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ORIGINAL ARTICLE

Quality of life in children with sleep-disordered breathing: evaluation by OSA-18

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Summary

Sleep-disordered breathing (SDB) is prevalent. There is evidence of their effect on quality of life. **Aim:** To assess the quality of life in children with SDB before and after adenoidectomy or adenotonsillectomy. **Methods:** A prospective 'before and after' interventional study, with a component for assessment. A consecutive sample of children referred to adenoidectomy or adenotonsillectomy was recruited from the otolaryngology clinic; guardians answered a specific survey for the evaluation of quality of life in children with SDB, the OSA-18, before and at least 30 days after surgery. Nasofibroscopic and otolaryngological exams and a semi-structured survey on the child's social and clinical profile were done on both appointments. **Results:** 48 children with a mean age of 5.93 years (SD=2.43) were evaluated. The mean number of schooling years for guardians was 8.29 years (SD=3.14). The most frequent symptoms were: agitated sleep, apnea and snoring. The total mean score of the initial OSA-18 was 82.83 (major impact); following surgery, the total mean score was 34.15. The differences in the total scores and in the domains between the initial OSA-18 and post-surgery scores were all significant ($p<0.00$). **Conclusion:** SDB has a relevant impact on quality of life, and patients show dramatic improvements after surgical treatment.

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INTRODUCTION

Sleep-disordered breathing (SDB) refers to a spectrum of sleep-related breathing disorders sufficiently intense to cause clinical symptoms. This includes children with obstructive sleep apnea/hypopnea syndrome (OSAHS) or with upper airway resistance syndrome, in which the apnea index is frequently normal in standard polysomnography tests.[1-2] The estimated occurrence of obstructive sleep apnea is 1-3% in preschool age children.[3] The incidence of upper airway resistance syndrome is unknown, but appears to be even more prevalent than apnea.[4]

Pharyngeal and palatine tonsillar hyperplasia is a frequent cause of nasal obstruction and chronic mouth breathing in childhood and the main cause of sleep-disordered breathing.[1-13] Various clinical alterations may ensue, ranging from apnea with or without cardiopulmonary repercussions, to changes in craniofacial development, postural changes, atypical swallowing and unhealthy eating habits, among others.[6]

Other than these widely studied and documented clinical findings, most SDB children are affected by the disease and/or the treatment, with serious repercussions on their quality of life. Zeitlhofer states that the quality of life (QOL) concept is an unique and personal perception of the state of health and/or non-medical aspects of life, which may be measured by asking the opinions of individuals (patients) through specific tools.[14] Scientific studies have only recently began studies on this theme.[8-10] A review of literature found a single published study in Brazilian scientific literature,[11] which demonstrates the lack of research on sleep-disordered breathing in Brazil.

Tools to measure QOL may be general or specific.[15] The former are descriptive instruments used to compare different populations and diseases, at the risk of being less sensitive to clinical aspects.[15] The latter are based on the special features of a specific disease, aimed mostly at assessing physical aspects and the effect of treatment over time.[15] These (specific) tools are more discriminative and predictive, being particularly useful in clinical trials.[16]

Most of the available QOL tools are in English language, which means that their use in other languages requires not only validated translation but also awareness that they are specific to a social context. The researcher should then be sure that the domains under investigation are appropriate to the population in which the QOL tool is applied.[15]

QOL and health state measures assessed from the perspective of the patient may be difficult or impossible in children, due to vocabulary differences and the varying sophistication of language in different age groups. The solution, then, is to use the answers provided by parents or caretakers to questionnaires, and then establish parallels with answers given by the children.[8-9] Although debatable, this approximation method for answers is both necessary and desirable for a pediatric population, as children have different vocabulary levels which they use to answer assessment tool questions; added to this is the fact that in practice, adults will be the ones to apply medical decisions.[17]

This study aims to assess the quality of life of sleep-disordered breathing children prior to and following adenoidectomy or adenotonsillectomy.

METHOD

The trial was a prospective interventional non-controlled before and after study using an evaluation component (QOL assessment). The study was conducted at the Walter Cantidio University Hospital otorhinolaryngology outpatient clinic in the Medical School of the Ceara Federal University, a reference hospital in the Brazilian public Unified Health System (Sistema Unico de Saude - SUS), located in the city of Fortaleza, Ceara state (Brazil). The study was approved by the hospital research ethics committee, protocol # 0105/04.

