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Correlation between sleep quality and quality of life in asthmatic children and primary caregivers

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Abstract

Background: Asthma is a serious global health problem that often and adversely affects children. Between 20 and 30% of children in the pediatric population experience sleep problems. The responsibilities of providing nocturnal care and the stress that is directly tied to the illness affect caregiver sleep patterns in a similar way to how a chronic illness may have a direct impact on a child's sleep.

Objective: To examine the relationship between an asthmatic child's quality of life and their primary caregivers sleep habits.

Material & Method: According to inclusion and exclusion criteria, 50 patients with chronic asthma and their primary caregiver were recruited from the pediatric outpatient department of Civil Hospital Sec. 6, Panchkula, for cross-sectional correlational research. Children with asthma were given the Children Sleep Habit Questionnaire (CSHQ) and the Mini PAQLQ (mini pediatric asthma quality of life questionnaire), whereas primary caregivers were given the Pittsburgh Sleep Quality Index (PSQI) and the Pediatric Asthma Caregiver's Quality of Life Questionnaire (PACQLQ), respectively.

Results: With a correlation value of $r = -.768$, this study demonstrated a strong association between asthmatic children's sleep quality and quality of life. With a connection value of $r = -.765$, main carers' sleep quality and quality of life were also shown to be significantly correlated.

Conclusion: Based on findings of the study, there was a significant correlation between the sleep quality and quality of life in asthmatic children and primary caregiver.

Keywords: Asthma, asthmatic children, primary caregiver, sleep quality, quality of life

Introduction

Asthma is a frequent and an exorbitant childhood disease eroding the quality of life of children and their families throughout the nation and impacts more than 300 million people all over the world^[1]. According to World Health Organization, asthma is a major non-communicable disease which is characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person^[2].

Data demonstrates that prevalence of Bronchial asthma in children is rising at a quicker rate than what was already known^[3]. In India, the prevalence of asthma in school going children is in an increasing pattern in past decade, it is 4.5% in school children of metropolitan Chennai in the age group 6-17 years categorized in lower income group/lower middle-class families^[4]. Many times, childhood asthma remains underdiagnosed and furthermore under treated, due to various factors such as ignorance, misconceptions, misleading judgements, and absence of awareness^[5]. Nocturnal symptoms of asthma in the form of cough, breathlessness and wheeze are common episodes for most asthmatic children. Indeed, even clinically stable asthmatic school children experienced continuous nocturnal symptoms and sleep deprivation and are ignored by the caregivers who do not think of it as adequately significant to report it to their physician. This may have significant clinical implications as under treatment of these debilitating indications may cause poor quality of life, expanded treatment cost and long-term morbidity^[6]. Sleep plays an important role in developing healthy living. In the pediatrics population, around 20% to 30% of children are influenced by sleep disturbance^[7, 8, 9] which result in the disturbed immune exposure, anxiety, attention deficit problems, behavioral issues, depression etc^[10].

So, it is important to consider the relationship between sleep and asthma when caring for children with asthma [11]. Research indicates that development of chronic respiratory conditions in children can be linked with sleep disorders and depressive anxiety in parents [12].

Various studies have found relationship between child's illness and caregiver sleep. However, the impact of sleep disruption on quality of life of child and their caregiver has not been explored. Also, with the increasing rate of depression in caregiver because of child's chronic illness [13, 14, 15, 16], it is essential to monitor the sleep, health, and well-being of caregiver of children with asthma. So, this study has been designed to evaluate the sleep quality and its impact on quality of life in asthmatic children and their primary caregiver.

Methodology

Study Design: Cross-sectional correlational study design.

Setting: Data was collected from Civil Hospital, Panchkula (Haryana) India within a period of September 2020 to March 2021.

Sample Size: 50

Inclusion Criteria: For children

Children aged between 7- to 16-year-old with physician diagnosed persistent asthma with disease duration of at least 6 months attending an outpatient clinic along with their one parent who was primary caregiver. Both male and females.

For primary caregiver

One parent of children with asthma who was primary caregiver Non -smoker.

Exclusion Criteria:

Children or primary caregiver with history of any other orthopedic, neurological, and cardiovascular disorders. Chronic disease to any other family member.

