

Original Article

Sociodemographic Characteristics of Childhood Asthma in Bangladeshi Population: An Observational Study

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Abstract

Background: Childhood asthma is a growing public health concern in Bangladesh. Understanding the sociodemographic profile of affected children is essential for targeted preventive and management strategies. **Objectives:** To describe the sociodemographic and early-life characteristics of children with asthma attending a tertiary care hospital in Bangladesh. **Methods:** This hospital-based cross-sectional observational study was conducted at the Department of Paediatrics, Rajshahi Medical College Hospital. A total of 104 children aged <12 years with physician-diagnosed asthma were enrolled over twelve months. Sociodemographic and early-life variables were collected through structured interviews and analyzed using SPSS version 24. Continuous variables were expressed as mean $\pm$ SD and categorical variables as frequency and percentage. **Result:** The mean age of children was 7.97 ± 2.06 years. The majority (43.3%) were aged 8–<10 years. Male children constituted 55.8% (male: female ratio 1.26:1). Most parents were aged 30–40 years (59.6%). Urban residence was observed in 70.2% of cases. Regarding parental education, 27.9% completed higher secondary certificate (HSC), 26% below SSC, and 18.3% were illiterate. Monthly family income was most commonly 10,000–20,000 BDT (39.4%). Cesarean section delivery was reported in 58.7% of children. Only 38.5% had exclusive breastfeeding for six months. Family history of asthma was present in 32.7% of cases. Most families (63.5%) had two children. **Conclusion:** Childhood asthma in this tertiary-care cohort was more common among school-aged boys, urban residents, and middle-income families. A considerable proportion had cesarean birth history and lacked exclusive breastfeeding. These findings highlight potential sociodemographic and early-life patterns relevant for asthma risk profiling in Bangladesh.

Keywords: Childhood asthma, sociodemographic profile, Bangladesh, observational study, paediatric epidemiology.

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Background

Asthma is one of the most common chronic respiratory diseases affecting children worldwide and it represents a major public health challenge, mainly in low- and middle-income countries. It is characterized by chronic airway inflammation, variable airflow limitation, and recurrent episodes of wheezing, chest tightness, cough, and shortness of breath. [1, 2] Globally, approximately 300 million individuals are affected by asthma, and this number is projected to increase to 400 million by 2025. [3] The International Study of Asthma and Allergies in Childhood (ISAAC) reported a global prevalence of 11% among children aged 6–7 years

and 14% among those aged 13–14 years. [4]

In South Asia, the burden of childhood asthma is increasing steadily. In Bangladesh, asthma remains a significant contributor to pediatric morbidity. A community-based study in a coastal area of Bangladesh reported a childhood asthma prevalence of 11.8%, [5] while the National Asthma Prevalence Study identified asthma symptoms in 7.3% of children aged 5–14 years. [6] Asthma is associated with substantial school absenteeism, activity limitation, and impaired quality of life. [7] Poorly controlled asthma during childhood may also predispose individuals to chronic obstructive pulmonary disease later in life. [8, 9]

Sociodemographic and early-life factors are increasingly recognized as important determinants of asthma risk and disease expression. Urban residence has been linked with higher asthma prevalence, possibly due to environmental pollution and lifestyle changes. [10, 11] Mode of delivery, particularly cesarean section, has been associated with altered immune development and increased risk of allergic diseases, including asthma. [12] Exclusive breastfeeding has been suggested to have a protective effect against allergic sensitization and respiratory illnesses. [13] Furthermore, genetic predisposition plays a role, as family history remains a recognized risk factor. [14]

Despite the growing burden of childhood asthma in Bangladesh, limited hospital-based data exist describing the sociodemographic distribution and early-life characteristics of affected children. Understanding these patterns is essential for risk stratification, targeted prevention strategies, and resource allocation. Therefore, this study aimed to describe the sociodemographic characteristics of children with asthma attending a tertiary care hospital in Bangladesh.

Materials and Methods

This hospital-based cross-sectional observational study was conducted in the Department of Pediatrics at Rajshahi Medical College Hospital, Bangladesh, over a twelve-month period (February 2022 to January 2023) following ethical approval from the Ethical Review Committee (Ref.-RMC/ER-C/2022/57). A total of 104 children aged less than 12 years with physician-diagnosed bronchial asthma along with their parents, who attended inpatient and outpatient department of Pediatrics, were enrolled using purposive sampling after fulfilling inclusion and exclusion criteria. All the patients Children with asthma for at least one year whose parents provided informed written consent were included, while those with significant comorbidities such as cystic fibrosis, tuberculosis, cardiac disease, or immunodeficiency were excluded. Data were collected through direct, in-person interviews utilizing a predesigned and structured questionnaire. Socio-demographic variables included child's age, gender, mode of delivery, exclusive breastfeeding history, family history of asthma, number of siblings, parental age, education, monthly family

income, and place of residence (urban/rural). All collected data were checked, coded, and entered into SPSS version 24.0 for analysis. Continuous variables were expressed as mean with standard deviation, and categorical variables were presented as frequencies and percentages. A p-value of less than 0.05 was considered statistically significant where applicable.