A consecutive sample of children in which adenoidectomy or adenotonsillectomy had been indicated was recruited at the aforementioned otorhinolaryngology outpatient clinic. After signing a free consent form, a validated QOL assessment questionnaire specific for children with SDB (OSA-18 survey) was applied prior to surgery (base or preoperative assessment) and between 30 and 90 days postoperatively (postoperative assessment). A questionnaire of symptoms was also applied, and children underwent a standard physical examination. The OSA-18 survey is a health-geared QOL assessment tool and focuses on physical problems, functional limitations and emotional distress resulting from disease. It is a valid and reliable QOL measurement tool with sufficient discrimination for children with sleep-disordered breathing. In previous trials, the OSA-18 survey has demonstrated test-retest reliability and internal consistency. The questionnaire includes 18 items grouped in 5 domains, where items are scored in an ordinal 7-point classification (1- none of the time, 2- hardly any of the time, 3- a little of the time, 4- some of the time, 5- a good bit of the time, 6- most of the time, 7- all of the time). OSA-18 domains yield the following scores:

a) sleep disturbances (4 items with scores between 4 and 28)

b) physical suffering (4 items with scores between 4 and 28)

c) emotional distress (3 items with scores between 3 and 21)

d) daytime problems (3 items with scores between 3 and 21)

e) parent or caretaker concern (4 items with scores between 4 and 28). The total OSA-18 score may therefore be between 18 and 126.

Total OSA-18 survey scores were classified into three groups according to the impact on the QOL of children: minor (scores below 60), moderate (scores between 60 and 80) and major (scores above 80); we followed Franco et al's[18] prior validation. The OSA-18 survey also provides a global rate of obstructive sleep disorder related to the QOL through a 10-point analog visual scale with specific semantic anchors (smiles faces). Its translation into Portuguese for this study was done using the back-translation technique in which, following a first translation from English into Portuguese by fluent and knowledgeable (of specific terms) professionals, a second translation is done back to English by similarly trained professionals, to check whether specific terms conform exactly to those used in the original document.

Children aged below 12 years, with sleep-disordered breathing and an indication for adenoidectomy and/or adenotonsillectomy, all in treatment at the Otorhinolaryngology outpatient clinic, were included. Exclusion criteria were: children residing far from the outpatient clinic, children in situations where outpatient follow-up would have been impossible, immunocompromised children (severely malnourished, with primary immune deficiency and AIDS), children with craniofacial malformation causing or worsening the clinical picture of mouth breathing, children whose parents refused to participate in the study, children with a history of previous surgery or that had undergone inferior turbinate cauterization.

Data was analyzed with Epi-info and Stats Direct software. The statistical significance level was $p<0.05$ (bicaudal). A global score was calculated by summing the points in each domain (values between 18 and 126) to define the impact of SDB on QOL at the preoperative visit and postoperative consultation. The impact on QOL was classified in three groups: a) minor (scores below 60); b) moderate (scores between 60 and 80) and major (scores above 80). Partial scores were also calculated for each domain by summing the items within each domain. The OSA-18 difference score was obtained from the difference between the preoperative and postoperative score means. The standard response mean (SRM) is defined as the score of the difference between the means divided by the standard deviation of the difference score, and is classified into three groups according to value: a) value of 0.2 (minor effect), b) value of 0.5 (moderate effect), and c) value equal to or higher than 0.8 (major effect). Peason's correlation was used for statistical analysis. The paired t-test was used to compare score means and to establish the significance of score changes (before and after surgery). Non-parametric tests were used in cases where parametric tests were inadequate.

RESULTS

Fifty-four children were included in the study. Three were not operated due to upper airway infection on the day of surgery, and three children did not return to the follow-up visit. The study population, therefore, was composed of 48 children, of which 58.30% (n=28) were male. The mean age at inclusion into the study was 5.93 years (SD=2.43). The OSA-18 survey was answered by the main caretaker (the mother in over 80% of cases). 62.50% of the children slept in the same bedroom as the main caretaker. 23 of the caretakers (68.70%) had incomplete or complete junior or middle school education, and only 2 (4.2%) were illiterate. The mean duration of caretaker school education was 8.29 years (SD=3.14). The mean duration of the complaint of respiratory disturbance was 4.62 years (SD= 2.49).