Procedure: The ethical clearance for the study proposal was taken from the "Institutional Ethics Committee of Mother Teresa Saket College of Physiotherapy." 50 Patients diagnosed with persistent asthma and their primary caregiver was taken from pediatric out-patient department of Civil Hospital Sec. 6, Panchkula as per inclusion and exclusion criteria. Thorough history and assessment were done for all patients. After comprehensive description of study, primary caregiver was asked to sign an informed consent and children were asked to sign assent form. Assessment of child sleep quality was done by Children's Sleep Habit Questionnaire. It is an interview-based questionnaire which consists of 33 item scale composed of 8 subscales (permission was taken to use the English version of the questionnaire) [17].

Assessment of children's quality of life was done by Mini version of Pediatric Asthma quality of life questionnaire. This questionnaire consists of 3 domains (symptoms, activity, and emotional functions). It contains 13 questions

of symptoms (such as wheezing cough) 5 questions of activity limitation (such as play, sport) and the 8 question of emotional functions (such as frightened, frustrated) (permission is taken to use this questionnaire in both English and Hindi version from Elizabeth F. Juniper Professor in McMaster University, Canada) [18]. Assessment of primary caregiver sleep quality was done by Pittsburgh sleep quality index. collection.

It differentiates "poor" from "good" sleep by measuring seven domains: components subjective sleep quality, sleep latency, sleep duration habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction over the last month (it is available as a free measure for use in clinical practice) [19].

Assessment of primary care giver quality of life was done by Pediatric Asthma Caregiver Quality of Life Questionnaire (PACQLQ). The questionnaire consists of 13 items divided into 2 domains [19] (permission is taken to use this questionnaire in both English and Hindi version from Elizabeth F. Juniper Professor in McMaster University, Canada).

Study Variables: Conceptual variables were sleep quality and quality of life in asthmatic children and sleep quality and quality of life in primary caregivers. Observational variables were CSHQ, Mini PAQLQ, PSQI and PACQLQ. Sleep quality index was correlated with quality of life in both children and their primary care giver.

Statistical Methods: The descriptive analysis is used to calculate mean, median, standard deviation, standard error and Skewness Kurtosis, and range for all study variables i.e., sleep quality and quality of life. Spearman's rho is used to calculate the correlation between study variables. SPSS software version 21.0 is used to determine the results and to interpret all readings. The level of significance is 95% and the p value is .004 which is considered highly significant.

Table 1: Test of Normality

	Shapiro-Wilk		
	Statistic	Df	P-value
CSHQ	0.973	50	.348
Mini PAQLQ	0.961	50	.004
PSQI	0.870	50	.027
PACQLQ	0.944	50	.018

Table 2: Descriptive Statistics of CSHQ

CSHQ		
		Std. Error
Mean	63.870	1.0506
Median	65.496	
Variance	56.432	
Std. Deviation	6.5780	
Minimum	53.0	
Maximum	80.0	
Range	25	
Interquartile Range	13.5	
Skewness	.056	.477
Kurtosis	-.534	.723

Table 3: Descriptive Statistics of Mini PAQLQ

Mini PAQLQ		Std. Error
Mean	2.564	.13498
Median	2.282	
Variance	.678	
Std. Deviation	.79450	
Minimum	1.38	
Maximum	4.84	
Range	3.56	
Interquartile Range	2.20	
Skewness	.768	.477
Kurtosis	.068	.723

Table 4: Descriptive Statistics of PSQI

PSQI		Std. Error
Mean	9.654	.3456
Median	8.627	
Variance	12.654	
Std. Deviation	4.6780	
Minimum	4.0	
Maximum	16.0	
Range	13.0	
Interquartile Range	6.5	
Skewness	-.067	.477
Kurtosis	-2.101	.723

Table 5: Descriptive Statistics of PACQLQ

PACQLQ		Std. Error
Mean	2.5689	.3456
Median	3.627	
Variance	2.5404	
Std. Deviation	2.13450	
Minimum	1.46	
Maximum	5.25	
Range	3.54	
Interquartile Range	1.54	
Skewness	.876	.477
Kurtosis	-.765	.723

Table 6: Correlation Between Sleep Quality and Quality of Life in Asthmatic Children

	CSHQ & Mini PAQLQ
Correlation Coefficient (r)	-.768
p- value	.004
N	50

Shapiro – Wilk test, the p value for CSHQ is greater than 0.05, so this variable follows the normal distribution in our study. For Mini PAQLQ, PSQI and PACQLQ, p value is less than 0.05, hence it is concluded that the data in these variables significantly deviate from normal distribution. As shown by the table 1, the descriptive statistics of sleep quality as measured by CSHQ in asthmatic children, mean is 63.870, standard error 1.0506, median is 65.496, variance is 56.432, standard deviation is 6.5780, interquartile range is 13.5, skewness value is .056 (standard error is .477) and kurtosis value is -.534 (standard error is .723).

