

Original Research Article

Socioeconomic, demographic and behavioural determinants of acute respiratory infections among children under five years in Kiandutu informal settlement, Kiambu County, Kenya

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Received: 19 February 2025

Revised: 27 March 2025

Accepted: 28 March 2025

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ABSTRACT

Background: Communicable diseases are a major cause of morbidity and mortality among children under five years worldwide. The global mortality associated with acute respiratory infections (ARI) among children aged below five years is 20%. ARIs are a major public health concern in both developed and developing countries. This study aimed to assess the socioeconomic, demographic and behavioral factors associated with the prevalence of ARIs among children under five years in Kiandutu Informal Settlement in Kenya.

Methods: A cross-sectional analytical study was conducted which consisted of 422 child-caregiver pairs attending Kiandutu Health Centre in Kiandutu Informal Settlement, Kiambu County, Kenya.

Results: The prevalence of acute respiratory infections was at 52.4% (n=221). Regression analyses revealed that socioeconomic, demographic and behavioural factors significantly associated with ARIs among children under five years were household level of income (AOR=0.41; CI: 0.24-0.70; p value <0.001 and AOR=0.10; CI: 0.02-0.50; p value=0.005), level of education (AOR=0.35; CI: 0.09-1.45; p value=0.011), presence of a family member with a respiratory tract infection (AOR=2.52; CI: 1.58-4.03; p value <0.001), presence of a smoker (AOR=1.47; CI: 0.7-3.08; p value=0.003) and presence of an alcohol user (AOR=1.06; CI: 0.5-2.25; p value=0.007) in the household.

Conclusions: Socioeconomic, demographic and behavioural characteristics play a critical role in influencing the occurrence of ARIs among children aged below five years.

Keywords: Acute respiratory infections, Risk factor, Prevalence, Children under five years

INTRODUCTION

Acute Respiratory Infections are caused by infectious agents which include viruses or bacteria that affect the upper and lower respiratory tracts of organisms.¹ Lower acute respiratory infections include bronchiolitis, bronchitis and pneumonia while upper acute respiratory infections include common cold, pharyngitis, sinusitis, laryngitis, epiglottitis and acute otitis media.² Common signs and symptoms of ARIs include obstruction, coryza, wheezing, sore throat and shortness of breath.³

Acute respiratory infection symptoms can be anguishing to the child. Moreover, death is likely to occur when the infection spreads to other parts of the body causing serious damage to cells and tissues. Respiratory viruses are also likely to cross over to the brain thus adversely affecting the proper functioning of the nervous system.⁴ ARIs are among the leading causes of morbidity and mortality among children under five years worldwide.⁵ Globally, child mortality attributed to ARIs among children aged below five years is 20%.⁶ High morbidity and mortality rates of ARIs among children are because

of the underdeveloped immune systems and also due to the short bronchial trees that make spreading of the infection quite easier than for an adult.^{7,8}

ARIs are still a major public health concern in developing countries because of their ability to cause disease and death among children under five years.⁹ In third-world countries, acute respiratory infection contributes to 2% to 4% of deaths among children under five years per year.¹⁰ Studies indicate that in these countries about 12 million cases and 1.3 million deaths due to ARIs are recorded annually.¹¹ It is estimated that on average a child can undergo eight episodes of ARIs with differing severity in a year.¹²

According to a study done in 28 Sub-saharan African countries, the prevalence of ARIs among children under five years was found to be 25.3%.¹³ The prevalence of ARIs among children under five years as per a study done in Kinango Sub County in Kenya was 59.2%.¹⁴ Unfortunately, despite the acute respiratory infection disease burden among children aged below five years there is scanty data to evaluate the problem and its associated factors in Kenya, particularly in the informal settlements. This data is important to provide the basis for strategizing on prevention and control measures for specific risk factors of ARIs. The prevalence of ARIs is thought to be higher in informal settlement schemes probably since dwellers are low-income earners in addition to hygiene and sanitation, water supply, population density and living conditions being compromised. Further, studies have shown that the burden of ARIs in informal settlements is greater than that in the general population.¹⁵ More research is needed to identify specific risk factors for ARIs among children aged below five years and hence the need for this study.

This study aimed at determining the prevalence and associated socioeconomic, demographic and behavioural risk factors of ARIs among children under five years in Kiandutu Informal Settlement which is one of the biggest informal settlement schemes in Kenya. Appropriate prevention and control strategies for ARIs in the informal settlements were identified after risk factors were specified.

