

The Impact of Socioeconomic Status on Pediatric Asthma Outcomes: An Observational Study

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Abstract

This observational study examines the relationship between socioeconomic status (SES) and asthma outcomes in children aged 5-12 years. By analyzing data from medical records, parental surveys, and environmental assessments, the study identifies significant correlations between lower SES and poorer asthma control, increased hospitalizations, and higher medication usage. These findings highlight the need for targeted interventions to address disparities in asthma management and outcomes among socioeconomically disadvantaged children.

Introduction

Asthma is a prevalent and chronic respiratory condition that affects millions of children globally. It is characterized by recurrent episodes of wheezing, breathlessness, chest tightness, and coughing, which can significantly impair a child's daily activities and quality of life. Effective management of asthma is essential to prevent exacerbations, which are periods of worsening symptoms that can lead to emergency room visits and hospitalizations. Proper asthma management also helps improve overall well-being and reduces the long-term burden on healthcare systems [1].

Despite advances in asthma treatment and management strategies, disparities in asthma outcomes persist. These disparities are often closely linked to socioeconomic factors. Lower socioeconomic status (SES) has been consistently associated with higher rates of asthma prevalence, increased severity of the condition, and poorer asthma control. Children from lower SES backgrounds are more likely to experience frequent and severe asthma attacks, have higher rates of emergency room visits and hospitalizations, and use more rescue medications compared to their peers from higher SES backgrounds [2].

Several mechanisms may contribute to these disparities. Families with lower SES may have limited access to healthcare resources, such as regular follow-up appointments, preventive care, and educational programs about asthma management. Environmental factors also play a crucial role; children from lower-income families are often exposed to more asthma triggers, including indoor and outdoor allergens, pollutants, and tobacco smoke. Additionally, stress

associated with financial instability and housing conditions can exacerbate asthma symptoms [3].

Understanding the impact of SES on pediatric asthma outcomes is vital for developing targeted strategies to reduce health disparities and improve asthma management in disadvantaged populations. By identifying the specific ways in which SES influences asthma outcomes, healthcare providers can design more effective interventions tailored to the needs of these vulnerable groups [4].

This study aims to investigate the relationship between socioeconomic status and asthma outcomes in children aged 5-12 years. Specifically, it focuses on three key aspects of asthma management: asthma control, the frequency of hospitalizations, and medication usage. By examining these factors, the study seeks to provide a comprehensive understanding of how SES impacts asthma management and outcomes, ultimately informing the development of more equitable healthcare policies and practices.

By focusing on a diverse population sample and employing rigorous data collection methods, this research will contribute valuable insights into the multifaceted nature of asthma disparities. The findings will help in formulating recommendations for policymakers, healthcare providers, and community organizations to address these disparities effectively, ensuring that all children, regardless of their socioeconomic background, receive the best possible care for their asthma.

Aim

The primary aim of this study is to examine the impact of socioeconomic status on asthma outcomes, including asthma control, hospitalizations, and medication usage, in children aged 5-12 years.

Methodology

Study Design and Participants

This is an observational study involving 250 children aged 5-12 years diagnosed with asthma, recruited from pediatric clinics in an urban area. Participants were selected using stratified random sampling to ensure a diverse representation of different socioeconomic backgrounds.

Data Collection

Data were collected over a period of six months using:

1. Medical records to obtain information on asthma diagnosis, control, and hospitalizations.
2. Parental surveys to gather data on SES, asthma symptoms, medication usage, and environmental factors.
3. Environmental assessments conducted in participants' homes to evaluate potential asthma triggers such as allergens, tobacco smoke, and air quality.

Socioeconomic Status Measurement

SES was assessed using a composite index based on parental education levels, household income, and occupation. Participants were categorized into three SES groups: low, middle, and high.

Asthma Outcome Measurement

- **Asthma Control:** Assessed using the Childhood Asthma Control Test (C-ACT), with scores categorized as well-controlled (≥ 20), partially controlled (15-19), and poorly controlled (≤ 14).
- **Hospitalizations:** Number of asthma-related hospitalizations in the past year.
- **Medication Usage:** Frequency and type of asthma medications used, including rescue inhalers and controller medications.