Clinical Assessment prior to surgery (Base Assessment)

Patients presented nasal obstruction symptoms such as sialosis, restless sleep, apnea, snoring, repeat upper airway infection, repeat otitis, rhinorrhea and frequent sneezing during the preoperative assessment, as shown on Table 1.

A history of disease included: pneumonia in 6 children (12.6%), repeat tonsillitis in 5 children (10.5%), asthma in 2 children (4.2%), prolonged stay in an incubator in 1 child (2.1%), streptococcal glomerulonephritis in 1 child (2.1%), and early puberty in 1 child (2.1%).

Otoscopy was normal in 33 patients (68.8%), revealed tympanic membrane opacification in 12 children (25.0%) and impacted cerumen in 3 children (6.2%) - which was removed prior to surgery for adequate otoscopy. Patients were distributed according to the degree of oropharyngeal obstruction by the palatine tonsils (Brodsky): grade I in 6 children (12.5%), grade II in 5 children (10.4%), grade III in 22 children (45.8%), and grade IV in 5 children (31.3%). The classification of the degree of choanal obstruction by the pharyngeal tonsil (adenoid) seen during nasofibroscopy was: mild (up to 40% obstruction) in 3 children (6.3%), moderate (between 40 and 70%) in 9 children (18.8%), and severe (over 70%) in 36 children (74.9%). The mean choanal obstruction was 73.65% (SD=14.86).

Nasofibroscopy showed nine patients (18.8%) with secretion of mucous or pus in the middle meatus, suggesting rhinosinusitis. Thirty-seven patients (77.1%) presented combined palatine tonsil and adenoid hyperplasia.

Forty-five patients underwent laryngoscopy as well as nasofibroscopy, of which 23 (51.1%) had a normal exam, 19 (33.1%) presented signs of esophagopharyngolaryngeal reflux, 7 (14.4%) had vocal fold nodules, and 1 (2.2%) had signs of acute laryngitis.

The body mass index (BMI) varied from 12.00 to 22.60, with a mean value of 16.15 (SD=2.5) during the preoperative assessment, and 11.70 to 22.10 with a mean value of 16.46 (SD=2.48) during the second visit, which was

Table 1. Frequency of symptoms found in children with sleep-disordered breathing in the preoperative assessment

Symptoms	Frequency n (%)
Nasal obstruction	42 (87,5)
Sialosis	37 (77,1)
Restless sleep	48 (100,0)
Apnea	48 (100,0)
Snoring	47 (97,9)
Repeat upper airway infection	22 (45,8)
Repeat otitis	1 (2,10)
Frequent rhinorrhea	34 (70,8)
Frequent sneezing	28 (58,3)
Frequent sneezing due to dust	26 (54,2)
Frequent sneezing due to changes in weather	23 (47,9)
Frequent sneezing due to other causes	5 (11,40)

not statistically significant (Fisher test = 0.31, p= 0.5419).

Table 2 shows the total OSA-18 item and domain mean scores and the QOL score in the global QOL visual scale on the preoperative assessment. The preoperative OSA-18 survey demonstrated minor impact on the QOL in 1 child (2.1%), moderate impact in 24 children (50%), and major impact in 23 children (47.9%).

Since the mean duration of the complaint of SDB was approximately 5 years, this time period was used as the cutoff point to evaluate the duration of the complaint of respiratory disturbance and the impact on QOL. Only one child had a mild impact, which was discarded in the statistical analysis. There was no correlation between duration of the complaint equal to or over 5 years and the impact on QOL, according to OSA-18 survey criteria (Table 3).

The correlation between the caretaker education level of 8 years or less (average number of study years of the caretaker and also the number of years required to complete basic schooling) and the degree of impact of sleep disturbance on QOL was not significant in the preoperative assessment (Table 3). Given that only one child presented mild impact, this datum was discarded in the statistical analysis. Even when the cutoff point was taken as 4 years or less (required time for completion of junior school) there was no statistical significance (p= 0.448).

There was no significant difference in preoperative QOL scores in patients with findings suggesting esophagopharyngolaryngeal reflux compared to the impact detected on the preoperative assessment (Table 3).

