Sleep Disorders among Children Suffering from Bronchial Asthma

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Abstract

Background: Sleep disorders are common among children suffering from bronchial asthma. Bronchial asthma is considered the most common non- communicable chronic disease in childhood. **Aim of study:** This study aimed to assess mothers and their children level knowledge regarding sleep disorders among children suffering from bronchial asthma. **Design:** Descriptive exploratory design was conducted to the study. **Setting:** The study was conducted at the Pediatric Departments, and Out-Patients clinics Department in Pediatric Hospital affiliated to Ain Shams University and Benha University Hospital. **Subject:** A purposive sample composed of 100 children with bronchial asthma and accompanying mothers regardless of their characteristic. **Tools: (1):** Structured interviewing questionnaire to assess Mothers 'knowledge regarding sleeping disorders among their children suffering from bronchial asthma, **(2)** Quality of life inventory scale to assess quality of life inventory for asthmatic children with sleeping problems, **(3):** The children sleeping pattern check list to assess the sleeping disorders among children with bronchial asthma, **Results:** Two thirds of the studied mothers had unsatisfactory knowledge regarding sleep disorders of children with bronchial asthma, more than half of the studied children were dependent to perform self care activities, one third of them had poor total quality of life. **Conclusion:** Slightly more than one fifths of the studied children had mild sleep disorders, and approximately half of them had moderate sleep disorders, and more than one quarter of them had severe sleep disorder. In addition, Sleep disturbance among children with asthma reported impact on the physical, psychological and social domains of quality of life. **Recommendations:** Periodical follow-up for the level of health teaching for mothers having asthmatic children suffering from sleep disorder.

Keywords: Bronchial asthma, Children, Mothers, Sleep disorders.

Introduction

Bronchial asthma is the most common chronic disease of childhood, it is a serious public health problem worldwide that can have a significant negative effect on children and their families and it is considered a common cause of emergency department visits and hospital admissions ***(Martinez et al., 2020).*** Bronchial asthma is a chronic inflammatory disorder of the respiratory tract characterized by an obstruction of airflow due to spasms of the bronchial smooth muscles, edema of the mucosa and increased mucus secretions in the bronchi and bronchioles brought on the various stimuli. The primary aim of asthma management is to make an early diagnosis and to achieve a prompt control of symptoms, in order to reduce the risk of future exacerbations and progressive loss of lung function ***(Hockenberry et al., 2019)***

Sleep disorders are characterized by the inability to maintain good quality sleep or problems with the duration of sleep, which can have an impact on daytime activities. Examples of sleep disorders include obstructive sleep apnea (OSA), insomnia, difficulty maintaining sleep, and restless leg syndrome. Sleep disturbances are common complaints among asthma patients and can be manifested as difficulties initiating and maintaining sleep, as well as early morning awakenings. Sleep disturbance at night may be partly due to poor asthma control and can

also be related to diurnal variations in airflow limitation, with an increase in beat heart rate (BHR) and airway resistance at night ***(Alanazi et al., 2021).***

Asthma and sleep disorders are both common in childhood. While asthma prevalence varies depending on the patients' age group, gender, race, socioeconomic background and additional factors. It is therefore not surprising that there are many children in whom both asthma and sleep disorders coexist. Moreover, studies have shown that in many of these children the rate of one is influenced by the other ***(Reiter et al., 2021).***

Asthmatic children in acute care hospitals also have nurses involved in their care throughout their entire hospital stay. Nurses have the most frequent contact with the child and family; therefore, they have more opportunity to interact with and monitor the child, their situation and needs, and the family dynamics. Furthermore, nurses are expected to engage in comprehensive asthmatic child assessment for discharge plan and to be involved in all stages of the process in accordance with their standards of practice, competencies and code of ethics ***(Perciaccante and Coralli, 2018).***

Aadequate follow-up is important in attempting to prevent readmission of children following an acute exacerbation and to improve asthma control ***(Clark et al., 2017).*** Appropriate referrals of children to other community agencies for education, worked together and shared responsibility for this program. Those specific purposes were, to improve the continuity of child care by developing an organized approach to the use of nursing care referral plans and to identify early for children whose diagnosis indicated that they might profit from a continuation of nursing care following discharge ***(Huynh et al., 2019).***

Significance of Study:

Sleep is an essential part of every one's routine and an indispensable part of healthy lifestyle. Adequate amount of sleep has improved attention, behavior, learning and overall mental and physical health. Amount of sleep it varies based on age, children 6-12 years old, 9-12 hours, teenagers 13-18 years, 8-10 hours ***(Foley, 2017).*** Sleep-related breathing disorders (SRBD) prevalence among Egyptian children aged 3-15 years was estimated to be 8.2%. ***Hassan and Hagrass (2017),*** its spectrum ranges from primary snoring to partial or complete airway obstruction, which is termed obstructive sleep apnea syndrome (OSAS). SRBD affects 5.1–13.3% of children, resulting in dysfunction of immune responses, cardiovascular function, and neurocognitive function. Recently, research has shown that asthma is associated with a high risk of SRBD in children ***(Zandieh et al., 2017).***

Aim of the Study

To assess mothers and their children level of knowledge regarding sleep disorders among children suffering from bronchial asthma.

Research questions:

- What are types of sleep disorders among children with bronchial asthma?
- To what extend bronchial asthma affect children's sleeping pattern and affect their daily life activities?
- Is there a relation between children personal characteristics and their sleep disorders?

Subject and Methods

Research Design

Descriptive exploratory research was used to conduct this study.

Study Settings

The study was conducted at the Pediatric departments and children Out-Patients Department in Pediatric Hospital affiliated to Ain Shams University and Benha University Hospital. As it locates in a vital place, covering large area of the country and receiving the largest number of sick children. Ain Shams University include two settings which are the old building: contains the NICU, PICU, surgical PICU and wards. The new bulding contains dialysis, oncology and NICU. Benha University Hospital include one setting which contains the NICU, PICU, dialysis and wards.

Subject

A purposive sample composed of 100 children with bronchial asthma and accompanying mothers regardless their characteristic.

Inclusion criteria

A purposive sample composed of 100 children with bronchial asthma and accompanying mothers regardless their characteristic according to power analysis equation:

$$n = \frac{NxP\,(1-P)}{[N-1x(d2/Z^2)]+P(1-P)}$$

While;

P= 0.5
N= Total population
Z= Z value "1.96"
D= Standard Error
n= sample size

Data collection tools

Data for this study collected through using the following tools:-

First tool:

Structured Interviewing Questionnaire:

It was designed and developed by the researcher in Arabic language after reviewing the related literature it covered the following parts:

Part (1): concerned with characteristics of the studied subjects:

A. Personal characteristics of the studied children include, age, gender, level of education, child rank, child present health status, residence and place of management chest in outpatients, duration of outpatient hospital stay.

B. Personal characteristics of studied mothers include, age, level of education, marital status,, residence, occupation.

Part (2): Mothers' knowledge regarding sleep disorders among their children suffering from bronchial asthma (12 Multiple Choose Questions) include the following:

Definition, factors, types, symptoms, problems, meaning of sleep apnea, causes, symptoms of sleep apnea during the day, handling sleep apnea, health instructions, treatment of sleep disorders and care child with sleep disorders.

Part (3): Mother's knowledge regarding bronchial asthma (25 Multiple Choose Questions) as the following:

- Meaning of asthma, type of asthma attack, factors induced asthma, diseases associated with asthma, warning signs of asthma, signs and symptoms of asthma, complications of asthma, methods of asthma treatment, medications giving during asthma, forms of Medications for asthma, medication used for prevent the asthma, role of breathing exercises to reduced asthma, maintain medication schedules, maintain medication doses, Keep medication in specified place, maintain medication available, indications of inhaler, Steps of use inhaler, problems of inhaler, management inhaler problems, preventive measure, avoiding recurrent of attack of bronchial asthma, regular follow up & time of follow up.

❖ **Scoring system:**

The total score for the questionnaire was74 grades, each question was scored 2for: complete correct answer response,one for incomplete correct answer response and zero for incorrect/don't know zero for each area of knowledge. the study sample knowledge was classified into two levels: satisfactory (≥60%), and unsatisfactory (<60%).

I. Second Tool:

Quality of life inventory scale: It was adapted from ***Varnia (2003),*** it was used to determine quality of life inventory for asthmatic

children with sleeping problems, and some modifications was done to be adapted to nature of the present study**.** Quality of life inventory scale consists of ten items (55 statements) as the following:

Physical domain (5 statements), Psychological domain (6 statements), Emotional domain (7 statements), Self-Perception (5 statements), Independence (5 statements), Home life and relationship with parents (6 statements), Supporting society and spirituality (8 statements), Social acceptance (4 statements), School Environment (6 statements), Financial affairs (3statements).

