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Epidemiological and Clinical Determinants of Acute Respiratory Infections among Children Aged 0 - 14 Years in Kamina Health District, Democratic Republic of Congo

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Abstract

Background: Acute respiratory infections (ARIs) remain a leading cause of morbidity and mortality among children in low- and middle-income countries. Identifying their epidemiological, clinical, and environmental determinants is essential for designing effective prevention and control strategies. This study aimed to assess the prevalence, clinical characteristics, and determinants of ARIs among children aged 0 - 14 years in the Kamina health zone, Democratic Republic of Congo. **Methods:** A community-based cross-sectional analytical study was conducted among 384 children aged 0 - 14 years. Data were collected using a structured questionnaire covering socio-demographic characteristics, clinical symptoms, environmental exposures, nutritional status, vaccination history, and healthcare-seeking behaviors. Peak expiratory flow (PEF) measurements were performed among eligible children. Descriptive statistics and multivariable logistic regression analyses were used to identify factors associated with ARIs. **Results:** Children exhibiting active signs of ARI were 12.5 times more likely to have the infection in bivariate analysis (PR = 12.5, $p < 0.001$). Having a prior history of ARI significantly increased current infection risk (PR = 5.21, $p < 0.001$; AOR = 3.96, $p < 0.001$). Both symptoms are strong indicators of ARI. Persistent cough (PR = 4.25; AOR = 2.84) and fever (PR = 3.15; AOR = 2.21) both retained strong, statistically significant associations in the final

model (p = 0.013). Acted as a significant determinant, increasing the odds of an ARI diagnosis by 78% in the multivariate model (aOR = 1.78, p = 0.041). Exposure to individuals with similar symptoms in the patient's immediate circle significantly increased ARI risk (PR = 2.80, p = 0.003). It remains highly significant after adjustment (aOR = 2.49, p = 0.007), highlighting the communicable nature of the infection. There was no statistically significant difference in ARI prevalence between the rainy and dry seasons (PR = 1.08, p = 0.838). The presence of underlying chronic conditions significantly increased the risk of ARI (PR = 1.77, p < 0.001). This vulnerability is sustained in the multivariate analysis (aOR = 1.69, p = 0.017). Severe forms of ARI showed a borderline significant relationship in bivariate analysis ($PR = 2.1, p = 0.053) and remained non-significant after adjustment (aOR = 1.58, p = 0.078). The multivariate logistic regression isolates the true, independent drivers of ARI by controlling for confounding variables. Living in a High Prevalence Health Area (aOR = 1.32, p = 0.018) is a significant environmental factor. **Conclusion:** ARIs represent a substantial public health burden among children in the Kamina health zone, driven primarily by household transmission and individual susceptibility factors. The limited diagnostic contribution of PEF underscores the need for integrated approaches combining clinical, environmental, and functional assessments. Strengthening community awareness, improving environmental conditions, and enhancing early detection strategies are critical to reducing ARI burden in resource-limited settings.

Subject Areas

Public Health

Keywords

Acute Respiratory Infections, Children, Determinants, Epidemiology, Peak Expiratory Flow, Democratic Republic of Congo

1. Introduction

Acute respiratory infections (ARIs) remain a leading cause of morbidity and healthcare utilization among children worldwide, particularly in low- and middle-income countries (LMICs) where they contribute substantially to outpatient visits, hospitalizations, and preventable deaths [1] [2]. Despite global progress in child survival, ARIs continue to impose a disproportionate burden in sub-Saharan Africa, driven by persistent environmental and socio-economic risk factors.

While most epidemiological studies and surveillance systems focus on children under five years of age, school-aged children remain an important but underrecognized reservoir of respiratory morbidity and transmission [3]. This population is frequently exposed to overcrowded living conditions, indoor air pollution, and behavioral risk factors that sustain infection dynamics within households and communities [1] [4]. However, data on ARI epidemiology in children aged 5 - 14 years remain

limited in many African settings, including the Democratic Republic of Congo.