METHODS

Study site

The study was conducted at Kiandutu Health Centre in Thika Sub-County, Kiambu County, Kenya. The health facility is situated within Kiandutu Informal Settlement scheme.

Study design

The study adopted a cross-sectional analytical survey design that comprised of 422 child-caregiver dyads attending Kiandutu Health Center in Kiandutu Informal Settlement in Kenya.

Population and sampling

Target population comprised of all children under five years living in Kiandutu Informal Settlement while accessible population comprised of children under five years old visiting Kiandutu Health Center in the company of their caregivers. Systematic sampling technique was used to acquire the required sample size of 422 child-caregiver pairs in which every 2nd pair was recruited to the study.

Inclusion criteria

All child-caregiver dyads that resided within Kiandutu Informal Settlement for at least one year before the period of study and for which the child was less than five years old were included.

Exclusion criteria

ARI-diagnosed severely sick children and ARI-diagnosed sick children whose caregivers refused to consent and participate in the study were excluded from the study.

Research instruments

Pre-tested interview-administered structured questionnaires were used for collecting data on demographic, socioeconomic and behavioural characteristics influencing ARIs among children under five years as well as the associated prevalence among children aged below five years living in Kiandutu Informal settlement. The demographic, socio-economic and behavioural data collected included: caregiver age, sex, marital status, household size, number of under-fives per household, the relationship of caregiver to the child, type of occupation, household level of income, level of education, presence of a family member with an ARI, a smoker and an alcohol user in the household as well as the household size.

Data collection procedures

Data collection exercise happened from 1st February 2024 to 28th February 2024. Study participants were recruited during the routine outpatient care, based on whether they had lived in Kiandutu Informal Settlement for at least one year and whether the child was less than five years. Upon arrival at the hospital, every 2nd child-caregiver pair was informed about the objectives as well as potential benefits and risks before seeking written consent from them. This happened at the outpatient clinic before the consultation. During the consultation process, the health care provider indicated the diagnosis of the child on the mother-child booklets.

Interview-administered structured questionnaires were used to collect data from every 2nd caregiver-child dyad that consented to participate. The caregiver was responsible for answering the questions on the questionnaire. The process of recruiting and collecting

data continued until the desired sample size of 422 respondents was attained.

Statistical analysis

The Statistical Package for Social Sciences (SPSS) version 29 was used in analyzing the data. Descriptive statistics such as frequencies and percentages, standard deviations and means were used to describe the study population. Inferential statistics such as Chi-square and logistic regression were also used to determine the association between independent and dependent variables. Chi-square was used to establish bivariate associations and after which the associated factors were fitted into multivariate regression model to determine factors associated with ARIs. A p value of <0.05 was standard used to determine statistical significance. Data was presented using tabulated and graphical descriptions.

RESULTS

Socioeconomic and demographic characteristics of the caregiver

Most of the caregivers (54%, n=229) were aged 20-29. The eldest respondent was 55 years and the youngest was 18 years. The mean age was 28.49 ± 6.42 SD years. Most of the caregivers were females (96%, n=407) and married (83%, n=350). The majority of the respondents (88.1%, n=372) were casual laborers. Findings also revealed that the majority of the households 72% (n=299) earned ≤Ksh. 10000(\$77). The mean household income was Ksh. 9660.933 (\$74) ± 7381 SD. Descriptive statistics also showed that most of the respondents 61.4% (n=259) had completed the secondary level of education (Table 1).

Child demographic characteristics

Table 2 shows that most of the children 52% (n=221) recruited under the study were between 24-59 months. Male children 52% (n=225) were the majority in the study. Most of the children 50%(n=212) had been born as the second child. Findings also revealed that the majority of the children (78%, n=328) had not commenced schooling.

Behavioural characteristics of the household

Findings also revealed that the majority of the households (59%, n=249) had at least one alcohol user, (53%, n=225) had at least a smoker in the household and 67% (n=281) had at least a family member with a respiratory tract infection within the previous two weeks (Table 3).

Prevalence of ARIs among children under five years

The study found the prevalence of ARIs among children under five years to be high at 52.4% (n=221) (Figure 1).

Table 1: Socio-economic and demographic characteristics of the caregiver (n=422).

