HOUSEHOLD MANAGEMENT OF ACUTE RESPIRATORY INFECTION SYMPTOMS IN UNDER-FIVE CHILDREN BY CAREGIVERS IN BENIN CITY

BY

EUNICE OKWUKWE CHIKA (MED1807380)

MICHEAL OKHALE DAMISA (MED1807384)

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DECLARATION

We hereby declare that this project work titled **'HOUSEHOLD MANAGEMENT OF ACUTE RESPIRATORY INFECTION SYMPTOMS IN CHILDREN BY CAREGIVERS IN BENIN CITY'** was conducted under the supervision of PROF. V.Y ADAM and has not been submitted elsewhere for the award of a degree or certificate.

EUNICE OKWUKWE CHIKA

MED1807380

EMAIL: chykha2@gmail.com

PHONE NUMBER: 08106898669

MICHEAL OKHALE DAMISA

MED1807384

EMAIL: damisaokale@gmail.com

PHONE NUMBER: 08163389207

CERTIFICATION

This is to certify that this research titled '**HOUSEHOLD MANAGEMENT OF ACUTE RESPIRATORY INFECTION SYMPTOMS IN CHILDREN BY CAREGIVERS IN BENIN CITY** was carried out by **EUNICE OKWUKWE CHIKA** (MED1807380) and **MICHEAL OKHALE DAMISA** (MED1807384) under the supervision of **PROF. V.Y ADAM**, in the Department of Public Health and Community Medicine, School of Medicine, College of Medical Sciences, University of Benin, Benin City, Edo State, Nigeria as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS) degree.

PROJECT SUPERVISOR	HEAD OF DEPARTMENT
PROF. V.Y ADAM	**DR O.E. OBARISIAGBON**
MBBS; FMCPH, MPH, FWACP	MBBS; FMCPH, MPH, FWAP
Professor	Associate Professor
Department of Public Health and	Department of Public Health and
Community Medicine,	Community Medicine,
School of Medicine	School of Medicine
University of Benin	University of Benin
Benin City, Edo State, Nigeria.	Benin City, Edo State, Nigeria.

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LIST OF ABBREVIATIONS

ARIs	Acute Respiratory Infections
CAP	Community Acquired Pneumonia
IBM	International Business Machines
LGA	Local Government Area
LRTIs	Lower Respiratory Tract Infections
MICS	Multiple Indicator Cluster Survey
NBS	Nigeria Beureau of Satistics
NDHS	Nigeria Demographic and Health Survey
NPC	National Population Commission
OTC	Over-The-Counter medication
SARI	Severe Acute Respiratory Infection
SPSS	Statistical Package for the Social Sciences
UNICEF	United Nations Children's Fund
URTIs	Upper Respiratory Tract Infection
WHO	World Health Organisation

OPERATIONAL DEFINITION OF TERMS

Acute Respiratory Infections: are infections affecting the respiratory system caused by pathogens such as viruses, bacteria and fungi.

Household health management: is the practices and strategies used by households to prevent**,** manage, and treat illnesses and health conditions.

Lower Respiratory Tract Infection: an infection of the lower respiratory tract including he trachea, bronchi, bronchioles and lungs.

Pneumonia: is an infection that inflames the air sacs in one or both lung

Self medication: the use of drugs to treat self recognized illness or symptoms without consulting a health care professional.

Traditional remedies: indigenous or culturally accepted methods of treating illness, including use of herbs or home rituals.

Upper Respiratory Tract Infection: an infection of the upper part of the respiratory system involving the nose, sinuses, pharynx or larynx.

ABSTRACT

Background: Acute Respiratory Infections (ARIs) are a major cause of morbidity and mortality among children under five years, especially in low- and middle-income countries such as Nigeria. Effective household management by caregivers plays a crucial role in early recognition, prompt treatment, and prevention of complications. However, inadequate knowledge, poor health-seeking behaviour, and inappropriate treatment practices remain significant challenges.

Aim: To assess the household management of ARI symptoms among caregivers of under-five children in Egor Local Government Area, Benin City, and identify factors influencing management practices and treatment outcomes.

Methods: A community-based descriptive cross-sectional study was conducted among 506 caregivers selected using a multistage sampling technique. Data were collected using structured interviewer-administered questionnaires adapted from standard survey tools. Information obtained included socio-demographic characteristics, knowledge of ARIs, prevalence of symptoms, care-seeking behaviour, factors influencing management, and treatment outcomes. Data were analysed using IBM SPSS version 27.0. Descriptive statistics and Chi-square tests were used to determine associations, with statistical significance set at $p < 0.05$.

Results: The mean age of caregivers was 35.98 ± 11.04 years, with the majority being mothers (73.9%) and females (76.7%). Most respondents (80.2%) had heard of ARI. Knowledge of danger signs (94.3%) and prevention (74.6%) was generally good, while knowledge of symptoms (29.3%) and causes (30.3%) was poor. The prevalence of ARI in the last two weeks was 14.8%. A majority of caregivers (70.7%) sought treatment, mainly from primary health centres and government hospitals (26.4% each). However, only 35.8% sought care on the same day. Major barriers to care-seeking included cost (31.8%) and perceived non-severity of illness (27.3%). Most children (77.3%) had complete recovery, with few complications (2.7%) and low hospitalization rates (5.3%). Caregiver age ($p = 0.009$) and sex of the child ($p = 0.037$) were significantly associated with treatment outcomes.

Conclusion: Although caregivers demonstrated good knowledge of ARI prevention and danger signs, significant gaps exist in knowledge of symptoms and causes. While care-seeking behaviour was relatively high, delays and inappropriate practices persist. Strengthening caregiver education, improving access to affordable healthcare, and addressing socio-economic barriers are essential to improve ARI management and reduce childhood morbidity and mortality.

Keywords: Acute Respiratory Infections, caregivers, household management, under-five children, prevalence, health-seeking behaviour, treatment outcomes

CHAPTER ONE

INTRODUCTION

1.1. BACKGROUND

Acute Respiratory Infections (ARIs) are a group of infections that affect the respiratory system, including the nose, throat, bronchi, and lungs. These ARIs are caused by microrganisms such as viruses, bacteria and fungi. These ARIs include mild form of disease such as common cold, more severe illnesses such as pneumonia and bronchiolitis. ARIs are classified into upper respiratory tract infections (URTIs) and lower respiratory tract infections (LRTIs).[1]

Globally, ARIs remain a major cause of childhood morbidity and mortality, particularly in low- and middle-income countries. According to the World Health Organisation (WHO) in 2021, ARIs account for approximately 15% of all deaths in children under five, with pneumonia alone responsible for nearly 800,000 deaths annually.[1] The high burden of ARIs is driven by multiple factors, including poor socioeconomic conditions, lack of access to healthcare, inadequate vaccination coverage, and environmental factors such as air pollution and indoor smoke from cooking fuels.While ARIs are prevalent worldwide, their impact is most severe in sub-Saharan Africa and South Asia, where healthcare infrastructure and public health interventions are often inadequate.[2]

A survey carried out by National Population Commission (NPC) in 2018 revealed that about 40% of households in Nigeria are exposed to solid fuels and 7% are exposed to tobacco smoke and this exposure poses potential adverse health effects to the individuals exposed like respiratory tract infections.[3] In Nigeria, ARIs are a leading cause of childhood morbidity and mortality. Studies indicate that pneumonia, one of the most severe forms of ARIs, contributes significantly to under-five mortality in the country.[4] The high prevalence of ARIs in Nigeria is

linked to factors such as poverty, malnutrition, limited healthcare access, and low levels of caregiver knowledge regarding prevention and treatment. Many households lack the necessary awareness and resources for early recognition and proper management of ARI symptoms.

Managing ARIs at the household level is important in reducing the severity and complications associated with the infections. Early recognition of symptoms, timely medical consultation, and appropriate home care practices, such as adequate hydration and maintaining a clean environment, are essential in improving child health outcomes. However, many caregivers in low-resource settings rely on self-medication, and traditional remedies, or delay seeking healthcare due to financial constraints, lack of awareness, or cultural beliefs.[5] A report by National Bureau of Statistics(NBS) Multiple Indicator Cluster Survey(MICS) in 2021 showed that 39% of caregivers sought treatment for ARIs in under-five children and 33.4% of caregivers got antibiotic treatment from a health facility or provider.[6] According to Nigeria Demographic and Health Survey (NDHS) in 2023, 71% of urban dwellers and 52% of rural dwellers sought for treatment for their children with symptoms of ARI.[7]

Several factors influence caregivers' ability to manage ARIs in children effectively. These include their level of education, socioeconomic status, cultural beliefs, accessibility to healthcare services, and awareness of preventive measures such as immunisation and proper hygiene. Environmental factors, such as exposure to indoor pollutants from cooking with biomass fuels, further exacerbate the risk and severity of ARIs .[8]

In 2021, WHO stated that despite the availability of effective treatments for ARIs, several challenges persist in ensuring proper management. These challenges include inadequate healthcare infrastructure, high costs of medical care, limited caregiver knowledge, and poor health-seeking behaviour.[1] Addressing these barriers requires a dynamic approach that includes health education, improved healthcare access and policies targeted at reducing environmental risk factors.[1] Understanding caregivers' knowledge, attitudes, and practices in

managing ARIs is essential in developing targeted interventions to reduce childhood mortality due to these infections.

1.2. STATEMENT OF PROBLEM

Globally, acute respiratory infections (ARIs) remain a leading cause of morbidity and mortality in children under five years old, responsible for a significant number of child deaths annually, particularly in low- and middle-income countries.[9] Regional studies across sub-Saharan Africa including Kenya, Uganda, Zambia, Rwanda and Nigeria indicate that inadequate knowledge of ARI symptoms and management among caregivers contributes to delayed treatment and increased severity of infections.[10] In Nigeria, research has shown that a significant proportion of caregivers misinterpret ARI symptoms or rely on ineffective home remedies, leading to worsened health outcomes.[5] This knowledge gap affects early detection, prompt care-seeking behaviour, and adherence to effective treatment. Bridging this gap through targeted education and awareness campaigns is crucial for improving child health outcomes.

ARIs are among the most common childhood illnesses in Nigeria, contributing significantly to hospital visits and childhood deaths. Nationally, the prevalence of ARIs among children under five is estimated at 20-30% in 2020 with variations across regions.[10] In developing countries, where urban congestion and air pollution are growing concerns, the prevalence of ARIs is suspected to be higher than the national average, although there is limited empirical data. Socioeconomic factors, poor living conditions, exposure to indoor smoke from cooking fuels, and inadequate healthcare access contribute to the high burden. Understanding the prevalence of ARIs is essential for designing effective interventions to reduce infection rates and improve child health outcomes.

Globally, only about 60% of caregivers seek appropriate healthcare for children with ARI symptoms, with lower rates in developing countries due to financial constraints, cultural beliefs, and lack of awareness.[9] In Nigeria, research suggests that many caregivers delay seeking medical attention or prefer self-medication and traditional remedies. Barriers such as the cost of healthcare, proximity to health facilities, and perception of illness severity impact care-seeking behaviour. Delayed or inadequate treatment increases the risk of complications like pneumonia, a leading cause of child mortality. Identifying the factors influencing care-seeking behaviours will help policymakers and healthcare providers develop targeted interventions to improve timely access to care.[8]

The management of ARIs in children is influenced by multiple factors, including caregiver education level, socioeconomic status, cultural beliefs, availability of healthcare facilities, and access to essential medicines. Studies indicate that caregivers with higher education levels and better economic status are more likely to seek timely and appropriate healthcare for their children.[11] Traditional medicine and over-the-counter medications are commonly used for treating childhood illnesses, sometimes delaying effective treatment.[12] Additionally, the use of antibiotics without proper prescriptions is prevalent, contributing to antimicrobial resistance.[13] Understanding these factors is critical for developing policies that promote informed and appropriate management of ARIs in children.

Globally, the gold standard for ARI management includes prompt diagnosis, proper use of antibiotics (when bacterial infections are present), adequate hydration, and supportive care. However, disparities exist in treatment approaches due to caregiver preferences and healthcare system limitations. There is a mix of formal healthcare utilisation, traditional medicine, and self-medication. While some caregivers report positive outcomes using home remedies, others experience complications due to improper treatment.[14] Evaluating the

effectiveness of these treatment methods will help improve ARI management strategies by reinforcing evidence-based practices and addressing misconceptions that lead to poor health outcomes.

By addressing these problem statements, this study will contribute valuable insights to improving ARI management in children under five, ultimately reducing morbidity and mortality rates in Benin City and similar urban settings.

1.3. JUSTIFICATION

Acute Respiratory Infections (ARIs) contribute significantly to morbidity and mortality rate in under-5 children especially in developing countries and this makes it necessary to assess the level of Knowledge of ARIs among caregivers. Caregivers' knowledge significantly impacts the early recognition and management of ARI symptoms which can lead to delayed treatment and increased severity of infections.[16] Assessing the knowledge of ARIs among caregivers will allow for identification of potential gaps in understanding which would help to guide a targeted solution towards improving the literacy of caregivers as regards ARIs.

The prevalence of ARIs in under-5 children remains under-recognised and poorly studied.[17] There has been limited data on the prevalence of ARIs especially in Benin City although national surveys indicate that ARIs are among the most common childhood illnesses in Nigeria.[17] This leaves critical gaps in the understanding of the burden and trend of ARIs in children. Accurate prevalence data can help in better understanding of the burden and impact of ARIs in under-5 children. This would guide targeted and adequate intervention to address the burden of ARIs among ubder-5 children in Benin city.

It is necessary to assess the health-seeking behaviour of caregivers as this plays a crucial role in the timely management of ARIs. Appropriate health-seeking behaviour significantly affects

the outcome of ARIs in terms of early detection of the cause, appropriate treatment regimen, prevention of morbidity and mortality and reducing the overall burden of ARIs in under-5 children. A larger percentage of caregivers resorted to Over-The-Counter(OTC) medications and native remedies. These practices can lead to delayed or inappropriate treatment, increasing the risk of complications.[18]

Several factors influence how caregivers manage ARI symptoms. It is important to determine the factors that are associated with the management of ARIs as they are critical in the outcome of treatment ARIs in children. These factors include educational level, socioeconomic status, and cultural beliefs.[15] Caregivers with higher educational levels were more likely to exhibit good health-seeking behaviour and have better assess to appropriate health care.[15] Determining the factors associated with the management of ARIs in children will allow for the identification of modifiable risk factors that can be targeted through interventions to prevent child morbidity and mortality.

Evaluating the effectiveness of various treatment methods is vital for developing guidelines and educational programs. Various treatment methods are often employed by caregivers in the management of ARIs some of which are unconventional and may be potentially harmful leading to worsening of symptoms and complication of the primary illness. The reliance on home-based practices raises concerns about the appropriateness and effectiveness of these treatments.[15] Understanding caregivers' perspectives on treatment efficacy can inform interventions promoting evidence-based practices.

The management of ARI symptoms in children under five by caregivers in Benin City is influenced by a complex interplay of knowledge, cultural practices, and access to healthcare services. Addressing the identified gaps through targeted education, improved access to healthcare, and culturally sensitive interventions is essential for reducing the burden of ARIs and improving child health outcomes in the region.[16]

1.4. RESEARCH QUESTIONS

1. What is the level of knowledge of caregivers in the management of ARIs in children?
2. What is the prevalence of ARIs among children under the age of 5 in Benin City?
3. What are the care-seeking methods for children with ARI symptoms?
4. What are the factors associated with the management of ARIs in children by caregivers?
5. What is the effectiveness of treatment methods for ARIs in children as reported by the caregivers in Benin City?

1.5. AIM

To assess the household management of ARI symptoms in under-5 children by caregivers in Benin City and identify opportunities to improve the quality of care provided in under-5 children with ARIs in Benin City.

1.6. SPECIFIC OBJECTIVES

1. To assess the knowledge of caregivers about the management of ARIs in children in Benin City.

2. To determine the prevalence of ARIs among children under the age of 5 in Benin City.

3. To ascertain the care-seeking by caregivers for under-5 children with ARI symptoms in Benin City.

4. To determine the factors associated with the management of ARIs in children by caregivers in Benin City.

5. To identify the effectiveness of treatment methods for ARIs in children as reported by the caregivers in Benin City.

CHAPTER TWO

LITERATURE REVIEW

Acute respiratory infections (ARIs) are a major cause of morbidity and mortality in children, particularly those under five years of age. In many settings, especially developing countries, the initial management of ARI symptoms often takes place at home by caregivers.[19] Understanding caregivers' knowledge, attitudes, and practices regarding household management of these infections is crucial for developing effective interventions to improve child health outcomes [20]

Caregivers' knowledge about ARIs significantly influences their home management practices. Studies reveal varying levels of understanding regarding the causes, symptoms, and appropriate treatment of ARIs. Some caregivers may have poor knowledge related to ARIs.[19] while others demonstrate awareness of common symptoms like cough, fever, wheezing, sneezing, or pain in the ear, nose, and throat.[21] However, knowledge about specific aspects, such as the viral aetiology of many URTIs, may be lacking.[22]

Beliefs about antibiotics play a significant role in household management. In Trinidad and Tobago, a study found that caregivers with low antibiotic knowledge had erroneous beliefs and misused antibiotics. Some caregivers believe that antibiotics can cure all infections, despite evidence that many childhood URTIs are viral. This misconception can lead to the demand for and self-administration of antibiotics even when they are not needed.[22]

Caregivers employ a range of practices to manage ARI symptoms at home. These often include: home Remedies, symptom relief measures, over-the-counter medications, observation and assessment of severity:[21] Several factors influencing how caregivers manage ARI symptoms at home include caregiver knowledge and education, socioeconomic status, cultural beliefs and practices, access to healthcare and perceived severity of illness[22]

The decision of when to seek healthcare for a child with ARI symptoms is influenced by various factors, including the caregiver's perception of the severity of the illness, their knowledge about danger signs, and their access to and trust in healthcare services. In some cases, caregivers may have a negative attitude towards consulting a physician, preferring home remedies or obtaining medications from pharmacies without a prescription.[19]

2.1. CONCEPTUAL FRAMEWORK

This study is guided by a conceptual framework developed from existing empirical evidence and underpinned by the Knowledge–Attitude–Practice (KAP) model[19,20] and relevant constructs of the Health Belief Model (HBM)[35]. The framework explains the pathways through which caregivers' socio-demographic characteristics, knowledge, attitudes, and perceptions influence household management practices and care-seeking behaviour for Acute Respiratory Infections (ARIs) among children under five years of age.[35]

The KAP model postulates that adequate knowledge about a health condition positively influences attitudes and beliefs, which subsequently determine health practices and behaviours. In the context of childhood ARIs, caregivers who possess correct knowledge regarding causes, symptoms, danger signs, prevention, and treatment are more likely to adopt appropriate home management practices and seek timely professional healthcare for affected children. Complementing this, the Health Belief Model explains how caregivers' perceptions of disease severity, susceptibility, benefits of action, barriers to care, and cues to action influence decision-making related to health-seeking behaviour.[35]

Within the framework, socio-demographic and environmental factors function as background variables that shape caregivers' knowledge, perceptions, and behaviour. These include caregiver age, level of education, occupation, household wealth status, religion, place of residence (urban or rural), and household environmental conditions such as cooking fuel type,

overcrowding, sanitation, and exposure to indoor air pollution. Evidence from several studies indicates that children from low-income households and those whose caregivers have limited education experience a higher burden of ARIs and poorer health-seeking behavior.[24,25] These factors indirectly influence ARI management by determining caregivers' access to health information, healthcare services, and financial capacity to seek appropriate treatment.