In addition, the use of simple functional respiratory assessment tools, such as peak expiratory flow (PEF), has been widely documented in chronic respiratory diseases but remains insufficiently explored in the context of acute respiratory infections in children. Understanding whether such tools can contribute to community-based screening strategies is particularly relevant in resource-limited settings where access to advanced diagnostics is constrained.

2. Methods

2.1. Study Design

A community-based cross-sectional study was conducted.

2.2. Study Framework

The study was carried out in the Kamina health District, Haut-Lomami province, Democratic Republic of Congo.

Study population:

The sample size was calculated using a single population proportion formula, assuming an expected ARI prevalence of 50% to maximize sample size in the absence of precise local estimates. A 95% confidence level and a margin of error of 5% were applied.

The initial sample size was calculated as follows:

$$n = \left(Z^2 \times p \times (1-p) / d^2\right)$$

where:

Z = 1.96 (standard normal value for 95% confidence level);

p = 0.5 (assumed prevalence);

d = 0.05 (margin of error).

This yielded a minimum sample size of 384 children. No design effect adjustment was applied, given the relatively simple sampling design. The final sample size was maintained at 384 participants.

Children aged 0 - 14 years residing in the study area were eligible. A total of 384 children were included.

Data collection:

Data were collected using a structured, pre-tested questionnaire administered to caregivers of eligible children by trained field investigators. The questionnaire was developed based on standard survey tools used in respiratory epidemiology and adapted to the local context. Prior to data collection, data collectors received comprehensive training on study procedures, interview techniques, and measurement protocols to ensure consistency and data quality.

The questionnaire captured the following domains: Socio-demographic characteristics, Clinical symptoms of ARI, Environmental exposures Nutritional status, Vaccination history, Healthcare-seeking behavior, Anthropometric and Functional Measurements, Quality Control.

To ensure data quality:

The questionnaire was pre-tested in a similar population:

1) Daily supervision and verification of collected data were conducted.

2) Data entry included consistency checks and validation procedures.

Statistical analysis:

Data were entered, cleaned, and analyzed using appropriate statistical software Stata version 17, SPSS version 27, and R version 4.3. Prior to analysis, rigorous data quality checks were performed, including verification of data completeness, consistency checks, and identification of outliers and implausible values. Range and logic checks were applied to ensure internal consistency across variables.

Ethical Considerations:

This paper has been approved by the ethics committee of the University of Lubumbashi and the authors have declared no conflict of interest.

3. Results

Table 1. Distribution of respondents according to the socio-demographic characteristics of parents and children.

Variables	Frequency	Percentage
Sex		
Female	180	46.9
Male	204	53.1
Parents' education level		
None	63	16.4
Primary	105	27.3
Secondary	164	42.7
Higher education	52	13.5
Mother's main occupation		
Farmer	122	31.8
Shopkeeper	106	27.6
Seamstress	15	3.9
Teacher	64	16.7
Civil servant	15	3.9
Nurse	7	1.8
Homemaker	55	14.3
Parents' marital status		
Single	2	0.5
Married	313	81.5
Separated	55	14.3
Widowed	14	3.6
Children age		

Continued

<5 ans	112	29.2
5 - 9 ans	156	40.6
≥10 ans	116	30.2
Total	384	100

A total of 384 children aged 0 - 14 years were included (mean age: 8.2 ± 3.9 years).

In 53.1% of cases, the parents were male, married (81.5%), farmers (Mothers) (31.8%), and had a secondary education (42.7%). Most children were between 5 and 9 years (40.6%) (See Table 1).

Table 2. Prevalence of acute respiratory infections among children.

Variables	Frequency	Percentage
ARI	N = 384	
Yes	338	88.0
No	46	12.0
Age		
<5 ans	106	94.6
5 - 9 ans	136	87.2
≥10 ans	96	82.8
Frequent symptoms	N = 338	
Cough	308	91
Rhinorrhea	264	78
Fever	213	63
Rapide breathing	95	28

The prevalence of acute respiratory infections is 88%, and children under 5 years of age are the most affected (94.6%), while cough is the most common symptom (91%) (See Table 2).

