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Overview of Respiratory Tract Infections among Children under Five Years in Ghana

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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Review Article

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ABSTRACT

It is well-documented that respiratory tract infections, especially in children, have the highest incidence and mortality rates in developing countries. Infections of the sinuses, throat, airways, and lungs are collectively referred to as Respiratory Tract Infections by the National Health Services (NHS). According to the statistics, in Ghana, the seasonal patterns of reported paediatric cases were different in the Northern sector than in the Central and Southern sectors. Hospitalization rates for children in the Volta Region showed clear seasonal trends, with most ailments being more common during the dry seasons than the wet ones. The purpose of this study is to examine respiratory tract infections among children under five years in Ghana. This will give readers and policy makers the nature and the condition of RTIs among children in Ghana. The study used the systematic review method to achieve this objective. The type of systematic review method used was the rapid review, which uses existing research documents and data to draw new findings.
The study found that, there is high rate of respiratory tract infections among children in Ghana. This is attributed to many factors. Poor breastfeeding and supplemented eating in early life may lead to childhood wasting, the leading cause of mortality in under-5s with poorer RTI worldwide. Severe

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acute malnutrition is one of numerous socioeconomic variables that have increased pneumonia, diarrheal illness, and malaria prevalence and severity. Other variables that have contributed to this rise including low birth weight, under-vaccination, parental smoking, early childhood respiratory impairment owing to indoor air pollution, other diseases, and overcrowding.
This study recommends that, much attentions should be given to children in Ghana. Prevention strategies for RTIs include frequent nutritional programs, campaigns, and education in the district to address stunting and underweight in children younger than five, as well as correct complementary feeding. Further population-based study in different parts of Ghana might strengthen these results.

Keywords: Respiratory tract infection; children; Ghana.

1. INTRODUCTION

In undeveloped countries, especially among children, respiratory tract diseases have the highest incidence and fatality rates. Respiratory tract infections (RTIs) encompass the sinuses, throat, airways, and lungs, according to the NHS in the UK [1]. Any upper or lower respiratory tract infection is an RTI. URTIs include the common cold, laryngitis, pharyngitis/tonsillitis, rhinitis, rhinosinusitis/sinusitis, and otitis media. Middle ear irritation is otitis media. Lower respiratory tract infections (LRTIs) include bronchitis, bronchiolitis, pneumonia, and tracheitis. This guideline covers the common cold, pharyngitis and tonsillitis, rhinosinusitis and sinusitis, acute otitis media, and acute cough and bronchitis [2].

Many viruses can infect the respiratory system. Rhinoviruses, influenza viruses (during seasonal outbreaks), parainfluenza viruses, RSV, enteroviruses, coronaviruses, and certain adenoviruses cause respiratory disease in children. Most viral respiratory tract infections are spread by children's hands touching nasal secretions. These discharges include viruses [3]. Children pass the infection to themselves by touching their eyes and noses. In rare situations, children might develop an infection by breathing in infectious coughs or sneezes. Children with viral respiratory tract infections have larger viral loads in their nasal or respiratory secretions than adults. Children are more prone to infect others due to their higher viral production and poor cleanliness. In schools and daycares, many children are close together, increasing transmission risk. Parents fear that letting their children play outside in the rain or cold may increase their risk of colds and other diseases [3].

Acute respiratory infections killed the most of the 5.4 million children under five who died in 2017 in sub-Saharan Africa [4]. Acute respiratory infections (ARIs) are a leading cause of mortality and morbidity in children under five worldwide. ARI mortality rates vary widely by region [5]. Global burden illness reported in 2010 that over 12 million children with severe ARI were hospitalised worldwide. ARI handles up to half of all paediatric emergency room visits worldwide [4].