Caregivers' knowledge constitutes a central component of the conceptual framework. This includes knowledge of the causes of ARIs, recognition of common symptoms such as cough, fever, and fast or difficult breathing, awareness of danger signs, preventive measures such as immunisation and exclusive breastfeeding, and correct understanding of antibiotic use. Studies conducted in Nigeria and other low- and middle-income countries have consistently demonstrated that inadequate knowledge among caregivers is associated with inappropriate home management, misuse of antibiotics, and delayed care-seeking.[21,32] Conversely, caregivers with higher levels of ARI-related knowledge are more likely to recognise illness severity early and seek professional care promptly.

Caregivers' attitudes and perceptions, conceptualised using the Health Belief Model, mediate the relationship between knowledge and behaviour. These perceptions include perceived susceptibility of the child to ARIs, perceived severity of the illness, perceived benefits of formal healthcare, perceived barriers such as cost, distance, and poor quality of services, as well as cultural beliefs and prevailing social norms. Psychosocial factors such as perceived treatment effectiveness and trust in healthcare services have been shown to significantly influence caregivers' decisions to seek care for children with ARI symptoms.[35,37] Even in the presence of adequate knowledge, negative perceptions and structural barriers may prevent caregivers from utilising appropriate healthcare services.

The framework further incorporates household management practices as mediating variables. These practices include the use of home remedies, over-the-counter medications, antibiotic

use without prescription, hygiene measures, and observation of illness severity at home. Empirical evidence suggests a strong association between caregivers' knowledge and attitudes and their home management practices.[34,36] Inappropriate practices, such as indiscriminate antibiotic use or reliance on traditional remedies, may delay effective treatment and worsen disease outcomes.

Care-seeking behaviour represents a key outcome variable within the framework. It encompasses the timeliness of seeking care, the type of healthcare provider consulted (formal versus informal), and delays in presentation to health facilities. Studies conducted in Nigeria and similar settings have shown that caregivers from poorer households, those with limited education, and those influenced by unfavourable social norms are more likely to seek care from untrained providers or delay seeking appropriate treatment.[32,33] Prompt and appropriate care-seeking is essential for reducing ARI-related complications and mortality among under-five children.

Ultimately, the framework links caregivers' care-seeking behaviour to child health outcomes, including severity of illness, occurrence of complications such as pneumonia and sepsis, need for hospital admission, and mortality. Evidence from hospital-based and community studies indicates that delayed or inappropriate care-seeking significantly increases the risk of severe disease and poor outcomes among children with ARIs.[26,33] Thus, improving caregiver knowledge, attitudes, and practices is critical to enhancing child survival and reducing the burden of ARIs.

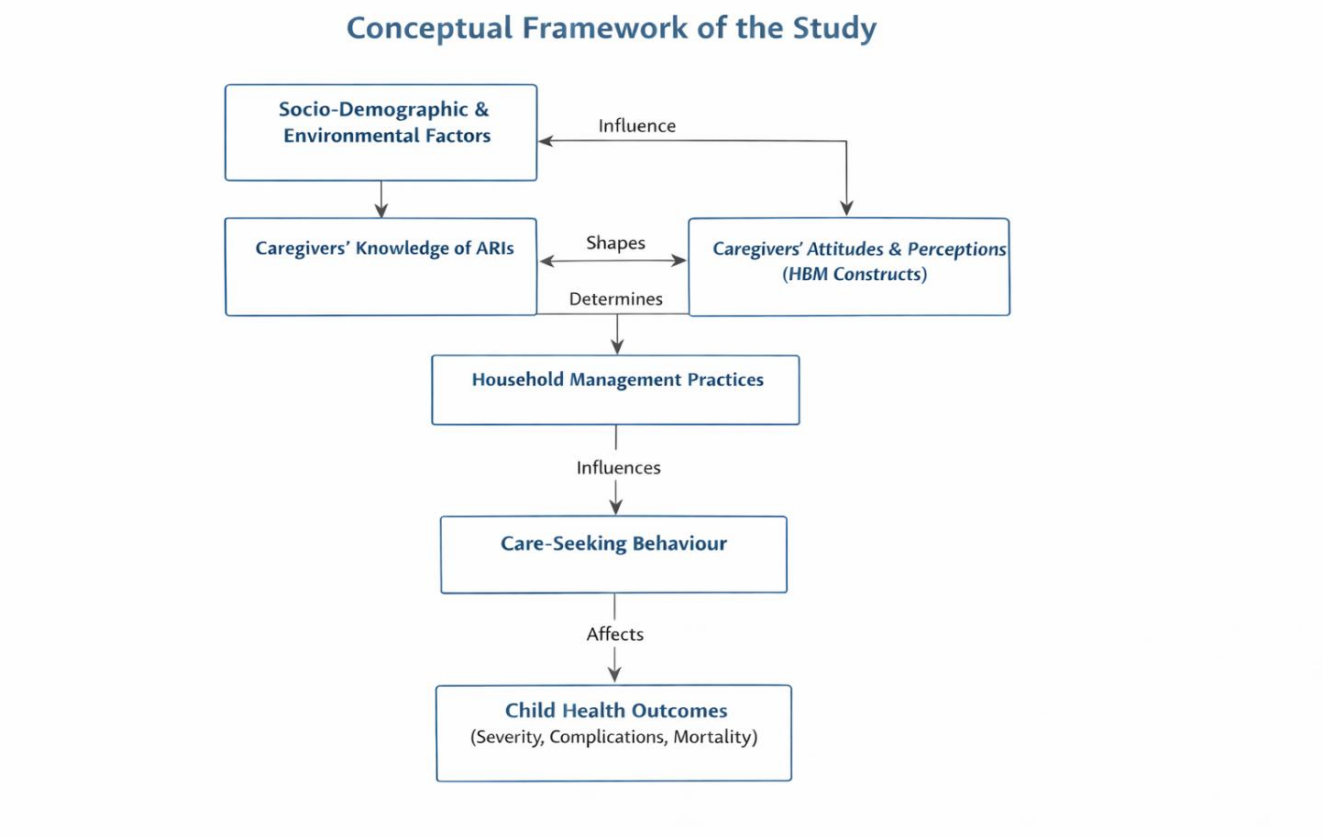

Fig 1: A diagram showing the conceptual framework for the household management of ARIs in children by caregivers[35]

2.2. THE KNOWLEDGE OF CAREGIVERS IN THE MANAGEMENT OF ARIs IN CHILDREN

A descriptive cross-sectional study focused on understanding the level of caregivers' knowledge, identifying prevalent misconceptions, and analysing practices related to ARI management was conducted in 2019 in Pakistan on 150 parents of children under five years old, living in the Kharakai community. A simple random sampling technique was utilised, and data were gathered using a modified structured questionnaire. Findings from the study reported that among participants, 51.3% were educated, while 48.7% were uneducated. It was reported that 51.7% of caregivers had poor knowledge (scoring 1–6), while 47.7% had good

knowledge (scoring >6). The mean knowledge score was 5.72, with a standard deviation of ±1.17. Statistically significant associations were found between knowledge and: Education level (p-value = 0.05), Gender, with female caregivers displaying higher knowledge levels (p-value = 0.03). The study utilized a random sampling technique, ensuring representativeness and reducing selection bias; however, the reliance on self-reported data could lead to recall or social desirability bias.

A prospective cross-sectional study was conducted to evaluate caregivers' knowledge and practices concerning acute respiratory infections (ARIs) in children. The primary aim was to assess their understanding of symptoms, risk factors, and complications of ARIs and to explore their management practices. The research was conducted on caregivers of 1,752 children from rural areas admitted to the paediatrics ward at All India Institute of Medical Sciences (AIIMS), Rishikesh, Uttarakhand, North India with complaints related to ARIs in 2019. Data were collected using a structured self-administered questionnaire comprising to Assessed knowledge regarding ARI symptoms, risk factors, and complications. Findings from the study showed that 98% of caregivers correctly identified symptoms such as fever, cough, wheezing, and sneezing, 66.3% recognised malnutrition as a risk factor for pneumonia, and 70.3% were aware of indoor smoking as contributing to ARIs. Knowledge about incomplete immunisation as a risk factor was limited, with only 41.6% showing adequate awareness. On the knowledge of Antibiotic use, only 42.6% of caregivers understood the proper use of antibiotics for treating ARIs, while 57.4% demonstrated incorrect knowledge, potentially contributing to inappropriate antibiotic use. This study provides extensive insights into the knowledge gaps and practices of caregivers regarding ARIs in a rural Indian setting. The study targeted caregivers who were present at the hospital during the study period suggesting a convenience sampling technique which limits the generalisability of findings to other populations or regions.

A similar descriptive cross-sectional study was conducted in Egypt in 2018 to assess mothers' knowledge and practices in managing acute respiratory infections (ARIs) in children under five years of age. The aim was to evaluate their understanding of ARI causes, symptoms, complications, and the proper management practices in 200 mothers with children under five years of age who were diagnosed with ARIs. A convenience sampling technique was used, and a structured interview schedule was developed by the researchers. Findings showed that 79.0% of mothers exhibited fair knowledge, while 12.0% had good knowledge and 9.0% demonstrated poor knowledge. The Specific areas of knowledge assessed revealed that 12% of mothers correctly defined ARI completely, while 66% provided incomplete answers. Also, 65% identified common ARI types incompletely, and 18.5% gave complete answers. Difficulty in breathing and fever were identified as ARI symptoms by 69.5% of mothers, while 51.5% mentioned wheezing. Acute pneumonia was cited as a major complication by 94%. A significant positive correlation ($r = 0.351$, $p = 0.000$) was observed between mothers' total knowledge scores and their practice scores, indicating that better knowledge was associated with improved management practices. The study uses a structured interview schedule which suggests some attempt at standardized data collection and by using quantitative scoring of knowledge and practice. This provides measurable results rather than purely descriptive narratives however, the convenience sampling technique used likely limits the representative picture of all mothers in the population thereby biasing the levels of knowledge/practice upward.

Another descriptive cross-sectional study carried out in Eastern Uganda in 2023 which targeted caregivers of children aged five years and below, primarily focusing on their knowledge and practices related to pneumonia. A total of 649 caregivers participated in the study, with caregivers were selected using a systematic sampling technique. Data was collected using a structured questionnaire. Responses were categorized and scored to

determine caregivers' knowledge levels, using Bloom's cut-off points as follows; Good knowledge was 80–100% (score of 9.6–12), Moderate knowledge was 60–79% (score of 7.2–9.6) and Poor knowledge was <60% (score below 7.2). Findings from the study reported that 28% of caregivers demonstrated good knowledge, while 36% had moderate knowledge, and 35% had poor knowledge regarding pneumonia management. Awareness of childhood illnesses was high, with 21% of caregivers identifying pneumonia as a common illness. Malaria (89%) and diarrhea (46%) were more commonly recognized. The study also showed the knowledge of risk factors and Symptoms indicating that 77% mentioned poor sanitation as a risk factor, while 61% mentioned incomplete immunization, and 53% pointed out the absence of insecticide-treated nets. The most frequently mentioned symptom was elevated body temperature (95%), followed by vomiting (58%) and a runny nose (56%). On the knowledge of caregivers on the treatment of ARIs, 92% identified coartem as a treatment for pneumonia, followed by ORS solution (60%) and amoxicillin (40%). Fewer caregivers were aware of proper antibiotic use and the need for prescribed treatments, reflecting knowledge gaps in appropriate therapeutic approaches. The study's large sample size (n=649) enhances the reliability of the findings. The detailed assessment of multiple knowledge dimensions in this study (risk factors, symptoms, treatments) provided nuanced insights.

A descriptive cross-sectional survey design, aimed at assessing caregivers' knowledge regarding Acute Respiratory Infections (ARIs) in children under five years old, was conducted in 2018 in Edo State, Nigeria. The study targeted caregivers of children under five years of age. A total of 346 caregivers participated in the study, selected using a multistage sampling technique and a researcher-administered questionnaire was used to collect data. Findings on the different areas of caregivers assessed revealed that 13.3% (46/346) had good knowledge of ARI symptoms, 42.5% (147/346) had fair knowledge, and 44.2% (153/346) demonstrated poor knowledge. Findings on the knowledge of causes revealed only 3.5% (12/346) had good

knowledge of ARI causes and a staggering 96.5% (334/346) showed poor knowledge. Findings on knowledge of danger signs showed that 2.6% (9/346) of caregivers demonstrated good knowledge, 4.6% (16/346) had fair knowledge and 92.8% (321/346) exhibited poor knowledge. While the study analyses associations between socio-demographic variables and knowledge levels (e.g., age, gender, education) there is less in-depth analysis of what drives specific practices (barriers to appropriate care, cultural beliefs, access to healthcare, economic constraints).This gives a limited exploration of the interplay between caregivers' knowledge and practices in relation to ARIs in children.

A descriptive cross-sectional study to assess caregivers' knowledge and care-seeking behaviours for pneumonia in children under the age of five years was conducted between December 2019 and March 2020 and carried out in Northwest Nigeria. The study targeted a selected 1,661 women caregivers in Kiyawa Local Government Area (LGA), Jigawa State, Northwest Nigeria, aged 16–49 years, who had children under five years of age using a systematic random sampling technique. Data were gathered via interviewer-administered surveys, which included videos to aid caregivers' recall of pneumonia-specific symptoms. Responses were scored, and multivariate logistic regression analyses were conducted. Finding from the study showed that only 4.9% of caregivers had correct knowledge of pneumonia-specific symptoms (cough and fast/difficult breathing), 45.9% knew about vaccination, 19.0% were aware of exclusive breastfeeding as preventive. The mean knowledge score for prevention was 0.9 out of 4. The level of knowledge of transmission risks and treatment was equally low, showing that 20.7% mentioned breathing dust as a transmission risk, 36.4% identified antibiotics as a treatment, The mean treatment knowledge score was 0.4 out of 2. This study measured knowledge across multiple domains (symptoms, prevention, risk, treatment) and constructed composite knowledge scorees therby giving a reliable result on caregivers' knowledge assessment of ARIs in children.

2.3. THE PREVALENCE OF ARIs AMONG CHILDREN UNDER THE AGE OF 5

A cross-sectional analysis of Demographic and Health Surveys (DHS) data collected between 2006 and 2021 across 37 sub-Saharan African countries, including Nigeria, provided valuable insights into the regional burden of ARIs[24]. The study analyzed data from a total of 381,424 children, with 33,924 children from Nigeria alone. A multistage stratified cluster sampling method was employed to select participants, and retrospective data were analyzed. The results revealed an overall ARI prevalence of 5% in Nigeria[24]. The burden was disproportionately higher among children from low-income households and those with less educated mothers. Urban residence, low household wealth, and limited maternal education were identified as significant predictors of increased ARI prevalence[24]. While the study was conducted over a the large sample size which gives statistical power, allows for cross-country comparisons and identifies broad socioeconomic predictors such as wealth, maternal education, urban/rural residence, it does not delve deeply into caregiver behaviour, home-management practices, decision-making processes, or cultural practices which limits the prevalence perspective projected in the results of the surveys.

Another relevant study involved an analytical cross-sectional national survey conducted in rural Gambia between 2019 and 2020[25]. The study targeted children aged 2 to 59 months, with a sample size of 1,364 rural children selected using stratified two-stage cluster sampling. Data collection involved structured questionnaires and the review of health records[25]. The weighted prevalence of ARIs was found to be 37.1%. Notably, children whose mothers had attained primary education exhibited lower ARI rates (30.1%) compared to those whose mothers had no formal education (41%). The study also highlighted the protective effect of breastfeeding, as non-breastfed children had significantly higher odds of developing ARIs (adjusted odds ratio [aOR] = 1.40)[25]. The study identifies key determinants such as maternal education, father's employment, breastfeeding status, which help piece together a socio-demographic

picture of ARI in the context of prevalence however,it uses existing Demographic and Health Surveys (DHS) data hence variables are restricted to what was collected which limits a broad-based view of ARI prevalence in Children.

In a retrospective hospital-based study conducted between 2021 and 2022 in a Nigerian tertiary health institution located in Nnewi, which shares characteristics with Benin City's urban environment, the prevalence and outcomes of ARIs among infants were examined[26]. The study population comprised infants aged 0 to 12 months, with 142 out of 694 admissions diagnosed with ARIs, resulting in a prevalence rate of 20.5%. Bronchopneumonia accounted for 83.8% of the ARI diagnoses, making it the most common clinical presentation[26]. The recorded mortality rate was 20.4%, with sepsis complicating bronchopneumonia being the principal cause of death. Additionally, a seasonal pattern in ARI cases was observed, with peaks occurring in November and December during the dry harmattan season[26]. The use of existing medical records allows access to clinical outcomes which many home- based or survey studies cannot capture however the study introduces a selection bias as it is retrospective and only includes infants admitted to the emergency room of a tertiary hospital.

Further evidence emerged from a hospital-based analytical cross-sectional study conducted between 2023 and 2024 in an urban pediatric hospital in Baghdad, Iraq[27]. Although conducted outside Nigeria, the urban context offers insights applicable to settings such as Benin City. The study involved 307 children aged 2 to 59 months, recruited through convenience sampling. Questionnaires and medical records were utilized for data collection[27]. An ARI prevalence of 57.4% was reported, with rhinitis (62%) and pneumonia (24%) being the most prevalent diagnoses. Identified risk factors included passive exposure to cigarette smoke (odds ratio [OR] = 3.85), close contact with individuals suffering from respiratory infections (OR = 3.42), and malnutrition (OR = 2.13)[27]. This study offers comparative data for different age groups and identifies important risk factors that play a role in the prevalence of ARIs in

children under the age of 5years however, The prevalence rate is given based on hospital attendees, which fails to capture the burden of broader community.

An observational cross-sectional study conducted in 2025 investigated the prevalence and risk factors associated with Acute Respiratory Infections (ARIs) among children under five years old, using data from a large-scale national household survey[28]. Although the study was conducted across 514 districts and cities in Indonesia, its findings are highly relevant to low-resource urban settings such as Benin City, Nigeria, due to comparable socioeconomic and environmental conditions. The study aimed to determine the prevalence of ARIs among children in low- and middle-income households and to identify key modifiable risk factors, including malnutrition, sanitation, and lack of social protection[28]. The final analyzed sample included 289,631 children under five, drawn from an initial 334,848 households using a two-stage stratified cluster sampling technique[28]. Data collection involved direct interviews with caregivers, anthropometric measurements to assess nutritional status, and clinical diagnosis of ARIs based on symptoms such as fever, cough of less than two weeks, runny nose, or sore throat confirmed by a physician. The prevalence of ARIs was found to be 5.7%, with infants under six months being the most affected group[28]. Risk factors significantly associated with ARIs included the use of unclean cooking fuels such as kerosene and firewood (aOR = 1.53, 95% CI: 1.47–1.60), shared toilet facilities (aOR = 1.19, 95% CI: 1.13–1.25), malnutrition (stunting, wasting, underweight), and lack of access to social protection programs. Regional variations showed higher ARI prevalence in rural and economically disadvantaged areas[28]. The use of a large sample size, regional stratification and a number of potentially modifiable household/environmental risk factors allows a robust and statistically accurate estimate of prevalence and regional disparities across Indonesia.

2.4. CARE-SEEKING FOR CHILDREN WITH ARI SYMPTOMS IN BENIN CITY

A study, conducted in 2019, employed a cross-sectional observational design through secondary analysis of data from the 2014 Bangladesh Demographic and Health Survey (BDHS)[29]. The aim of the study was to investigate the prevalence of ARIs, the care-seeking behaviors of caregivers, and the socio-economic factors influencing these behaviors among children under five years of age[29]. This nationally representative study was based in Bangladesh and included a study population of 6,566 children under five years old. Participants were selected using a multi-stage stratified sampling technique. Data collection was conducted using structured household surveys in which mothers and primary caregivers were interviewed[29]. Notably, 90% of caregivers of children with symptoms sought some form of care. However, the analysis revealed significant disparities based on household wealth: children from the poorest households were substantially less likely to receive care, with an adjusted odds ratio (AOR) of 0.03 and a 95% confidence interval (CI) of 0.01 to 0.55[29]. Several key determinants were identified. Children younger than two years of age and male children exhibited higher ARI prevalence. Rural residents were 3.74 times more likely to seek care from untrained healthcare providers compared to their urban counterparts. Maternal education and household wealth were both significantly associated with the likelihood of seeking appropriate healthcare[29]. Although most caregivers sought treatment for children with ARIs, many relied on untrained healthcare providers thereby highlighting gaps in accessibility of government healthcare services.