Table 3. Distribution of respondents according to health area.

Area	Frequence	Percentage
Most represented areas	161	41.9
Areas with moderate representation	124	32.3
Areas with low representation	99	25.8
Total	384	100

Most represented areas: Q. 52, Congo, Q. Katuba 2, Q. Katuba 4 (28.9%).

Areas with moderate representation: Q. 53, Q. base, Q. Katuba 3, Q.14, Kinkuki,

Q. Katuba 1, Kiabukwa, Q. 82 (46.1%) (See Table 3).

Areas with low representation: Mwitobwe, Rva, CU, Cinquantenaire, SNCC, Alliance: (25%).

Table 4. Household characteristics (size, income and type of housing).

Variables	Terms and conditions (Modality)	Frequency	Percentage
Number of children in the household	1 - 3 children	97	25.3
	4 - 6 children	191	49.7
	7 - 9 children	76	19.8
	10 or more children	20	5.2
Monthly household income	Low (< 50.000)	68	17.7
	Medium (50.000 - 100.000)	166	43.2
	High (100.001 - 300.000)	106	27.6
	Very high (> 300.000)	44	11.5
Type of accommodation	Moderne	244	63.5
	Traditionnel	140	36.5
Number of people in the household	2 - 4 peoples	58	15.1
	5 - 7 peoples	172	44.8
	8 - 10 peoples	120	31.3
	11 peoples and more	34	8.9
	Total	384	100

The distribution of respondents according to household characteristics highlights important trends related to family size, income level, and housing conditions.

Households with between 4 and 6 children were the majority (49.7%), the average monthly income was medium (43.2%), households living in types of accommodation considered modern (63.5%), and households with between 5 and 7 people (44.8%) (See Table 4).

Table 5. Epidemiological profile and clinical manifestations of acute respiratory infections in children.

Variable	Frequency	Percentage
IRA in the last 14 days		
Yes	338	88
No	46	12
Current presence of signs of ARI		
Yes	253	65.9
No	131	34.1

Continued

History of IRA		
Yes	231	60.2
No	153	39.8
Number of ARI episodes (last 12 months)		
1 episode	29	12.6
2 episodes	142	61.5
3 or more episodes	60	25.9
No	99	25.8
Persistent cough		
Yes	285	74.2
No	99	25.8
Number of cough episodes (last 6 months)		
1 épisode	32	11.2
2 épisodes	145	50.9
3 épisodes et plus	108	37.9
Presence of fever		
Yes	273	71.1
No	111	28.9
Total	384	100

Indeed, 88.0% of children experienced an episode of acute respiratory infection in the past 14 days; 65.9% of children still presented with signs of infection at the time of the survey; 60.2% of children had previously suffered from an acute respiratory infection, confirming the recurrent nature of this illness. Most children experienced two episodes in the past 12 months (61.5%), while 25.9% experienced three or more episodes, reflecting repeated exposure to risk factors (See Table 5).

A persistent cough appears to be a frequent symptom, affecting 74.2% of children. Among them, more than half (50.9%) experienced two episodes of cough in the past six months, and 37.9% experienced three or more episodes. Fever was observed in 71.1% of children during these episodes, highlighting the potential severity of acute respiratory infections in this population.

Table 6. Clinical characteristics and vaccination of children with acute respiratory infection.

Variables	Frequency	Percentage
Main symptoms		
Cough + Difficulty breathing + Fever	339	88.3
Chest pain + Cough + Difficulty breathing + Fever	35	9.1
Difficulté respiratoire + Toux + Fièvre	10	2.6

Continued

Duration of symptoms		
Less than 5 days	120	31.3
Between 5 and 9 days	139	36.2
More than 9 days	125	32.6
Type of ARI		
Rhinitis	184	47.9
Rhinopharyngitis	124	32.3
Bronchitis	31	8.1
Bronchiolitis	22	5.7
Pneumonia	20	5.2
Bronchopneumonia	3	0.8
Treatment received		
Traditional	244	63.5
Cough suppressants (alone or in combination)	75	19.6
Antibiotics (alone or in combination)	59	15.4
Vaccination		
Has a vaccination card	375	97.7
Does not have a card	9	2.3
Age at last vaccination (years)		
1 - 5	122	31.9
6 - 10	151	39.5
11 - 14	72	18.8
Not specified	2	0.5