❖ **Scoring system:**

scores are ranged from (0-4) with zero representing never has a problem, with (1) representing almost never has a problem, with (2) representing sometimes has a problem, with (3) representing often has a problem, with (4) representing almost always has a problem. The total score was 220 marks were classified into three levels; good (75%), average (50<75%) and poor (<50%).

II. Third Tool:

The children sleeping pattern check list, it was adapted from ***Owens et al., (2000)*****:** it was used to assess sleep disorders among children suffering from bronchial asthma. It includes (32 statements) under title:

Bed time (7 statements), time takes to sleep (1 statement), duration of the sleep (3 statements), anxiety when sleeping (1 statement), wake up during sleep (3 statements), occurrences associated sleep (7 statements), sleep breathing (3 statements) &wake up breathing (7 statements).

❖ **Scoring system:**

The total answers of data from children and their mothers regarding statement of sleeping disorders were classified into three levels: rarely, sometimes and usually. The total score was 96 marks were classified into three levels; Severe disorders (≥75%), Moderate disorders (50<75%) and acute disorders (<50%).

III. Operational Design:

The operational design for this study consisted of three phases, namely preparatory phase, pilot study and fieldwork.

Preparatory Phase:

This phase included reviewing of literature related knowledge regarding sleep disorders among children suffering from bronchial asthma.It was served to develop the study tools for data collection. During this phase, the researcher also visited the selected place to be acquainted with the personnel and the study settings. Development of the study tools was accomplished under the supervisors' guidance and experts' opinions were considered.

Validity and Reliability:

- **Content Validity:** It was ascertained by a group of experts (3 experts for pediatric nursing at Ain Shams University) to test its content validity by reviewing the tools clarity, relevance, comprehensives, and simplicity. Their opinions elicited regarding the format, layout, consistency, accuracy, completeness however, a minor modification was done.

- **Reliability:** The tool was tested to ensure that an assessment tool produces stable and consistent results overtimes reliability of the study tools used Alpha Cronbach test. The values of Cronbach' alpha of the reliability of Structured interviewing questionnaire, Quality of life inventory scale and the children sleeping pattern check list were (0.80), (0.84) and (0.82) respectively.

Pilot Study

Pilot study was carried out on 10% (n=10 mothers and their children) children with bronchial asthma and accompanying mothers at previously mentioned settings throughout the period of data collection. In order to test the applicability of the constructed tools and the clarity of the tools. The pilot has also served to estimate the time needed for each subject to fill in the questions. According to the results of the pilot, some corrections and omissions of items were performed as needed. The pilot

participants were not included in the main study sample.

Fieldwork

The actual field work was carried out over 3 months started at the beginning of November (2020) and was completed by the end of January (2021). The researcher was available at study setting by rotation, three days/weeks (Saturday, Monday and Thursday) during the morning from 9Am to 2 Pm and starting by introducing herself to children and their mothers then informing them about aim of the study. Where each child and mother were interviewed individually. The studied tool was filled in by the researcher; it consumed 45-60 minutes.

IV. Administrative Design

Approval was obtained through on issued letter from the form the Dean of Faculty of Nursing, Ain Shams University to directors of each previously mentioned setting. The researcher then met the hospital each director and explained the purpose and the methods of the data collection.

Ethical Consideration

The research approval obtained from the faculty ethical committee before starting the study. Verbal approval obtained from the child/mother before inclusion in the study; a clear and simple explanation given according to their level of understanding, physical and mental readiness. They secured that all the gathered data was confidential and used for research purpose only. The nurses informed that they are allowed to choose to participate or not in the study and they have the right to withdraw from the study at any time.

V. Statistical Analysis

Data collected from the studied sample was revised, coded and entered using. PC. Computerized data entry and statistical analysis were fulfilled using the statistical package for social sciences (SPSS) version 26.Data were presented using descriptive statistics in the form of frequencies, percentages. Chi-square test(X^2) was used for comparisons between qualitative variables and correlation cofficiency was used to test correlation between variables. The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the p-value was considered significant as the following:

- P value ≤0.05 was considered significant.
- P value <0.001 was considered as highly significant.
- P value >0.05 was considered insignificant.