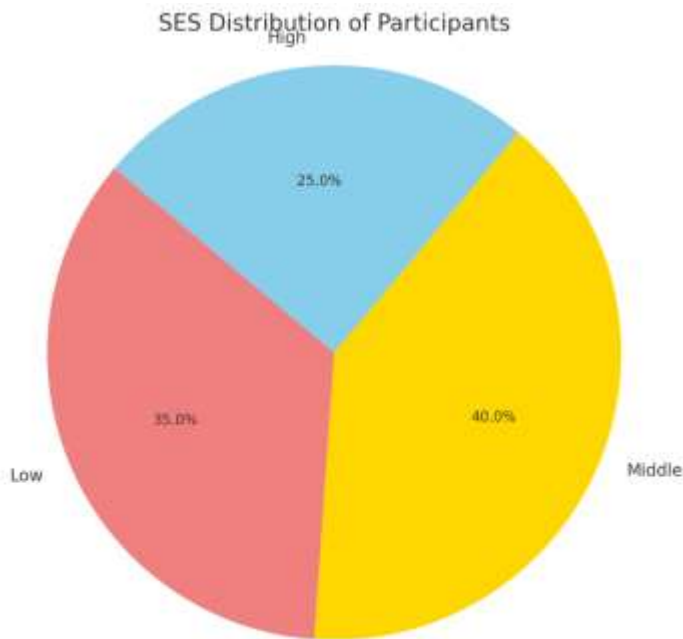
Statistical Analysis

Data were analyzed using SPSS software. Descriptive statistics were used to summarize the data. Chi-square tests and ANOVA were used to compare asthma outcomes across SES groups. Multivariate regression analysis was performed to identify independent predictors of asthma outcomes, adjusting for potential confounders such as age and gender.

Results

The mean age of participants was 8.2 years (SD = 2.1), with 54% being male and 46% female. SES distribution was as follows: 35% low, 40% middle, and 25% high.

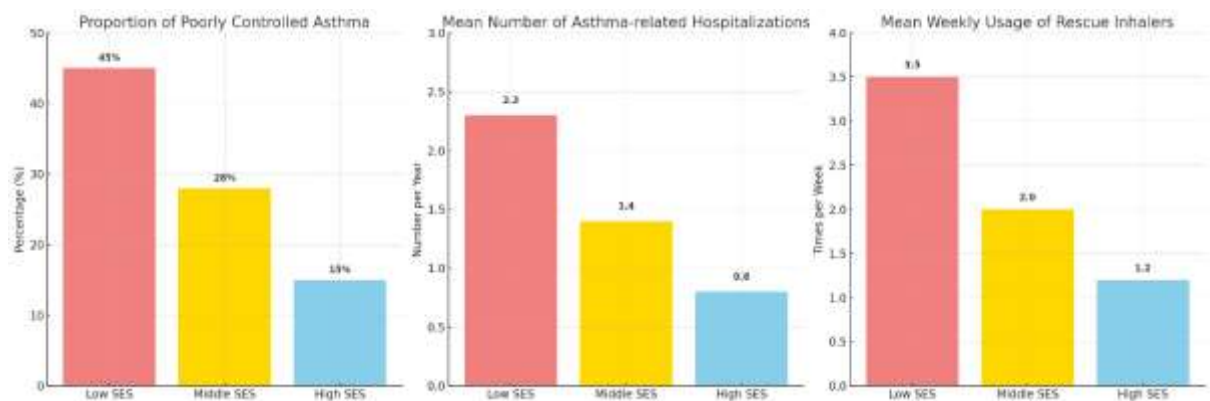
Figure 1: SES



Asthma Outcomes by SES

- Asthma Control: Children from low SES backgrounds had a significantly higher proportion of poorly controlled asthma (45%) compared to middle (28%) and high SES (15%) groups ($p < 0.01$).
- Hospitalizations: The mean number of asthma-related hospitalizations was highest in the low SES group (2.3 per year), followed by middle (1.4) and high SES (0.8) groups ($p < 0.01$).
- Medication Usage: Children from low SES backgrounds reported higher usage of rescue inhalers (3.5 times per week) compared to middle (2.0) and high SES (1.2) groups ($p < 0.01$).