Results and Observation

A total of 104 children with physician-diagnosed asthma were included in the study. The mean age of the children was 7.97 ± 2.06 years, with the majority (43.3%) belonging to the 8–<10 years age group, followed by 22.1% in the 6–<8 years group, 21.2% in the 10–12 years group, and 13.5% in the 2–<6 years group (Figure 1). Male children constituted 55.8% of the study population, while females accounted for 44.2%, yielding a male-to-female ratio of approximately 1.26:1 (Figure 2). Most parents (59.6%) were aged between 30–40 years, followed by 26.9% aged 20–30 years and 13.5% aged over 40 years (Figure 3). Regarding residence, 70.2% of the children were from urban areas, whereas 29.8% were from rural areas (Figure 4). In terms of educational status, 27.9% of parents had completed higher secondary education (HSC), 26% had education below SSC, 21.1% had completed SSC, 18.3% were illiterate, and only 6.7% were graduates or above (Figure 5). Monthly family income was most commonly between 10,000–20,000 BDT (39.4%), followed by less than 10,000 BDT (26%), more than 40,000 BDT (20.2%), and 20,000–40,000 BDT (14.4%) (Figure 6). Cesarean section was the mode of delivery in 58.7% of cases, while 41.3% were delivered by normal vaginal delivery (Figure 7). Only 38.5% of children had a history of exclusive breastfeeding for the first six months, whereas 61.5% received mixed feeding (Figure 8). Most families (63.5%) had two children, 22.1% had one child, and 14.4% had more than two children (Figure 9). Family history of asthma was present in 32.7% of cases, while 67.3% reported no such history (Figure 10).

Overall, childhood asthma in this tertiary-care cohort was predominantly observed among school-aged male children from urban, middle-income families, with a notable proportion having cesarean birth history and absence of exclusive breastfeeding.

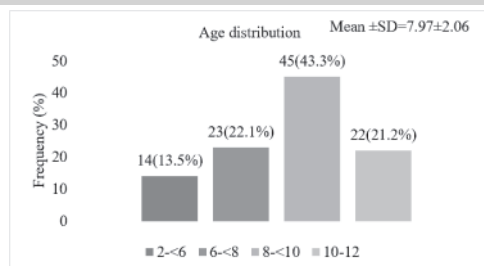


Figure 1: Age distribution of the study participants (n=104).

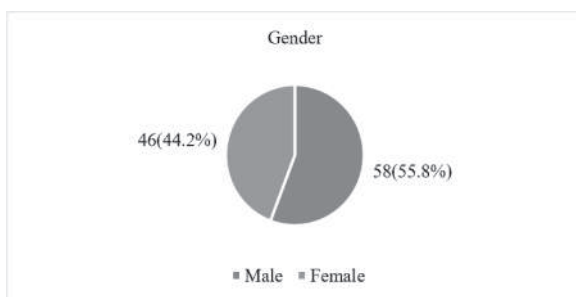


Figure 2: Gender distribution of the study participants (n=104).

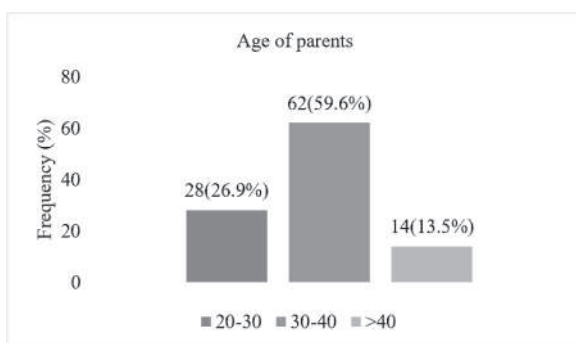


Figure 3: Age distribution of the parents of study participants (n=104).