Cough was the most frequently observed symptom (88.3%), with treatment lasting between 5 and 9 days (36.2%). Rhinitis was the most common acute respiratory infection (47.9%), and recourse to traditional treatment was frequent (63.5%). Most women presented their vaccination card (97.7%), and for 39.5%, their last vaccination had been between 6 and 10 years prior (See Table 6).

Table 7. Measures of central tendency and dispersion of the main quantitative variables of children and their households.

Variable	Minimum	Maximum	Standard deviation	Mean	Median	Interquartile range (Q1 - Q3)
Age (in years)	0.08 (1 months)	14	3.73	8.15	8	5 - 11
Total number of children in the household	1	14	2.35	5.21	5	3 - 7
Number of people living in the household	2	16	2.43	7.04	7	5 - 9

Continued

Body temperature (˚C)	36	39	0.86	36.82	37	36.2 - 37.5
Respiratory rate (respiratory rate/min)	18	30	3.76	26.38	26	24 - 29
Estimated monthly income (Local currency: FC)	10,000	950,000	144105.71	145820.31	50,000	30,000 - 150,000

The average age of the children and the average number of children are 8.15 years (±3.7) and 5.21 (±2.35), respectively. The average number of people living in the household is 7.5 (±2.4); the average temperature is 36.8˚C (±0.86˚C) with an average respiratory rate of 26.38 (±3.76). The average monthly income is $64 (±21.8) (See Table 7).

Table 8. Association between the prevalence level of health areas and the occurrence of acute respiratory infections (ARIs).

	Acute respiratory infections (ARI)				
Variable	**Yes (%)**	**No (%)**	**PR (IC 95%)**	χ^2	p
Health area					
High Prevalence (≥85%)	230 (95%)	12 (5%)	6[3.0 - 12,1]	30.6	<0.001
Low Prevalence (<85%)	108 (76%)	34 (24%)	1		

Children living in high-prevalence health areas are more likely to develop ARIs than those living in low-prevalence health areas (PR: 6; p: 0.0000) (See Table 8).

Table 9. Determinants related to history and clinical manifestations of ARI.

Variables	ARI Yes (%)	ARI No (%)	PR [IC 95%]	p-value
Current signs of ARI				
Yes	245 (64.0%)	8 (2.1%)	12.5 [5.63 - 27.8]	<0.001
No	93 (24.2%)	38 (9.9%)	1	
History of ARI				
Yes	219 (57.0%)	12 (3.1%)	5.21 [2.60 - 10.45]	<0.001
No	119 (30.9%)	34 (8.9%)	1	
Persistent cough				
Yes	264 (68.8%)	21 (5.5%)	4.25 [2.25 - 8.01]	<0.001
No	74 (19.3%)	25 (6.5%)	1	
Fever				
Yes	251 (65.4%)	22 (5.7%)	3.15 [1.68 - 5.90]	<0.001
No	87 (22.7%)	24 (6.3%)	1	
Difficulty breathing				
Yes	166 (43.2%)	12 (3.1%)	2.73 [1.37 - 5.46]	0.004
No	172 (44.8%)	34 (8.9%)	1	

Children with clinical signs of ARI at the time of the survey have an extremely high risk of developing ARI in the past 14 days (RR = 12.5; 95% CI = 5.63 - 27.8; p < 0.001) (See Table 9).

A history of ARI is also a determining factor, with a relative risk of 5.21 (95% CI = 2.60 - 10.45; p < 0.001).Persistent cough (RR = 4.25; 95% CI = 2.25 - 8.01; p < 0.001) and fever (RR = 3.15; 95% CI = 1.68 - 5.90; p < 0.001) also emerged as important determinants. The presence of dyspnea or rapid breathing is associated with a significant risk of developing ARI (RR = 2.73; 95% CI = 1.37 - 5.46; p = 0.004), indicating that the intensity of respiratory symptoms is an additional indicator of severity, useful for risk stratification and priority management (See Table 9).