In impoverished nations, acute respiratory infections (ARIs) kill most children under 5. Sub-Saharan African children have a 15-fold higher mortality risk before 5 than children in high-income nations [6]. These health events threaten survival, hence the third Sustainable Development Goal aims to reduce under-5 mortality to 25 per 1000 live births by 2030 [7]. The World Health Organisation (WHO) recommends that countries provide basic medical care to all children regardless of family income to reduce child mortality and sickness before five [6]. The high under-5 mortality rate in Ghana is caused by diseases like RTIs [8]. Childhood RTIs are the major cause of hospitalisation and mortality in Ghanaian children under 5 [9]. The under-5 mortality rate in Ghana declined from 82 in 2011 to 56 in 2018 [10]. Despite lowering under-5 death rates, Kipp et al. [11] reported that Ghana is one of eight African nations with minimal progress. Slow infant mortality reduction is due to high RTI morbidity rates in infants under 5.

Poor breastfeeding and supplemented eating in early life may lead to childhood wasting, the leading cause of mortality in under-5s with a lower RTI worldwide. Severe acute malnutrition is one of several socioeconomic variables that have increased pneumonia, diarrheal illness, and malaria [12]. A younger age of illness beginning, low birth weight, under-vaccination, parental smoking, early childhood respiratory harm from indoor air pollution, other diseases, and overcrowding have all contributed to this trend [13].

The free maternal health policy, child health policy 2007–2015, newborn care strategy 2014–

2018, and community-based health planning and services (CHPS) policy were implemented to reduce under-5 morbidity and mortality in Ghana. RTIs are linked to infant mortality in Ghana, hence researching their risk factors is crucial [9]. Given the impact of ARI on morbidity and mortality in children under 5 in SSA countries like Ghana, there is a lack of information. However, research on why SSA nations have different ARI episode recurrence rates is sparse. To accomplish the Sustainable Development Goal (SDG) of decreasing infant mortality to 125 per 1000 live births worldwide, ARI incidence and risk factors must be widely available. UNICEF [14] reports the highest under-5 death rate in SSA (55%). Analysing regional and national ARI prevalence and determinants is essential to reducing ARI in SSA nations including Ghana. The goal of this systematic study is to analyse respiratory tract infections in Ghanaian children under five. This will enlighten readers and policymakers on Ghanaian children's RTIs.

2. METHODS

Research methods are the processes used to acquire data or evidence for analysis to gain new information or a better understanding of a topic. This study used respiratory tract illness data from children under five. This comprises published papers, theses, and online books and webpages. This is the systematic procedure. A "systematic review" uses a predefined and deliberate approach to acquire and analyse data to reach research conclusions. A "systematic review" is a type of review. A systematic review is a comprehensive analysis and synthesis of relevant literature on a topic or clinical issue. A meta-analysis is another name. A systematic review step-by-step approach has been found to improve scientific writing. Systematic reviews can provide the evidence base for knowledge translation products like patient decision aids, clinical practise guidelines, and policy briefs and help decision-makers understand individual research findings in the context of the overall data. Rapid review, a subset of systematic review, was used in this investigation. Rapid reviews are a sort of knowledge synthesis that provides information quickly. Rapid reviews expedite or eliminate some systematic review steps.

Key words like Respiratory tract infection, children, Ghana were used during the search for information.

The table below summarises the research papers, books, online information and data used by the study to achieve its results.

Table 1. Summarization of research papers, books, online information and data used by the study

No	Topic	Author(s)	Year	Country	Methods	Results
1	*"Pathogens associated with hospitalization due to acute lower respiratory tract infections in children in rural Ghana: a case–control study"*	Ralf Krumkamp et al.	2023	Ghana	A sample size of 233 cases and 350 controls was	Children under the age of five years old have a higher risk of passing away due to respiratory illnesses than any other cause of mortality. There is currently a dearth of data on the frequency of certain organisms in African youngsters as well as their importance.
2	*"Acute Lower Respiratory Infections among Children Under Five in Sub-Saharan Africa: A Scoping Review of Prevalence and Risk Factors"*	Jacob Owusu Sarfo et al.	2023	Sub-Saharan Africa	Four major databases were searched in depth. (PubMed, JSTOR, Web of Science and Central). After rigorous screening and the removal of duplicates, a total of 3,329 records were discovered, and 107 full-text studies were examined for assessment, of which 43 were included in this scoping review.	ALRTIs are common in SSA children under five (1.9–60.2%). inadequate education, poverty, hunger, exposure to second-hand smoke, inadequate ventilation, HIV, traditional cooking stoves, filthy fuel, poor sanitation, and unclean drinking water make SSA children under five more susceptible to ALRTIs. Health promotion interventions including health education have increased the health-seeking behaviours of mothers of under-5-year-olds against ALRTIs.

