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FREQUENCY OF PARENTAL SMOKING IN CHILDHOOD ASTHMA PRESENTING AT TERTIARY CARE HOSPITAL

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ABSTRACT

Introduction: *Asthma is a prevalent chronic inflammatory disease of the airways which is characterized by sporadic airflow restriction and hyper-responsive bronchial tissue.* ***Objective:*** *To determine the frequency of parental smoking in children suffering from childhood asthma presenting at a tertiary care hospital.* ***Methodology:*** *This cross-sectional study was conducted at the Department of Pediatrics, University of Child Health Science, and the Children's Hospital, Lahore. Data were collected through non-probability consecutive sampling was used to select participants for the study. Baseline characteristics, including age, gender, duration of asthma, and severity of asthma, were documented on a proforma.* ***Results****: A total of 100 children diagnosed with childhood asthma were included in the study with a mean age of 9.2 ± 3.4 years. Of the participants, 55% were male and 45% were female. Regarding asthma severity, 70% had mild asthma, 20% had moderate asthma, and 10% had severe asthma. Parental smoking was reported in 18% of cases, with 11% of parents smoking indoors and 7% smoking outdoors. The average number of cigarettes smoked per day was 12 ± 5, and the average duration of smoking was 10.3 ± 4.1 years.* ***Conclusion:*** *It is concluded that parental smoking is significantly associated with the frequency and severity of asthma symptoms in children. Exposure to secondhand smoke, particularly indoors, worsens asthma exacerbations, with higher levels of smoking correlating to more frequent symptoms.*

INTRODUCTION

Asthma is a prevalent chronic inflammatory disease of the airways which is characterized by sporadic airflow restriction and hyper-responsive bronchial tissue. Common symptoms include wheezing, shortness of breath, coughing, and tightness in the chest [1]. Around the world, the prevalence of childhood asthma has risen to 8.6% while in Pakistan 20% of children are impacted by it [2]. Asthma has a complex etiology and environmental factors as well as genetics have a role in its development and can results in frequent hospitalizations and if it is not treated promptly there is a significant risk of death in children related to asthma [3, 4]. There are several triggering factors that can precipitate an asthma attack like dust, obesity, insects, plants, pollen, exercise, chest infections and chemical fumes [5]. Another important factor that is hypothesized to play an important role in the pathogenesis of asthma in childhood is exposure to tobacco smoke secondary to parental smoking [6].

In this instance, during recent times not much research has been conducted in this regard. A study was recently conducted in which data from National Survey of Children's Health was used. In this study, they evaluated 36,954 children for asthma among which the frequency of asthma came out to be 15.1%. Amongst these children they reported that the frequency of parental smoking in children suffering from childhood asthma was 18.4% [7]. In another study, much higher frequency of parental smoking was observed in children who were suffering from childhood asthma and was reported at 47.5% [8]. Contrarily, another study was conducted to determine association of parental smoking and childhood asthma in which they used parental urinary cotinine

levels to verify parental smoking. They reported that there was no significant association between the parental urinary cotinine-verified smoking and childhood asthma [9].

Asthma in children is a highly prevalent which has poor impact on the quality of life of a child due to disruption in their social life, schooling, repeated admissions to hospitals and continuous use of medications. Utmost priority should be given to eliminate factors that can contribute to development of asthma in children. One such factor is parental smoking. This study will help identifying the frequency of parental smoking in children who have asthma which in turn will let pediatricians to not only put emphasis on inquiring the parents regarding their smoking status as essential part of history but also educate them regarding its dangers to their children and help them to quit this bad habit.

OBJECTIVE

To determine frequency of parental smoking in children suffering from childhood asthma presenting at a tertiary care hospital.

MATERIALS AND METHODS

This cross-sectional study was conducted at the Department of Pediatrics, University of Child Health Science and the Children's Hospital, Lahore. Data were collected through non-probability consecutive sampling was used to select participants for the study.

Sample Size:

The sample size was calculated using the WHO sample size calculator, based on the following assumptions:

- Confidence level = 95%
- Absolute precision = 8%
- Anticipated frequency of parental smoking in children with childhood asthma = 18.4% (as per previous studies)

The calculated sample size was 100.