Postoperative assessment

The mean time between surgery and the follow-up visit was 38.17 days (SD= 10.65).

Nasofibroscopy was done in every child at this time. Only one child had persistent lymphoid tissue in the cavum (adenoid) that obstructed 60% of the choanae (moderate hyperplasia). All other children had postoperative remains of the adenoid obstructing 30% or less of the choanae.

A correlation of the medical assessment after surgery with the impact on QOL according to the postoperative OSA-18 survey revealed that 47 (97.9%) of children were classified as having mild or low impact.

Table 2 shows the mean preoperative and postoperative scores and their difference based on the OSA-18 survey, as well as the standardized response mean (SRM) obtained through dividing the difference between mean scores by the standard deviation of the difference between the mean scores. The mean preoperative total score was 82.83 (SD=12.57), and the mean postoperative total score 34.30 (SD = 9.95), a statistically significant difference (p=0.000). The domain that presented the greatest pre and postoperative difference was sleep disturbances, followed by caretaker concern. The domain with the lowest difference was daytime problems. All total differences and domain scores (before and after surgery) were statistically significant (p= 0.000). Chart 1 illustrates the change pattern of the domain score means in the preoperative and postoperative OSA-18 surveys.

There was a statistically significant difference (F test=443.70; p=0.0000) in the relation between the difference of the OSA-18 total score means compared to the visual scale score means (global assessment of SDB related to QOL).

There was no statistically significant difference (F test=0.841; p=0.6714; Kruskal-Wallis p=0.472) in the assessment of the correlation between duration of complaint of sleep disturbances and the score differences in the preoperative and postoperative OSA-18 surveys.

There was no statistically significant difference in the mean difference of scores in the preoperative and postoperative OSA-18 surveys according to female gender

Table 2. Total and domain pre and postoperative scores.

Domain	Mean of pre-operative OSA-18 survey	Mean of post-operative OSA-18 survey	Mean differences between the preoperative and postoperative means (CI 95%)*	SRM
Sleep disturbances	21.19	5.06	16.13 (14.74 a 17.51)	3.39
...loud snoring?	6.02	1.31	4.71 (4.29 a 5.13)	3.27
...periods in which breathing stopped or air seemed trapped during the night?	4.62	1.04	3.58 (3.07 a 4.09)	2.03
...choking noise or breathlessness while sleeping?	5.12	1.40	3.73 (3.13 a 4.33)	1.81
...restless sleep or frequent awakening during sleep?	5.41	1.31	4.10 (3.59 a 4.62)	2.30
Physical suffering	18.35	7.33	11.02 (9.66 a 12.39)	2.35
...mouth breathing due to nasal obstruction?	6.00	1.83	4.17 (3.59 a 4.74)	2.10
...frequent common colds or upper airway infection?	3.92	1.81	2.10 (1.56 a 2.64)	1.13
...nasal secretion or runny nose?	3.85	1.85	2.00 (1.42 a 2.58)	0.99
...eating difficulties?	4.58	1.77	2.81 (2.08a 3.55)	1.11
Emotional distress	13.27	9.15	4.13 (2.63 a 5.62)	0.80
...change in humor or rage?	4.73	2.71	2.02 (1.36 a 2.68)	0.89
...aggressive or hyperactive behavior?	4.65	2.79	1.85 (1.21 a 2.50)	0.83
... problems with discipline?	3.90	3.64	0.25 (0.34 a 0.84)	0.12
Daytime problems	8.77	6.49	2.31 (1.24 a 3.39)	0.62
...drowsiness or excessive daytime naps?	1.94	1.25	0.69 (0.19 a 1.19)	0.40
...poor concentration or attention?	3.68	2.48	0.69 (0.13 a 1.25)	0.36
...difficulty to wake up in the morning?	3.67	2.73	0.94 (0.26 a 1.62)	0.40
Caretaker concern	21.35	6.13	15.23 (13.67 a 16.79)	2.84
...leave you worried about the general health of your child?	6.27	1.75	4.52 (4.12 a 4.92)	3.30
...created a concern that your child is not breathing enough air?	5.79	1.75	4.04 (3.56 a 4.52)	2.45
...interfered in your ability to carry out your daily activities?	3.85	1.29	2.56 (1.83 a 3.30)	1.01
...made you feel frustrated?	5.46	1.33	4.13 (3.53 a 4.72)	2.02
Total OSA	82.83	34.15	48.69 (44.45 a 52.93)	3.33
Visual scale score - global quality of life	6.04	9.60	-3.56 (-4.09 a -3.03)	-1.96

* There was statistical significance ($p < 0.05$) for every difference in means in the preoperative and postoperative scores except for the item discipline problems ($p=0.395$). CI = confidence interval. SRM = standardized response mean.