No	Topic	Author(s)	Year	Country	Methods	Results
3	*Acute respiratory infection and its associated factors among children underfive years attending pediatrics ward at University of Gondar Comprehensive Specialized Hospital, Northwest Ethiopia: institution-based cross-sectional study*	Henok Dagne, Zewudu Andualem, Baye Dagnew and Asefa Adimasu Taddese	2020	Ethiopia	Cross-sectional study	Children less than five years old disproportionately suffered from acute respiratory infections. Significant characteristics reported as being related with an acute respiratory infection in children were maternal age, maternal residency, and maternal hand hygiene information.
4	"Factors associated with diarrhoea and acute respiratory infection in children under-5 years old in Ghana: an analysis of a national cross-sectional survey"	Paschal Awingura Apanga and Maxwell Tii Kumbeni	2021	Ghana	cross-sectional survey	Children between the ages of 6 and 11 months, as well as those between the ages of 12 and 23 months, were shown to have a greater frequency of diarrhoea and ARI than infants and toddlers. The frequency of diarrhoea in children under the age of five was lower among those whose moms had completed some college education compared to those whose mothers had not.
5	*"Patterns of respiratory tract infections in children under 5 years of age in a low–middle-income country"*	Nehal M. El-Koofy, Mortada H. El-Shabrawi, Basant A. Abd El-alim, Marwa M. Zein and Nora E. Badawi	2022	Egypt	Patients with upper and lower RTIs identified clinically and/or radiologically at the outpatient clinics at Cairo University Children's Hospital in Egypt were the subjects of a cross-sectional, observational, epidemiological study.	Roughly one-third of infections in under-fves were lower RTI. Malnutrition was one of the signifcant risk variables for decreased RTI in children below 2 years.
6	*"Prevalence and factors associated with acute respiratory infection among under-five children in selected tertiary hospitals of Kathmandu Valley"*	Pratima GhimireI, Rashmi Gachhadar, Nebina Piya1 , Kunja Shresthal, Kalpana Shrestha	2022	Nepal	A cross-sectional research was done at Nepal Medical College and Teaching Hospital and International Friendship Children's Hospital (IFCH) in athmandu among children of age 2–59 months attending Pediatric OPD.	Acute Respiratory Infection affected 60.8% of 286 children. (ARI). Nearly 20% of youngsters had serious pneumonia. Religion, family, presence of the child in the kitchen while cooking, and family respiratory tract infection were significantly associated with acute respiratory infection (p = 0.009, OR = 4.59 CI = 1.47–14.36).
7	*"Analysis of risk factors associated with acute respiratory infections among under-fve children in Uganda"*	Yassin Nshimiyimana and Yingchun Zhou	2022	Uganda	Data on 13,493 Ugandan children less than 5 years old from the 2016 UDHS (Ugandan Demographic and Health Survey) were analysed using a cross-sectional approach.	40.3% of Ugandan children had ARI symptoms two weeks before the study. ARI illness signs were common in infants and toddlers. By evaluating 75% of the sample, the random forest outperformed logistic regression (accuracy=62.0%; AUC=0.638) and other approaches in predicting childhood ARI symptoms (accuracy=88.7%; AUC=0.951).