A mixed-methods study conducted between 2011 and 2016 in Mehinji District, rural Malawi, utilized a cross-sectional analysis of verbal autopsies to investigate care-seeking patterns among children aged 1-59 months who died of suspected pneumonia[30]. Data were obtained through community-based surveillance and a random selection of verbal autopsy narratives. The open caregiver narratives and WHO 2012 verbal autopsy questionnaire provided rich

qualitative and quantitative insights[30]. Among the 171 children who died from suspected pneumonia, 86% were taken to a healthcare facility prior to death, and 44% had visited more than one provider. However, only 25% of those admitted received oxygen therapy, indicating severe gaps in treatment availability[30]. Major barriers included delayed decision-making, transportation difficulties, and poor quality of care within the facilities. The study also revealed that although female children were more likely to be brought to a hospital, they had lower hospital admission rates compared to males[30].

A third study utilized data from the Uganda Demographic and Health Surveys (UDHS) collected between 1995 and 2016 to examine long-term trends in ARI prevalence and care-seeking behavior among 26,974 infants aged 0–5 months[31]. The secondary analysis of this nationally representative dataset relied on maternal self-reporting of ARI symptoms and health-seeking responses. The study revealed a declining trend in ARI prevalence over the years, although it remained notably high by 2016, fever affected 36.2% of infants, cough 42.6%, and dyspnea 19.3%. Care-seeking behavior for fever and cough doubled over the two-decade span, yet disparities persisted. Infants of higher birth order, those residing in rural areas, and those born to mothers with limited education were less likely to receive timely and appropriate treatment for ARI symptoms[31] thus indicating unequal access and persistent barriers to public healthcare use.

An observational (cross-sectional) study, conducted in 2023 in Kiyawa Local Government Area of Jigawa State, Nigeria, also utilized an observational cross-sectional design[32]. It served as a baseline household survey for the inspiriring trial and aimed to assess caregiver knowledge of pneumonia and their care-seeking behavior when children under five exhibited ARI symptoms. The study population consisted of 1,661 female caregivers and 2,828 children under the age of five[32]. Participants were selected using a three-step systematic random sampling approach. Data collection was facilitated through interviewer-administered surveys,

which were conducted digitally using CommCare on tablets. Findings from this study revealed notable gaps in caregiver knowledge: only 4.9% of caregivers could correctly identify both cough and fast or difficult breathing as symptoms of pneumonia[32]. Although 19% of children had experienced ARI symptoms during the survey reference period, only 32.3% of these children were taken to a healthcare facility or provider for treatment. The study further found that children from wealthier households were twice as likely to receive care compared to those from lower-income backgrounds, with an AOR of 2.13 and a 95% CI of 1.03 to 4.38[32]. The presence of fever in a child was also associated with increased care-seeking, with an AOR of 2.45 and a 95% CI of 1.38 to 4.34. Interestingly, maternal knowledge of pneumonia symptoms did not significantly impact care-seeking behavior, suggesting that broader structural and economic barriers may have a more decisive role in determining whether or not children receive appropriate medical attention[32].

A cross-sectional matched case-control study conducted between 2015 and 2017 in Ibadan, an urban area comparable to Benin City, compared care-seeking behavior among 302 children diagnosed with pneumonia and 302 children with non-pneumonia respiratory symptom[33]. Participants were recruited through hospital outpatient clinics, and follow-up assessments were carried out at home using Demographic and Health Survey (DHS) and Multiple Indicator Cluster Survey (MICS) instruments. The study reported that children with pneumonia experienced longer median delays in seeking care (three days) compared to those without pneumonia (two days)[33]. Approximately 22% of pneumonia cases initially sought help from inappropriate providers such as pharmacies and traditional healers. Alarmingly high antibiotic use was observed, with 92% of pneumonia cases and 84% of non-pneumonia cases receiving antibiotics, regardless of proper diagnostic confirmation. Additionally, rural residence, lower paternal education, and younger child age were associated with longer delays in accessing appropriate care[33].

2.5. FACTORS ASSOCIATED WITH THE MANAGEMENT OF ARIS IN CHILDREN BY CAREGIVERS IN BENIN CITY.

In a descriptive cross-sectional study conducted in El-Raml Children's Hospital, Alexandria, Egypt, the knowledge and practices of 200 mothers regarding ARI management were assessed through structured interviews using a validated questionnaire[34]. The study revealed that 79% of mothers had fair knowledge of ARIs, while only 12% had good knowledge. In terms of practice, 58.5% of the mothers demonstrated satisfactory management behavior, whereas 32% had unsatisfactory practices[34]. A statistically significant positive correlation (p=0.000) was observed between mothers' knowledge levels and their practice scores. Regarding information sources, 43.5% of the mothers cited pediatricians, 31% mentioned relatives or neighbors, and 23% reported obtaining information from pediatric nurses. This highlights the need for more structured health education from qualified personnel to improve maternal understanding and practical response to ARI symptoms in children[34].

A descriptive correlational study conducted in Mandalay, Myanmar, explored factors associated with preventive behaviors among 116 parent caregivers of children under five with ARIs. Data were collected using Health Belief Model-based questionnaires, and purposive sampling was employed to recruit participants[35]. The findings indicated poor overall preventive behavior, with a mean score of 23.57 ± 3.22. Several psychosocial predictors were identified: perceived susceptibility ($p < 0.05$), perceived severity ($p < 0.01$), perceived benefits ($p < 0.05$), and cues to action ($p < 0.01$) were all significantly associated with caregiver behavior[35]. These results emphasize the importance of psychosocial awareness in shaping parental health responses and the pressing need for educational campaigns to improve knowledge and perceptions around ARI prevention[35].

Another study conducted in Pangkajene and Island District, Indonesia, employed a correlational predictive design to analyze the role of caregiver knowledge, attitudes, and

anxiety in managing ARIs among mothers of toddlers with a history of the illness[36]. The study involved 392 mothers who were recruited using purposive sampling and responded to validated questionnaires assessing their knowledge, attitudes, anxiety levels, and family health management practices. The analysis found that good knowledge (OR=19.791, p=0.000) and positive attitudes (OR=9.265, p=0.000) were strongly linked to effective ARI management within families[36]. Conversely, higher anxiety levels significantly reduced management effectiveness (OR=0.137, p=0.000). It was also observed that mothers with higher levels of education were more likely to demonstrate better health management behaviors, suggesting that targeted education interventions could improve outcomes in similar populations[36].

The study was conducted at the Iganga and Mayuge Health and Demographic Surveillance Site (IMHDSS) located in Eastern Uganda. It employed an observational cross-sectional survey design and targeted caregivers of children aged five years and below[20]. A total of 649 caregivers participated in the study. Systematic sampling was used to select households, drawing from 25 enumeration areas with 26 households selected per area. Data were collected through structured interviews using a pre-tested questionnaire that had been translated into the local language, Lusoga, to ensure clarity and cultural relevance[20]. The findings revealed that in terms of actual practices related to ARI management, 74.1% of caregivers reported good practices, which included prompt healthcare seeking behavior and hygienic practices like handwashing. The study also found that female caregivers were more likely to engage in appropriate ARI management practices (aOR = 2.32, 95% CI: 1.23–4.37)[20]. Religion was also associated with practices, as Muslim caregivers were less likely to report good practices (aOR = 0.53, 95% CI: 0.39–0.77). Occupational status played a significant role, with peasant farmers being less likely to engage in good ARI management practices (aOR = 0.50, 95% CI: 0.29–0.85), possibly due to limited financial resources or access to healthcare information and services[20].

In Northwestern Nigeria (Kebbi, Sokoto, Zamfara), an analytical cross-sectional population-based study assessed pneumonia-related ideations and care-seeking behavior among caregivers of children under two years with pneumonia symptoms[37]. A total of 350 children were included, and data were collected through a two-stage cluster sampling technique using household and female-specific questionnaires. Only 33.8% of caregivers sought formal medical care for their children, while 38% reported the use of antibiotics[37]. Key predictors of care-seeking included perceived treatment efficacy (PR=1.35, p=0.050) and positive views of health services (PR=2.13, p=0.001). However, social norms favoring the use of drug shops were negatively associated with formal care-seeking (PR=0.71, p=0.030)[37]. Additionally, low antibiotic use was significantly linked to misconceptions about the child's susceptibility to illness (PR=0.71, p=0.040), highlighting the influence of cultural beliefs and community practices on caregiver behavior[37].

2.6. EFFECTIVENESS OF TREATMENT METHODS FOR ARIs IN CHILDREN AS REPORTED BY THE CAREGIVERS IN BENIN CITY.

The first study, a cluster-randomized controlled trial conducted in rural Bangladesh across Gazipur, Kishoreganj, Mymensingh, and Tangail districts, was carried out in 2020[38]. It aimed to assess the impact of water, sanitation, hygiene (WASH), and nutritional interventions on childhood ARIs. The study population included pregnant women and their index children, with 4,747 children followed up at 12 months and 4,667 at 24 months[38]. Geographic clusters of pregnant women were block-randomized into various intervention and control arms. Data were collected through structured interviews in which caregivers reported symptoms such as persistent cough, panting, wheezing, or difficulty breathing[38]. The findings revealed that single WASH interventions such as water chlorination, improved sanitation and handwashing significantly reduced ARI prevalence to between 6.3% and 6.4%, compared to 8.9% in the control group. However, combining WASH interventions did not provide additional benefits

beyond those achieved by individual components. Nutritional interventions alone did not lead to a significant reduction in ARI prevalence, recording 7.4% compared to 8.9% in controls[38]. Notably, caregivers' reports of ARI symptoms closely aligned with objective adherence metrics, which reinforced the conclusion that simple WASH interventions can effectively reduce the ARI burden[38].

In contrast, a similar cluster-randomized controlled trial conducted in rural Kenya in 2020 produced different outcomes. The study was carried out in Bungoma, Kakamega, and Vihiga counties and included pregnant women and their children under the age of three years. The sample size comprised 6,960 children in the first year and 7,088 in the second year[39]. Village clusters were randomized into eight intervention arms, including combinations of WASH and nutritional programs. Data collection relied on caregiver-reported ARI symptoms such as cough and difficulty breathing, along with information on treatment sources. The findings showed that, unlike in Bangladesh, WASH interventions in Kenya did not reduce ARI prevalence[39]. The control group had an ARI prevalence of 46%, while intervention groups ranged from 43% to 48%, indicating no substantial difference. However, nutritional interventions, which involved counseling and the provision of lipid-based nutrient supplements, reduced ARI symptoms by 13% in the first year, though this effect was not sustained in the second year[39]. The researchers noted that caregiver adherence to water treatment and handwashing practices declined over time, which may have compromised the intervention's effectiveness. These findings emphasize the importance of context-specific factors, such as baseline hygiene practices and sustained adherence, in determining the success of health interventions[39].

A third study conducted in 2020 in Northwestern Nigeria focused on pneumonia-related care-seeking behaviors and antibiotic use among caregivers. This cross-sectional population-based survey employed a two-stage cluster sampling technique in Kebbi, Sokoto, and Zamfara

states[37]. The study population consisted of women with children under the age of two years, and a total of 350 children exhibiting pneumonia symptoms were included. Enumeration areas were randomly selected, and all households with eligible children were surveyed[37]. Structured interviews were used to assess caregiver behaviors regarding care-seeking, treatment options, and ideational or psychosocial factors. The results revealed that only 33.8% of caregivers sought formal medical care for symptoms associated with pneumonia, while 37% used antibiotics[37]. Importantly, caregivers who believed in the efficacy of antibiotics were 35% more likely to seek formal care. Negative perceptions about the quality of healthcare services discouraged care-seeking, while social norms that favored purchasing medications from drug shops also contributed to reduced reliance on formal treatment. The study also uncovered age-based disparities, as infants aged 0–5 months were less likely to receive appropriate care than older children[37].

CHAPTER 3

METHODOLOGY

3.1. STUDY AREA

Egor Local Government Area is one of the 18 local government areas in Edo State, situated within Benin City, the state capital. It is located in the southern part of Nigeria and forms part of the Benin Metropolitan region. Egor LGA is strategically positioned and shares boundaries with Ovia North-East to the west, Ikpoba-Okha to the east, and Oredo to the south. It lies approximately between latitude 6°20′N and 6°25′N and longitude 5°35′E and 5°40′E[40].

The area is urban and semi-urban in nature, reflecting a mix of residential, commercial, and institutional settings. Egor is densely populated and is known for its vibrant socio-economic activities. The population is diverse, with inhabitants from various ethnic and cultural backgrounds, although the Benin (Edo) people form the majority. According to the 2006 National Population Census, Egor LGA had a population of over 340,000 people.[40] With a projected growth rate of 3.2% the estimated population of Egor LGA stands at about 638,180 in 2026.

Egor LGA is notable for hosting several educational institutions, including campuses of the University of Benin and other secondary and primary schools, both public and private. This makes it a relevant location for educational and health-related research. The local government area also has a variety of healthcare facilities ranging from primary health centres to private and federal hospitals. There are 10 public Primary Health Centres distributed across the political wards of the LGA, providing basic community health services.[41] In addition, Egor LGA has approximately 25 secondary health care facilities which are private hospitals.[42] There are also 2 federal tertiary hospitals which include the University of Benin Teaching

Hospital (UBTH) and the Federal Neuro-Psychiatric Hospital that serve the population's health needs.[43]

The climate of Egor is tropical, characterized by two major seasons: the rainy season (April to October) and the dry season (November to March). The average annual temperature ranges between 25°C and 30°C, and humidity levels are relatively high, especially during the rainy season. Egor LGA has relatively good road network with a the popular Uselu-Lagos road passing through part of the LGA, relatively stable power supply and good telecommunication network providers. The vegetation is predominantly tropical rainforest, although urbanization has altered much of the natural landscape[44].

In terms of governance, Egor LGA is administered by a Local Government Chairman and councilors representing various wards. The local government plays a significant role in grassroots development, including health, education, sanitation, and infrastructural maintenance[39].

Due to its population density, infrastructural layout, and availability of educational and healthcare institutions, Egor LGA is considered an ideal setting for community-based studies, especially those focused on public health, education, and socio-behavioral issues[39].

3.2. STUDY DESIGN

This was a community-based descriptive cross-sectional study collecting quantitative data at a single point in time. Caregivers of under-five children in Egor LGA was surveyed using structured questionnaires. This design is appropriate for estimating the levels of caregiver knowledge, care-seeking practices, and reported effectiveness of treatments for ARI symptoms in the population. Such a cross-sectional approach has been used in similar under-

five health studies (e.g. in Ethiopia) and allows calculation of prevalence and associations between variables in the target community[40].

3.3. STUDY POPULATION

The study population consists of primary caregivers of children aged 0-59 months residing in Egor LGA. A "caregiver" is defined as the parent or guardian (typically the mother, but may be father or other household member) who is responsible for the child's day-to-day care and has knowledge of their illness history. All eligible caregivers living in Egor LGA for at least six months was considered.

3.3.1 Inclusion Criteria

a. Adult (≥18 years) caregivers who are the primary caregiver of a child aged 0–59 months.
b. Resident in Egor LGA for at least six months prior to the survey.

3.3.2 Exclusion Criteria

a. Children with chronic respiratory conditions
b. Any child presenting symptoms that are not related to acute respiratory tract infections (e.g Diarrhoea)
c. Those who are not the primary caregiver (e.g. visitors or relatives not usually responsible for the child's care).

3.4. STUDY DURATION

The survey was carried out over a 12-month period from May 2025 to April 2026. This includes time for preparatory activities (e.g. staff training, pilot-testing), data collection, and data entry/analysis.

3.5 SCOPE OF THE STUDY

This study assessed five main aspects of household ARI management in under-five children:

a. Caregiver knowledge of ARI symptoms and prevention
b. The prevalence of ARI among under 5 children
c. Care-seeking practices (e.g. use of home remedies, OTC drugs, formal health care)
d. Factor associated with management of ARI in children
e. Perceived effectiveness of the treatments used at home.

Emphasis was on identifying gaps and patterns in these areas. Evaluating the effectiveness of various treatment methods is considered critical for guiding future education and policy. Prior work has noted that reliance on home-based or traditional practices can raise concerns about appropriateness and efficacy. By focusing on these domains, the study aimed to capture whether caregivers recognize ARI danger signs, how often they occur, where and how quickly they seek care, factors involved in the management, and how well the treatments they use seem to work in practice.

3.6 SAMPLE SIZE DETERMINATION

The sample size was determined using Cochran's formula for sample size calculation in cross-sectional studies[48]

$$n = \frac{z^2pq}{d^2}$$

Where:

n = Minimum sample size

z = Standard normal deviate set at 1.96 (at 95% confidence interval)

p = Prevalence of the characteristics of interest

p = A prevalence of 27.4% percent was obtained from a study done in Nnewi, Anambra State on the prevalence and outcome of Acute Respiratory tract Infections among under five years with acute respiratory tract infection.[26]

d = Desired level of precision = 0.05

q = The complementary probability, 1 – p

q = 1 – 0.274 = 0.726

Therefore $n = \frac{1.96^2 \times 0.274 \times 0.726}{0.05^2}$

$$n = \frac{3.8416 \times 0.1989}{0.0025}$$

$$n = \frac{0.764}{0.0025}$$

$$n = 305.6 \sim 306$$

10% non-response rate = 30.6 ~ 31

Therefore, the minimum sample size is 306+31 = 337 respondents.

Design Effect

Since this study used multi-stage random sampling technique, a design effect (DE) of 1.5 was applied:

$n$adjusted = 337 x 1.5 = 505.5 ~506 respondents

Thus, the final adjusted sample size was 506 respondents

3.7 SAMPLING TECHNIQUE

A multistage sampling technique was employed in this study to select eligible caregivers of under-five children in Egor Local Government Area (LGA), Edo State. This approach was considered appropriate due to the large population size and the administrative structure of the LGA, which is divided into wards and households.

Stage one: Selection of Wards

In the first stage, all the 10 political wards in Egor Local Government Area which include Ugbowo, Okhoro, Uwelu, Uselu I, Uselu II, Ogida I, Ogida II, Useh, Egor, Evbuotubu was listed to form the sampling frame. From this list, 5 wards were selected by simple random sampling using a lottery method or random number table. This ensured that all wards had an equal chance of being selected and that the sample adequately represented different geographical and socio-economic areas within the LGA.

Stage two: Selection of Settlements / Communities

All the settlements (towns and villages) within each selected ward was listed to form the secondary sampling frame. Egor LGA is made up of several towns and villages including Okhoro, Use, Uwelu, Iguikpe, Ugbighoko amonst others. From this list, a proportion of settlements were selected from each ward using simple random sampling. The number of settlements selected per ward was determined based on the ward's estimated population size

and the need for geographical spread. This stage ensured that diversity within wards was captured and reduced clustering bias.

Stage three: Selection of Households

In the second stage, a household listing was conducted within each selected ward. All households in the selected wards were enumerated, and households with at least one child aged 0–59 months was identified. From the list of eligible households, systematic random sampling was used to select households proportionately from each ward based on the ward's estimated population size. The sampling interval was determined by dividing the total number of eligible households in each ward by the number of households required from that ward.

