embarrassment, distractibility, happiness, confidence, self-care and leisure activities.

Questionnaire B – Postoperative Assessment

Questionnaire B was administered to the parents one year after Adenotonsillectomy to evaluate the perceived benefit of surgery and changes in the child's quality of life. It was based on the Glasgow Children's Benefit Inventory and retained the same 24 domains as Questionnaire A, enabling comparison between preoperative and postoperative status. Questions specifically assessed changes in sleep/snoring, behaviour, growth, social activities, learning and school attendance, concentration, nasal obstruction, recurrent tonsillitis, ear-related symptoms, doctor visits, medication use, daily activities, energy, appetite, confidence, emotional well-being, family interaction, self-care and leisure activities. Responses ranged from "much better" to "much worse," with "no change" as the neutral category.

After performing Adenotonsillectomy in these patients, they were called up for followup after 1 week, 4 weeks, 12 weeks, 6 months up to 1 year. After one- year

Questionnaire B was given to parents of the patient to be filled.

Scoring

Score of questionnaires was calculated and improvement in quality of life was evaluated at end of 1 year. A gist of 24 questions was summed up according to the satisfaction of parent after Adenotonsillectomy surgery of their child under 6 headings which includes effect of Adenotonsillectomy surgery on Sleep Apnoea, Recurrent attacks of tonsillitis, Nasal blockage, rhinitis, Ear discharge, Growth of child and School performance. Whether the complaints were relieved or not were observed. Individual responses were assigned values from -2 to $+2$; the total was divided by 24 and multiplied by 50, producing a score from -100 (maximum harm) to $+100$ (maximum benefit).

Surgical technique

All procedures were performed under general anaesthesia with end tracheal intubation. Adenoids were removed with an adenoid curette; gauze tampons were used to achieve haemostasis. Tonsillectomy was performed using a cold knife dissection technique, gauze

tampons, and electro cautery to achieve haemostasis. All patients were discharged on next day after surgery and received 5 days of oral paracetamol and amoxicillin, or an equivalent antibiotic, postoperatively. Routine follow up was performed 1 week after surgery.

Statistical analysis and methods

Data was collected by using a structure proforma. Data thus was entered in MS excel sheet and analysed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of percentages and proportions. Quantitative data was expressed in terms of Mean and Standard deviation. Association between two qualitative variables was seen by using Chi square test. Comparison of mean and SD between two groups will be done by using paired test to assess whether the mean difference between groups is significant or not. Descriptive statistics of each variable was presented in terms of Mean, standard deviation, standard error of mean. A p value of <0.05 was considered as statistically significant whereas a p value <0.001 was considered as highly significant.

Observations and results

Table 1: Age and Sex distribution of the Children

Age and Sex distribution		No of cases	Percentage (%)
Age(in years)	6–10	63	63
	11–15	37	37
Gender	Male	62	62
	Female	38	38
Total		100	100

Among the participants, 63 (63%) were aged 6–10 years, while 37 (37%) were aged 11–15 years, indicating that children in the younger age group constituted the majority of the study population. 62 (62%) patients were male and 38 (38%) were female, demonstrating a male

predominance. Overall, the study population consisted of 100 children, with a greater proportion of patients belonging to the 6–10-year age group and a higher representation of male children. This distribution indicates that Adenotonsillar hypertrophy requiring

surgery was more frequently observed among younger

and male children in the study population.

Table 2: Score of questionnaires A and B

Questionnaire	Mean	Std. Deviation	T Value	P Value	Inference
Pre op(A)	-10.31	11.30	42.003	<0.001	Highly significant
Post op(B)	43.33	8.77			

A summary of score of questionnaires A and B was calculated by assigning the individual question responses a numerical value from -2 to +2, then adding this up,

dividing by the no. of questions (24), and multiplying by 50 to produce a result on a scale from -100 (max. harm) to +100 (max benefit).