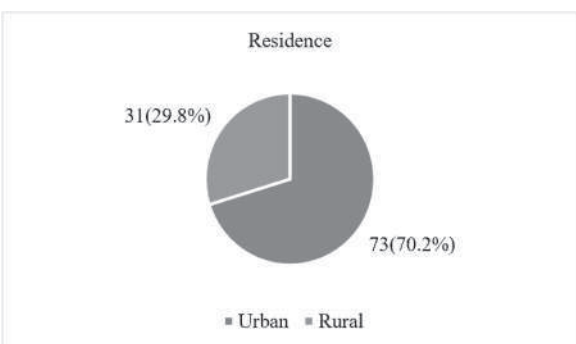


Figure 4: Residence of the parents of study participants (n=104).

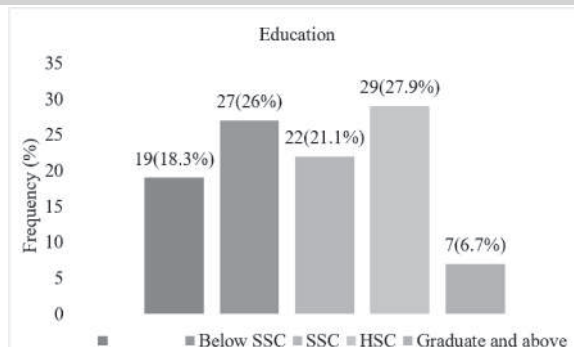


Figure 5: Education of the parents of study participants (n=104).

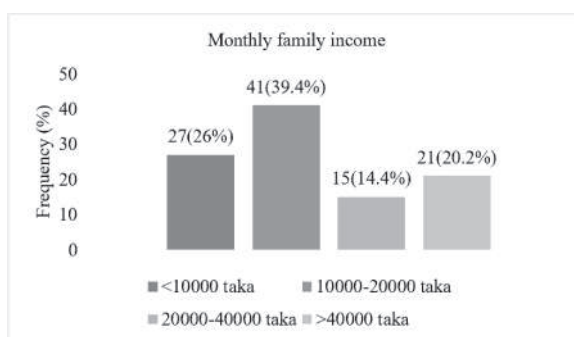


Figure 6: Monthly family income of the parents of study participants (n=104).

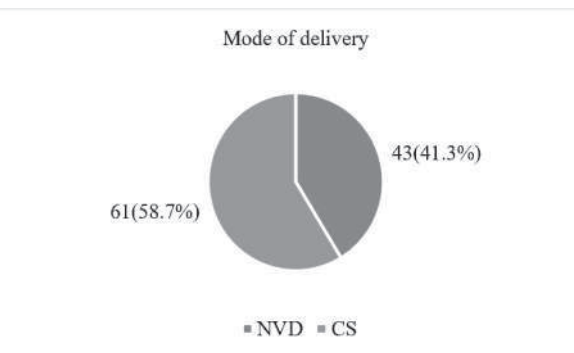


Figure 7: Mode of delivery of the study participants (n=104).

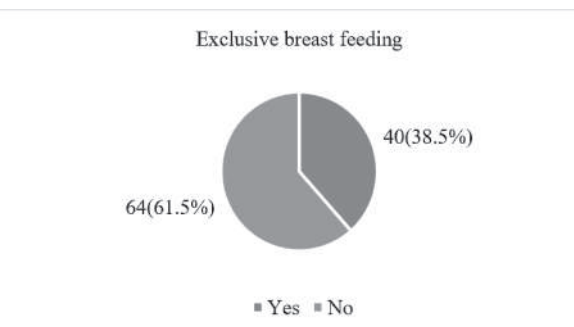


Figure 8: Exclusive breast feeding history of the study participants (n=104).

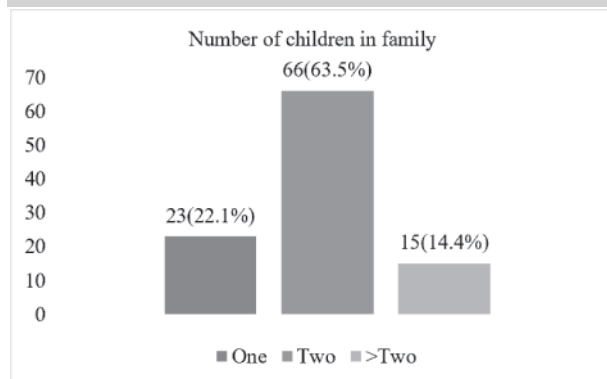


Figure 9: Number of children in a family (n=104)

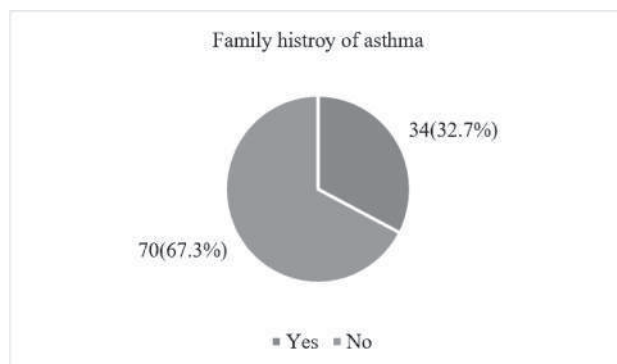


Figure 10: Family history of asthma in the study participants (n=104).