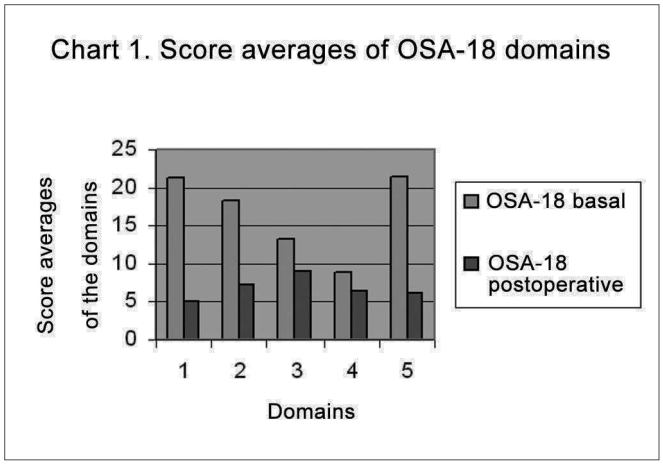
Table 3. Relation between variables and the impact on quality of life according to the preoperative OSA-18 survey.

Variables	Impact on quality of life - OSA-18 survey (n)			
	Moderate	Major	Test	P
1. Duration of complaint of sleep disturbances				
< 5years	13	10		
≥ 5years	11	13	0,1941	0,659
2. Education (time) of caretaker				
Education ≤ 8years	13	13		
Education >8 years	11	10	0,021	0,896
3. Signs of GERD* on laryngoscopy				
YES	8	10		
NO	14	12	(2)	0,759

(1) x^2 test; (2) x^2 test with Yates's correction. * GERD= gastroesophageal reflux disease.

(47.96) and male gender (49.35).

The OSA-18 survey total score following surgery, compared to the classification of the impact on QOL seen in the preoperative assessment OSA-18 survey, changed from 73.20 to 33.87 in children with moderate impact on the QOL (preoperative assessment), and from 94.13 to 35.13 in children with major impact on the QOL. The change rate of the latter was approximately 1.2 times higher than that of the former.



Graph 1. Mean of OSA-18 survey domain scores - Domains: 1. Sleep disturbances; 2. Physical suffering; 3. Emotional distress; 4. Daytime problems; 5. Caretaker concern.

DISCUSSION

Many published studies have demonstrated the impact of sleep-disordered breathing on the quality of life of children with this condition.[4-5,8-10,18-33] Until recently, there was a single published Brazilian study on this theme.11 In this trial, Di Francesco et al. assessed the responses of parents or other caretakers of children undergoing adenotonsillectomy due to palatine and pharyngeal tonsil hyperplasia associated with sleep-related breathing disorders. They analyzed 36 children aged between 2 and 15 years, with adenoids obstructing at least 75% of the air column as seen on a cavum radiograph, associated with increased palatine tonsils (grade II or more). The conclusion was that increased palatine tonsils and obstructive sleep apnea worsened the quality of life of these children, mostly due to physical suffering and sleep disturbances, and that adenoamigdalectomy results in a significant improvement of their quality of life.11 However, Di Francesco et al. used the OSD-6, an instrument that was not validated with polysomnography and with an unknown discriminating capability.4 Sohn et al.23 studied children with sleep-related breathing disorders, comparing their quality of life before and after adenotonsillectomy, using the OSA-18 and the OSD-6 surveys. The authors concluded that the OSA-18 survey is adequate for a variety of situations, particularly when the progression of the patient is to be studied. It is easy to apply and may be used by physicians to generate marketing information, to improve the quality of service, for comparison purposes with findings of peers, or in association with objective research methods.[23]

We used the OSA-18 survey because this tool

has been more completely validated and is thus able to provide a better assessment of the quality of life in children with sleep-disordered breathing. It is the first study on the quality of life of sleep-disordered breathing children in Brazil using this instrument. Consistency was assured by the fact that data was collected only by the main researcher.