Result:

Table (1): reveals that, less than half (47%) of the studied children's their age ranged from 9 to less than 12 years with their mean age 11.2±1.4years. Also, more than half (51%) of the studied children were ranked as the second child in their families. In addition, nearly half (49%) of them were at preparatory education.

Figure (1): displays that, more than half (58%) of the studied children had positive family history regarding bronchail asthma.

Table (2): shows that, nearly half (46%) of the studied children were presence of home smokers, nearly half (44%) of them had burning of garbage around home. Also, the majority 95% and 88% of the studied children were not use kerosene for lighting, and did not had ceramic earth respectively, most of studied children (82%) had presence of air conditioning in the home, more than four fifths (87%) of them had cooking in child place at home and half (50%) of them had using of cleansing agents while the child at home.

Table (3): displays that, half (50%) of the studied mothers had incomplete answer regarding meaning of sleep apnea. Whereas, more than half (57%) of the studied mothers did not know causes of sleep apnea. and half (50%) of them had correct answer concerning symptoms of sleep apnea during the day. Also, more than half (57%) of the studied mothers did not know the treatment of sleep disorders. In addition, less than half (45%) of them did not know how to care child with sleep disorders.

Table (4): shows that, more than one-quarter (29%) of the studied children were had good total quality of life, more than one third (39%) of them were had average total quality of

life and less than one-third (32%) of them were had poor total quality of life.

Table (5): illustrates, two third (66%) of the studied mothers had unsatisfactory knowledge regarding sleep disorders of children with bronchial asthma, while more than one third (34%) of them had satisfactory knowledge regarding sleep disorders of children with bronchial asthma.

Table (6): illustrates that, the great majority (90.3%) of the studied children were had unsatisfactory knowledge related to suffering from severe sleep disorders, while more than half (57.1%) of them had satisfactory knowledge regarding to suffering from mild sleep disorders. In addition, there is a highly statistically significant difference between sleep disorders of studied children and their total knowledge ($p < 0.01$).

Table (7): illustrates that, the majority (54.8%) of the studied children were had poor quality of life while they suffering from severe sleep disorders, while more than two fifth (42.9%) of them were had good quality of life while they suffering from mild sleep disorders. In addition, there is statistically significant difference between sleep disorders of studied children and their total quality of life ($p < 0.05$).

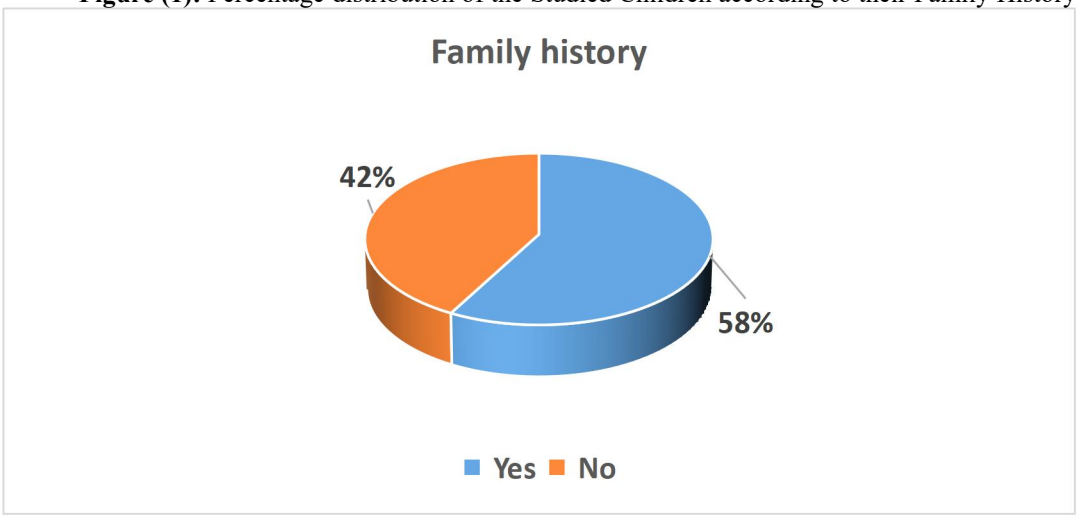
Table (8): illustrates that there are statistically significant differences between sleep disorders of the studied children and their gender, age of studied children ($p < 0.05$). Meanwhile, there are no statistically significant differences between sleep disorders of the studied children and their ranking in the family and level of education ($p > 0.05$).