No	Topic	Author(s)	Year	Country	Methods	Results
8	*"Risk factors of acute respiratory infections among under five children attending public hospitals in southern Tigray, Ethiopia, 2016/2017"*	Sielu Alemayehu , Kalayou Kidanu, Tensay Kahsay and Mekuria Kassa	2019	Ethiopia	Institution-based case control research ran from November 2016 to June 2017. 288 children under 5 (96 cases and 192 controls) were interviewed using a standardised questionnaire. SPSS version 20 was used to analyse data from systematic random sampling.	This study found that mother literacy, smoking, cow dung consumption, and diet were highly linked with kid acute respiratory illness. Healthcare providers and the public should share scientific information and acute respiratory infection prevention recommendations.
9	*"Differentials in the Prevalence of Acute Respiratory Infections Among Under-Five Children: An Analysis of 37 Sub-Saharan Countries"*	Michael Ekholuenetale et al	2023	Sub-Saharan Country	This study analysed data from the Demographic and Health Survey (DHS) in 37 African nations. Information gathered from kids less than five years old was analysed. Differences in the prevalence of ARIs amongst SSA nations were uncovered using a forest plot.	Children under the age of five were more likely to have ARI in the following countries: Uganda (9%), Kenya (9%), Sao Tome and Principe (9%), Gabon (8%), Chad (8%), Eswatini (8%), Burundi (7%), Ethiopia (7%), and the Congo Democratic Republic (7%).
10	*"Exposure to pesticides and symptoms of acute respiratory tract Infection in children under five in the Offinso-North District"*	Enoch Akyeampong	2017	Ghana	The Offinso North Farm Health Study is a population-based cross-sectional design from which the study population was drawn. (ONFAHS). A questionnaire provided during interviews obtained data on self-reported markers of exposure to pesticides.	Children younger than five years old are more likely to exhibit signs of acute lower respiratory infections if they have been exposed to pesticides.
11	*"Ecological zone and symptoms of acute respiratory infection among children under five in Ghana: 1993–2014"*	Abdul-Aziz Seidua,Edward Kwabena Ameyawb, Bright Opoku Ahinkorahb, Linus Baatiemaa,Francis Appiah	2019	Ghana	Data from the Ghana Demographic and Health Surveys were utilised for the study. (1993–2014). Women of reproductive age who had children under the age of five and who had had a cough that was accompanied by short, quick breaths in the two weeks before to each of the surveys were included in the research sample.	The findings of the study have indicated the necessity for public health education and sensitization on ARI to be more specific and target women who reside in the Middle zone who have children under the age of five. This is in comparison to those who live in other ecological zones.
12	*"Patterns of Frequently Diagnosed Pediatric Morbidities in Hospitalized Children in the Volta Region of Ghana"*	Samuel Mawuli Adadey, Richmond Ayee, Sylvester Languon, Darius Quansah, and Osbourne Quaye		Ghana	Among the most often diagnosed paediatric morbidities were those with more than a thousand documented hospitalisations.	According to the statistics, the seasonal patterns of reported paediatric cases were different in the Northern sector than in the Central and Southern sectors. Hospitalization rates for children in the Volta Region showed clear seasonal trends, with most ailments being more common during the dry seasons than the wet ones.

Source: Author's compiled

3. RESULTS

3.1 Respiratory Tract Infections in Children under Five Years Ghana

In Ghana, RTI is the second common outpatient diagnosis after malaria. More than half of patients who sought medical attention for respiratory infections were prescribed antibiotics, despite the fact that the vast majority of these infections were caused by viruses [15]. For antibiotics to be used responsibly, they must be given to patients when they need them, at the right dosages, for the right amounts of time, and at the lowest possible cost to the community. Antibiotics are widely used, but the fast rise of antibiotic resistance has prompted a fresh look at how often they are really administered [15].

Respiratory infections in children follow a seasonal distribution pattern, according to studies. The virus is most active throughout the winter and spring in temperate regions, where it frequently causes epidemics. RSV infection rates are higher in the winter in both tropical and subtropical nations, however there is a wide range in seasonality from place to region [16]. Infection rates for RTIs are highest between July and October in Ghana, according to previous research. Ghana has a tropical climate, with a dry winter and a wet summer due to the African monsoon. The wettest months are April through October in the central region, May through September in the north, and April through November in the south. However, the rainy season is shorter in the east coast, lasting just from April to June before taking a break in July and August and then slowly picking back up again in September and October [17]. The southern hemisphere is the wettest. The north, with its single rainy season, and the eastern coast (including Accra), with its two rainy seasons, are the driest regions [17].