The OSA-18 survey was shown to be an adequate tool to study the quality of life of sleep-disordered breathing children. Over half of the caretakers in this study slept in the same room as the children we assessed; therefore, one may assume that the information they provided is of good quality.

Few caretakers in this study had university level education, which reflects the Brazilian social reality. The sample included mostly low-income individuals, who use the Brazilian public Unified Health System. We know that in Brazil only 9% of people aged between 18 and 24 years have access to university education, and that this percentage is even lower in the low-income strata of the population.[34]

Sleep apnea in children and other sleep disturbances secondary to adenotonsillar hyperplasia are commonly found in the pediatric population. These conditions affect approximately 11% of children,1 similarly distributed between both sexes.[19] Our study contained a similar number of males and females, different from studies such as the Mitchell et al. trial, in which males predominated.[24-27]

Our study population presented a high rate of apnea (according to the caretaker's perception), restless sleep and snoring (roughly 100% of our sample). This is probably due to the fact that these children had been previously selected as sleep-disordered breathing cases, both during outpatient care as in the clinical visit to confirm surgery and for inclusion into the study. Rather than evidence of any bias, this suggests an adequate selection of participants, namely children with sleep-disordered breathing.

In a similar trial, Franco Jr et al.[18] found that 89% (61 children) of the participants had a BMC equal to or below 25kg/m^2. According to this same criterion, no child in our study was overweight; comparing the proportions, there is a significant difference (p=0.04). However, this classification is based on first world parameters and does take into account the age of children and their origin, which in our case is composed of children with a low social and economic status. Participants of the study mentioned above18 also were mostly low income individuals, compared to North American standards.

There was a minor impact on the quality of life in only 2.1% of our sample, as seen during the preoperative assessment; most of the sample showed moderate or major impact in roughly equal proportions. Franco Jr et al.[18] found a more homogeneous distribution of the impact of sleep-disordered breathing on quality of life in their sample. However, this happened because children with indication for surgery due to repeat tonsillitis and without sleep-disordered breathing were also included.

The average OSA-18 survey scores showed that the item with the highest mean score was loud snoring. There are controlled studies assessing children with polysomnography showing that the quality of life and the behavior of children without apnea but with primary snoring is altered compared to the control group.[22,29,35] The suggestion is that snoring needs to be investigated with greater care in clinical practice.

The highest mean scoring domain during the preoperative assessment was caretaker concern, different from various other studies, in which sleep disturbance had the highest score.[4,5,11,18,23-28,30] In our trial, sleep disturbance had the second highest score, which was the position of the item caretaker concern in the studies of Mitchell et al.[24-27] and Tran et al.[30] Other authors have found physical suffering as the second most affected domain.[19,23]

The lowest mean scoring item in the preoperative assessment was drowsiness or excessive daytime naps, which is in line with current findings. Different from adults with obstructive sleep apnea, who generally present drowsiness, children tend to be more hyperactive.

The average time between the beginning of respiratory complaints and surgery was considered high, especially if we take into account the mean age of our sample (5.93 years). Franco Jr et al.[18] found an average symptom duration of 2 years. This may reflect the difficulty of accessing otorhinolaryngological health care - particularly surgical care - faced by patients using the Brazilian public Unified Health System, as detailed by Sarmento Júnior et al.[36] The long waiting time may worsen the quality of life of these patients, which is a different situation from what is seen in studies in developed countries. On the other hand, there was no correlation between the duration of the complaint of sleep disturbance (less or more than 5 years) and the degree of impact on the quality of life as seen on the preoperative assessment. Our sample, however, is somewhat small. There is no information about this correlation so far in published quality of life and sleep-disordered breathing studies. Therefore, we were unable to assess whether this is or not a peculiar finding in our

sample, possibly due to social and cultural factors. This may reflect a cultural passive acceptance of suffering among the low-income population in Northeastern Brazil that use the public health system, and frequently do not enforce their right to question long waiting times, merely accepting this fact as if it where normal.[36]

Adenoidectomy and adenotonsillectomy are the most common surgical procedures in otorhinolaryngology.[8-10,19] In adequately selected children, these measures can change the perception of quality of life and solve obstructive problems.[19] We had a short follow-up period in our sample, which is a limitation of many of our analyses. Undeniably there is a substantial short-term improvement in the perception of quality of life by parents and caretakers of children with sleep-disordered breathing following surgery.