Stage four: Selection of Respondents

In the third stage, one eligible caregiver was selected from each sampled household. An eligible caregiver was defined as the primary caregiver of a child aged 0–59 months who has resided in the household for at least six months and meets the study inclusion criteria.

3.8 DATA MANAGEMENT

This study employed a quantitative method of data collection using a structured questionnaire

3.8.1 Data collection tools

The questionnaire was adapted from the Household Survey Manual: Diarrhoea and Acute Respiratory Infections[43] and the NDHS 2024 Household Survey Report.[46] It made use of a structured format (with mostly closed-ended questions) which facilitated uniform data gathering.

The questionnaire design for this study consisted of five sections which are as follows;

Section A: Sociodemographic characteristics of the respondents.

Section B: Knowledge of acute respiratory infections (ARI) among respondents.

Section C: Prevalence of acute respiratory infections in the last two weeks

Section D: Care seeking behavior for ARI

Section E: Factors influencing ARI management

Section F: Treatment methods used

3.8.2. Method of data collection

An interviewer-administered questionnaire was used to collect data from caregivers of under-5 children. Visits was carried out to the selected households and the questionnaire was administered to the eligible caregiver. This interviewer-administered approach (rather than self-administered) helps ensure completeness and accuracy of responses, especially given varying literacy levels of respondents.

3.8.3 Pretesting

The pretesting was carried out with 10% of the sample size which is 64 in Oredo LGA, Edo state. It was done in order to validated the questionnaire and spot any error in the questionnaire which was appropriately corrected before data collection begins

3.9 SCORING SYSTEM

Knowledge of of Acute Respiratory Infection in different domains was scored, including knowledge of symptoms, knowledge of causes, knowledge of danger signs and knowledge of

prevention of Acute Respiratory Infection. Each correct answer scored a point of one (1), incorrect responses scored zero (0). The maximum and minimum total scores attainable were ‘6’ and ‘0’ respectively for knowledge of symptoms and knowledge of danger signs, and ‘8’ and ‘0’ for knowledge of causes and knowledge of prevention of acute respiratory infections. The total score for each respondent was converted into a percentage. Respondents were then be categorized into two groups based on their scores:

- ....Good knowledge: >50%
- ....Poor knowledge: ≤50%

3.9.1. ARI prevalence

Under-5 children who have had an episode of fast breathing and cough over the last 2 weeks was defined as a case of ARI.

3.9.2. Treatment outcome score

Under-5 children who recovered completely following ARI treatment was scored '1' while those who did not was scored zero. The maximum score was '1' and the minimum score zero. A score of one classified participants into '*complete recovery*' and a score of zero, *'imcomplete recover”.*

3.10. DATA ANALYSIS

Data was cleaned, coded and analyzed using IBM SPSS® version 27.0 software. This was conducted in phases using a combination of descriptive statistics including univariate analysis; and bivariate statistical techniques to comprehensively explore and interpret the data collected in relation to the study objectives.

3.10.1. Descriptive Statistics

Descriptive statistical techniques were used to summarize the distribution of key variables. Univariate analysis was conducted to describe the socio-demographic characteristics of respondents, as well as their responses to knowledge, Prevalence, care seeking behaviors, factors associated as well as treatment methods and outcome of acute respiratory infections. tabular representation wasused to visually summarize the distribution of variables.

3.10.2. Bivariate Analysis

To examine potential relationships and test hypotheses regarding associations between selected variables, bivariate analysis was conducted using the Chi-square test of independence (χ^2). This test was applied to assess statistically significant associations between respondents' socio-demographic characteristics (e.g., age group, education level, income bracket) and their levels of; knowledge about symptoms, causes, prevention, as well as danger signs of acute respiratory infections; prevalence of acute respiratory infections in the last two weeks; and ARI treatment outcomes. In instances where the expected cell count in the contingency table is less than five (5), the Chi-square Test was applied to ensure statistical validity, with the level of statistical significance set at $p < 0.05$

3.11. ETHICAL CONSIDERATION

Ethical approval for this study was obtained from the University of Benin Teaching Hospital Research Ethics Committee with protocol number (ADM/E 22/A/VOL VII/14865491272110) to ensure compliance with ethical guidelines and standards. Prior to participation, written informed consent was obtained from all participants, ensuring that they fully understand the purpose, procedures, and potential implications of the study. Participation was entirely voluntary, with individuals having the right to withdraw from the study at any time without facing any form of penalty. Additionally, strict confidentiality measures was maintained throughout the research process. All collected data was anonymised, and no identifying information was published, thereby safeguarding the privacy and rights of the participants.

3.12. LIMITATION OF STUDY

Several limitations were anticipated. First, as in any survey relying on caregiver recall, there was potential recall bias and reporting bias. Second, data on symptoms and treatments were self-reported and not clinically verified, so diagnostic misclassification was possible. Third, because this study is confined to Egor LGA, the findings may not be fully generalisable to other parts of Benin City or Edo State with different socio-cultural contexts. Finally, the cross-sectional design prevented us from establishing causal relationships. Nonetheless, these limitations was mitigated by careful questionnaire design (e.g. using simple recall periods) and cautious interpretation of associations.

CHAPTER FOUR

RESULTS

A total of 506 Caregivers in Egor L.G.A, Benin City, Edo State, participated in this study. The response rate was 100%.

The results are divided into the following sections:

SECTION A: Socio-demographic characteristics of the respondents.

SECTION B: Knowledge of acute respiratory infections (ARI) among respondents.

SECTION C: prevalence of acute respiratory infections in the last two weeks

SECTION D: Care seeking behavior for ARI

SECTION E: Factors influencing ARI management

SECTION F: Treatment methods used

SECTION A: Socio-demographic characteristics of the respondents

Table 4.1a: Socio-demographic and Household Characteristics

Variable	Frequency (n=506)	Percent (%)
Relationship		
Mother	374	73.9

Father	77	15.2
Grandparent	25	4.9
Guardian	22	4.4
Others#	8	1.6
Caregiver Age Group (Years)		
<20	33	6.5
20–29	139	27.5
30–39	118	23.3
40–49	142	28.1
50–59	74	14.6
Index Child Age Group (Months)		
0–11	92	18.2
12–23	103	20.3
24–59	311	61.5
Sex of Caregiver		
Female	388	76.7
Male	118	23.3
Number of Under-5 Children		
1	359	70.9
2	103	20.4
3	44	8.7
Sex of Index Child		
Female	276	54.5
Male	230	45.5
Religion		
Christianity	396	78.3
Islam	70	13.8
ATR	30	5.9
Others*#	10	2.0
Ethnicity		
Benin	234	46.2
Esan	58	11.5
Yoruba	49	9.7
Urhobo	35	6.9
Igbo	32	6.3
Owan	29	5.7
Etsako	28	5.5
Hausa	25	4.9
Calabar/AkwaIbom	12	2.4
Others*	4	0.8
Marital Status		
Married	307	60.7
Single	123	24.3
Cohabiting	46	9.1
Divorced/Separated	15	3.0
Widowed	15	3.0

Mean caregiver age (years) (± SD): 35.98±11.04 Others#: Sibling, Greatgrand Parent
Mean index Under-5 age (months) (± SD): 30.53±17.16 Others*: Tiv, Boma, Itsekiri Others*#: Green World, Elkankar, Krishna

Table 4.1b: Socio-demographic and Household characteristics

Variable	Frequency (n=506)	Percent (%)
Education Level		
Secondary	221	43.7

Tertiary	169	33.4
Primary	86	17.0
None	30	5.9
Employment Status		
Employed	332	65.6
Unemployed	174	34.4
Monthly Income		
< ₦70,000	170	33.6
₦70,000–₦100,000	128	25.3
₦100,000–₦200,000	89	17.6
₦200,000–₦500,000	81	16.0
> ₦500,000	38	7.5
Residence Type		
Urban	274	54.2
Peri-urban	175	34.6
Rural	57	11.3
Cooking Fuel		
Gas	203	40.1
Kerosene	141	27.9
Electric cooker	91	18.0
Firewood	50	9.9
Charcoal	21	4.2
Cooking Inside House		
Yes	254	50.2
No	252	49.8
Caregiver Smokes		
No	484	95.7
Yes	22	4.3
Others Smoke		
No	371	73.3
Yes	135	26.7
Household Size Category		
1–6	291	57.5
>6	215	42.5

The mean age of caregivers was 35.98 years (±11.04), while the mean age of the index under-five children was 30.53 months (±17.16). Regarding the relationship to the child, the majority of caregivers were mothers 374 (73.9%), followed by fathers 77 (15.2%), grandparents 25 (4.9%), guardians 22 (4.4%), and others 8 (1.6%).

Caregivers were predominantly aged 40–49 years 142 (28.1%), followed by those aged 20–29 years 139 (27.5%), 30–39 years 118 (23.3%), 50–59 years 74 (14.6%), and those younger than 20 years 33 (6.5%). Most index children were aged 24–59 months 311 (61.5%), while 103 (20.3%) were aged 12–23 months and 92 (18.2%) were aged 0–11 months.

The majority of caregivers were female 388 (76.7%), while 118 (23.3%) were male. Most households had one under-five child 359 (70.9%), followed by two children 103 (20.4%) and

three children 44 (8.7%). Slightly more than half of the index children were female 276 (54.5%), while 230 (45.5%) were male.

Christianity was the predominant religion 396 (78.3%), followed by Islam 70 (13.8%), African Traditional Religion 30 (5.9%), and other religions 10 (2.0%). The largest ethnic group was Benin 234 (46.2%), followed by Esan 58 (11.5%), Yoruba 49 (9.7%), Urhobo 35 (6.9%), Igbo 32 (6.3%), Owan 29 (5.7%), Etsako 28 (5.5%), Hausa 25 (4.9%), Calabar/AkwaIbom 12 (2.4%), while 4 (0.8%) belonged to other ethnic groups such as Tiv, Boma, and Itsekiri.

Most respondents were married 307 (60.7%), followed by single individuals 123 (24.3%), those cohabiting 46 (9.1%), and both divorced/separated and widowed respondents 15 (3.0%) each.

Educational attainment showed that the majority had secondary education 221 (43.7%), followed by tertiary education 169 (33.4%), primary education 86 (17.0%), while 30 (5.9%) had no formal education. Most caregivers were employed 332 (65.6%), whereas 174 (34.4%) were unemployed.

Monthly income distribution revealed that 170 (33.6%) earned less than ₦70,000, followed by 128 (25.3%) earning ₦70,000–₦100,000, 89 (17.6%) earning ₦100,000–₦200,000, 81 (16.0%) earning ₦200,000–₦500,000, and 38 (7.5%) earning more than ₦500,000.

The majority of respondents resided in urban areas 274 (54.2%), followed by peri-urban areas 175 (34.6%) and rural areas 57 (11.3%). Cooking fuel usage was highest for gas 203 (40.1%), followed by kerosene 141 (27.9%), electric cookers 91 (18.0%), firewood 50 (9.9%), and charcoal 21 (4.2%).

Slightly more than half of the respondents cooked inside the house 254 (50.2%), while 252 (49.8%) cooked outside. Most caregivers did not smoke 484 (95.7%), whereas 22 (4.3%)

reported smoking. Similarly, the majority reported that no other household members smoked 371 (73.3%), while 135 (26.7%) indicated that others smoked.

Household size was predominantly between 1–6 members 291 (57.5%), while 215 (42.5%) had more than six members.

SECTION B: Knowledge of Acute Respiratory Infections (ARI) among respondents

Table 4.2a: Caregiver knowledge of Acute Respiratory Infection (ARI)

Variable	Frequency	Percent (%)
Heard of ARI (n=506)		
Yes	406	80.2

No	100	19.8
Source of Information (n=406)		
Hospital	119	29.3
Television	103	25.4
Radio	84	20.7
Friends	41	10.1
Newspaper	25	6.2
Relatives	21	5.2
Church	8	2.0
Others*	5	1.2
Symptoms of ARI (n=406)		
Cough	205	50.5
Fever	178	43.8
Fast breathing	168	41.4
Difficulty breathing	141	34.7
Chest indrawing	93	22.9
Don't know	18	4.4
Perceived Causes of ARI (n=406)		
Germs	238	58.6
Cold weather	164	40.4
Dust	125	30.8
Smoke	86	21.2
Teething	69	17.0
Overcrowding	69	17.0
Evil spirit	38	9.4
Don't know	31	7.6
ARI Preventable (n=406)		
Yes	305	75.1
No	101	24.9
Prevention Methods (n=406)		
Vaccination	131	32.3
Handwashing	125	30.8
Good nutrition	110	27.1
Breastfeeding	98	24.1
Avoiding sick people	81	20.0
Coughing into elbow	46	11.3
Don't know	12	3.0
Others#	7	1.7
Child Fully Immunized (n=406)		
Yes	280	69.0
No	126	31.0
Immunization Card Seen (n=406)		
No	209	51.5
Yes	197	48.5

Others*: Social media, Medical Outreach Others#: Regular medical checks, Facemasks, Avoiding rain

Table 4.2b: Caregiver knowledge of Acute Respiratory Infection (ARI)

Variable	Frequency	Percent (%)
Exclusive Breastfeeding (n=406)		

Yes	247	60.8
No	159	39.2
Attends Daycare (n=406)		
No	284	70.0
Yes	122	30.0
Knowledge of Danger Signs (n=406)		
Fast/difficult breathing	306	75.4
Unable to eat/drink	297	73.2
Unconscious/weak	287	70.7
Convulsions	282	69.5
Chest indrawing	282	69.5
High fever	281	69.2

Out of the 506 respondents, the majority had heard of acute respiratory infection (ARI) 406 (80.2%), while 100 (19.8%) had not. Among those who were aware of ARI (n=406), the most common source of information was hospitals 119 (29.3%), followed by television 103 (25.4%), radio 84 (20.7%), friends 41 (10.1%), newspapers 25 (6.2%), relatives 21 (5.2%), church 8 (2.0%), and other sources such as social media and medical outreach 5 (1.2%).

Knowledge of ARI symptoms varied among respondents. The most commonly identified symptom was cough 205 (50.5%), followed by fever 178 (43.8%), fast breathing 168 (41.4%), difficulty in breathing 141 (34.7%), and chest indrawing 93 (22.9%), while 18 (4.4%) did not know any symptoms.

Regarding perceived causes of ARI, the majority correctly identified germs 238 (58.6%), followed by cold weather 164 (40.4%), dust 125 (30.8%), smoke 86 (21.2%), teething 69 (17.0%), and overcrowding 69 (17.0%). A smaller proportion attributed ARI to evil spirits 38 (9.4%), while 31 (7.6%) did not know any cause.

Most respondents believed that ARI is preventable 305 (75.1%), whereas 101 (24.9%) did not. The commonly reported preventive measures included vaccination 131 (32.3%), handwashing 125 (30.8%), good nutrition 110 (27.1%), breastfeeding 98 (24.1%), avoiding sick individuals 81 (20.0%), and coughing into the elbow 46 (11.3%), while 12 (3.0%) did not know any

preventive method and 7 (1.7%) mentioned other methods such as regular medical checks, use of facemasks, and avoiding rain.

With respect to child immunisation status, 280 (69.0%) reported that their child was fully immunised, while 126 (31.0%) were not. However, immunisation cards were not seen for the majority 209 (51.5%), while 197 (48.5%) presented them.

Exclusive breastfeeding was practiced by 247 (60.8%) of respondents, whereas 159 (39.2%) did not practice it. Most children did not attend daycare 284 (70.0%), while 122 (30.0%) did.

Knowledge of ARI danger signs was generally high among respondents. The most recognized danger sign was fast or difficult breathing 306 (75.4%), followed by inability to eat or drink 297 (73.2%), unconsciousness or weakness 287 (70.7%), convulsions 282 (69.5%), chest indrawing 282 (69.5%), and high fever 281 (69.2%)

Table 4.3: Overall caregiver knowledge of ARI

Variable	Frequency (n=406)	Percent (%)
Knowledge of Symptoms		
Good Knowledge	119	29.3
Poor Knowledge	287	70.7
Knowledge of Causes		
Good Knowledge	123	30.3
Poor Knowledge	283	69.7
Knowledge of Prevention		
Good Knowledge	303	74.6
Poor Knowledge	103	25.4
Knowledge of Danger Signs		
Good Knowledge	383	94.3
Poor Knowledge	23	5.7

Overall caregiver knowledge of acute respiratory infection (ARI) varied across different domains. Knowledge of symptoms was generally low, as the majority of respondents had poor knowledge 287 (70.7%), while only 119 (29.3%) demonstrated good knowledge.

Similarly, knowledge of the causes of ARI was also low, with 283 (69.7%) having poor knowledge, compared to 123 (30.3%) who had good knowledge.

In contrast, knowledge of ARI prevention was relatively high, as most respondents demonstrated good knowledge 303 (74.6%), while 103 (25.4%) had poor knowledge.

Knowledge of danger signs of ARI was notably high among caregivers, with the vast majority exhibiting good knowledge 383 (94.3%), whereas only 23 (5.7%) had poor knowledge.

Table 4.4a: Socio-demographic characteristics and Knowledge of ARI symptoms

Category	Knowledge of ARI Symptoms (n=406)		χ^2	p-value
	Good (n=119) Freq (%)	Poor (n=287) Freq (%)		
Caregiver age group (Years)				
<20	5 (19.2)	21 (80.8)	3.392	0.495
20–29	37 (33.6)	73 (66.4)		
30–39	27 (27.8)	70 (72.2)		
40–49	38 (31.1)	84 (68.9)		
50–59	12 (23.5)	39 (76.5)		
Sex of caregiver				
Male	30 (31.3)	66 (68.8)	0.228	0.633
Female	89 (28.7)	221 (71.3)		
Number of U5 children				
1	86 (29.7)	204 (70.3)	7.631	**0.022***
2	29 (36.3)	51 (63.7)		
3	4 (11.1)	32 (88.9)		
Household size				
1–6	67 (28.2)	171 (71.8)	0.373	0.541
>6	52 (31.0)	116 (69.0)		
Marital status				
Married	78 (31.1)	173 (68.9)	0.989	0.320
Unmarried	41 (26.5)	114 (73.5)		

Table 4.4b: Socio-demographic characteristics and Knowledge of ARI Symptoms

Category	Knowledge of ARI Symptoms (n=406)		χ^2	p-value
	Good (n=119) Freq (%)	Poor (n=287) Freq (%)		
Education level				
None	7 (31.8)	15 (68.2)	0.534	0.911
Primary	18 (26.1)	51 (73.9)		
Secondary	52 (29.2)	126 (70.8)		
Tertiary	42 (30.7)	95 (69.3)		
Employment status				
Employed	78 (29.7)	185 (70.3)	0.044	0.835
Unemployed	41 (28.7)	102 (71.3)		
Monthly income				
< ₦70,000	48 (34.8)	90 (65.2)	8.056	0.090
₦70,000–₦100,000	24 (23.1)	80 (76.9)		
₦100,000–₦200,000	24 (35.3)	44 (64.7)		
₦200,000–₦500,000	18 (28.1)	46 (71.9)		
> ₦500,000	5 (15.6)	27 (84.4)		
Residence type				
Rural	11 (22.0)	39 (78.0)	4.179	0.124
Peri-urban	50 (35.2)	92 (64.8)		
Urban	58 (27.1)	156 (72.9)		
Cooking inside house				
Yes	53 (26.2)	149 (73.8)	1.832	0.176
No	66 (32.4)	138 (67.6)		
Caregiver smokes				
Yes	5 (29.4)	12 (70.6)	0.000	0.993
No	114 (29.3)	275 (70.7)		

The association between caregiver knowledge of ARI symptoms and selected socio-demographic characteristics is presented in Tables 4.4a and 4.4b.