Table 3: Effect of Adenotonsillectomy my surgery on sleep apnoea

Sleep apnoea	Pre op		Postop		Total	P value
Much better	0	0%	53	53%	50	0.0001, Highly Significant
Little better	0	0%	29	29%	26	
No complaint/change	15	15%	15	15%	30	
Little worse	48	48%	3	3%	57	
Much worse	37	37%	0	0%	37	
Total	100	100%	100	100%	200	

It has been observed that preoperatively complaint of sleep apnoea was much worse in 37 % patient and little worse in 48 % patient. After Adenotonsillectomy surgery complaint of sleep apnoea was relieved and 53% patients felt much better (no complaint) and 29% patients felt little better (some complaint but not like before). In our study 15% patient had no complaint

preoperatively and there were 15% in whom there was no change in complaints postoperatively.

There is statistically significant difference in the no. of patients showing the responses at preoperative and postoperative stage. This shows that after Adenotonsillectomy surgery complaints of sleep apnoea are reduced and quality of life of child is improved.

Table 4: Effect of Adenotonsillectomy surgery on recurrent attacks of Tonsillitis

Pre-operative and post-operative analysis of complaint of recurrent attacks of Tonsillitis in Adenotonsillar Hypertrophy patient

Recurrent attacks of tonsillitis	Pre op		Post op		Total	P value
Much better	0	0.0%	40	40.0%	40	0.0001, Highly Significant
Little better	0	0.0%	50	50.0%	50	
No complaint/change	7	7.0%	7	7.0%	14	
Little worse	44	44.0%	3	3.0%	47	
Much worse	49	49.0%	0	0.0%	49	
Total	100	100.0%	100	100.0%	200	

It has been observed that preoperatively complaint of recurrent tonsillitis was much worse in 49% patient and

little worse in 44% patient. After Adenotonsillectomy surgery complaint of recurrent tonsillitis was relieved

and 40% patients felt much better (no complaint) and 50% patients felt little better (some complaint but not like before). In our study 7% patient had no complaint preoperatively and there were 7 % in whom there was no change in complaints postoperatively. There is

statistically significant difference in the no. of patients showing the responses at preoperative and postoperative stage. After Adenotonsillectomy surgery complaints of recurrent tonsillitis is reduced and quality of life of child is improved.

Table 5: Effect of Adenotonsillectomy surgery on nasal blockage, rhinitis

Nasal blockage, rhinitis	Pre op		Postop		Total	P value
Much better	0	0.0	52	52.0	52	0.0001, Highly Significant
Little better	0	0.0	38	38.0	38	
No complaint / change	8	8.0	8	8.0	16	
Little worse	52	52.0	2	2.0	54	
Much worse	40	40.0	0	0.0	40	
Total	100	100.0	100	100.0	200	

It has been observed that preoperatively complaint of nasal blockage, rhinitis was much worse in 40 % patient and little worse in 52 % patient. After Adenotonsillectomy surgery complaint of nasal blockage, rhinitis was relieved and 52% patients felt much better (no complaint) and 38% patients felt little better (some complaint but not like before). In our study 8% patient had no complaint preoperatively and there

were 8% in whom there was no change in complaints postoperatively. There is statistically significant difference in the no. of patients showing the responses at preoperative and postoperative stage. After Adenotonsillectomy surgery complaints of nasal blockage, rhinitis is reduced and quality of life of child is improved.

Table 6: Effect of Adenotonsillectomy surgery on ear discharge

Ear blockage Ear discharge	Pre op		Post op		Total	P
Much better	0	0.0%	8	8.0%	8	0.0001, highly significant
Little better	0	0.0%	11	11.0	11	
No complaint/ change	78	78.0%	78	78.0%	156	
Little worse	9	9.0%	3	3.0%	12	
Much worse	13	13.0%	0	0.0%	13	
Total	100	100.0%	100	100.0%	200	

It has been observed that preoperatively complaint of ear discharge was much worse in 13% patient and little worse in 9% patient. After Adenotonsillectomy surgery complaint of ear discharge was relieved and 8% patients felt much better (no complaint) and 11% patients felt little better (some complaint but not like before). In

our study 78% patient had no complaint preoperatively. There is statistically significant difference in the no. of patients showing the responses at preoperative and postoperative stage.

This shows that after Adenotonsillectomy surgery complaints of ear discharge is reduced and quality of life of child is improved.