Similar to international studies,[19,23,24-27,29-31] we found significant improvements in all OSA-18 survey domains assessed before and after surgery. Follow-up time between surgery and the quality of life assessment was short. However, Mitchell et al. published a long-term evaluation of quality of life changes (between 9 and 24 months) following adenotonsillectomy for the treatment of obstructive sleep apnea, documented by full-night polysomnography, and concluded that parents perceived more pronounced short-term than long-term significant improvements in the quality of life of children after surgery, which were not uniformly distributed between all OSA-18 survey domains.[25]

The standardized response mean (SRM) revealed a marked impact on all of the domains (SRM equal to or higher than 0.8), except for daytime problems, an item that showed a moderate impact. This confirms the significant effect of surgery on the quality of life of sleep-disordered breathing children.

The most affected domain was sleep disturbances, similar to findings in international medical literature.[19,23,25-27,29,30] However, the less affected position in our study was daytime problems, different from those studies, in which emotional distress was the least affected domain. This may be a cultural difference, as Latin populations are more expansive and active compared to the North American population, which was surveyed in the aforementioned studies. A second explanation would be the climate, as Brazil is mostly a tropical and subtropical country where, particularly in the Northeastern region, days are clear and sunny for most of the year, different from places in which those studies mentioned above were carried out. Although the domain daytime problems was the least affected in our study, the only item that did not show a statistically significant difference between the preoperative and postoperative assessments (with SRM showing a weak change effect) was discipline problems, which is included in the domain emotional distress.

The change rate of the mean OSA-18 survey scores before and after surgery did not vary in patients with mild, moderate or major impact during the preoperative assessment. These findings are similar to those presented by Mitchell et al. in 2004.24 However, both studies have relatively small samples, which is a limitation.

Similar to findings by Mitchell et al.,[24] there was no significant gender difference in the mean preoperative and postoperative OSA-18 survey scores or the mean of the difference between scores. It should be noted that males predominate in Mitchell's sample.[24]

De Serres et al.[5] remind us that resource allocation is currently a growing problem; they state that the personal impact of diseases and their treatments should be better understood, taking into account their standard medical morbidity or functional limitations, which should be included in the decision-making process. We saw a significant short-term change in the quality of life of sleep-disordered breathing children following surgery. We disapprove the long waiting time these children face until treatment. The Brazilian constitution assures universal health care, but political and economical reasons have made it impossible for the Brazilian public Unified Health System (Sistema Unico de Saude - SUS) to provide adequate care as originally intended.[37] Resource allocation needs to be better equated, including observations of the impact diseases have on quality of life, especially in sleep-disordered breathing children, the object of this trial.

Our study had limitations that should be considered. The sample size was small, and originated from a previously selected group, meaning that inferences about the general population may be somewhat jeopardized. However, the basic aim of this study was to analyze quality of life related specifically to a disease group, namely sleep-disordered breathing - which the sample fully supported.

Polysomnography was not done in our sample. In daily clinical practice, high cost and difficulty in doing the exam preclude its use; in sleep-disordered breathing cases, it is only applied when a differential diagnosis is required. On the other hand, certain studies have suggested that even children with mild sleep-disordered breathing (primary snoring) show changes in measurements of attention, memory and intelligence compared to non-snorers.[35] Furthermore, Flanary[19] has demonstrated that, although polysomnography may provide information about children with sleep-disordered breathing, this exam is not necessary to establish

which patients will show improvements in quality of life following adenotonsillectomy.

Another limitation of our study was the short follow-up time, not allowing inferences about the sustainability of quality of life improvements in children. There are studies such as those by Flanary19 and Mitchell,25 that have demonstrated this premise.

CONCLUSION

Sleep-disordered breathing due to adenotonsillar hyperplasia causes moderate to major repercussions on the quality of life of children.

Adenoidectomy or adenotonsillectomy results in a significant quality of life improvement in these children.

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