There was no statistically significant association between caregiver age group and knowledge of ARI symptoms ($\chi^2 = 3.392$, $p = 0.495$). Although caregivers aged 20–29 years had the

highest proportion of good knowledge 37 (33.6%), this difference was not statistically significant. Similarly, sex of caregiver was not significantly associated with knowledge of ARI symptoms ($\chi^2 = 0.228$, $p = 0.633$), with comparable proportions of good knowledge among males 30 (31.3%) and females 89 (28.7%).

A statistically significant association was observed between the number of under-five children and knowledge of ARI symptoms ($\chi^2 = 7.631$, $p = 0.022$). Caregivers with two under-five children had the highest proportion of good knowledge 29 (36.3%), followed by those with one child 86 (29.7%), while those with three children had the lowest proportion 4 (11.1%).

Household size was not significantly associated with knowledge of ARI symptoms ($\chi^2 = 0.373$, $p = 0.541$), although slightly higher good knowledge was observed among households with more than six members 52 (31.0%) compared to those with 1–6 members 67 (28.2%). Marital status also showed no significant association ($\chi^2 = 0.989$, $p = 0.320$), with married caregivers having slightly higher good knowledge 78 (31.1%) than unmarried caregivers 41 (26.5%).

Furthermore, educational level was not significantly associated with knowledge of ARI symptoms ($\chi^2 = 0.534$, $p = 0.911$), as similar proportions of good knowledge were observed across all education categories. Employment status was also not significantly associated ($\chi^2 = 0.044$, $p = 0.835$), with comparable levels of good knowledge among employed 78 (29.7%) and unemployed caregivers 41 (28.7%).

Monthly income showed no statistically significant association with knowledge of ARI symptoms ($\chi^2 = 8.056$, $p = 0.090$), although caregivers earning between ₦100,000–₦200,000 had relatively higher good knowledge 24 (35.3%), while those earning above ₦500,000 had the lowest 5 (15.6%).

Similarly, residence type was not significantly associated with knowledge of ARI symptoms ($\chi^2 = 4.179$, $p = 0.124$), though caregivers in peri-urban areas had a slightly higher proportion of good knowledge 50 (35.2%) compared to urban 58 (27.1%) and rural residents 11 (22.0%).

Cooking location was not significantly associated with knowledge ($\chi^2 = 1.832$, $p = 0.176$), although caregivers who cooked outside the house had slightly higher good knowledge 66 (32.4%) compared to those who cooked inside 53 (26.2%). Caregiver smoking status also showed no significant association with knowledge of ARI symptoms ($\chi^2 = 0.000$, $p = 0.993$), with nearly identical proportions of good knowledge among smokers 5 (29.4%) and non-smokers 114 (29.3%).

Table 4.5a: Socio-demographic characteristics and Knowledge of ARI causes

Category	Knowledge of ARI Causes (n=406)		χ^2	p-value
	Good (n=123) Freq (%)	Poor (n=283) Freq (%)		
Caregiver age group (Years)				
<20	4 (15.4)	22 (84.6)	5.002	0.287
20–29	38 (34.5)	72 (65.5)		
30–39	25 (25.8)	72 (74.2)		
40–49	39 (32.0)	83 (68.0)		
50–59	17 (33.3)	34 (66.7)		
Sex of Caregiver				
Male	26 (27.1)	70 (72.9)	0.614	0.433
Female	97 (31.3)	213 (68.7)		
Number of U5 Children				
1	89 (30.7)	201 (69.3)	0.113	0.945
2	23 (28.7)	57 (71.3)		
3	11 (30.6)	25 (69.4)		
Household Size				
1–6	70 (29.4)	168 (70.6)	0.213	0.645
>6	53 (31.5)	115 (68.5)		
Marital Status				
Married	83 (33.1)	168 (66.9)	2.393	0.122
Unmarried	40 (25.8)	115 (74.2)		

Table 4.5b Socio-demographic characteristics and Knowledge of ARI causes

Category	Knowledge of ARI Causes (n=406)		χ^2	p-value
	Good (n=123) Freq (%)	Poor (n=283) Freq (%)		
Education Level				
None	6 (27.3)	16 (72.7)	0.970	0.808
Primary	24 (34.8)	45 (65.2)		
Secondary	54 (30.3)	124 (69.7)		
Tertiary	39 (28.5)	98 (71.5)		
Employment Status				
Employed	75 (28.5)	188 (71.5)	1.118	0.290
Unemployed	48 (33.6)	95 (66.4)		
Monthly Income				
< ₦70,000	42 (30.4)	96 (69.6)	0.545	0.969
₦70,000–₦100,000	34 (32.7)	70 (67.3)		
₦100,000–₦200,000	19 (27.9)	49 (72.1)		
₦200,000–₦500,000	19 (29.7)	45 (70.3)		
> ₦500,000	9 (28.1)	23 (71.9)		
Residence Type				
Rural	12 (24.0)	38 (76.0)	2.084	0.353
Peri-urban	40 (28.2)	102 (71.8)		
Urban	71 (33.2)	143 (66.8)		
Cooking Inside House				
Yes	55 (27.2)	147 (72.8)	1.792	0.181
No	68 (33.3)	136 (66.7)		
Caregiver Smokes				
Yes	4 (23.5)	13 (76.5)	0.385	0.535
No	119 (30.6)	270 (69.4)		

The association between caregiver knowledge of ARI causes and selected soci-odemographic characteristics is presented in Tables 4.5a and 4.5b.

There was no statistically significant association between caregiver age group and knowledge of ARI causes ($\chi^2 = 5.002$, $p = 0.287$). Although caregivers aged 20–29 years had the highest proportion of good knowledge 38 (34.5%), this difference was not statistically significant. Similarly, sex of caregiver was not significantly associated with knowledge of ARI causes ($\chi^2 = 0.614$, $p = 0.433$), with slightly higher good knowledge among females 97 (31.3%) compared to males 26 (27.1%).

Number of under-five children was not significantly associated with knowledge of ARI causes ($\chi^2 = 0.113$, $p = 0.945$), as similar proportions of good knowledge were observed among caregivers with one child 89 (30.7%), two children 23 (28.7%), and three children 11 (30.6%). Household size also showed no significant association ($\chi^2 = 0.213$, $p = 0.645$), although caregivers from households with more than six members had slightly higher good knowledge 53 (31.5%) compared to those with 1–6 members 70 (29.4%).

Marital status was not significantly associated with knowledge of ARI causes ($\chi^2 = 2.393$, $p = 0.122$), though married caregivers had a higher proportion of good knowledge 83 (33.1%) compared to unmarried caregivers 40 (25.8%).

Furthermore, educational level was not significantly associated with knowledge of ARI causes ($\chi^2 = 0.970$, $p = 0.808$), with comparable levels of good knowledge across all categories. Employment status also showed no statistically significant association ($\chi^2 = 1.118$, $p = 0.290$), although unemployed caregivers had slightly higher good knowledge 48 (33.6%) compared to employed caregivers 75 (28.5%).

Monthly income was not significantly associated with knowledge of ARI causes ($\chi^2 = 0.545$, $p = 0.969$), with similar proportions of good knowledge observed across all income categories.

Likewise, residence type showed no significant association ($\chi^2 = 2.084$, $p = 0.353$), although urban residents had slightly higher good knowledge 71 (33.2%) compared to peri-urban 40 (28.2%) and rural residents 12 (24.0%).

Cooking location was not significantly associated with knowledge of ARI causes ($\chi^2 = 1.792$, $p = 0.181$), though caregivers who cooked outside the house had somewhat higher good knowledge 68 (33.3%) compared to those who cooked inside 55 (27.2%). Caregiver smoking status also showed no significant association ($\chi^2 = 0.385$, $p = 0.535$), with slightly higher good knowledge among non-smokers 119 (30.6%) compared to smokers 4 (23.5%).

Table 4.6a: Socio-demographic characteristics and Knowledge of ARI Prevention

Category	Knowledge of ARI Prevention (n=406)		χ^2	p-value
	Good (n=303) Freq (%)	Poor (n=103) Freq (%)		
Caregiver age group (Years)				
<20	15 (57.7)	11 (42.3)	12.299	**0.015***
20–29	79 (71.8)	31 (28.2)		
30–39	72 (74.2)	25 (25.8)		
40–49	103 (84.4)	19 (15.6)		
50–59	34 (66.7)	17 (33.3)		
Sex of Caregiver				
Male	68 (70.8)	28 (29.2)	0.957	0.328
Female	235 (75.8)	75 (24.2)		
Number of U5 Children				
1	213 (73.4)	77 (26.6)	2.753	0.252
2	59 (73.8)	21 (26.3)		
3	31 (86.1)	5 (13.9)		
Household Size				
1–6	170 (71.4)	68 (28.6)	3.115	0.078
>6	133 (79.2)	35 (20.8)		
Marital Status				
Married	186 (74.1)	65 (25.9)	0.096	0.756
Unmarried	117 (75.5)	38 (24.5)		

Table 4.6b: Socio-demographic characteristics and Knowledge of ARI Prevention

Category	Knowledge of ARI Prevention (n=406)		χ^2	p-value
	Good (n=303) Freq (%)	Poor (n=103) Freq (%)		
Education Level				
None	17 (77.3)	5 (22.7)	5.196	0.158
Primary	54 (78.3)	15 (21.7)		
Secondary	123 (69.1)	55 (30.9)		
Tertiary	109 (79.6)	28 (20.4)		
Employment Status				
Employed	196 (74.5)	67 (25.5)	0.004	0.947
Unemployed	107 (74.8)	36 (25.2)		
Monthly Income				
< ₦70,000	109 (79.0)	29 (21.0)	8.631	0.071
₦70,000–₦100,000	74 (71.2)	30 (28.8)		
₦100,000–₦200,000	55 (80.9)	13 (19.1)		
₦200,000–₦500,000	40 (62.5)	24 (37.5)		
> ₦500,000	25 (78.1)	7 (21.9)		
Residence Type				
Rural	37 (74.0)	13 (26.0)	2.315	0.314
Peri-urban	100 (70.4)	42 (29.6)		
Urban	166 (77.6)	48 (22.4)		
Cooking Inside House				
Yes	152 (75.2)	50 (24.8)	0.081	0.776
No	151 (74.0)	53 (26.0)		
Caregiver Smokes				
Yes	13 (76.5)	4 (23.5)	0.032	0.859
No	290 (74.6)	99 (25.4)		

The association between caregiver knowledge of ARI prevention and selected socio-demographic characteristics is presented in Tables 4.6a and 4.6b.

There was a statistically significant association between caregiver age group and knowledge of ARI prevention ($\chi^2 = 12.299$, $p = 0.015$). Caregivers aged 40–49 years had the highest proportion of good knowledge 103 (84.4%), followed by those aged 30–39 years 72 (74.2%) and 20–29 years 79 (71.8%), while caregivers younger than 20 years had the lowest proportion 15 (57.7%).

Sex of caregiver was not significantly associated with knowledge of ARI prevention ($\chi^2 = 0.957$, $p = 0.328$), although females had slightly higher good knowledge 235 (75.8%) compared to males 68 (70.8%). Similarly, the number of under-five children showed no significant association ($\chi^2 = 2.753$, $p = 0.252$), though caregivers with three children had the highest proportion of good knowledge 31 (86.1%) compared to those with one 213 (73.4%) and two children 59 (73.8%).

Household size was not significantly associated with knowledge of ARI prevention ($\chi^2 = 3.115$, $p = 0.078$), although caregivers from households with more than six members had slightly higher good knowledge 133 (79.2%) compared to those with 1–6 members 170 (71.4%). Marital status also showed no significant association ($\chi^2 = 0.096$, $p = 0.756$), with similar proportions of good knowledge among married 186 (74.1%) and unmarried caregivers 117 (75.5%).

Furthermore, educational level was not significantly associated with knowledge of ARI prevention ($\chi^2 = 5.196$, $p = 0.158$), although those with tertiary education had slightly higher good knowledge 109 (79.6%) compared to other groups. Employment status was also not significantly associated ($\chi^2 = 0.004$, $p = 0.947$), with nearly identical proportions of good knowledge among employed 196 (74.5%) and unemployed caregivers 107 (74.8%).

Monthly income did not show a statistically significant association with knowledge of ARI prevention (χ^2 = 8.631, p = 0.071), although caregivers earning ₦100,000–₦200,000 had relatively higher good knowledge 55 (80.9%), while those earning ₦200,000–₦500,000 had lower good knowledge 40 (62.5%).

Residence type was not significantly associated with knowledge of ARI prevention (χ^2 = 2.315, p = 0.314), though urban residents had slightly higher good knowledge 166 (77.6%) compared to peri-urban 100 (70.4%) and rural residents 37 (74.0%). Cooking location also showed no significant association (χ^2 = 0.081, p = 0.776), with similar proportions among those cooking inside 152 (75.2%) and outside 151 (74.0%).

Caregiver smoking status was not significantly associated with knowledge of ARI prevention (χ^2 = 0.032, p = 0.859), with comparable levels of good knowledge among smokers 13 (76.5%) and non-smokers 290 (74.6%).

Overall, caregiver age group was the only socio-demographic factor significantly associated with knowledge of ARI prevention, while all other variables showed no statistically significant association.

Table 4.7a: Socio-demographic characteristics and Knowledge of ARI danger signs

Category	Knowledge of ARI Danger Signs (n=406)		χ^2	p-value
	Good (n=383) Freq (%)	Poor (n=23) Freq (%)		
Caregiver Age Group (Years)				
<20	24 (92.3)	2 (7.7)	1.632	0.803
20–29	102 (92.7)	8 (7.3)		
30–39	91 (93.8)	6 (6.2)		
40–49	117 (95.9)	5 (4.1)		
50–59	49 (96.1)	2 (3.9)		
Sex of Caregiver				
Male	93 (96.9)	3 (3.1)	1.518	0.218
Female	290 (93.5)	20 (6.5)		
Number of U5 Children				
1	275 (94.8)	15 (5.2)	0.663	0.718
2	75 (93.8)	5 (6.3)		
3	33 (91.7)	3 (8.3)		
Household Size				
1–6	223 (93.7)	15 (6.3)	0.437	0.508
>6	160 (95.2)	8 (4.8)		
Marital Status				
Married	234 (93.2)	17 (6.8)	1.510	0.219
Unmarried	149 (96.1)	6 (3.9)		

Table 4.7b: Socio-demographic characteristics and Knowledge of ARI danger signs

Category	Knowledge of ARI Danger Signs (n=406)		χ^2	p-value
	Good (n=383) Freq (%)	Poor (n=23) Freq (%)		
Education Level				
None	21 (95.5)	1 (4.5)	6.651	0.084
Primary	67 (97.1)	2 (2.9)		
Secondary	162 (91.0)	16 (9.0)		
Tertiary	133 (97.1)	4 (2.9)		
Employment Status				
Employed	249 (94.7)	14 (5.3)	0.163	0.686
Unemployed	134 (93.7)	9 (6.3)		
Monthly Income				
< ₦70,000	132 (95.7)	6 (4.3)	3.781	0.436
₦70,000–₦100,000	97 (93.3)	7 (6.7)		
₦100,000–₦200,000	65 (95.6)	3 (4.4)		
₦200,000–₦500,000	61 (95.3)	3 (4.7)		
> ₦500,000	28 (87.5)	4 (12.5)		
Residence Type				
Rural	46 (92.0)	4 (8.0)	1.867	0.393
Peri-urban	132 (93.0)	10 (7.0)		
Urban	205 (95.8)	9 (4.2)		
Cooking Inside House				
Yes	188 (93.1)	14 (6.9)	1.205	0.272
No	195 (95.6)	9 (4.4)		
Caregiver Smokes				
Yes	15 (88.2)	2 (11.8)	1.235	0.266
No	368 (94.6)	21 (5.4)		

The association between caregiver knowledge of ARI danger signs and selected socio-demographic characteristics is presented in Tables 4.7a and 4.7b.

There was no statistically significant association between caregiver age group and knowledge of ARI danger signs ($\chi^2 = 1.632$, $p = 0.803$). Although caregivers aged 50–59 years had the highest proportion of good knowledge 49 (96.1%), this difference was not statistically significant. Similarly, sex of caregiver was not significantly associated with knowledge of danger signs ($\chi^2 = 1.518$, $p = 0.218$), though males had slightly higher good knowledge 93 (96.9%) compared to females 290 (93.5%).

Number of under-five children was also not significantly associated with knowledge of ARI danger signs ($\chi^2 = 0.663$, $p = 0.718$), with similar proportions of good knowledge among caregivers with one child 275 (94.8%), two children 75 (93.8%), and three children 33 (91.7%). Household size showed no significant association ($\chi^2 = 0.437$, $p = 0.508$), although caregivers from households with more than six members had slightly higher good knowledge 160 (95.2%) compared to those with 1–6 members 223 (93.7%).

Marital status was not significantly associated with knowledge of ARI danger signs ($\chi^2 = 1.510$, $p = 0.219$), though unmarried caregivers had slightly higher good knowledge 149 (96.1%) compared to married caregivers 234 (93.2%).

Furthermore, educational level was not significantly associated with knowledge of ARI danger signs ($\chi^2 = 6.651$, $p = 0.084$), although caregivers with primary and tertiary education had higher proportions of good knowledge 67 (97.1%) and 133 (97.1%) respectively, compared to those with secondary education 162 (91.0%). Employment status also showed no significant association ($\chi^2 = 0.163$, $p = 0.686$), with comparable proportions of good knowledge among employed 249 (94.7%) and unemployed caregivers 134 (93.7%).

Monthly income was not significantly associated with knowledge of ARI danger signs ($\chi^2 = 3.781$, $p = 0.436$), although caregivers earning above ₦500,000 had slightly lower good knowledge 28 (87.5%) compared to other income groups. Residence type also showed no

statistically significant association ($\chi^2 = 1.867$, $p = 0.393$), though urban residents had slightly higher good knowledge 205 (95.8%) compared to peri-urban 132 (93.0%) and rural residents 46 (92.0%).

Cooking location was not significantly associated with knowledge of ARI danger signs ($\chi^2 = 1.205$, $p = 0.272$), with slightly higher good knowledge among those who cooked outside the house 195 (95.6%) compared to those who cooked inside 188 (93.1%). Caregiver smoking status also showed no significant association ($\chi^2 = 1.235$, $p = 0.266$), although non-smokers had higher good knowledge 368 (94.6%) compared to smokers 15 (88.2%).

SECTION C: Prevalence of acute respiratory infections in the last two weeks

Table 4.8: Prevalence of ARI in the last two weeks

Variable	Frequency (n=506)	Percent (%)
Cough in the last 2 weeks		
Yes	163	32.2
No	343	67.8
Other Symptoms Experienced*		
Runny nose	128	25.3
Fever	90	17.8
Fast breathing	75	14.0
Difficulty breathing	42	8.3
ARI (Cough and Fast Breathing)		
Yes	75	14.8
No	431	85.2

***Multiple responses**

The prevalence of acute respiratory infection (ARI) among under-five children in the last two weeks is presented in Table 4.8. A total of 163 (32.2%) caregivers reported that their child had cough within the last two weeks, while the majority 343 (67.8%) reported no history of cough. Regarding other symptoms experienced, the most commonly reported was runny nose 128 (25.3%), followed by fever 90 (17.8%), fast breathing 75 (14.0%), and difficulty in breathing 42 (8.3%).

Using the combined definition of cough and fast breathing, the prevalence of ARI was 75 (14.8%), while 431 (85.2%) of the children did not meet the criteria for ARI.