Variable	Frequency	Percentage
Caregiver age category		
<20 years	13	3
20-29 years	229	54
≥30 years	180	43
Caregiver gender		
Female	407	96
Male	15	4
Marital status of the caregiver		
Married	350	83
Single	50	12
Divorced/separated	13	3
Widow/widower	9	2
Caregiver occupation		
Casual labour	372	88.1
Unemployed	18	4.3
Housewife	15	3.6
Formal employment (salaried)	7	1.7
Business owner	6	1.4
Farming	4	0.9
Household income level		
≤KSh.10000	299	72
KSh.10001-KSh.20000	102	24
KSh.20001-KSh.30000	13	3
>KSh.30000	4	1
Caregiver education level		
Tertiary	18	4.3
Secondary	259	61.4
Primary	141	33.4
None	4	0.9

Table 2: Child demographic characteristics.

Variable	Frequency	Percentage
Child age category		
24-59 months	221	52
6-23 months	189	45
Under 6 months	12	3
Child gender		
Male	225	53
Female	197	47
Childbirth order		
1	80	19
2	212	50
3	105	25
4	25	6
Child schooling		
No	328	78
Yes	94	22

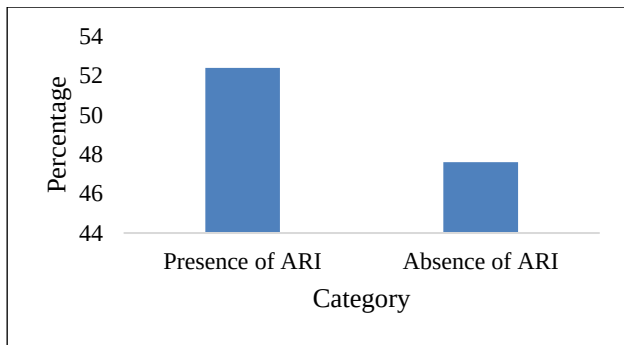


Figure 1: Prevalence of ARIs.

Factors associated with acute respiratory infections

The study showed that there was a significant relationship between child ARI and presence of family member with ARI infection within the previous 2 weeks (AOR=2.52; CI: 1.58-4.03; p value <0.001), presence of a smoker

(AOR=1.47; CI: 0.7-3.08; p value=0.003), alcohol user in the household (AOR=1.06; CI: 0.5-2.25; p value=0.007), caregiver level of education (AOR=0.35; CI:0.09-1.45; p value=0.011) and level of household income (AOR=0.41;CI: 0.24-0.70; p value <0.001 and AOR=0.10;CI: 0.02-0.50; P value=0.005) (Table 4).

Table 3: Behavioural characteristics of the household (n=422).

Variable	Frequency	Percentage
Presence of an alcohol user in the household		
Yes	249	59
No	173	41
Presence of a smoker in the household		
Yes	225	53
No	197	47
Presence of a family member with ARI		
Yes	281	67
No	141	33

Table 4: Factors associated with ARIs.

	Child ARI		COR(95%, CI)	AOR(95% CI)	p value
Variable	No	Yes			
Household income level (KSh)					
≤KSh.10000	125	174	1	1	0.001
KSh.10001-KSh.20000	57	45	0.57(0.36,0.89)*	0.41(0.24,0.70)*	
KSh.20001-KSh.30000	11	2	0.13(0.3, 0.60)*	0.10(0.02, 0.50)*	
Caregiver education					
Primary	61	80	1	1	0.011
Secondary	124	135	0.83(0.55,1.25)	1.01(0.64,1.59)	
Tertiary	15	3	0.15(0.04, 0.55)*	0.35(0.09, 1.45)	
None	1	3	2.29(0.23,22.53)	2.20(0.2,23.59)	
Presence of family member with ARI					
No	87	54	1	1	<0.001
Yes	114	167	2.36(1.56,3.57)**	2.52(1.58,4.03)**	
Presence of a smoker					
No	109	88	1	1	0.003
Yes	92	133	1.79 (1.22, 2.63)*	1.47(0.7, 3.08)	
Presence alcohol user					
No	96	77	1	1	0.007
Yes	105	144	1.71(1.16, 2.53)*	1.06(0.5, 2.25)	

Notes: *statistically significant at p value<0.05, **statistically significant at p value <0.001. COR refers to Crude Odds Ratio, and AOR refers to Adjusted Odds Ratio