Table 10. Contextual and environmental determinants of IRA.

Variables	Modalites	ARI Yes n (%)	ARI No n (%)	PR [IC 95%]	p-value
Hospital consultation	Yes	294 (76.6%)	29 (7.6%)	3.92 [1.99 - 7.71]	<0.001
	No	44 (11.5%)	17 (4.4%)	1	
Season	Rainy	245 (63.8%)	34 (8.9%)	1.08 [0.53 - 2.17]	0.838
	Dry	93 (24.2%)	12 (3.1%)	1	
Similar cases in the patient's circle	Yes	168 (43.8%)	12 (3.1%)	2.80 [1.40 - 5.59]	0.003
	No	170 (44.3%)	34 (8.9%)	1	

Children who attended the hospital had a significantly higher risk of developing Acute Respiratory Infections (ARI) (RR = 3.92; 95% CI = 1.99 - 7.71; p < 0.001) (See Table 10).

The presence of other cases of ARI in the immediate environment was a significant determinant (RR = 2.80; 95% CI = 1.40 - 5.59; p = 0.003).

Table 11. Medical determinants of ARI.

Variables	Modalites	ARI Yes (%)	ARI No (%)	PR [IC 95%]	p-value
Respiratory allergies	Oui	42 (10.9%)	12 (3.1%)	4.54 [0.61 - 34.1]	0.107
	Non	296 (77.1%)	34 (8.9%)	1	
Chronic illnesses	Oui	231 (60.2%)	18 (4.7%)	1.77 [1.22 - 2.57]	<0.001
	Non	107 (27.9%)	28 (7.3%)	1	

Children with a history of chronic diseases have a significantly higher risk of developing ARI (PR = 1.77; 95% CI = 1.22 - 2.57; p < 0.001) (See Table 11).

There is no association between the occurrence of ARI and the types of ARI or the type of treatment (See Table 12).

Table 12. Advanced clinical and therapeutic determinants of ARI.

Variables	Modalites	ARI Yes n (%)	ARI No n (%)	PR [IC 95%]	p-value
Type of ARI	Severe forms	75 (19.5%)	1 (0.3%)	2.1 [0.98 - 4.50]	0.053
	Mild forms	263 (68.5%)	45 (11.7%)	1	
Treatment	Modern	102 (26.6%)	11 (2.9%)	1.85 [0.96 - 3.55]	0.087
	Traditional	236 (61.5%)	35 (9.1%)	1	

Table 13. Factors associated with acute respiratory infections in children (multivariate logistic regression).

Variables	Adjusted OR	CI 95%	p-value
High Prevalence Health Area	1.32	1.05 - 1.67	0.018
Current Signs of ARI	8.74	4.10 - 18.62	<0.001
History of ARI	3.96	2.01 - 7.81	<0.001
Persistent Cough	2.84	1.55 - 5.21	0.001
Fever	2.21	1.18 - 4.12	0.013
Difficulty Breathing	1.78	1.02 - 3.10	0.041
Similar Cases in Close Contacts	2.49	1.28 - 4.83	0.007
Chronic Diseases (Asthma/Tuberculosis)	1.69	1.10 - 2.60	0.017
Respiratory Allergies	1.42	0.72 - 2.82	0.310
Type of Severe ARI	1.58	0.95 - 2.64	0.078
Modern Treatment	1.21	0.72 - 2.03	0.472
Hospital Consultation	1.36	0.78 - 2.36	0.271

Current clinical signs of ARI (aOR = 8.74; 95% CI: 4.10 - 18.62; $p < 0.001$), History of ARI (aOR = 3.96; 95% CI: 2.01 - 7.81; $p < 0.001$), Respiratory symptoms such as persistent cough (aOR = 2.84; $p = 0.001$), fever (aOR = 2.21; $p = 0.013$), and shortness of breath (aOR = 1.78; $p = 0.041$) (See Table 13).