Table 4.9a: Socio-demographic characteristics and Prevalence of ARI

	Prevalence of ARI

Category	Yes (n=75) Freq (%)	No (n=431) Freq (%)	χ^2	p-value
Child Age Group (Months**)**				
0–11	16 (17.4)	76 (82.6)	1.973	0.373
12–23	11 (10.7)	92 (89.3)		
24–59	48 (15.4)	263 (84.6)		
Caregiver Age Group (Years)				
<20	3 (9.1)	30 (90.9)	4.386	0.356
20–29	19 (13.7)	120 (86.3)		
30–39	19 (16.1)	99 (83.9)		
40–49	18 (12.7)	124 (87.3)		
50–59	16 (21.6)	58 (78.4)		
Sex of Caregiver				
Male	16 (13.6)	102 (86.4)	0.194	0.659
Female	59 (15.2)	329 (84.8)		
Number of U5 Children				
1	52 (14.5)	307 (85.5)	2.605	0.272
2	13 (12.6)	90 (87.4)		
3	10 (22.7)	34 (77.3)		
Sex of Child				
Male	28 (12.2)	202 (87.8)	2.342	0.126
Female	47 (17.0)	229 (83.0)		
Employment Status				
Employed	42 (12.7)	290 (87.3)	3.606	0.058
Unemployed	33 (19.0)	141 (81.0)		

Table 4.9b: Socio-demographic characteristics and Prevalence of ARI

	Prevalence of ARI			
Category	**Yes**	**No**	**χ^2**	**p-value**

	(n=75) Freq (%)	(n=431) Freq (%)		
Household Size				
1–6	44 (15.1)	247 (84.9)	0.048	0.826
>6	31 (14.4)	184 (85.6)		
Marital Status				
Married	46 (15.0)	261 (85.0)	0.016	0.899
Unmarried	29 (14.6)	170 (85.4)		
Cooking Inside House				
Yes	42 (16.5)	212 (83.5)	1.186	0.276
No	33 (13.1)	219 (86.9)		
Others Smoke				
Yes	17 (12.6)	118 (87.4)	0.725	0.395
No	58 (15.6)	313 (84.4)		
Caregiver Smokes				
Yes	4 (18.2)	18 (81.8)	0.206	0.650
No	71 (14.7)	413 (85.3)		
Cooking Fuel				
Electric cooker	11 (12.1)	80 (87.9)	1.703	0.790
Gas	34 (16.7)	169 (83.3)		
Kerosene	20 (14.2)	121 (85.8)		
Firewood	8 (16.0)	42 (84.0)		
Charcoal	2 (9.5)	19 (90.5)		
Child Immunization Status				
Yes	55 (73.3)	290 (67.3)	1.077	0.299
No	20 (26.7)	141 (32.7)		

Table 4.9c: Socio-demographic characteristics and Prevalence of ARI

	Prevalence of ARI			
Category	**Yes (n=75)**	**No (n=431)**	**χ^2**	**p-value**

	Freq (%)	Freq (%)		
Education Level				
None	7 (23.3)	23 (76.7)	3.830	0.280
Primary	10 (11.6)	76 (88.4)		
Secondary	37 (16.7)	184 (83.3)		
Tertiary	21 (12.4)	148 (87.6)		
Residence Type				
Rural	12 (21.1)	45 (78.9)	2.130	0.345
Peri-urban	26 (14.9)	149 (85.1)		
Urban	37 (13.5)	237 (86.5)		
Monthly Income				
< ₦70,000	23 (13.5)	147 (86.5)	0.699	0.951
₦70,000–₦100,000	18 (14.1)	110 (85.9)		
₦100,000–₦200,000	15 (16.9)	74 (83.1)		
₦200,000–₦500,000	13 (16.0)	68 (84.0)		
> ₦500,000	6 (15.8)	32 (84.2)		

There was no statistically significant association between child age group and ARI prevalence ($\chi^2 = 1.973$, $p = 0.373$), although children aged 0–11 months had a slightly higher prevalence 16 (17.4%) compared to those aged 24–59 months 48 (15.4%) and 12–23 months 11 (10.7%).

Caregiver age group was also not significantly associated with ARI prevalence ($\chi^2 = 4.386$, $p = 0.356$), though caregivers aged 50–59 years had the highest proportion of children with ARI 16 (21.6%), while those younger than 20 years had the lowest 3 (9.1%). Similarly, sex of caregiver showed no significant association ($\chi^2 = 0.194$, $p = 0.659$), with comparable prevalence among males 16 (13.6%) and females 59 (15.2%).

Number of under-five children was not significantly associated with ARI prevalence ($\chi^2 = 2.605$, $p = 0.272$), although households with three children had a relatively higher prevalence 10 (22.7%) compared to those with one 52 (14.5%) and two children 13 (12.6%). Sex of the

child also showed no significant association ($\chi^2 = 2.342$, $p = 0.126$), though females had a slightly higher prevalence 47 (17.0%) compared to males 28 (12.2%).

Employment status approached statistical significance but did not reach it ($\chi^2 = 3.606$, $p = 0.058$), with higher ARI prevalence observed among children of unemployed caregivers 33 (19.0%) compared to employed caregivers 42 (12.7%).

Household size was not significantly associated with ARI prevalence ($\chi^2 = 0.048$, $p = 0.826$), with similar prevalence among households with 1–6 members 44 (15.1%) and those with more than six members 31 (14.4%). Marital status also showed no significant association ($\chi^2 = 0.016$, $p = 0.899$), with nearly identical prevalence among married 46 (15.0%) and unmarried caregivers 29 (14.6%).

Cooking location was not significantly associated with ARI prevalence ($\chi^2 = 1.186$, $p = 0.276$), although children from households where cooking was done inside had a slightly higher prevalence 42 (16.5%) compared to those cooking outside 33 (13.1%). Exposure to smoke from others was also not significantly associated ($\chi^2 = 0.725$, $p = 0.395$), though slightly lower prevalence was observed among households where others smoked 17 (12.6%) compared to those where no one smoked 58 (15.6%).

Caregiver smoking status showed no significant association with ARI prevalence ($\chi^2 = 0.206$, $p = 0.650$), although a slightly higher prevalence was observed among smokers 4 (18.2%) compared to non-smokers 71 (14.7%). Cooking fuel type was also not significantly associated ($\chi^2 = 1.703$, $p = 0.790$), with comparable prevalence across all fuel categories.

Educational level was not significantly associated with ARI prevalence ($\chi^2 = 3.830$, $p = 0.280$), though caregivers with no formal education had a relatively higher prevalence 7 (23.3%) compared to other groups. Residence type also showed no significant association ($\chi^2 = 2.130$, $p = 0.345$), although rural residents had a slightly higher prevalence 12 (21.1%) compared to

peri-urban 26 (14.9%) and urban residents 37 (13.5%). Child Immunization status also showed no significant association with ARI prevalence ($\chi^2 = 1.077$, $p = 0.299$).

Monthly income was not significantly associated with ARI prevalence ($\chi^2 = 0.699$, $p = 0.951$), with similar proportions observed across all income categories.

SECTION D: Care-seeking behavior for ARI

Table 4.10: Care-seeking behaviour for children with ARI

Variable	Frequency	Percent (%)
Sought Treatment (n=75)		
Yes	53	70.7
No	22	29.3
First Place of Care (n=53)		
Primary Health Centre	14	26.4

Government hospital	14	26.4
Private hospital	10	18.9
Pharmacy	10	18.9
Traditional healer	2	3.8
Market/shop	2	3.8
Relative/friend	1	1.9
Time Before Seeking Care(n=53)		
Same day	19	35.8
1-2 days	17	32.1
3 days or more	17	32.1
Reason for Provider Choice (n=53)		
Nearness	14	26.4
Affordable	13	24.5
Quality	12	22.6
Recommendation	8	15.1
Past experience	3	5.7
Others*	3	5.7
Satisfaction with Care (n=53)		
Satisfied	20	37.7
Very satisfied	16	30.2
Neutral	10	18.9
Dissatisfied	5	9.4
Very dissatisfied	2	3.8
Reasons for Not Seeking Care (n=22)		
Cost	7	31.8
Illness not serious	6	27.3
Home remedies	4	18.2
Distance	1	4.5
No one to accompany	1	4.5
Others#	3	13.6

Others*: Spouse choice, Sibling works there
Others#: No reason, faith, Strong family genes

Care-seeking behaviour among caregivers of children with acute respiratory infection (ARI) is presented in Table 4.10. The majority of caregivers sought treatment for their children 53 (70.7%), while 22 (29.3%) did not seek any form of treatment.

Among those who sought care (n=53), the most common first place of care was both primary health centres and government hospitals 14 (26.4%) each, followed by private hospitals 10 (18.9%) and pharmacies 10 (18.9%). A smaller proportion sought care from traditional healers 2 (3.8%), market or shop sources 2 (3.8%), and relatives or friends 1 (1.9%).

Regarding the timing of care-seeking, most caregivers sought care on the same day of symptom onset 19 (35.8%), while 17 (32.1%) sought care within 1–2 days and another 17 (32.1%) delayed care for three days or more.

The main reasons for choosing a healthcare provider were nearness 14 (26.4%), affordability 13 (24.5%), and perceived quality of care 12 (22.6%), followed by recommendations 8 (15.1%), past experience 3 (5.7%), and other reasons such as spouse influence or having a sibling working at the facility 3 (5.7%).

In terms of satisfaction with care received, most caregivers reported being satisfied 20 (37.7%) or very satisfied 16 (30.2%), while 10 (18.9%) were neutral. A smaller proportion expressed dissatisfaction 5 (9.4%) or very dissatisfied 2 (3.8%).

The reasons for not seeking care among caregivers of children with acute respiratory infection (ARI) are presented in Table 4.10. Among those who did not seek care (n = 22), the most commonly reported reason was cost 7 (31.8%), followed by the perception that the illness was not serious 6 (27.3%).

Other reasons included the use of home remedies 4 (18.2%), while a small proportion cited distance to healthcare facilities 1 (4.5%) and lack of someone to accompany them 1 (4.5%). Additionally, 3 (13.6%) reported other reasons or did not specify any reason.

Overall, financial constraints and low perceived severity of illness were the major barriers to seeking healthcare among caregivers of children with ARI.

SECTION E: Factors influencing ARI management

Table 4.11: Factors associated with ARI management

Variable	S Freq (%)	A Freq (%)	N Freq (%)	D Freq (%)	SD Freq (%)
Cost of treatment is a barrier	24 (32.0)	21 (28.0)	12 (16.0)	12 (16.0)	6 (8.0)
Distance to health facility is too far	27 (36.0)	24 (32.0)	19 (25.3)	1 (1.3)	4 (5.3)

I trust government health facilities	27 (36.0)	25 (33.3)	14 (18.7)	5 (6.7)	4 (5.3)
Herbal remedies are effective	9 (12.0)	23 (30.7)	22 (29.3)	14 (18.7)	7 (9.3)
Pharmacy medicines are strong enough	22 (29.3)	22 (29.3)	20 (26.7)	9 (12.0)	2 (2.7)
Long waiting times discourage me	21 (28.0)	18 (24.0)	17 (22.7)	14 (18.7)	5 (6.7)

S = Strongly Agree, A = Agree, N = Neutral, D = Disagree, SD = Strongly Disagree

Factors influencing the management of acute respiratory infection (ARI) among caregivers are presented in Table 4.11.

Cost of treatment was identified as a major barrier, with the majority of respondents either strongly agreeing 24 (32.0%) or agreeing 21 (28.0%), while 12 (16.0%) were neutral, 12 (16.0%) disagreed, and 6 (8.0%) strongly disagreed.

Similarly, distance to health facilities was perceived as a challenge, as most respondents strongly agreed 27 (36.0%) or agreed 24 (32.0%) that health facilities were too far, whereas 19 (25.3%) were neutral, 1 (1.3%) disagreed, and 4 (5.3%) strongly disagreed.

Trust in government health facilities was generally high, with 27 (36.0%) strongly agreeing and 25 (33.3%) agreeing that they trusted these facilities, while 14 (18.7%) were neutral, 5 (6.7%) disagreed, and 4 (5.3%) strongly disagreed.

Perceptions regarding the effectiveness of herbal remedies were mixed, as 9 (12.0%) strongly agreed and 23 (30.7%) agreed that herbal remedies are effective, while 22 (29.3%) were neutral, 14 (18.7%) disagreed, and 7 (9.3%) strongly disagreed.

Similarly, opinions on the effectiveness of pharmacy medicines showed that 22 (29.3%) strongly agreed and 22 (29.3%) agreed that pharmacy medicines are strong enough, while 20 (26.7%) were neutral, 9 (12.0%) disagreed, and 2 (2.7%) strongly disagreed.

Long waiting times were also identified as a discouraging factor, with 21 (28.0%) strongly agreeing and 18 (24.0%) agreeing, while 17 (22.7%) were neutral, 14 (18.7%) disagreed, and 5 (6.7%) strongly disagreed.

SECTION F: Treatment methods used

Table 4.12: Treatment outcomes among ARI cases

Variable	Frequency (n=75)	Percent (%)
Treatment Outcome		
Complete recovery	58	77.3
Partial recovery	16	21.3
No improvement	1	1.3

Complications		
No	73	97.3
Yes	2	2.7
Type of Complication		
None	73	97.3
Meningitis	1	1.3
Pneumonia	1	1.3
Hospitalization		
No	71	94.7
Yes	4	5.3

Treatment outcomes among children with acute respiratory infection (ARI) are presented in Table 4.12. The majority of children recovered completely 58 (77.3%), while 16 (21.3%) showed partial improvement and only 1 (1.3%) had no improvement.

Complications were rare, as most children did not experience any complications 73 (97.3%), while only 2 (2.7%) developed complications. Regarding the type of complications, the majority had none 73 (97.3%), while 1 (1.3%) developed meningitis and another 1 (1.3%) developed pneumonia.

Hospitalization was uncommon, with most children not requiring admission 71 (94.7%), while only 4 (5.3%) were hospitalized.

Table 4.13a: Socio-demographic characteristics and teatment outcome of ARI

	Treatment Outcome			
Category	**Complete Recovery (n=58) Freq (%)**	**Incomplete Recovery (n=17) Freq (%)**	**χ^2**	**p-value**
Child Age Group (Months)				

0–11	14 (87.5)	2 (12.5)	3.257	0.196
12–23	10 (90.9)	1 (9.1)		
24–59	34 (70.8)	14 (29.2)		
Caregiver Age Group (Years)				
<20	2 (66.7)	1 (33.3)	13.604	**0.009***
20–29	19 (100.0)	0 (0.0)		
30–39	15 (78.9)	4 (21.1)		
40–49	9 (50.0)	9 (50.0)		
50–59	13 (81.3)	3 (18.8)		
Sex of Caregiver				
Male	12 (75.0)	4 (25.0)	0.063	0.802
Female	46 (78.0)	13 (22.0)		
Number of U5 Children				
1	38 (73.1)	14 (26.9)	1.846	0.397
2	11 (84.6)	2 (15.4)		
3	9 (90.0)	1 (10.0)		
Sex of Child				
Male	18 (64.3)	10 (35.7)	4.339	**0.037***
Female	40 (85.1)	7 (14.9)		
Employment Status				
Employed	31 (73.8)	11 (26.2)	0.676	0.411
Unemployed	27 (81.8)	6 (18.2)		

***Statistically Significant p<0.05**

Table 4.13b: Treatment outcome ARI and Socio-demographic characteristics

Category	Treatment Outcome		χ^2	p-value
	Complete Recovery (n=58) Freq (%)	Incomplete Recovery (n=17) Freq (%)		
Household Size				

1–6	36 (81.8)	8 (18.2)	1.221	0.269
>6	22 (71.0)	9 (29.0)		
Marital Status				
Married	35 (76.1)	11 (23.9)	0.105	0.745
Unmarried	23 (79.3)	6 (20.7)		
Cooking Inside House				
Yes	35 (83.3)	7 (16.7)	1.960	0.161
No	23 (69.7)	10 (30.3)		
Others Smoke				
Yes	15 (88.2)	2 (11.8)	1.491	0.222
No	43 (74.1)	15 (25.9)		
Caregiver Smokes				
Yes	3 (75.0)	1 (25.0)	0.013	0.909
No	55 (77.5)	16 (22.5)		
Cooking Fuel				
Electric cooker	9 (81.8)	2 (18.2)	3.826	0.430
Gas	29 (85.3)	5 (14.7)		
Kerosene	14 (70.0)	6 (30.0)		
Firewood	5 (62.5)	3 (37.5)		
Charcoal	1 (50.0)	1 (50.0)		
Child Immunization Status				
Yes	64 (73.6))	21 (70.0)	0.143	0.706
No	23 (26.4)	9 (30.0)		

Table 4.13c: Treatment outcome ARI and Socio-demographic characteristics

Category	Treatment Outcome		χ^2	p-value
	Complete Recovery (n=58) Freq (%)	Incomplete Recovery (n=17) Freq (%)		
Education Level				

None	5 (71.4)	2 (28.6)	1.128	0.770
Primary	9 (90.0)	1 (10.0)		
Secondary	28 (75.7)	9 (24.3)		
Tertiary	16 (76.2)	5 (23.8)		
Residence Type				
Rural	10 (83.3)	2 (16.7)	0.538	0.764
Peri-urban	19 (73.1)	7 (26.9)		
Urban	29 (78.4)	8 (21.6)		
Monthly Income				
< ₦70,000	20 (87.0)	3 (13.0)	4.468	0.346
₦70,000–₦100,000	13 (72.2)	5 (27.8)		
₦100,000–₦200,000	13 (86.7)	2 (13.3)		
₦200,000–₦500,000	8 (61.5)	5 (38.5)		
> ₦500,000	4 (66.7)	2 (33.3)		

The association between treatment outcome of acute respiratory infection (ARI) and socio-demographic characteristics is presented in Table 4.13a, b and c

There was no statistically significant association between child age group and treatment outcome ($\chi^2 = 3.257$, $p = 0.196$). Among children aged 0–11 months, the majority had complete recovery 14 (87.5%), while 2 (12.5%) had incomplete recovery. Similarly, for those aged 12–23 months, 10 (90.9%) had complete recovery and 1 (9.1%) had incomplete recovery, while among children aged 24–59 months, 34 (70.8%) had complete recovery and 14 (29.2%) had incomplete recovery.

There was a statistically significant association between caregiver age group and treatment outcome ($\chi^2 = 13.604$, $p = 0.009$). Caregivers aged 20–29 years recorded complete recovery 19 (100.0%), while those aged 40–49 years had equal proportions of complete recovery 9 (50.0%) and incomplete recovery 9 (50.0%). Other age groups showed varying proportions of recovery outcomes.

Similarly, sex of caregiver was not significantly associated with treatment outcome ($\chi^2 = 0.063$, $p = 0.802$). Among male caregivers, 12 (75.0%) recorded complete recovery while 4 (25.0%) had incomplete recovery, compared to 46 (78.0%) complete recovery and 13 (22.0%) incomplete recovery among female caregivers.

There was also no statistically significant association between number of under-five children and treatment outcome ($\chi^2 = 1.846$, $p = 0.397$). Households with one child had 38 (73.1%) complete recovery, those with two children had 11 (84.6%), and those with three children had 9 (90.0%) complete recovery.

However, there was a statistically significant association between sex of child and treatment outcome (χ^2 = 4.339, p = 0.037). Female children had a higher proportion of complete recovery 40 (85.1%), compared to male children 18 (64.3%), who also had a higher proportion of incomplete recovery 10 (35.7%).

Employment status was not significantly associated with treatment outcome (χ^2 = 0.676, p = 0.411). Among employed caregivers, 31 (73.8%) recorded complete recovery, while 27 (81.8%) of unemployed caregivers recorded complete recovery.

Household size also showed no significant association (χ^2 = 1.221, p = 0.269). Households with 1–6 members had 36 (81.8%) complete recovery, compared to 22 (71.0%) among those with more than six members.