Discussion

In the present study most of the cases were observed aged from 6 to 10 years of age. 63 % cases were aged from 6 to 10 years of age, 37 % cases aged from 11 to 15 years of age. Mean Age in our study is 9.5. In study conducted by Swain SK et al (2020)⁶ they observed, mean age of patients was 6.8. In study conducted by Putra AE et al (2016)⁷ they observed, mean age of patients was 8.5.

In the present study 62 % were male cases and 38 % were female cases. In study conducted by Swain SK et al. (2020)⁶ they observed, 55.45% were male child and 44.55% were female child. In study conducted by Putra A E et al. (2016)⁷ they observed 62.5% were male child and 37.5% were female child. In the present study after Adenotonsillectomy surgery 43 was mean Score of Questionnaire B (prepared on the basis of GCBI).

In the present study after Adenotonsillectomy surgery complaints of sleep apnoea reduced significantly. Out of 100 patients in our study, 48 % had little worse complaint of snoring (fairly bad problem) while 37% patients had much worse complaint of snoring (very bad) preoperatively.

During postoperative follow-up 53% parents responded that complaint of snoring was reduced and they felt little better while 29% patients responded that they had no complaint post operatively and felt much better.

In Silu Metal.⁸ study of 50 patients, when parents were asked regarding snoring preoperatively 34% parents responded that their children had fairly bad problem 68 % patients responded that they had severe problem. During postoperative follow up at the end of six month

42% parents responded that children had very mild problem, while 58% said they had no problem at all. In study conducted by Swain SK et al.⁶ (2020) Airway obstruction with sleep apnea was improved after surgery with good quality of sleep.

In the present study after Adenotonsillectomy surgery complaints of recurrent tonsillitis reduced significantly. Out of 100 patients in our study, 40 patients felt much better (no sore throat) after surgery, 50 patients felt little better (some sore throat but not as before) and 3 patients felt little worse (similar episodes of sore throat as before). In Kubba et al.⁹ out of 452 patients 173 patients felt much better (no sore throat) after surgery, 231 patients felt little better (some sore throat but not as before) and 13 patients felt little worse (similar episodes of sore throat as before).

In the present study, out of 100 patients 52 patients had little worse and 40 patients had much worse complaint of nasal blockage of which post operatively complaints were relieved and 52 % patients felt much better and 38% patients felt little better after Adenotonsillectomy surgery. In Mourad et al.¹⁰ study there is improvement in quality of life of child suffering from chronic rhinitis following surgery.

In the present study, out of 100 patients 78 patients had no complaint of ear. Out of remaining 22 patients, 9 patients had little worse and 13 patients had much worse complaints of ear discharge of which postoperatively complaints were relieved and 8 patients felt much better while 11 patients felt little better. In Silu M et al.⁸ out of 218 patients with complaints of ear discharge, blockage 162 showed much improvement and 30 patients showed no improvement.

Limitations

Patient follow up was less, so patients who did regular follow up for 1 year were included in the study. We had to call patient and request them to do the follow up. In our study we could do only subjective assessment considering the age of patient it was not possible for us to do tests like Rhino manometry, diagnostic nasal endoscopy on OPD basis, MRI etc since they were un co-operative to do objective assessment. Certain patients did not show improvement in symptoms like recurrent URTI, nasal blockage, rhino rhea, that may be due to allergies, COVID pandemic and socio-economic factors.

Conclusion

Adenotonsillectomy significantly improves the health-related quality of life and clinical symptoms in children with Adenotonsillar hypertrophy. Significant postoperative improvement occurs in sleep apnoea, recurrent attacks of tonsillitis, nasal blockage and rhinitis, and ear discharge. The mean quality-of-life score improves markedly from – 10.31 preoperatively to 43.33 postoperatively ($p < 0.001$).

Thus, Adenotonsillectomy effectively reduces symptom burden and provides substantial overall benefit in affected children during one-year follow - up. Adenotonsillectomy should be considered appropriately for symptomatic children with Adenotonsillar hypertrophy, with structured postoperative follow-up and objective assessment where feasible.

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