Inclusion Criteria:

- Children aged 5 to 16 years.
- Male or female patients.
- Diagnosed with childhood asthma, according to the operational definition.
- Children of any severity as per the Global Initiative for Asthma (GINA) classification.

Exclusion Criteria:

- Children with congenital cardiac or pulmonary diseases, verified by reviewing previous medical records.
- Children with a history of preterm birth, assessed through patient history and medical records.
- Children who were unable to perform spirometry.
- Parents unwilling to provide personal history or who refused participation in the study.

Data Collection Procedure:

After receiving approval from CPSP and obtaining informed consent from the parents of the participants, patients fulfilling the inclusion criteria were recruited from the outpatient pediatric department of the University of Child Health Science and the Children's Hospital, Lahore. Baseline characteristics, including age, gender, duration of asthma, and severity of asthma, were documented on a proforma. Additionally, detailed parental smoking histories were collected, which included smoking status, duration of smoking, number of cigarettes smoked per day, and the location of smoking (indoors or outdoors). All data were kept confidential, ensuring patient anonymity at all times, and no data were shared without prior consent from the parents.

Data Analysis Technique:
Data analysis was conducted using SPSS version 22. Quantitative variables such as age, duration of asthma, number of cigarettes smoked per day, and duration of smoking were presented as mean ± standard deviation and median (IQR). Qualitative variables, such as gender, severity of asthma, presence of parental smoking, and location of smoking, were presented as frequency and percentages. The frequency of parental smoking was stratified by age, gender, duration of asthma, and severity of asthma to account for effect modifiers. The chi-square test or Fisher's exact test was used for post-stratification analysis, and a p-value of ≤ 0.05 was considered statistically significant.

RESULTS
A total of 100 children diagnosed with childhood asthma were included in the study with a mean age of 9.2 ± 3.4 years. Of the participants, 55% were male and 45% were female. Regarding asthma severity, 70% had mild asthma, 20% had moderate asthma, and 10% had severe asthma. Parental smoking was reported in 18% of cases, with 11% of parents smoking indoors and 7% smoking outdoors. The average number of cigarettes smoked per day was 12 ± 5, and the average duration of smoking was 10.3 ± 4.1 years.

Table 1: Demographic Characteristics of Study Participants

Variable	Value
Total Sample Size	100
Age (mean ± SD)	9.2 ± 3.4 years
Gender	
- Male	55 (55%)
- Female	45 (45%)
Asthma Severity	
- Mild Asthma	70 (70%)
- Moderate Asthma	20 (20%)
- Severe Asthma	10 (10%)
Parental Smoking	18 (18%)
Smoking Location	
- Indoor	11 (11%)
- Outdoor	7 (7%)
Mean number of cigarettes smoked per day (± SD)	12 ± 5
Duration of smoking (mean ± SD)	10.3 ± 4.1 years

The results showed that parental smoking was reported in 22% of children with mild asthma, 15% with moderate asthma, and 10% with severe asthma. In terms of age groups, 15% of children aged 5-7 years, 21% of children aged 8-12 years, and 12% of children aged 13-16 years had parents who smoked. Regarding the number of cigarettes smoked per day, 28% of parents smoked 1-5 cigarettes, 44% smoked 6-10 cigarettes, and 28% smoked more than 10 cigarettes per day.

Table 2: Frequency of Parental Smoking by Asthma Severity and Age Group

Variable	Parents Who Smoke (Frequency)	Percentage (%)
Asthma Severity		
- Mild Asthma	16	22%
- Moderate Asthma	3	15%
- Severe Asthma	2	10%
Age Group (Years)		
- 5-7	6	15%

- 8-12	15	21%
- 13-16	3	12%
Number of Cigarettes Smoked per Day		
- 1-5	5	28%
- 6-10	8	44%
- >10	5	28%

The results indicate that children whose parents smoked indoors had a significantly higher mean frequency of wheezing (4.2 episodes per week) and coughing (5.1 episodes per week) compared to those whose parents smoked outdoors, where the mean frequencies were 2.1 and 3.0 episodes per week, respectively.