Table (9): reveals that there are statistically significant positive correlation between "knowledge and self-care activities", "knowledge and quality of life" and "self-care activities and quality of life" ($p < 0.05$).

Table (1): Number and Percentage Distribution of The Studied Children According to their Characteristic, (n=100).

Items	Total Number (n=100)	
	No	%
Child Chronological Age (years):		
6<9	41	41.0
9<12	47	**47.0**
12≤19	12	12.0
X±SD 11.2±1.4		
Child's Ranking in The Family:		
First	26	26.0
Second	51	**51.0**
Third	14	14.0
Fourth or more	9	9.0
Child Level of Education:		
In The Nursry	15	15.0
Primary Education	17	17.0
Preparatory Education	49	**49.0**
Secondary Education	19	19.0

Figure (1): Percentage distribution of the Studied Children according to their Family History



for Bronchial Asthma, (n=100).

Table (2): Number and Percentage Distribution of the Studied Children according to their Triggers Factors that Induced Bronchial Asthma in their Home, (n=100).

Items s	Yes		No	
	No	%	No	%
Presence of craft workshop beside the home	38	38.0	62	62.0
Presence of home smoker	46	**46.0**	54	54.0
Burning of garbage around home	44	**44.0**	56	56.0
There are a home birds or animals inside home	34	34.0	66	66.0
Use kerosene for lighting	5	5.0	95	**95.0**
Presence of insects in the home	29	29.0	71	71.0
Use insecticides and air freshener in a child's place	39	39.0	61	61.0
Child home near an agricultural soil	34	34.0	66	66.0
Home ground ceramic	12	12.0	88	**88.0**
Presence of air conditioning in the home	82	**82.0**	18	18.0
Cooking in child place at home	87	**87.0**	13	13.0
Using of cleansing agents while the child at home	50	**50.0**	50	50.0

Table (3): Number and Percentage Distribution of the Studied Mothers according to their Knowledge about Sleep Apnea and Management of the Sleep Disorders (n=100).

Items	Total Number (n=100)					
	Complete correct answer		Incomplete correct answer		Don't know/Incorrect answer	
	No	%	No	%	No	%
Meaning of sleep apnea	15	15.0	50	**50.0**	35	35.0
Causes of sleep apnea	15	15.0	27	27.0	57	**57.0**
Symptoms of sleep apnea during the day	50	**50.0**	29	29.0	21	21.0
Handling sleep apnea	28	28.0	29	29.0	43	43.0
Treatment of sleep disorders	15	15.0	28	28.0	57	**57.0**
Care child with sleep disorders	25	25.0	30	30.0	45	**45.0**

Table (4): Number and percentage distribution of the Studied Children according to their total quality of life, (n=100).

Level of total quality	No	%
Good	29	29.0
Average	39	39.0
Poor	32	32.0

Table (5): Number and percentage Distribution of the Studied Mothers according to their Total Knowledge regarding Sleep Disorders of children with Bronchial Asthma, (n=100).

Level of Total Knowledge	No	%
Satisfactory	34	**34**
Unsatisfactory	66	**66**

Table (6): Relationship between Sleep disorders of Studied Children and Total knowledge.

Total knowledge	Sleep Disorders						X^2	P Value
	Mild (n=21)		Moderate (n=48)		Severe (n=31)			
	No	%	No	%	No	%		
Satisfactory	12	**57.1**	19	39.6	3	9.7	13.85	****0.001**
Unsatisfactory	9	42.9	29	60.4	28	**90.3**		

(**) Highly Statistical significant difference at p<0.01

Table (7): Relationship between Sleep disorders of Studied Children and Quality of life.

Quality of life	Sleep Disorders						X^2	P Value
	Mild (n=21)		Moderate (n=48)		Severe (n=31)			
	No	%	No	%	No	%		
Good	9	**42.9**	15	31.3	5	16.1		
Average	8	38.1	22	45.8	9	29.0	12.01	***0.02**
Poor	4	19.0	11	22.9	17	**54.8**		

(*)Statistically significant at p ≤0.05

Table (8): Relationship between Sleep disorders of Studied Children and Their Personal characteristics