Environmentally, residence in a high-prevalence health area is significantly associated with ARI (aOR = 1.32; $p = 0.018$), as is the presence of similar cases in the immediate environment (aOR=2.49; p=0.007), highlighting the important role of community and intra-familial transmission.

Chronic diseases (asthma and tuberculosis) also constitute an independent risk factor (ORa = 1.69; $p = 0.017$), highlighting the increased vulnerability of children with chronic conditions.

4. Discussion

This study highlights a very high burden of acute respiratory infections (ARIs) in children aged 0 to 14 years, with an overall prevalence exceeding 80% and a peak in children under 5 years old (94.6%) (Table 1 and Table 2). Multivariate analysis

confirms a pediatric endemicity fueled by the interaction of closely linked individual, environmental, and social factors.

The study population is slightly male dominated (53.1%) (**Table 1**), a trend described in several studies attributing a slightly increased susceptibility of males to respiratory infections during childhood [5]. Parental education (**Table 1**) levels remain generally low to intermediate, with approximately 43% to 45% having limited schooling, reflecting a structural vulnerability that influences prevention practices and early access to healthcare [6]. Maternal activities are predominantly informal and agricultural (over 50%), a profile associated with precarious living conditions, increased exposure to household fumes, and overcrowding, recognized as major risk factors for acute respiratory infections (ARIs) [7]. Marital status is dominated by stable households (81.5% of parents are married), which does not offer sufficient protection against economic and environmental constraints.

The epidemiological data shows a high recurrence rate of infections: 88% of recent episodes, 65.9% of cases still symptomatic, and over 25% of children having experienced at least three episodes per year (**Table 5**). This recurrence of episodes reflects continuous exposure to risk factors, particularly among young children, whose high vulnerability is well documented and linked to immune immaturity [1] [8]. The gradual decline with age reflects the gradual acquisition of immunity.

Household living conditions reinforce this situation (**Table 4**). The high average household size (7.04 people) and the frequency of large families (nearly 70% with at least five children) promote household transmission. Incomes, predominantly low to middle (around 60%), limit access to healthcare and preventive measures (**Table 4**). Even though 63.5% of dwellings are considered modern, occupancy density and inadequate ventilation maintain an environment conducive to the transmission of infections [9].

Clinical data reveal a symptomatology dominated by the triad of cough, fever, and dyspnea, with a high frequency of persistent cough (74.2%), fever (71.1%), and recurrences (over 85% with at least two episodes) (**Table 6**, **Table 9**). Mild forms remain predominant (>80%), but nearly one-fifth of cases present with more severe forms, indicating a significant potential for progression. The predominant use of traditional treatments (63.5%) (**Table 6**).

Multivariate analysis (**Table 13**) reveals a core set of factors independently associated with acute respiratory infections (ARIs). Current clinical signs are the strongest determinant (aOR = 8.74), followed by a history of ARIs (aOR = 3.96), reflecting a strong tendency for recurrence and persistent susceptibility. Persistent cough (aOR = 2.84), fever (aOR = 2.21), and respiratory distress (aOR = 1.78) are reliable clinical markers of severity.

Environmental factors also play a significant role, with a significant association between the presence of cases in the immediate environment (aOR = 2.49) and residence in areas with high prevalence (aOR = 1.32), confirming the major contribution of community transmission and territorial inequalities [10]. Chronic diseases (asthma and tuberculosis) also increase the risk (aOR = 1.69), reflecting

increased biological vulnerability.

In contrast, respiratory allergies, clinical severity, use of modern treatments, and hospital consultation did not show any significant independent associations after adjustment. These variables appear to reflect clinical presentation or healthcare-seeking behaviors rather than true risk factors.

Overall, acute respiratory infections (ARIs) in children appear to be the result of a combination of age-related biological fragility, unfavorable socioeconomic conditions, and high levels of intrafamilial and community transmission, consistent with models described in the international literature [11]-[16].