As shown by the table 2, the descriptive statistics of quality of life in asthmatic children as measured by Mini PAQLQ, mean is 2.564, standard error .13498, median is 2.282, variance is .678, standard deviation is .79450, inter-quartile

range is 2.20, skewness value is .768 (standard error is .477) and kurtosis value is .068 (standard error is .723).

As shown by the table 3, the descriptive statistics of sleep quality in primary caregiver as measured by PSQI, mean is 9.654, standard error .3456, median is 8.627, variance is 12.654, standard deviation is 4.6780, interquartile range is 6.5, skewness value is -.067 (standard error is .477) and kurtosis value is -2.101 (standard error is .723). As shown by the table 4, the descriptive statistics of quality of life in primary caregiver as measured by PACQLQ, mean is 2.5689, standard error is .3456, median is 3.627, variance is 2.5404, standard deviation is 2.13450, interquartile range is 1.54, skewness value is .876 (standard error is .477) and kurtosis value is -.765 (standard error is .723).

The table 5 represents the significant negative correlation between CSHQ and Mini PAQLQ by using Spearman’s rho correlation coefficient. The correlation coefficient for CSHQ is -.768. The correlation is statistically significant because p value is less than 0.05.

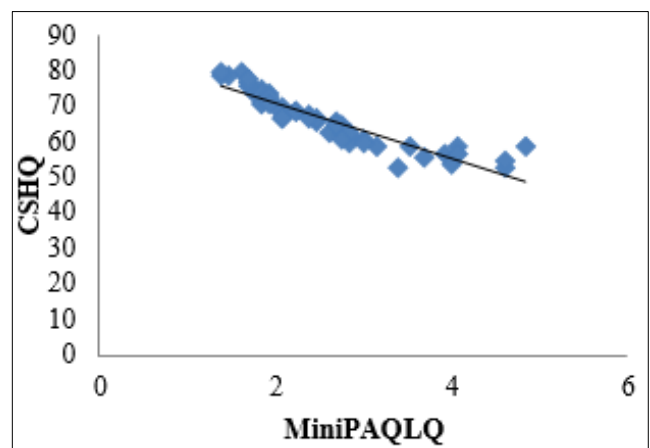


Fig 1: Correlation Between CSHQ and MiniPAQLQ

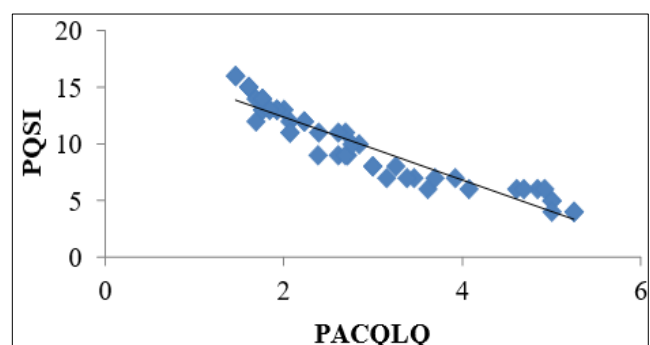


Fig 2: Correlation Between PSQI and PACQLQ

Fig 1 represents, the y-axis represents CSHQ and x-axis represents Mini PAQLQ and graph depicts a negative correlation between CSHQ and Mini PAQLQ.

Table 6 represents the negative correlation between PQSI and PACQLQ by using Spearman's rho correlation coefficient. The correlation coefficient for PQSI is -0.765 . The correlation is statistically significant because p value is less than 0.05.

Fig 2, the y-axis represents PSQI, and x-axis represents PACQLQ, and graph depicts a negative correlation between PSQI and PACQLQ

Discussion & Conclusion

Our study demonstrates a significant correlation between sleep quality and quality of life in asthmatic children and their primary caregivers.

