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# PARENTAL INSIGHTS ON QUALITY OF SLEEP AND ITS ASSOCIATION IN CHILDREN WITH MOUTH BREATHING HABIT- A QUESTIONNAIRE STUDY

Paediatric Dentistry

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## ABSTRACT

**Aim and objectives:** Mouth breathing is one of the most common deleterious oral habits in children and a symptom of sleep disordered breathing (SDB). The prevalence ranges from 11 to 56% in children. The objective of this study was to evaluate parental responses about sleep-disordered breathing and its association with mouth breathing (MB) in their children. **Materials and Methods:** A study was carried out on 109 consecutively selected children of mouth breathing, aged 6-12 years, based on results of a mouth breathing test, using children's sleep habit questionnaire (CSHQ). After obtaining their responses, all questions were evaluated to understand the parental responses to associate their knowledge about SDB of their children with the presence of MB in their children. Statistical analysis was done. Mean, standard deviation and Chi-square test were used in analysis. **Results:** On the CSHQ scale, highest score was found with snoring (85.3%), followed by mouth breathing factors (84.4%) (dry mouth or mouth open during day), overall health (52.3%) (nocturnal enuresis, obesity, morning headache) and daytime sleepiness (41.2%) (unfresh in the morning, problem staying awake during daytime, hard to wake up). **Conclusion:** Sleep disturbances and mouth breathing are closely related, with each factor potentially exacerbating the others. Therefore, screening for quality of sleep is crucial for ensuring accurate diagnosis, appropriate management.

## KEYWORDS

Mouth breathing, Sleep Disordered Breathing (SDB), Children's Sleep Habit Questionnaire (CSHQ).

## INTRODUCTION

Breathing, a fundamental physiological process essential for maintaining the body's metabolic functions and overall health, primarily occurs through nose. When nasal breathing is supplemented by breathing through mouth, it is termed mouth breathing.[1] Mouth breathing (MB) has a multifactorial etiology ranging from anatomical obstruction such as tonsillar hypertrophy, nasal polyps, rhinitis or indirectly from adverse oral habits.[2]

Nasal obstruction and mouth breathing can negatively impact facial development and contribute to breathing difficulties during sleep. Symptoms of this condition may include prolonged sleep, hyperactivity, irritability, bedwetting, and morning headaches. Mouth breathing is frequently linked to Sleep-Disordered Breathing (SDB), a condition often underdiagnosed in children ranging from Primary Snoring (PS) without significant sleep disruptions to Obstructive Sleep Apnoea Syndrome.[4] Although SDB is a common medical issue among adults, it is increasingly recognized in children and is considered one of six major categories of sleep disorders that compromise both mental and physical health.[6]

Risk factors associated with SDB include hypertrophic lymphatic organs, allergic rhinitis, obesity, and nocturnal enuresis.[8] Additionally, craniofacial disharmony, which has been linked to upper airway narrowing in children, is associated with pediatric SDB. This includes conditions such as macroglossia, midface hypoplasia, mandibular and maxillary retrognathia, short cranial base length, increased total and lower anterior facial heights.[9]

Available epidemiological data on SDB in children are limited, with prevalence estimates ranging from 0.7% to 2.9%.[8] Numerous studies have explored prevalence of Sleep-Disordered Breathing (SDB) in adults globally. However, there is a lack of research on SDB prevalence and its associated risk factors among children, particularly in India. This study aims to address by assessing prevalence of disturbed sleep and parental responses to it among children with mouth breathing.

## MATERIALS AND METHODS:

This study was conducted in Department of Pediatric and Preventive Dentistry at AJ Institute of Dental Sciences, Mangalore, following approval from institutional ethics committee (IEC/PEDO22/121/V2). Based on study by Ballikaya E et al. [10], with an assumed prevalence (p) of 44.5% and a 95% confidence interval, along with a 10% allowable error (L), estimated sample size was 109, calculated using formula $n = z^2 1\text{-}\alpha/2p^{(1-p)}/L^2$. Consequently, 109 children aged 6–12 years with mouth breathing and their caretaker were selected to participate in study.

Children visiting department for various dental problems were screened for mouth breathing. Primary diagnosis of mouth breathing was done with Water holding test. Parents of children who showed a positive result for mouth breathing were then interviewed after taking consent (assent). Children already diagnosed with psychiatric or neuropsychiatric disorder were excluded from study.

### Children's sleep habits questionnaire (CSHQ)

Parents were explained about objective of study.
The Children's Sleep Habits Questionnaire (CSHQ), 45-item parent questionnaire used for retrospective assessment, was employed to evaluate quality of sleep in mouth-breathing children.[11] Sleep difficulties evaluated were snoring, sleep-disordered breathing; daytime sleepiness, behaviour and general health.

For accurate psychometric evaluation, some questions were eliminated. Remaining 16 questions were grouped into six subscales as sleep domains: 1. Frequency of snoring 2. quality of snoring 3. Breathing problems 4. Mouth breathing effects 5. Daytime sleepiness 6. Overall health. Completely filled forms were collected and sent for statistical analysis.

### Statistical Analysis:

The data was collected, coded and fed in SPSS for statistical analysis. Descriptive statistics will include frequency, percentages, mean and standard deviation. Inferential statistical tests were Chi square test, Independent t test and Pearson correlation for comparisons. Level of significance was set at 0.05 at 95% confidence interval.

## RESULTS:

In study population, mean CSHQ score was found to be 4.2 (±1.67). Table 1 and table 2 shows the list of questions used in questionnaire and their responses. 85.3% children had habit of snoring while 14.7% of children did not typically snore.