Items	Sleep Disorders						X^2	P Value
	Mild (n=21)		Moderate (n=48)		Severe (n=31)			
	No	%	No	%	No	%		
Child chronological age (years)								
6<9	8	38.1	17	35.4	16	51.6		
9<12	7	33.3	28	58.3	12	38.7	10.1	**0.03***
12≤18	6	28.6	3	6.3	3	9.7		
Gender								
Male	12	57.1	22	54.8	24	77.4	7.7	**0.02***
Female	9	42.9	26	54.2	7	22.6		
Child's Ranking in the family								
First	7	33.3	15	31.3	4	12.9		
Second	9	42.9	24	50.0	18	58.1	4.7	0.58
Third	3	14.3	5	10.4	6	19.4		
Fourth or more	2	9.5	4	8.3	3	9.7		
Child level of education								
Illiterate	4	19.0	8	16.7	3	9.7		
Primary school	5	23.8	7	14.6	5	16.1	3.6	0.72
Preparatory school	7	33.3	24	50.0	18	58.1		
Secondary school	5	23.8	9	18.8	5	16.1		

(*)Statistically significant at p ≤0.05

Table (9): Correlation between Total Knowledge level, Self-Care Activities and Quality of life**.**

Items s		Knowledge	Quality of life	Self-care activities
Knowledge	**R**		0.67	
	P		**0.04***	
Quality of life	**R**			0.065
	P			**0.04***
Self-care activities	R	0.72		
	P	**0.03***		

(*)Statistically significant at p ≤0.05

Discussion

Regarding the characteristics of the studied children, the findings of the current study in **(Table 1),** revealed that less than half of the studied children their age group were ranged from 9 to 12 years with mean of 11.2±1.4 years. In addition nearly half of them were at preparatory education, The study findings were agreed with study done by ***Abd-Elrahim, (2019)*** entitled "Asthma-related lung function, sleep quality, and sleep duration in urban children." who mentioned that the mean age of the studied subject was 11.4± 0.3 years and more than half of them were at preparatory education.

As regards, the findings of the current study in **(Figure 1)** showed that, nearly three fifths of the studied children had positive family history regarding bronchail asthma. This finding was in agreement with a study done by ***Sadeq and Jaber, (2017)*** entitled "Epidemiology of Childhood Asthma in Fayoum City (District) Egypt. Who reviewed that the majority of the studied children had positive family history of asthma and allergy as a predisposing factors from their mothers.

Regarding to the triggers factors that induced bronchial asthma in studied children's homes **(Table 2)** the findings of the current study indicated that, nearly half of the studied children were presence of home smokers, of them had burning of garbage around home, Also, the majority of the studied children were not use kerosene for lighting, didn't had ceramic earth and more than three quarters of them had presence of air conditioning in the home,more than three quarters of them had cooking in child place at home.

These findings were agreed with a study done by ***AboElkheir, Hafez, & Mohamed, (2017)*** entitled "environmental and personal factors related to asthma severity among children" where only one fifth of severely asthmatic children under had contact with gas stoves, indicating that localized indoor air pollution, particulate matter as well as gases released during the use of gas stoves may play an important role in asthma severity.

The current study findings **(Table 3),** showed that, more than half of the studied mothers did not know causes of sleep apnea. Whereas, half of the studied mothers had incomplete answer regarding meaning of sleep apnea and half of them had correct answer concerning symptoms of sleep apnea during the day. It might be due to more than fifth of them were secondary educational level.

These results were in disagreement with a study done by ***Xu et al., (2021)*** entitled "Survey of parental awareness of obstructive sleep apnea among children in Guangdong province", where nearly half of respondents were aware of childhood obstructive sleep apnea among children.

Concerning of children according to their reported practices regarding their total quality of the current study findings **(Table 4)** showed that, nearly one third of the studied children were had good total quality of life, more than one third of them were had average total quality of life and one third of them were had poor total quality of life. From the researcher's point of view these results may be due to the effect of illness on the quality of life of asthmatic children and the family. Asthmatic children and their parents had lower scores in all domains.

These findings were in agreement with a study done by ***Juniper, (2017)*** entitled "Pediatric Asthma Quality of Life Questionnaire. Who mentioned that asthmatic patients who reported more frequent attacks of wheezy chest, admissions to hospital using of inhaled nebulizers, or inhaled corticosteroids obtained lower quality of life scores than others. Such findings suggested that quality of life is related to the level of the asthma control.

