

The prevalence of asthma and allergic rhinoconjunctivitis among preschool children in South Africa



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The self-reported prevalence of asthma and allergic rhinoconjunctivitis among preschool children in Mabopane and Soshanguve was 6.8% and 18.5%, respectively. The use of gas significantly increases the risk of asthma and allergic rhinoconjunctivitis

BACKGROUND

- The study aimed to investigate the association between air pollution sources and the prevalence of asthma and allergic rhinoconjunctivitis among preschool children in Mabopane and Soshanguve townships in Gauteng, South Africa. This research was conducted in response to the lack of environmental epidemiology studies on air pollution in South Africa.
- Children are particularly vulnerable to the health effects of air pollution because their bodies are still developing, including their brains, immune systems, and lung capacity.¹
- Globally, air pollution has been linked to 709,000 deaths in children under 5 years old.² In South Africa, major air pollution sources include industrial emissions, vehicle exhaust, residential burning of biomass, combustion of paraffin, power plants, and indoor environmental tobacco smoke (ETS).³

METHODS

- The study was conducted in Mabopane and Soshanguve townships, South Africa.
- Across-sectional study design was utilized, using the Phase III International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire.
- A list of 42 preschools in the Mabopane and Soshanguve areas was obtained from the Department of Education. We contacted the principals and invited them to participate.
- A total of 1844 parents/guardians completed the questionnaire. The final data analysis (STATA V18) included 1840 valid responses (4 were discarded due to errors).

RESULTS

- Most participants were from Soshanguve (n = 1039), with 53.6% female and 46.2% male. Electricity was the most used energy source in both townships for heating and cooking (88.5%).

Table 1. Demographic characteristics and sources of air pollution exposure of the participant by residence (n=1840)

Place of Residence					
Variable	Mabopane (n=801)		Soshanguve (n=1039)		Total (%)
	No	%	No	%	
Sex					
Male	365	45.6	486	46.8	851 (46.2)
Female	434	54.2	552	53.1	986 (53.6)
Residential cooking/heating fuel type					
Electricity	727	90.8	901	86.7	1628 (88.5)
Gas	43	5.4	72	6.9	115 (6.2)
Open fire (paraffin/coal/wood)	18	2.2	43	4.1	61 (3.3)
Frequency of trucks passing near residence on weekdays					
Almost all-day	43	5.4	81	7.8	124 (6.7)
Frequently through the day	192	24.0	214	20.6	406 (22.1)
Seldom	353	44.1	466	44.9	819 (44.5)
Never	199	24.8	255	24.5	454 (24.7)
Smoking exposure at home in the past 30 days					
No	621	77.5	793	76.3	1414 (76.8)
Yes	134	16.7	172	16.6	306 (16.6)
Smoking exposure at preschool in the past 30 days					
No	684	85.4	831	80.0	1515 (82.3)
Yes	14	1.7	11	1.1	25 (1.4)

RESULTS CONTINUED

- The self-reported prevalence of asthma and allergic rhinoconjunctivitis among preschool children in Mabopane and Soshanguve was 6.8% and 18.5%, respectively. The use of gas significantly increased the likelihood of asthma and allergic rhinoconjunctivitis ($p < 0.05$). Similarly, the use of open fire sources such as paraffin, coal, or wood for cooking and heating also increased the likelihood of asthma. Additionally, the constant presence of trucks passing near homes throughout the weekdays significantly increased the likelihood of allergic rhinoconjunctivitis. Exposure to ETS at home significantly increased the likelihood of allergic rhinoconjunctivitis ($p < 0.05$).

Table 2: Prevalence of asthma and allergic rhinoconjunctivitis amongst the participants (Mabopane and Soshanguve combined) along with adjusted odd ratios (aOR's).

Variable	Asthma (n= 6.8%)		Allergic rhinoconjunctivitis (n= 18.5%)	
	Adjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
Residential cooking/heating fuel type				
Electricity	1		1	
Gas	3.91 (2.19 - 7.0)	<0.001	2.48 (1.55 - 3.96)	<0.001
Open fire	3.69 (1.22 - 11.2)	0.021	1.25 (1.55 - 3.96)	0.602
Frequency of trucks passing near residence on weekdays				
Never	1		1	
Almost all-day	0.13 (0.02 - 1.0)	0.050	1.31 (0.72 - 2.38)	0.379
Frequently through the day	0.1 (0.03 - 0.28)	<0.001	0.44 (0.28 - 0.69)	<0.001
Seldom	0.97 (0.62 - 1.51)	0.880	0.90 (0.65 - 1.25)	0.529
Smoking exposure at home in the past 30 days				
No	1		1	
Yes	1.43 (0.87 - 2.36)	0.159	2.11 (1.49 - 2.97)	<0.001
Smoking exposure at preschool in the past 30 days				
No	1		1	
Yes	1.95 (0.52 - 7.38)	0.323	1.24 (1.49 - 2.96)	0.662

Statistically significant values ($p < 0.05$) for the adjusted odds ratios are marked in bold font. The model was adjusted for all variables.

CONCLUSION

- The study found an association between ETS, fuel types, asthma, and allergic rhinoconjunctivitis in preschool children, providing a baseline for future trends in these conditions.

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