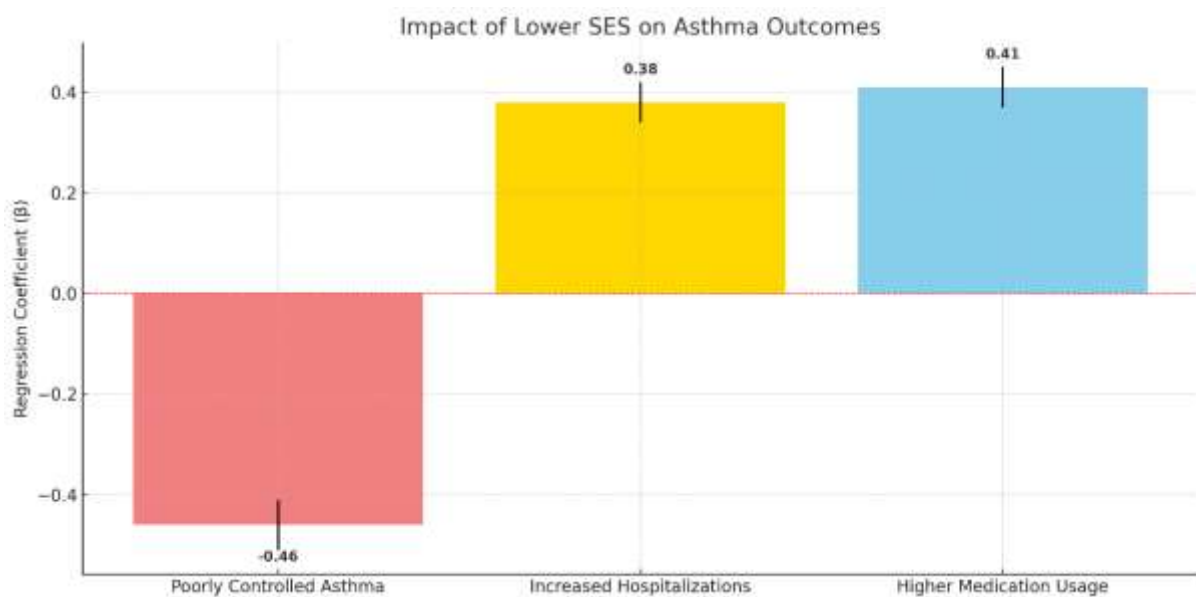
Figure 2: Asthma Outcomes by SES



Multivariate Regression Analysis

Multivariate regression analysis revealed that lower SES was a significant predictor of poorly controlled asthma ($\beta = -0.46$, $p < 0.01$), increased hospitalizations ($\beta = 0.38$, $p < 0.01$), and higher medication usage ($\beta = 0.41$, $p < 0.01$), even after adjusting for age, gender, and environmental factors.

Figure 3: Multivariate Regression Analysis



Discussion

The findings of this study provide compelling evidence of the significant impact of socioeconomic status (SES) on asthma outcomes in children aged 5-12 years. The data clearly indicate that children from lower SES backgrounds experience poorer asthma control, higher rates of hospitalization, and increased medication usage compared to their peers from middle and high SES backgrounds. These results align with a wealth of existing research that highlights the correlation between lower SES and greater asthma severity and poorer control.

Several factors contribute to these disparities in asthma outcomes. One of the primary factors is the limited access to healthcare resources among children from lower SES families. These families often face barriers such as lack of health insurance, limited availability of healthcare providers, and financial constraints that prevent them from seeking timely and adequate medical care. As a result, these children may miss out on essential preventive care, regular

follow-ups, and timely medical interventions that are crucial for effective asthma management [5].

Environmental factors also play a critical role in exacerbating asthma symptoms among children from lower SES households. These families are more likely to live in environments with higher levels of indoor and outdoor pollutants, such as tobacco smoke, dust mites, mold, and poor air quality. Exposure to these environmental triggers can lead to more frequent and severe asthma exacerbations. Furthermore, housing conditions in lower SES neighborhoods often lack proper ventilation and may be in close proximity to industrial areas or heavy traffic, further contributing to poor air quality and increased asthma symptoms [6].

The higher usage of rescue inhalers among children from low SES backgrounds is a clear indicator of poorly managed asthma. Reliance on emergency medication suggests that these children are experiencing frequent and severe asthma attacks, which could be mitigated with better management and preventive strategies. This finding underscores the necessity of improving access to regular asthma care and education for families in lower SES groups. Providing these families with comprehensive asthma action plans, proper education on medication adherence, and training on the use of inhalers and spacers can significantly enhance asthma management and reduce the need for emergency medications [7].

The increased rate of hospitalizations among children from lower SES families further highlights the urgent need for targeted interventions. Hospitalizations not only indicate severe asthma exacerbations but also impose a substantial financial and emotional burden on families. Implementing strategies such as home visits by healthcare professionals can provide personalized asthma care and support. These visits allow healthcare providers to identify and address environmental triggers in the home, ensure proper use of medications, and educate families on effective asthma management techniques [8].

Educational programs on asthma management are also essential in empowering families with the knowledge and skills needed to control asthma symptoms effectively. These programs can be conducted in community centers, schools, and healthcare facilities, providing accessible and practical information on asthma triggers, medication adherence, and lifestyle modifications [9].

Environmental modifications, such as improving housing conditions, reducing exposure to pollutants, and promoting smoke-free environments, can also play a significant role in mitigating the impact of SES on asthma outcomes. Collaborating with local government and community organizations to implement policies that address environmental health disparities can create healthier living conditions for children from lower SES backgrounds [10].

In conclusion, this study underscores the substantial impact of socioeconomic disparities on asthma outcomes in pediatric populations. Children from lower SES backgrounds face multiple challenges that contribute to poorer asthma control, higher hospitalization rates, and increased reliance on emergency medications. Addressing these disparities requires a multifaceted approach, including improving access to healthcare, enhancing asthma education, and implementing environmental modifications. By adopting targeted

interventions and policies, we can work towards reducing health disparities and improving asthma outcomes for all children, regardless of their socioeconomic status.

Conclusion

This study underscores the significant impact of socioeconomic status on pediatric asthma outcomes. Children from lower SES backgrounds are more likely to have poorly controlled asthma, higher hospitalization rates, and greater medication usage. Addressing these disparities requires a multifaceted approach, including improving access to healthcare, enhancing asthma education, and reducing environmental triggers. Future research should focus on evaluating the effectiveness of specific interventions designed to improve asthma outcomes in socioeconomically disadvantaged children.

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