The current study findings **(Table 5),** showed that, more than half of the studied mothers did not know causes of sleep apnea. These results were in disagreement with a study done by ***Xu et al., (2021)*** entitled "Survey of parental awareness of obstructive sleep apnea among children in Guangdong province", where nearly half of respondents were aware of childhood obstructive sleep apnea among children. From the researcher point of view sleep disorder among asthmatic children may be due to side effects of pharmacological treatment of asthma, asthmatic children administered high doses of nebulised or intravenous β-adreno-ceptor agonists. Corticosteroid therapy can be a cause of sleep disturbances, especially with a high-dose. Aminophylline increases sleep latency, while decreasing sleep efficiency and total sleep time along.

In the researcher point of view it might be due to their children do not expose to sleep apnea so they do not know about it. Whereas, half of the studied mothers had incomplete answer regarding meaning of sleep apnea and half of them had correct answer concerning symptoms of sleep apnea during the day.

Regarding to relationship between sleep disorders of studied children and total knowledge, **(Table 6)** the current study findings illustrated that, the great majority of the studied children were had unsatisfactory knowledge related to suffering from severe sleep disorders, while more than half of them had satisfactory knowledge regarding to suffering from mild sleep disorders. In addition, there is a highly statistically significant difference between sleep disorders of studied children and their total knowledge ($p < 0.001$). These results were supported with results of ***Jensen, et al. (2017)*** entitled" Increased sleep latency and reduced sleep duration in children with asthma" who found that there are a statistical significant relation between sleep disorders and total knowledge score.

Regarding to relationship between sleep disorders of the children with bronchial asthma their quality of life, **(Table 7)** the current study findings illustrated that, more than half of the studied children were had poor quality of life suffering from severe sleep disorders, while more than two of them were had good quality of life suffering from mild sleep disorders. In addition, there was statistically significant difference between sleep disorders of studied children and their total quality of life ($p < 0.05$).

These findings were in agreement with a study done by ***Elnady, et al., (2019)*** entitled "Relation of asthma control with quality of life among a sample of Egyptian asthmatic school children" who mentioned that there was a significant negative correlation between asthma severity and symptoms score, emotional function score and overall asthmatic score ($p < 0.05$) which implied that when asthmatic children suffering from high grades of severity, they had a negative impact on their health-related quality of life (HRQOL).

Concerning of relationship between sleep disorders of asthmatic children and their sociodemographic characteristics; **(Table 8)** the current study findings illustrated that there were statistically significant differences between sleep disorders of the studied children and their gender, age of studied children ($p < 0.05$). Meanwhile, there were no statistically significant differences between sleep disorders of the studied children and their ranking in the family, level of education ($P \leq 0.05$).

These results were in similar with a study done by ***Perikleous, et al., (2018)*** entitled "Association of asthma and allergic rhinitis with sleep-disordered breathing in childhood, who reported a correlation between asthma control

and less likelihood of sleep-related breathing disorder (SRBD). The difference between them was small, with a P-value of 0.048, which, although is statistically significant, was very close to 0.05.

The current study findings in **(Table 9)** illustrated that, there was positive correlation between total knowledge level of the studied children and their total quality of life with a statistically significant difference between total knowledge level of studied children and their total quality of life ($p < 0.05$).

These findings were supported with a study done by ***Matsunaga et al., (2017)*** entitled "Physical activity and asthma control level in children and adolescents where there was no association between physical activity level and quality of life in study.

Conclusion

Based on results of the current study, it was concluded that, slightly more than one fifths of the studied children had mild sleep disorders, and approximately half of them had moderate sleep disorders, and more than one quarter of them had severe sleep disorder.

In addition, Sleep disturbance among children with asthma reported impact on the physical, psychological and social domains of quality of life. More than half of the studied children were dependent to perform self-care activities, one third of them had poor total quality of life.There were statistically significant differences between sleep disorders of the studied children and their gender, age. Meanwhile, there were no statistically significant differences between sleep disorders of the studied children and their ranking in the family and level of education.

Recommendations

The results of this study projected the following- recommendation:

- Provide discharge instructional pamphlet or illustrated booklet to mothers of childrens with bronchail asthma at all emergency departments, inpatient departments, outpatient hospital clinics and health centers for children suffering from bronchial asthma and for their mothers about asthma and related sleep disorders.
- Periodical follow-up for the level of health teaching for mothers having asthmatic children suffering from sleep disorder.
- Further researches are required involving larger study sample of children suffering from bronchial asthma and their mothers about the effect of discharge plan at different study settings, all over Egypt, in order to generalize the results.

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