Marital status was not significantly associated with treatment outcome (χ^2 = 0.105, p = 0.745). Among married caregivers, 35 (76.1%) had complete recovery, compared to 23 (79.3%) among unmarried caregivers.

Similarly, cooking inside the house was not significantly associated with treatment outcome (χ^2 = 1.960, p = 0.161). Those who cooked inside had 35 (83.3%) complete recovery, while those who did not had 23 (69.7%) complete recovery.

Exposure to smoke from others was not significantly associated (χ^2 = 1.491, p = 0.222), as 15 (88.2%) of those exposed had complete recovery compared to 43 (74.1%) among those not exposed. Caregiver smoking also showed no significant association (χ^2 = 0.013, p = 0.909).

Cooking fuel type was not significantly associated with treatment outcome (χ^2 = 3.826, p = 0.430), although higher complete recovery proportions were observed among users of gas 29 (85.3%) and electric cookers 9 (81.8%) compared to other fuel types.

Educational level of caregivers was not significantly associated with treatment outcome (χ^2 = 1.128, p = 0.770). Complete recovery was observed across all levels, including primary education 9 (90.0%), secondary 28 (75.7%), and tertiary 16 (76.2%). Child immunization status also was not significantly associated with treatment outcome (χ^2 = 0.143, p =0.706).

Residence type also showed no significant association (χ^2 = 0.538, p = 0.764), with urban residents 29 (78.4%), peri-urban 19 (73.1%), and rural 10 (83.3%) recording similar recovery outcomes.

Finally, monthly income was not significantly associated with treatment outcome (χ^2 = 4.468, p = 0.346). However, slightly higher complete recovery was observed among those earning less than ₦70,000 20 (87.0%) and ₦100,000–₦200,000 13 (86.7%), compared to other income groups.

CHAPTER FIVE

DISCUSSION

5.1 DISCUSSION

In this study, awareness of acute respiratory infection (ARI) among caregivers was relatively high (80.2%), indicating that most caregivers had heard about the condition. This suggests that ARI is a familiar illness within the study population, likely due to its frequent occurrence among under-five children in Egor Local Government Area. This finding is consistent with a study conducted in Benin City, southern Nigeria in 2018, which reported that about 85% of caregivers were aware of ARI among under-five children.[59] Similarly, a study conducted in Kiyawa Local Government Area in Jigawa state Nigeria reported that over 80% of caregivers had heard of childhood pneumonia.[62] These similarities suggest that high awareness of ARI is common in Nigerian settings and may be driven by repeated exposure to the illness as well as contact with healthcare services. In this study population, the relatively urban setting and frequent interaction with health facilities may explain the high level of awareness. However, awareness alone does not guarantee adequate understanding or appropriate health practices, highlighting the need for deeper health education. Hospitals were identified in this study as the most common source of information (29.3%), followed by television and radio. This indicates that healthcare facilities play a key role in disseminating health information. This finding aligns with a study conducted in Ilorin, Nigeria in 2023, which reported that health workers were the primary source of child health information among caregivers.[55] The similarity suggests that caregivers in this population rely heavily on formal healthcare settings for information. In Egor Local Government Area, this may be due to relatively better access to health facilities compared to rural areas. However, reliance on passive sources such as media may contribute to incomplete understanding, as information received may not be detailed or interactive. This is important because the quality and depth of information influence caregiver decision-making. It is therefore recommended that healthcare providers utilize every contact opportunity, such as immunization visits and outpatient consultations, to provide structured and comprehensive education on ARI.

Despite the high level of awareness observed in this study, knowledge of ARI symptoms was generally poor, with only 29.3% of caregivers demonstrating good knowledge. While cough (50.5%) and fever (43.8%) were commonly recognized, fewer caregivers correctly identified key danger signs such as fast breathing (41.4%) and chest indrawing (22.9%). This finding is consistent with a study conducted Benin City, southern Nigeria in 2018, which found that although most caregivers had heard of ARI, less than 40% could correctly identify fast breathing as a danger sign.[59] Similarly, a study conducted in Enugu, Nigeria in 2024 reported that many caregivers had poor knowledge of symptoms despite high awareness levels.[60] The similarity suggests that caregivers in this study population may be familiar with common symptoms but lack knowledge of critical signs that indicate severity. In Egor Local Government Area, this may be due to insufficient emphasis on symptom recognition during health education sessions. This is particularly important because failure to recognize danger signs can delay care-seeking and increase the risk of complication. This highlights a critical gap in caregiver knowledge, and it is recommended that health education programs place greater emphasis on early symptom recognition, especially danger signs such as fast breathing and chest indrawing.

This study also found that knowledge of ARI causes was poor, with only 30.3% of caregivers demonstrating good knowledge. While a majority identified germs (58.6%) as a cause, many caregivers attributed ARI to misconceptions such as cold weather, teething, and supernatural factors. This finding is consistent with the study conducted in Enugu, Nigeria in 2024, which reported that caregivers commonly held misconceptions about the causes of childhood illnesses, including attributing them to environmental or spiritual factors.[60] Similarly, it was also in tandem with a study conducted in Bayelsa State, Nigeria in 2023 which reported that cultural beliefs and myths significantly influenced caregivers' understanding of childhood illnesses.[61] These similarities suggest that misconceptions about disease causation remain

widespread in Nigerian settings. In this study population, such beliefs may be influenced by cultural practices and traditional knowledge systems that coexist with modern healthcare. This is important because incorrect beliefs can lead to inappropriate treatment practices and delays in seeking medical care. Therefore, it is recommended that health education interventions address these misconceptions directly using culturally appropriate communication strategies.

In contrast, this study found that knowledge of ARI prevention was relatively high (74.6%), with caregivers identifying measures such as vaccination, handwashing, good nutrition, and breastfeeding. This finding is consistent with a study conducted in Jigawa State, North west Nigeria by in 2023, which reported that a majority of caregivers were aware of preventive measures for childhood pneumonia.[62] The similarity suggests that preventive knowledge may be higher due to repeated exposure to public health campaigns, particularly immunization programs. In this study population, frequent contact with immunization services and public health messaging may explain this finding. However, the discrepancy between high preventive knowledge and poor knowledge of symptoms and causes suggests incomplete understanding of the disease. This is significant because effective prevention also depends on early recognition and appropriate response. This indicates the need for integrated health education, and it is recommended that the programs combine messages on prevention, symptom recognition, and care-seeking behaviour.

This study further revealed that knowledge of danger signs was notably high (94.3%), with most caregivers identifying severe symptoms such as difficulty breathing and inability to eat or drink. A study in Benin City, southern Nigeria in 2018 contrast this finding as it reports a poor knowledge level of about 96.5% of ARI danger signs.[59] The elevated level in this study may reflect exposure to targeted health messages delivered during antenatal care and immunization clinics. However, the coexistence of high knowledge of danger signs with poor knowledge of early symptoms suggests inconsistency in understanding. In this population,

caregivers may recognize severe illness but fail to identify early warning signs, leading to delayed care-seeking. This is important because early detection is critical for preventing complications. Therefore, it is recommended that health education emphasize the full spectrum of symptoms, from early signs to severe danger signs.

Additionally, this study identified gaps in immunisation verification, as more than half of caregivers (51.5%) could not present immunisation cards. This raises concerns about record-keeping and monitoring of child health. In this population, this may be due to poor storage practices, loss of cards, or limited awareness of their importance. This is significant because accurate immunization records are essential for tracking child health and ensuring complete vaccination. It is therefore recommended that efforts be made to strengthen record-keeping practices and educate caregivers on the importance of maintaining immunization cards. Furthermore, although exclusive breastfeeding was practiced by a majority (60.8%), a substantial proportion (39.2%) did not practice it. Given that exclusive breastfeeding is protective against respiratory infections, this gap may contribute to increased susceptibility to ARI among children in this population. This finding suggests that while some caregivers are aware of recommended practices, adherence is not universal. From a public health perspective, this highlights the need for continued promotion of exclusive breastfeeding, and it is recommended that breastfeeding education be reinforced during antenatal and postnatal care services. Overall, the findings of this study demonstrate a clear gap between awareness and comprehensive knowledge of ARI among caregivers. While awareness and knowledge of prevention are relatively high, understanding of symptoms and causes remains inadequate. These findings are consistent with studies conducted in Nigeria and other low-resource settings, indicating that this pattern is widespread. In Egor Local Government Area, this gap may be due to reliance on passive information sources and limited structured health education. From a public health perspective, this underscores the need for more targeted and

comprehensive educational interventions. It is therefore recommended that health education programs be redesigned to provide clear, consistent, and practical information on ARI, focusing on symptom recognition, disease causation, and appropriate care-seeking behaviour to improve child health outcomes.

Another key finding in this study is that the prevalence of acute respiratory infection (ARI) among under-five children within the two weeks preceding the survey was 14.8%, indicating a moderate burden of disease in Egor Local Government Area, Benin City. This finding shows that a considerable proportion of children in this population experience respiratory illness within a short period, highlighting the continued public health relevance of ARI in this setting. This prevalence is comparable to findings from a study conducted across sub-Saharan Africa in 2022, which reported that approximately 16–18% of under-five children had symptoms of ARI within a two-week period.[63] Similarly, a study conducted in Ethiopia in 2024 reported a two-week ARI prevalence of 21.3% among under-five children, indicating a high burden of disease in that population.[85] These findings are slightly higher than the prevalence observed in this study but remain within a similar range, suggesting that the burden of ARI in Egor is consistent with regional patterns across Africa. The slightly lower prevalence observed in this study may be attributed to the urban nature of the study area, where access to healthcare services and health information is relatively better compared to rural settings. In contrast, lower prevalence rates have been reported in some settings. For example, a study conducted in rural Ethiopia in 2021 reported an ARI prevalence of approximately 7.8% among under-five children.[68] Similarly, national survey data from Ethiopia in 2026 showed a prevalence of about 7%–11% over time among under-five children.[86] The lower prevalence observed in these studies may be due to differences in methodology, environmental exposure, seasonal variation, or healthcare-seeking behaviour. In this study population, the higher prevalence compared to these studies may be explained by urban environmental factors such as air

pollution, overcrowding, and indoor cooking practices, which increase children's exposure to respiratory pathogens. This study also found that a higher proportion of children experienced respiratory symptoms such as cough (32.2%) compared to those classified as having ARI (14.8%). This indicates that not all respiratory symptoms progressed to clinically defined ARI. This finding is consistent with a study conducted in Chennai, Tamil Nadu, in India in 2019, which reported that a large proportion of children experienced mild respiratory symptoms, while a smaller proportion met the criteria for ARI.[66] This suggests that mild upper respiratory tract infections are more common than severe infections. In our study population, this pattern may be due to frequent exposure to environmental irritants and infectious agents, leading to mild but recurrent respiratory symptoms. This is important because even mild symptoms can progress to severe illness if not properly managed, hence appropriate and timely health seeking behaviors should be encouraged through proper health outreaches and sensitisations

Furthermore, this study observed that children aged 0–11 months had a higher prevalence of ARI (17.4%) compared to older children. This finding is consistent with the study conducted in Ethiopia in 2024, which reported that younger children had significantly higher odds of developing ARI compared to older children.[85] This similarity suggests that infants are more vulnerable to respiratory infections due to immature immune systems. In this our study population, this increased vulnerability may also be influenced by factors such as incomplete immunization and poor breastfeeding practices. This is significant because it highlights the need to prioritize infants in ARI prevention strategies. Although no statistically significant association was found between socio-demographic factors and ARI prevalence in this study, some trends were observed. For instance, children of unemployed caregivers had a higher prevalence of ARI (19.0%) compared to those of employed caregivers (12.7%). This aligns with findings from studies in low- and middle-income countries, particularly in rural Ethiopia in 2021 which reported that children from poorer households are more likely to experience

ARI due to unfavorable living conditions and limited access to healthcare.[68] In our study population, this may be due to financial constraints affecting nutrition, housing quality, and healthcare access.

Environmental factors assessed in this study, such as indoor cooking and type of fuel used, did not show statistically significant associations with ARI, although children exposed to indoor cooking had a slightly higher prevalence (16.5%). This finding is in tandem with evidence from a review study done in developing countries in 2013, which have established a link between indoor air pollution and increased risk of respiratory infections among children.[69] In this our population, the lack of statistical significance may be due to similar exposure levels across households or limitations in measurement, but the trend still suggests a meaningful relationship.

Similarly, exposure to tobacco smoke did not show a significant association with ARI in this study, although slight differences were observed. This contrasts with findings from a study in Isiohor, Southern Nigeria, which identify passive smoking as a significant risk factor for respiratory infections in children.[70] In our population, this discrepancy may be due to lower smoking prevalence among caregivers or under-reporting of smoking behaviour. Hence health improve surveillance is encouraged.

This study also found that ARI prevalence was higher in rural areas (21.1%) compared to peri-urban (14.9%) and urban areas (13.5%), although the difference was not statistically significant. This pattern is consistent with findings from a multi-country study in sub-Saharan Africa in 2022, which reported higher ARI prevalence in rural areas due to poorer living conditions and limited access to healthcare services.[63] In our study population, the higher rural prevalence may be explained by increased exposure to biomass fuels, poorer housing conditions, and reduced healthcare access. Hence improved health policies targeted at rural development is essential to ameliorate this increase in rural ARI prevalence.

Overall, the findings of this study indicate that ARI remains a common childhood illness with a prevalence comparable to regional and international estimates. The observed patterns suggest that ARI in this population is influenced by a complex interaction of environmental, socioeconomic, and biological factors rather than single determinants. From a public health perspective, these findings highlight that ARI continues to pose a significant burden among under-five children, particularly in settings with persistent environmental and socioeconomic challenges. The moderate prevalence observed suggests ongoing transmission and exposure to risk factors within the community. Therefore, it is recommended that comprehensive interventions be implemented, including improving environmental conditions (such as reducing indoor air pollution), strengthening primary healthcare services for early detection and treatment, and enhancing caregiver education on prevention and early symptom recognition to reduce the burden of ARI among children.

A key discovery of this study is that, 70.7% of caregivers sought treatment for children with acute respiratory infection (ARI), while 29.3% did not seek any form of care, indicating a relatively good level of care-seeking behaviour among caregivers in Egor Local Government Area. This suggests that a majority of caregivers recognize the need for intervention when children develop symptoms of ARI. However, this level of care-seeking, although encouraging, does not necessarily imply that care was appropriate or timely. This finding is higher than that reported in a national study conducted in Nigeria in 2022 using the Nigeria Demographic and Health Survey, which found that at least 25% of caregivers did not seek any care for children with ARI symptoms, and only about 13% sought appropriate care (i.e., timely care from a formal health provider.[72] The difference suggests that caregivers in this study population demonstrate relatively better care-seeking behaviour compared to national averages. In Egor Local Government Area, this may be explained by its urban setting, where access to healthcare facilities is relatively better, and caregivers may have more exposure to

health information through hospitals and media. This indicates that urban residence may positively influence care-seeking behaviour, although it does not eliminate other barriers such as cost and delays.

Despite the relatively high proportion of caregivers seeking care in this study, only 35.8% sought care on the same day of symptom onset, while the majority delayed care by one day or more. This finding is consistent with the same study (Nigeria, 2022), which reported that timely care-seeking within 24 hours was low, with many caregivers delaying care despite recognizing illness. This similarity suggests that delayed care-seeking remains a common challenge in Nigeria. In this study population, delay may be due to factors such as financial constraints, underestimation of illness severity, or initial reliance on home remedies. This is particularly important because delayed care-seeking increases the risk of disease progression and complications, especially in young children. From a public health perspective, this highlights a critical gap in timely healthcare utilisation, and it is recommended that health education programs emphasize the importance of seeking care immediately when symptoms such as fast breathing or fever are observed.

Regarding the choice of healthcare provider, this study found that primary health centres and government hospitals (26.4% each) were the most commonly used sources of care, followed by private hospitals and pharmacies (18.9% each). This indicates a relatively balanced use of both public and private healthcare services. This finding is consistent with the national Nigerian study (2022), which reported that formal health facilities were commonly used but informal providers such as drug shops also accounted for a large proportion (about 39–47%) of care-seeking.[72] The similarity suggests that caregivers in this study population utilize a mix of formal and informal healthcare providers. In Egor Local Government Area, this pattern may be influenced by accessibility, convenience, and perceived quality of care. However, the use of pharmacies and informal providers observed in this study raises concerns about the

appropriateness of care received. This is consistent with a study conducted in Edo State, Nigeria. in 2015, which reported that a significant proportion of caregivers relied on patent medicine vendors for treatment of childhood illnesses due to ease of access and lower cost.[73] In our study population, the frequent use of pharmacies may be driven by shorter waiting times, proximity, and affordability. This is important because informal providers may not adhere to standard treatment guidelines, potentially leading to inappropriate treatment and poor outcomes. Therefore, it is recommended that regulatory policies be strengthened and that patent medicine vendors be trained to recognize danger signs and refer cases appropriately.

This study also found that nearness (26.4%), affordability (24.5%), and perceived quality of care (22.6%) were the main factors influencing choice of healthcare provider. This finding aligns with a multi-country study conducted across low- and middle-income countries by Ketema *et al*. in 2024, which reported that healthcare-seeking behaviour for ARI was significantly influenced by household wealth, accessibility, and maternal education.[87] The similarity suggests that structural factors play a major role in determining healthcare utilization. In this study population, proximity to health facilities and financial constraints likely explain these preferences. This is significant because it shows that caregiver decisions are influenced not only by knowledge but also by enabling factors such as access and affordability. It is therefore recommended that healthcare services be made more accessible and affordable, particularly at the primary healthcare level. In terms of satisfaction, the majority of caregivers in this study reported being satisfied or very satisfied with the care received. This suggests a generally positive perception of healthcare services. In this population, satisfaction may encourage future utilization of healthcare services. However, satisfaction does not necessarily reflect quality of care, as caregivers may lack the knowledge to assess appropriateness of treatment. This is important because perceived quality may influence continued use of services regardless of actual effectiveness. It is therefore

recommended that quality improvement measures be implemented alongside efforts to increase utilization.

Among caregivers who did not seek care, the main reasons identified were cost (31.8%) and the perception that the illness was not serious (27.3%). This finding is consistent with the Nigerian study by Adeoti and Cavallaro (2022), which reported that financial constraints and poor recognition of illness severity were major barriers to appropriate care-seeking.[72] The similarity suggests that these barriers are widespread across Nigeria. In this study population, caregivers may delay seeking care because they underestimate the severity of symptoms or lack financial resources. This is particularly concerning because early symptoms of ARI can rapidly progress to severe illness if not treated promptly. From a public health perspective, this highlights the need to address both financial and perceptual barriers, and it is recommended that public health campaigns emphasize the seriousness of ARI symptoms and the importance of early treatment. Other reasons such as reliance on home remedies and lack of support also reflect the influence of social and cultural factors on healthcare decision-making. In this study population, caregivers may initially attempt home treatment before seeking formal care, which may delay appropriate intervention. This is important because such practices can worsen outcomes if ineffective treatments are used. Therefore, it is recommended that community-based health education address these behaviours and promote timely use of formal healthcare services.

Overall, the findings of this study indicate that while a relatively high proportion of caregivers seek care for ARI, significant gaps remain in terms of timeliness and appropriateness of care. The continued reliance on informal providers, delays in care-seeking, and financial barriers highlight ongoing challenges in healthcare utilisation. From a public health perspective, these findings underscore the need for comprehensive interventions aimed at improving early recognition of symptoms, promoting prompt care-seeking, reducing financial barriers, and

strengthening primary healthcare systems. It is therefore recommended that policies and programs focus on improving access, affordability, and quality of care, while also addressing caregiver knowledge and perceptions to enhance appropriate care-seeking behaviour and ultimately reduce morbidity and mortality associated with ARI among under-five children.