Discussion

This observational study describes the sociodemographic and early-life characteristics of children with asthma attending a tertiary care hospital in Bangladesh. The findings indicate that childhood asthma in this cohort was more common among school-aged children, males, urban residents, and middle-income families, with notable proportions having cesarean birth history, absence of exclusive breastfeeding, and positive family history of asthma.

In the present study, the mean age of affected children was approximately eight years, with the highest proportion (43.3%) belonging to the 8–<10 years age group. This aligns with global epidemiological data indicating that asthma prevalence peaks during school age, when environmental exposure and school-related triggers become more prominent.⁴ Male predominance (55.8%) was observed, consistent with previous reports suggesting higher asthma prevalence in boys during childhood, potentially due to smaller airway caliber relative to lung size and hormonal influences. [4, 14]

Urban residence accounted for 70.2% of cases,

supporting evidence that urbanization is associated with higher asthma prevalence. Studies have demonstrated that exposure to air pollution, traffic-related nitrogen dioxide (NO₂), indoor allergens, and lifestyle changes contribute to increased asthma incidence in urban populations. [10, 11] In Bangladesh, rapid urbanization and environmental pollution may similarly contribute to this observed distribution.

Regarding parental sociodemographic status, most parents were aged 30–40 years and had secondary to higher secondary education. Although this study was descriptive, previous literature suggests that parental education and socioeconomic status can influence health-seeking behavior, environmental exposure, and disease recognition. [2]

The high rate of cesarean delivery (58.7%) among asthmatic children in this cohort is noteworthy. Several studies have reported an association between cesarean section and increased risk of asthma and allergic diseases, potentially mediated by altered neonatal gut microbiota and immune development. [12, 15] The lack of exposure to maternal vaginal flora during cesarean birth may affect immune maturation and predispose children to atopic disorders.

Exclusive breastfeeding was reported in only 38.5% of cases. Breastfeeding has been shown to confer immunological protection and may reduce the risk of respiratory infections and allergic diseases. A systematic review and meta-analysis demonstrated a protective association between breastfeeding and reduced asthma risk in early childhood. [13] Although causality cannot be inferred from this study, the relatively low rate of exclusive breastfeeding highlights a potentially modifiable early-life factor.

Family history of asthma was present in 32.7% of cases, supporting the role of genetic predisposition. Asthma is recognized as a multifactorial disease influenced by both genetic susceptibility and environmental exposure. [14] The presence of familial clustering reinforces the need for early monitoring in children with positive family history. [16]

Monthly family income in most participants ranged between 10,000–20,000 BDT, representing a middle-income group. Socioeconomic status may influence living conditions, environmental exposures, indoor pollution, and access to healthcare. However, both low and high socioeconomic settings have been associated with asthma through

different mechanistic pathways, including hygiene hypothesis, pollution exposure, and lifestyle factors. [10, 17, 18]

Taken together, this study highlights identifiable sociodemographic patterns in childhood asthma within a Bangladeshi tertiary-care setting. Urban residence, male sex, cesarean birth, limited exclusive breastfeeding, and positive family history appear as prominent characteristics. While the cross-sectional nature of this study prevents causal inference, the findings are consistent with international literature and underscore the importance of early-life and environmental influences in asthma epidemiology.

Conclusion

Childhood asthma in this Bangladeshi tertiary-care population was predominantly observed among urban, school-aged male children from middle-income families. High cesarean delivery rates and low exclusive breastfeeding prevalence were notable early-life characteristics. These findings provide baseline sociodemographic evidence that may inform national pediatric asthma risk profiling and preventive interventions.

Limitations

This study has several limitations that should be acknowledged. First, as a single-center investigation, the findings may not be fully generalizable to the broader pediatric population. Second, the relatively small sample size may limit the statistical power of the results. Finally, because data were collected using self-administered questionnaires, the possibility of recall bias cannot be entirely excluded.

Recommendations

Future research should incorporate multicenter approaches with larger sample sizes and population-based study designs to validate these findings. Such investigations would facilitate a more comprehensive understanding of the observed associations and assist in developing appropriate prevention strategies suited to the Bangladeshi population.

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