Children's demographics, parents' socioeconomic status, housing, and upbringing all have a role in the likelihood that they may contract an acute respiratory illness. Age [18], immunisation status [19], HIV infection, diarrheal comorbidity, malnutrition, and poor weaning timing have all been linked to RTIs in studies conducted in the SSA area and other emerging countries. Several studies have found a correlation between a variety of parent variables and ARIs. These include age, employment position, and education level [20]. Increased risk of ARIs has also been associated to factors including lower socioeconomic status, smaller family size, and less access to basic amenities like clean water and proper sanitation. Risk factors for ARIs include household smoking, the quality of cooking fuel, the cleanliness of drinking water, and the availability of restrooms [21-24].

There was a study conducted by Denno et al. on Maternal knowledge, attitude and practices regarding childhood acute respiratory infections in Kumasi, Ghana. The study's findings suggested that, at "Kumasi's two major open-air marketplaces, 143 mothers with at least one kid under five were interviewed. Acute respiratory infection (ARI) in children was the focus of the study. Married, Christian, Ashanti, 20-29 years old, and with 2-3 live children, the ladies were typical. 73.4 percent had a youngster with cough and fever in the past six months. Coughing was directly caused by cold exposure for 73.4%. Many women wrongly attributed worm infestation for cough and fever (21%), and constipation for cough (25.9%). None attributed cough and fever to infections. No one stated proper ventilation and avoiding overcrowding prevent cough and fever. The more severe the symptoms, the more likely the mothers were to seek medical treatment (e.g., cough only, 0.7%; cough and fever, 6.3%; cough, fever, and anorexia, 30%; and cough, fever, and lethargy, 57.3%). Ephedrine or other nasal drops, herbal remedies, antipyretics, and antibiotics were used to cure runny noses at home. Coughs are treated with antibiotics by 39.9%. Cough and fever treatments included honey and cough syrup. Some herbal and home care remedies were hazardous. Castor oil and enemas were used by 25.9% to avoid ARI. Symptom severity knowledge was adequate for the women (mean = 15/20; range = 11-18)".

The study's findings suggested that, a health education programme for mothers of children under five is needed based on these findings.

4. CONCLUSION

Acute respiratory infections (ARIs) impact the nose to the lungs. Upper respiratory system (URIs) and lower respiratory system (LRIs) ARIs exist. Children under five experience acute respiratory infections more than any other age group, putting a strain on the health care system. The WHO estimates that respiratory infections cause 6% of global illness. Most of the 6.6 million children under five who die each year live in low-income countries, and a third of them die from acute respiratory illnesses. Most studies show

that 10%–60% of SSA children under five have ALRTIs. Most research use demographic health surveys and hospitalised samples, which would explain why children have such high ALRTI rates, but these surveys and samples provide more full information. SSA children under five had a significant pneumonia incidence regardless of research design. SSA children under five have traditionally had greater pneumonia than other ALRTIs like bronchiolitis. Because pneumonia is so frequent in children, SSA may have more pneumonia deaths. Self-reported symptoms may not be a reliable technique to diagnose ALRTIs in children, therefore studies that use them may indicate an erroneous number of cases.

The study indicated that Ghanaian children have high respiratory tract infection rates. This has various causes. Poor breastfeeding and supplementary food in early life may promote childhood wasting, the main cause of death among under-5s with poorer RTI globally. Numerous socioeconomic factors have increased pneumonia, diarrheal disease, and malaria prevalence and severity, including severe acute malnutrition. Low birth weight, under-vaccination, parental smoking, indoor air pollution-induced early childhood respiratory impairment, other illnesses, and overcrowding have also contributed to this trend.

This research suggests giving Ghanaian youngsters more attention. RTI prevention includes frequent nutritional programmes, campaigns, and district education to target stunting and underweight in children under five, as well as correct supplementary feeding. Population-based studies in other Ghanaian regions may enhance these findings.

CONSENT AND ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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