5. Conclusion

Acute respiratory infections in children aged 0 to 14 years in the Kamina health zone appear to be a major public health problem, with a very high prevalence and a high concentration in children under 5 years of age. Their occurrence results from a close interaction between individual vulnerability, unfavorable living conditions, and high levels of community transmission. The most significant risk factors are a history of acute respiratory infections (ARIs), the presence of current respiratory symptoms, chronic illnesses, and living with similar cases in the immediate environment. Despite generally satisfactory vaccination coverage, the persistence of recurrent and sometimes severe forms of the disease highlights shortcomings in prevention and management.

Author Contributions

Conceptualisation and methodology: Chancelle Nasoro Abiba, Georges Banza Maloba, Guillaume Ngoie Mwamba, Celestin Muleka Kimpanga and Oscar luboya Numbi; Software: Chancelle Nasoro Abiba, Georges Banza Maloba; Validation: Hancelle Nasoro Abiba, Oscar Luboya Numbi and Celestin Muleka Kimpanga; Formal analysis: Simon Ilunga Kandolo and Michel Kabamba Nzaji; Investigation: Chancelle Nasoro Abiba; Resources: Chancelle Nasoro Abiba; Data curation: Simon Ilunga Kandolo; Writing review and editing: Chancelle Nasoro Abiba, Simon ilunga Kandolo and Georges Banza Maloba; Visualisation: Chancelle Nasoro Abiba, Simon ilunga Kandolo, Georges Banza Maloba, Celestin Muleka Kimpanga and Oscar Luboya Numbi; Project administration: Chancelle Nasoro Abiba; Funding acquisition: Chancelle Nasoro Abiba. All authors read and agreed to the published manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

References

[1] Sirota, S.B., Bender, R.G., Villanueva Dominguez, R.M., *et al.* (2026) Global Burden of Lower Respiratory Infections and Aetiologies, 1990-2023: A Systematic Analysis for the Global Burden of Disease Study 2023. *The Lancet Infectious Diseases*, **26**, 343-

361. https://doi.org/10.1016/s1473-3099(25)00689-9

[2] Troeger, C., Blacker, B.F., Khalil, I.A., Rao, P.C., *et al.* (2018) Estimates of the Global, Regional, and National Morbidity, Mortality, and Aetiologies of Lower Respiratory Infections in 195 Countries, 1990-2016: A Systematic Analysis for the Global Burden of Disease Study 2016. *The Lancet Infectious Diseases*, **18**, 1191-1210. https://doi.org/10.1016/s1473-3099(18)30310-4

[3] Polo-Pucho, D.A., Gonzales-Carrillo, J.J. and Arce-Huamani, M.A. (2025) Factors Associated with Acute Respiratory Infections in Children under Five Years Old: Analysis of the Demographic and Family Health Survey. *Children*, **12**, Article 1242. https://doi.org/10.3390/children12091242

[4] Gordon, S.B., Bruce, N.G., Grigg, J., Hibberd, P.L., Kurmi, O.P., Lam, K.H., *et al.* (2014) Respiratory Risks from Household Air Pollution in Low and Middle Income Countries. *The Lancet Respiratory Medicine*, **2**, 823-860. https://doi.org/10.1016/s2213-2600(14)70168-7

[5] Nicolai, A., Frassanito, A., Nenna, R., Cangiano, G., Petrarca, L., Papoff, P., *et al.* (2017) Risk Factors for Virus-Induced Acute Respiratory Tract Infections in Children Younger than 3 Years and Recurrent Wheezing at 36 Months Follow-Up after Discharge. *Pediatric Infectious Disease Journal*, **36**, 179-183. https://doi.org/10.1097/inf.0000000000001385

[6] Victora, C.G., Adair, L., Fall, C., Hallal, P.C., Martorell, R., Richter, L., *et al.* (2008) Maternal and Child Undernutrition: Consequences for Adult Health and Human Capital. *The Lancet*, **371**, 340-357. https://doi.org/10.1016/s0140-6736(07)61692-4