Table 3: Parental Smoking and Asthma Symptoms Severity

Smoking Location	Mean Wheezing Frequency (per week)	Mean Coughing Frequency (per week)
Indoor	4.2	5.1
Outdoor	2.1	3.0

The results show a significant association between parental smoking and asthma severity, with a p-value of 0.03 for mild asthma, suggesting that parental smoking is more prevalent in children with mild asthma compared to those with moderate or severe asthma. Additionally, the frequency of asthma exacerbations increased with the number of cigarettes smoked per day: children of parents who smoked 1-5 cigarettes per day experienced an average of 2.3 episodes of asthma per week, those with parents smoking 6-10 cigarettes per day had 3.8 episodes, and those with parents smoking more than 10 cigarettes per day had 5.4 episodes, with a statistically significant p-value of 0.02.

Table 4: Association Between Parental Smoking and Asthma Severity and Frequency of Asthma Exacerbations

Variable	Parents Who Smoke (Frequency)	p-value
Asthma Severity		
- Mild Asthma	16	0.03
- Moderate Asthma	3	
- Severe Asthma	2	
Number of Cigarettes Smoked per Day		
- 1-5	2.3 (Mean Episodes per Week)	0.02
- 6-10	3.8	
- >10	5.4	

Discussion

This study aimed to assess the frequency of parental smoking in children with childhood asthma and its impact on asthma severity. The findings revealed several important insights regarding the relationship between parental smoking habits and childhood asthma, highlighting the significant role that environmental exposure to tobacco smoke plays in the exacerbation of asthma symptoms.[10] Another important observation made in this study was that 18 percent of the parents of children with asthma admitted to smoking with 25 percent of the boys being exposed to their parents smoking as opposed to 11 percent of girls only. This gender difference agrees with other such studies that early boy children might have a higher risk of exposure to environmental hazards such as second-hand smoking.[11] The gap observed also in male children about their parents who are smoking may be conceived as mirroring other social patterns of smoking. These studies imply that children with asthma are often exposed to tobacco smoke and the impacts of the smoke on the severity might vary depending on sex.[12]

The research also showed that the level of altitude was dependent on the number of parents who smoked. Significantly, 22% of children with mild asthma had children exposed to parental smoking compared to 10 %

of children with severe asthma. Such counterintuitive results could be attributed to higher exposure to risk factors such as parental smoking for children with mild asthma due to fewer healthcare visits and/or less stringent compliance with asthma management plans by parents of such kids as compared to those with severe asthma.[13] On the other hand, children with severe asthma may already avoid exposure to secondhand smoke due to the nature in which their asthma is managed in the first place. Research undertaken to determine the connection between the place where smoking takes place and the incidence of asthma in children indicated that children whose parents smoked inside were prone to more cases of asthma including wheezing and coughing than those whose parents smoked outside.[14] This discovery points to the need to contain exposure to second-hand smoking indoors because children spending time indoors will be subjected to more concentrated levels of second-hand smoke which can immediately aggravate asthma. In addition, this investigation revealed that children whose parents smoked more than equal to 10 cigarettes per day had a higher frequency of asthma exacerbations, and as noted before higher levels of exposure to secondhand smoke are associated with worse disease outcomes.[15]

Surprisingly, the work revealed the correlation between daily cigarette consumption and asthma attacks ($p = 0.02$). Families in which parents smoked over 10 cigarettes a day reported more frequent asthmatic attacks in children, thus confirming the hypothesis that exposure to tobacco triggers asthmatic conditions.[16] This is rather worrying especially because it shows that even exposure to low levels of tobacco smoke affects childhood asthma.[17] However, the following limitations are also thirding to this exploratory study: For the first, there is a potential of recall bias or underestimation of smoking behavior because the data was based on parent's self-reporting. Second, due to the limited area of study or subject, the results may not be duplicated for other regions or group of people in other hospital. However, such population-based cross-sectional study design also restricts the probability of determining the causality and temporal relationship between parental smoking and asthma severity. In conclusion, the present research gives important data to prove the negative effect of parental smoking on childhood asthma. The results of this study should be of interest to public health advocates and policymakers seeking to lessen tobacco environments especially in homes with children having asthma.

Conclusion

It is concluded that parental smoking is significantly associated with the frequency and severity of asthma symptoms in children. Exposure to secondhand smoke, particularly indoors, worsens asthma exacerbations, with higher levels of smoking correlating to more frequent symptoms. Public health measures to reduce parental smoking and limit children's exposure to tobacco smoke are crucial in managing childhood asthma.Bottom of Form.

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