Sleep quality in asthmatic children: In the present study, sleep quality of asthmatic children was measured by CSHQ. As shown in results, the mean of sleep quality is 63.870, which is much above the clinically significant cut-off of 41, which indicates extensive sleep disturbance among the studied population^[20]. This is in accordance with the study done earlier by Lisa Meltzer et.al. which concluded that children with poorly controlled asthma had poorer sleep patterns, more difficulty in falling asleep and more sleep disruptions^[21].

Quality of life in asthmatic children: In the present study, the quality of life of asthmatic children was determined by using Mini PAQLQ. According to results, mean of Mini PAQLQ came out to be 2.564, which showed severe impairment of quality of life in asthmatic children. This is in consistent with a study done earlier by Wander et.al. which concluded that bronchial asthma imposes significant burden on children quality of life, despite availability of effective and safe treatment^[22].

Correlation between sleep quality and quality of life in asthmatic children: In the present study, it was concluded that there was a significant correlation between sleep quality and quality of life in asthmatic children. This shows that as sleep quality deteriorates, there was poor quality of life among asthmatic children.

However, the poor sleep quality and quality of life in asthmatic children can be attributed to presence of nocturnal symptoms. In the present study, it was observed that nocturnal symptoms were present in asthmatic children which leads to poor sleep quality.

Harly G. et.al. observed that respiratory compromise occurs during sleep, especially in asthma patients experiencing nocturnal symptoms. These nocturnal symptoms often present with repetitive nighttime awakenings accompanied by dyspnea, cough and wheeze which is secondary to bronchoconstriction. Many factors contribute to worsen bronchial activity during sleep like increase in lower airway resistance, increase in airway parasympathetic tone and comorbidities like obstructive sleep apnea and gastroesophageal reflex^[23].

Sleep quality in primary caregivers: In the present study, sleep quality among primary caregivers was measured by PSQI. As shown in results, the mean of sleep quality is 9.654, which is much above the clinically significant value

of 5, which shows that caregivers of asthmatic children have poor sleep quality^[18]. This is in consistent with a study done by Mitra S. et.al which showed decreased sleep quality in mothers of children with cystic fibrosis and asthma^[13].

The present study demonstrated that effect of disease on sleep extends well beyond the patient to the caregiver who is responsible for the children health care and nighttime caregiving. So, sleep disorders in a child might influence the sleep quality of the caregivers too explaining the results of our study.

Quality of life in primary caregivers: In this study, quality of life in primary caregivers was determined by using PACQLQ. As shown in results, the mean of quality of life is 2.5689, which shows that quality of life is severely impaired in primary caregivers of asthmatic children. This is in accordance with a study done by Maria F. et.al. which showed worse quality of life among parents of children with more nocturnal symptoms^[24].

Correlation between sleep quality and quality of life in primary caregivers: In the present study, there is a significant correlation between sleep quality and quality of life in primary caregivers, which shows that disrupted sleep quality in primary caregiver also impairs their quality of life. This is in accordance with a study done by Ozge Y et.al. which showed that presence of a chronic respiratory disease is associated with disrupted sleep quality and increased depression and anxiety in mothers^[16].

Children with bronchial asthma often require caregiving which have a great impact on family, primarily the mother who is often the primary caregiver of the child. These maternal caregivers report poor sleep quality and high stress, leading to overall poorer quality of life, as determined by this study.

So, the present study demonstrates that sleep quality is a significant predictor of quality of life in asthmatic children and their primary caregivers.

Clinical Significance: Sleep is one of the basic requirements and very crucial factor for good quality of life at all ages. This study revealed that asthmatic children and their primary caregivers are affected with respect to their sleep quality. So, attention to sleeping pattern and its characteristic in asthmatic children may be beneficial in term of the development of child as well as their quality of life. Physician and physiotherapists attending to patients are recommended to pay attention to sleep in children considering negative effects of daytime sleepiness and tiredness on behavior, mood, and cognitive functions. Also, non-pharmacological interventions like group therapy, family therapy is recommended to reduce stress and to break the vicious cycle in which family and patients are involved in. So, this study stresses the importance of providing psychological support and counselling in long term management of asthma.

Conflict of Interest: There is no conflict of interest.

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