[7] Pyash, A.S., Shoshi, H.R., Biswas, M.A.A.J., Rahman, M., Haque, R., Petri, W.A., *et al.* (2025) Incidence and Viral Etiology of Acute Respiratory Infections and Pneumonia among Children under Two Years: A Birth Cohort Study in Dhaka, Bangladesh. *The American Journal of Tropical Medicine and Hygiene*, **114**, 237-246. https://doi.org/10.4269/ajtmh.25-0466

[8] Gudmundsdóttir, H.K., Hilde, K., Bains, K.E.S., Färdig, M., Haugen, G., LeBlanc, M., *et al.* (2023) Fetal Thoracic Circumference in Mid-Pregnancy and Infant Lung Function. *Pediatric Pulmonology*, **58**, 35-45. https://doi.org/10.1002/ppul.26153

[9] Tessema, F., Bisrat, F., Kidane, L., Assres, M., Tadesse, T. and Asegedew, B. (2019) Improvements in Polio Vaccination Status and Knowledge about Polio Vaccination in the CORE Group Polio Project Implementation Areas in Pastoralist and Semi-Pastoralist Regions in Ethiopia. *The American Journal of Tropical Medicine and Hygiene*, **101**, 52-58. https://doi.org/10.4269/ajtmh.19-0022

[10] Black, R.E., Cousens, S., Johnson, H.L., Lawn, J.E., Rudan, I., Bassani, D.G., *et al.* (2010) Global, Regional, and National Causes of Child Mortality in 2008: A Systematic Analysis. *The Lancet*, **375**, 1969-1987. https://doi.org/10.1016/s0140-6736(10)60549-1

[11] Jackson, S., Mathews, K.H., Pulanić, D., Falconer, R., Rudan, I., Campbell, H., *et al.* (2013) Risk Factors for Severe Acute Lower Respiratory Infections in Children—A Systematic Review and Meta-Analysis. *Croatian Medical Journal*, **54**, 110-121. https://doi.org/10.3325/cmj.2013.54.110

[12] Li, Y., Wang, X., Blau, D.M., Caballero, M.T., *et al.* (2022). Global, Regional, and National Disease Burden Estimates of Acute Lower Respiratory Infections Due to Respiratory Syncytial Virus in Young Children in 2019: A Systematic Analysis. *SSRN Electronic Journal*.

[13] McAllister, D.A., Liu, L., Shi, T., Chu, Y., Reed, C., Burrows, J., *et al.* (2019) Global, Regional, and National Estimates of Pneumonia Morbidity and Mortality in Children Younger than 5 Years between 2000 and 2015: A Systematic Analysis. *The Lancet*

Global Health, **7**, e47-e57. https://doi.org/10.1016/s2214-109x(18)30408-x

[14] Nair, H., Nokes, D.J., Gessner, B.D., Dherani, M., Madhi, S.A., Singleton, R.J., *et al.* (2010) Global Burden of Acute Lower Respiratory Infections Due to Respiratory Syncytial Virus in Young Children: A Systematic Review and Meta-Analysis. *The Lancet*, **375**, 1545-1555. https://doi.org/10.1016/s0140-6736(10)60206-1

[15] Wang, X., Li, Y., Deloria-Knoll, M., Madhi, S.A., Cohen, C., Arguelles, V.L., *et al.* (2021) Global Burden of Acute Lower Respiratory Infection Associated with Human Parainfluenza Virus in Children Younger than 5 Years for 2018: A Systematic Review and Meta-Analysis. *The Lancet Global Health*, **9**, e1077-e1087. https://doi.org/10.1016/s2214-109x(21)00218-7

[16] Wang, X., Li, Y., O'Brien, K.L., Madhi, S.A., Widdowson, M., Byass, P., *et al.* (2020) Global Burden of Respiratory Infections Associated with Seasonal Influenza in Children under 5 Years in 2018: A Systematic Review and Modelling Study. *The Lancet Global Health*, **8**, e497-e510. https://doi.org/10.1016/s2214-109x(19)30545-5