94.5% of children with mouth breathing had no history of trouble in breathing or apnoea. 84.4% of children had dry mouth or mouth open during day or both.

41.2% of mouth breathing children had signs of daytime sleepiness like unfresh in the morning, problem staying awake during day or hard to wake up while 52.3% of children had compromised health like morning headache, bedwetting, delayed growth or obesity.

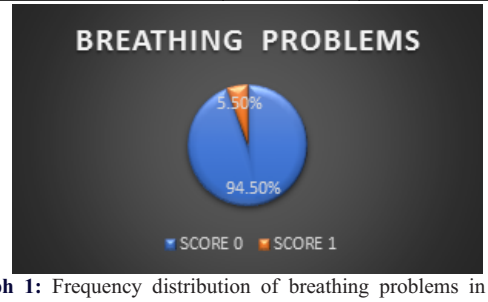
**Table 1: List of subscales in CSHQ and retained questions**

| Symptoms | Questions | |
|---|---|---|
| SNORING | Frequency | A2: usually snores |

| | | |
|---|---|---|
| | | A3: always snores |
| | Quality | A4: snores loudly |
| | | A5: Heavy breathing |
| BREATHING PROBLEMS | A6: trouble breathing | |
| | A7: observed apnoea | |
| MOUTH BREATHING EFFECTS | A24: mouth open during day | |
| | A25: dry mouth on awakening | |
| DAYTIME SLEEPINESS | B1: unfresh in the morning | |
| | B2: problem with sleepiness | |
| | B4: sleepy per teacher | |
| | B6: hard to wake up | |
| OVERALL HEALTH | A32: nocturnal enuresis | |
| | B7: morning headache | |
| | B9: delayed growth | |
| | B22: obesity | |

**Table 2: Frequency distribution table of CSHQ in study population**

| CSHQ | | Frequency (%) |
|---|---|---|
| Frequency of snoring | 0 | 16(14.7) |
| | 1 | 81(74.3) |
| | 2 | 12(11) |
| Quality of snoring | 0 | 82(75.2) |
| | 1 | 23(21.1) |
| | 2 | 4(3.7) |
| Breathing problems | 0 | 103(94.5) |
| | 1 | 6(5.5) |
| Mouth breathing issues | 0 | 7(6.4) |
| | 1 | 10(9.2) |
| | 2 | 92(84.4) |
| Daytime sleepiness | 0 | 63(57.8) |
| | 1 | 37(33.9) |
| | 2 | 7(6.4) |
| | 3 | 2(1.8) |
| Overall health | 0 | 52(47.7) |
| | 1 | 50(45.9) |
| | 2 | 6(5.5) |
| | 3 | 1(0.9) |




**Graph 1:** Frequency distribution of breathing problems in study population

## DISCUSSION:

Mouth breathing a common oral habit in children, can adversely affect dentofacial development during growth. Effects of mouth breathing include malocclusion, poor oral hygiene, increased risk of cavities, sleep disturbances, behavioural changes, and abnormal growth of maxillofacial region. Mouth breathing, a spectrum of symptoms identified in growing children is a matter of concern for many parents. These children often suffer from learning difficulties and poor academic performance due to sleep-related obstructive breathing, altered pattern of sleeping, frequent awakening at night, and daytime sleepiness.

Snoring a common condition in mouth breathing, occurs due to disharmony between "negative intrathoracic pressure" and "the oropharyngeal dilator muscles." Habitual snoring is predicted to happen in 10% of population of children. Frequently, children with obstructive sleep apnoea (OSA) have a history of snoring. There is a tendency to breathe loudly and might comprise noticeable pauses/gasps while breathing. Occasionally, snoring comprises a continuous, partial obstruction without any noticeable pauses and awakenings.[8]

In a study by Chervin et al[11] an association was found between sleep-related breathing, daytime sleep, decreased academics and social life. Dry mouth common in mouth breathing children leads to reduced oxygen level, frequent arousal at night in turn causes behavioural problems and is associated with a narrow and long face pattern known as Adenoid facies. In this study, out of 109 children, 92(46.66%) felt dry mouth on waking and mouth open during day. This finding can correlate with the statement mentioned in study of Sinha and Guilleminault 2010 [12] which states that dry mouth accompanies mouth breathing. In this study population about 37(33.9%) children had problem of daytime sleepiness. Daytime sleepiness occurs secondary to sleep disturbances at night and hence poor sleep can affect cognitive functions like memory and attention.

Persistent sleep disturbances can lead to various behavioural issues, such as irritability, impulsivity, difficulty concentrating, excessive talkativeness, and forgetfulness. Therefore, identifying and addressing the underlying cause of mouth breathing might aid in managing condition effectively.

## CONCLUSION:

Sleep difficulties and mouth breathing are closely related, with each factor potentially exacerbating others. Persistent sleep disturbances, in turn, can manifest as symptoms of inattention and hyperactivity. Therefore, screening for quality of sleep in children with mouth breathing habit, along with gathering parental feedback on sleep difficulties, is crucial for ensuring accurate diagnosis, appropriate management, and significant improvements in sleep quality.

## Summary:

Rationale of this study was to evaluate the parental responses about quality of sleep and its association with mouth breathing in their children. Study also evaluates prevalence of sleep disturbances in child with mouth breathing habit. Persistent sleep disturbances can lead to various behavioural issues in children of school age, hence, identifying and addressing underlying cause of mouth breathing might aid in managing condition effectively.

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