DISCUSSION

Prevalence of acute respiratory infections

The study found the prevalence of ARIs among children under five years to be high at 52.4% (n=221). The prevalence was however lower than that found in studies done in Kinango Sub-County in Kenya among children aged below five years that was 59% and Cameroon (54.7%) and higher than that of a study done in Zambia

that was 8%.^{14,16,7} The variations in prevalence could be due to different cultural factors, socioeconomic factors, study populations, age categories and/or environmental factors. Should the prevalence of ARIs remain the same or worse increase, this could lead to a greater disease burden as well as economic crises in the population. The study noted that there is a need for prompt implementation of prevention and control measures for ARIs among children below five years.

Socioeconomic, demographic and behavioural characteristics of the caregiver and the child

Most of the caregivers had formal education with only 1% having none at all. The majority had attained the secondary level of education. This study identified the level of education as a significant risk factor for the occurrence of ARIs among children aged below five years. Education level influences the level of knowledge a caregiver has on good childcare practices. Other studies also found out that the level of education influences the occurrence of ARIs.^{14,17} Efforts should be upscaled to encourage pupils and students to progress to higher levels of their studies.

The majority of the households earned a monthly income of KSh 10000 (\$77) and below. Findings showed that there was a relationship between child ARIs and household level of income. Other studies have shown comparable findings in which children from households stricken by poverty were more at risk of contracting ARIs.^{17,18} There is a need for solutions to improve the socio-economic status of people living in informal settlement areas.

Most of the respondents reported that the child lived in the same household with a family member suffering from a respiratory tract infection. ARIs are communicable and hence can be transmitted to the child when proper infection prevention measures are not put in place. This study established a significant association between family members with an ARI and child ARIs. These findings are congruent with those of other studies in which children who lived with a family member with an ARI had increased odds of contracting ARIs.^{2,17} There is a need to improve early health-seeking behavior to prevent the spread of ARIs amongst family members.

The findings of this study also showed that the majority of the children lived with a family member who was a smoker. Cigarette smoke contains toxic components that remain in the air and once breathed in by the child they adversely affect the respiratory tract thus causing ARIs.¹⁹ The study also established a significant relationship between child ARIs and presence of a smoker in the household. There is a need for public health education to reduce smoking in the population. In addition, most of the children lived with an alcohol user in the same household. Alcohol consumption in the household is likely to diminish household income level thereby interfering with the lifestyle of the child including nutrition and health care practices a situation that consequently increases the odds of contracting ARIs.^{4,20,21}

Factors such as the caregiver's age, gender, occupation, marital status, the relationship of the caregiver to the child, household size as well as the child's age, gender, index birth order and schooling status were not significantly associated with the child ARIs.

Strengths and limitations of the study

The study looked at multiple risk factors which included socioeconomic status, environmental exposure, nutritional status and clinical status which provide a holistic understanding of contributors of respiratory infections.

On the other hand, the study being a cross-sectional study made it difficult to establish causality. It was not possible to adequately control for confounding variables and hence the researcher could not fully relate exposure with the outcome.

CONCLUSION

The prevalence of Acute Respiratory Infections among children under five years in Kiandutu Informal settlement is high. This prevalence is associated with the socioeconomic, demographic and behavioural characteristics of the caregiver and the household such as level of education, household level of income, presence of a smoker in the household, presence of an alcohol user in the household and presence of a family member with an ARI in the previous two weeks.

Recommendations

In light of the findings of this study, there is a need for health care providers to conduct health education to sensitize the public on risk factors of ARIs. There is a need to increase awareness among people on existing government funds to start income-generating activities to boost household levels of income. Increased level of income will translate to improved living standards including child care practices and nutrition leading to reduced prevalence of ARIs.

ACKNOWLEDGEMENTS

We would like to thank the staff of Kiandutu Health Center for their support and to the study participants for their cooperation which made this study a success.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Scientific Ethics Review Committee (ISERC) of the University of Eastern Africa, Baraton

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Cite this article as: Mburu NW, Gachohi JW, Kiboi WK. Socioeconomic, demographic and behavioural determinants of acute respiratory infections among children under five years in Kiandutu informal settlement, Kiambu County, Kenya. *Int J Community Med Public Health* 2025;12:2087-92.