Another key finding in this study reveals several key factors influencing the management of acute respiratory infection (ARI) among caregivers were identified, including cost of treatment, distance to health facilities, trust in healthcare services, perceptions of treatment effectiveness, and health system barriers such as long waiting times. These findings indicate that ARI management in Egor Local Government Area is shaped by a combination of economic, geographic, cultural, and health system factors. Cost of treatment emerged as a major barrier in this study, with a large proportion of caregivers indicating that it limited their ability to manage ARI effectively. This finding is consistent with a study conducted in rural communities in Benue State, Nigeria which found that cost of treatment had a significant influence on healthcare utilization, with higher costs reducing the likelihood of seeking care.[88] The similarity suggests that financial constraints remain a major determinant of healthcare access in Nigeria. In our study population, this may be due to low-income levels despite employment, as observed earlier, as well as reliance on out-of-pocket payment systems. This is particularly important because inability to afford care can lead to delayed treatment or reliance on inappropriate alternatives. From a public health perspective, this highlights the need to reduce financial barriers, and it is recommended that health insurance coverage and subsidized child healthcare services be expanded to improve access.

Distance to health facilities was also identified as a significant barrier in this study, with many caregivers reporting that facilities were too far. This finding aligns with a study conducted in kogi state, Nigeria in 2011, which reported that distance and travel cost significantly reduced utilization of healthcare services.[89] Similarly, a study conducted in Ogun State, Nigeria. in

2023 found that distance to health facilities and transportation costs negatively influenced the use of formal healthcare services. These findings suggest that geographic accessibility is a critical determinant of healthcare utilization. In this our study population, although Egor is an urban area, perceived distance and transport costs may still pose challenges, especially for low-income households. This is important because reduced accessibility can lead to delays or complete avoidance of healthcare services. Therefore, it is recommended that primary healthcare facilities be more evenly distributed and located closer to communities to improve access.

Trust in government healthcare facilities was relatively high in this study, with most caregivers expressing confidence in public health services. This is a positive finding, as trust has been shown to influence healthcare utilization. However, despite this trust, barriers such as cost and distance still limited access. This suggests that trust alone is insufficient to ensure utilization when structural barriers exist. In this study population, caregivers may trust public facilities but still opt for alternatives due to convenience or affordability. This is important because it highlights the need to address both perception and structural barriers simultaneously. It is therefore recommended that health systems not only maintain trust through quality service delivery but also improve accessibility and affordability. Perceptions regarding treatment effectiveness also played a significant role in this study, with some caregivers believing that herbal remedies are effective and others relying on pharmacy-based medications. This finding is in tandem with a study conducted in Ogun State, Nigeria in 2023, which reported that households often combine formal healthcare with self-medication and traditional treatment options.[90] The similarity suggests that pluralistic healthcare practices are common in Nigerian settings. In this study population, this behaviour may be influenced by cultural beliefs, accessibility of herbal remedies, and ease of obtaining drugs from pharmacies. This is important because reliance on unregulated treatments may lead to inappropriate

management of ARI. From a public health perspective, this underscores the need to address cultural practices and informal care use, and it is recommended that community-based education programs be implemented to promote appropriate treatment-seeking behaviour.

The perception that pharmacy medicines are "strong enough" in this study indicates a reliance on over-the-counter medications and self-medication. This finding is supported by global evidence from review articles conducted in 2017 and 2024 showing that easy access to drugs encourages self-medication practices in low- and middle-income countries.[77,78] In this study population, this may be due to the widespread availability of pharmacies and patent medicine vendors. This is significant because inappropriate use of medications, especially antibiotics, contributes to poor treatment outcomes and antimicrobial resistance.[79,80] Therefore, it is recommended that stricter regulation of drug sales be enforced and that caregivers be educated on the risks of self-medication.

Long waiting times at healthcare facilities were also identified in this study as a discouraging factor. This finding is consistent with a community-based survey conducted between May and June, 2017 in Enugu Nigeria, and reported in the Pan African Medical Journal in 2022, which found that long waiting times and high service costs were major barriers to the utilization of primary healthcare services.[91] Similarly, another study conducted in a tertiary institution in South-West Nigeria reported that about 67% of respondents identified long waiting time as a major barrier to healthcare utilization.[92] These similarities suggest that health system inefficiencies are common challenges across developing settings. In this study population, long waiting times may discourage caregivers, particularly those who are employed, from seeking care at formal health facilities. This is important because it pushes caregivers toward faster but potentially less appropriate alternatives such as pharmacies. From a public health perspective, this highlights the need to improve health system efficiency, and it is

recommended that healthcare facilities reduce waiting times through better staffing, appointment systems, and service organisation.

Overall, these findings demonstrate that ARI management among caregivers is influenced by a complex interaction of economic, geographic, cultural, and health system factors. These findings are consistent with the broader health-seeking behaviour framework, which emphasizes that healthcare utilization is determined by enabling factors (such as income and access), predisposing factors (such as beliefs), and health system factors (such as quality and waiting time). In this study population, the interplay of these factors explains why caregivers may delay care, use informal providers, or rely on self-medication despite having some level of awareness. From a public health perspective, this underscores the need for comprehensive and integrated interventions that address multiple determinants of healthcare utilization. It is therefore recommended that efforts to improve ARI management should include reducing financial barriers, improving accessibility of healthcare services, strengthening health systems to reduce waiting times, regulating informal healthcare providers, and implementing culturally appropriate health education programs. These combined strategies are essential for improving caregiver decision-making and reducing the burden of ARI among under-five children.

5.2 CONCLUSION

This study examined caregiver knowledge, disease burden, care-seeking behaviour, determinants of management, and treatment outcomes of acute respiratory infections (ARI) among under-five children in Egor Local Government Area, Benin City.

The findings revealed that although awareness of ARI among caregivers was relatively high, detailed knowledge of symptoms and causes was generally inadequate, while knowledge of prevention and danger signs was comparatively better. This indicates that caregivers may not be sufficiently equipped to recognize early symptoms and respond appropriately, which is essential for effective management of the condition.

The burden of ARI in the study population was notable, with a considerable proportion of children experiencing symptoms within the two weeks preceding the survey. This highlights that ARI remains a common childhood illness in the study area and continues to pose a significant public health concern.

Care-seeking behaviour among caregivers was generally encouraging, as the majority sought some form of treatment. However, delays in seeking care and reliance on informal sources such as pharmacies were observed, suggesting gaps in timely and appropriate healthcare utilization.

The management of ARI was influenced by several factors, including cost of treatment, distance to healthcare facilities, waiting time, and caregiver perceptions of treatment effectiveness. These findings reflect the role of both socioeconomic and health system barriers in shaping healthcare decisions.

Treatment outcomes were largely favourable, with most children experiencing complete recovery and very few developing complications or requiring hospitalization. This suggests that available treatment methods are generally effective, particularly when care is accessed. However, the presence of partial recovery in some cases indicates a need for improved treatment adherence and follow-up.

Overall, the study highlights that while caregivers demonstrate a reasonable level of awareness and generally good treatment outcomes, important gaps remain in knowledge,

timely care-seeking, and access to healthcare services. Addressing these gaps through targeted health education, improved accessibility and affordability of healthcare, and strengthening of primary healthcare systems is essential for reducing the burden of ARI among under-five children.

5.3 RECOMMENDATIONS

To the Federal Government

1. To reduce childhood morbidity and mortality associated with acute respiratory infections (ARI), the Federal Government should prioritize ARI prevention and management within

national child health programs. This should be achieved by strengthening and scaling up the Integrated Management of Childhood Illness (IMCI) strategy across all states through training and supervision of healthcare workers. The Federal Ministry of Health and the National Primary Health Care Development Agency should be responsible for this implementation, which should commence immediately and be sustained continuously. This intervention should target under-five children and their caregivers across Nigeria.

2. To improve financial access to healthcare, the Federal Government should expand the coverage of the National Health Insurance Authority (NHIA) to include more under-five children, particularly from low-income households. This should be implemented through policy expansion and increased funding for child health services. The NHIA and relevant policymakers should oversee this process, with immediate rollout and scaling within one year, targeting vulnerable populations nationwide.

3. To ensure safe and appropriate treatment practices, stricter regulations on drug sales, especially antibiotics, should be enforced. This should be done through routine monitoring and mandatory training of patent medicine vendors on recognition and referral of ARI cases. Regulatory bodies such as NAFDAC and the Pharmacists Council of Nigeria should implement this through quarterly inspections and periodic training, targeting informal healthcare providers and the general population.

To the State Government (Edo State)

1. To improve caregivers' knowledge of ARI symptoms, causes, and danger signs in Benin City, the Edo State Ministry of Health should integrate structured and disease-specific health education into antenatal clinics, immunization services, and outpatient visits. This should be

delivered using simple language, visual aids, and local dialects by healthcare workers at every clinic visit and through monthly outreach programs. This intervention should target caregivers of under-five children.

2. To reduce financial barriers to accessing healthcare, the Edo State Government should expand enrollment in the Edo State Health Insurance Scheme and subsidize treatment for under-five children. This should be achieved through community-based registration drives and increased funding for child health services. The state government and health insurance agencies should implement this immediately with scale-up within one year, targeting low-income households.

3. To strengthen primary healthcare services, the state government should ensure adequate staffing, availability of essential drugs, and improved service delivery in primary healthcare centres. This should be done through recruitment of health workers and improved supply chain management. The Edo State Ministry of Health and Local Government Health Authorities should implement this within 6–12 months, targeting under-five children and their caregivers.

4. To reduce waiting time in health facilities, the state government should improve efficiency of service delivery through better patient flow systems, appointment scheduling, and redistribution of staff. Hospital administrators and PHC managers should implement this within 3–6 months, targeting caregivers accessing public health facilities.

5. To reduce environmental risk factors, the state government should promote clean cooking practices and improved ventilation through public health campaigns. This should be implemented by environmental health officers and community health workers on a continuous basis, targeting households exposed to indoor air pollution.

To the Local Government (Egor LGA and others)

1. To improve early detection and management of ARI at the community level, Local Government Health Departments should train and deploy community health workers to conduct household visits, provide education, and refer severe cases. This should be implemented within 3–6 months and sustained continuously, targeting households with under-five children.

2. To improve access to healthcare services, local government authorities should ensure equitable distribution and proper functioning of primary healthcare centres across wards. This should be implemented within 6–12 months, targeting underserved communities.

3. To regulate informal healthcare providers, local government authorities should collaborate with regulatory bodies to conduct routine monitoring and supervision of pharmacies and patent medicine vendors. This should be done quarterly, targeting providers within the community.

4. To improve community awareness, local governments should organize regular health education outreaches in markets, schools, and religious centres. This should be carried out monthly by community health workers and health educators, targeting caregivers in the community.

To the Community

1. To promote prompt care-seeking behaviour, caregivers should be encouraged to seek medical care within 24 hours of symptom onset. This should be achieved through continuous community sensitization led by community leaders, religious leaders, and health workers, targeting caregivers of under-five children.

2. To reduce inappropriate treatment practices, caregivers should be discouraged from self-medication and reliance on unverified herbal remedies. This should be done through education by healthcare workers and community leaders on a continuous basis, targeting all caregivers.

3. To reduce environmental exposure, households should adopt safer cooking practices, improve ventilation, and reduce overcrowding. This should be implemented continuously by families with guidance from environmental health officers, targeting households with under-five children.

4. To improve child health practices, mothers should practice exclusive breastfeeding and ensure proper immunization, including safe keeping of immunization cards. This should be reinforced during routine healthcare visits by health workers, targeting infants and young children.

5.4 CONTRIBUTION TO KNOWLEDGE

This study contributes to existing knowledge by providing current, context-specific evidence on the knowledge, care-seeking behaviour, and determinants of acute respiratory infection (ARI) among caregivers of under-five children in Egor Local Government Area, Benin City. Unlike previous studies that primarily focused on awareness levels, this study highlights a critical gap between awareness and comprehensive knowledge, demonstrating that although a high proportion of caregivers had heard of ARI, knowledge of key symptoms such as fast breathing and chest indrawing, as well as causes of the disease, remained poor. This finding adds to the body of knowledge by emphasizing that awareness alone is insufficient to drive appropriate health behaviour.

Furthermore, this study contributes by identifying inconsistencies in caregiver understanding, particularly the coexistence of high knowledge of danger signs with poor recognition of early

symptoms. This provides new insight into the pattern of knowledge gaps among caregivers and underscores the importance of emphasizing early symptom recognition in health education programs.

The study also adds to existing literature by documenting the continued influence of misconceptions, including attributing ARI to cold weather, teething, and supernatural causes. This highlights the persistent role of cultural beliefs in shaping health behaviour in urban Nigerian settings, thereby reinforcing the need for culturally sensitive health education interventions.

In addition, this study provides evidence on care-seeking behaviour, showing that although a relatively high proportion of caregivers sought care, significant delays and reliance on informal healthcare providers persist. This finding contributes to knowledge by demonstrating that access alone does not guarantee timely or appropriate healthcare utilisation, as economic, perceptual, and health system factors continue to influence decision-making.

The identification of key determinants such as cost of treatment, distance to health facilities, waiting time, and trust in healthcare services further enriches the understanding of factors influencing ARI management in this setting. By highlighting the interplay between socioeconomic, environmental, and health system factors, this study supports existing theoretical frameworks on health-seeking behaviour while providing localized evidence from Benin City.

Overall, this study contributes to knowledge by providing a comprehensive and context-specific understanding of ARI among caregivers in an urban Nigerian setting, thereby serving as a valuable reference for future research, policy formulation, and intervention design aimed at reducing childhood morbidity and mortality.

5.5 POLICY IMPLICATIONS OF THE FINDINGS

The findings of this study have several important policy implications for improving the prevention and management of acute respiratory infections (ARI) among under-five children in Benin City and similar settings.

Firstly, the observed gap between awareness and comprehensive knowledge of ARI suggests that existing health education strategies are insufficient. This implies the need for policies that prioritize structured, disease-specific health education within routine healthcare services. Policymakers should ensure that ARI education is systematically integrated into antenatal care, immunization services, and primary healthcare delivery, with emphasis on early symptom recognition and appropriate care-seeking behaviour.

Secondly, the influence of financial constraints on healthcare utilization highlights the need for policies that reduce out-of-pocket expenditure. The findings support the expansion of health insurance schemes and subsidized healthcare services for under-five children. Strengthening financial protection mechanisms will improve timely access to appropriate care and reduce delays in treatment.

Thirdly, the continued reliance on pharmacies and patent medicine vendors underscores the need for stronger regulatory policies. There is a clear need for enforcement of regulations governing drug sales, as well as formal inclusion and training of informal healthcare providers within the health system. Policies should focus on equipping these providers with the skills to recognize danger signs and refer cases appropriately.

Additionally, the role of environmental factors such as indoor air pollution and overcrowding suggests the need for policies that address broader social determinants of health. This includes promoting clean cooking technologies, improving housing conditions, and implementing community-level environmental health interventions.

The findings also highlight health system challenges such as long waiting times and accessibility barriers. This implies the need for policies aimed at strengthening primary healthcare systems through improved staffing, infrastructure, and service delivery efficiency. Reducing waiting time and improving service quality will enhance healthcare utilization.

Finally, the persistence of misconceptions and cultural beliefs influencing health behaviour indicates the need for culturally sensitive public health policies. Health communication strategies should be tailored to local contexts and involve community leaders and influencers to ensure effectiveness.

In conclusion, the findings of this study underscore the need for integrated, multi-sectoral policy approaches that address knowledge gaps, financial barriers, health system weaknesses, and environmental risk factors. Implementing these policy measures will significantly improve the prevention and management of ARI and contribute to reducing under-five morbidity and mortality.

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APPENDIX 1

INFORMED CONSENT FORM

TITLE OF STUDY

Household Management of Acute Respiratory tract Infection symptoms in under five children by caregivers in Benin City.

Department of Public Health and Community Medicine, College of Medical Sciences, University of Benin, Benin City.

PRINCIPAL INVESTIGATORS

Eunice Okwukwe Chika

Micheal Okhale Damisa

SUPERVISOR

Prof. Vincent Adam

FINANCIAL SPONSORSHIP

This research work is financially sponsored by the principal investigators.

PURPOSE OF RESEARCH

The purpose of this research work is to assess the knowledge, prevalence, care-seeking behaviour, factors affecting treatment and effectiveness of treatment methods of Acute Respiratory tract infections by caregivers in Benin City.

PROCEDURES

You are kindly requested to complete a questionnaire designed to assess the knowledge, prevalence, care-seeking behaviour, factors affecting treatment and effectiveness of treatment methods of Acute Respiratory tract infections by caregivers in Benin City.This questionnaire is for research purposes only.

CONFIDENTIALITY

All information collected would be kept confidential and stored securely. Data collected would he anonymized and only accessible to the research team.

COMPENSATION

Participants will not receive any compensation for their participation.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. You may withdraw from the study at any time without any consequences.

RISKS

There are no risks associated with participation in this study.

BENEFITS

The information you provide will help us better understand how Acute Respiratory Tract Infections affect under five children. This can help raise awareness and may inform future policies, support services, and community education efforts aimed at preventing Acute respiratory tract infections in children and identify opportunities to improve the quality of care provided in under fve children in Benin City

CONTACT INFORMATION

If you have any questions or concerns regarding this research work please contact:

Eunice Okwukwe Chika

Email: chykha2@gmail.com

Phone Number: 08106898669

Micheal Okhale Damisa

Email: damisaokale@gmail.com

Phone number: 08163389207

OR

Ethics and Research Committee,

University of Benin Teaching Hospital,

Benin City.

Email: ubthresearchethics@gmail.com

Phone number: 07063331337

IF THERE IS ANY PORTION OF THIS CONSENT AGREEMENT THAT YOU DO NOT UNDERSTAND, ASK THE FIELD WORKER OR INVESTIGATOR BEFORE SIGNING.

Please, sign below if you have agreed to participate in the study.

CERTIFICATION OF CONSENT

I, _____ having full capacity to consent for myself do thereby consent to my participation in the research study.

The methods and means by which the study wasconducted have been explained to me by Ethical Committee. I have been given the opportunity to ask questions concerning this investigational study, and any such questions have been answered to my full and complete

satisfaction.

I understand that I may at any time during the course of this study revoke this consent and withdraw myself from the study without prejudice.

Participant's Signature: _____

Date: _____

APPENDIX II

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE

UNIVERSITY OF BENIN TEACHING HOSPITAL.

CAREGIVER KNOWLEDGE, CARE-SEEKING PRACTICES, AND MANAGEMENT OF ACUTE RESPIRATORY INFECTIONS (ARI) IN UNDER FIVE CHILDRE, EGOR LGA, BENIN CITY.

Dear respondent,

We are 600L medical students at the University of Benin currently doing our one-year project. This study aims to assess the knowledge, care-seeking practices and household management of acute respiratory tract infection symptoms in under five children by caregivers in Benin city Edo State, Nigeria.

Please kindly answer all questions as best as you can. There are no right or wrong answers and there is no penalty for opting out of the study at any time. Be assured that every information given to us wastreated with utmost confidentiality. Thank you.

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

A1. Relationship to child: ( ) Mother ( ) Father ( ) Grandparent ( ) Guardian

( ) Others: _____ please specify

A2. Age of caregiver: _____ years

A3. Sex of caregiver: ( ) Female ( ) Male

A4. Number of under five children: _____

A5. Age of index under five child: _____ months

A6. Sex of index under five child: ( ) Female ( ) Male

A7. Religion: ( ) Christianity ( ) Islam ( ) African Traditional Religion ( ) Others: _____ please specify

A8. Ethnicity: ( ) Benin ( ) Esan ( ) Etsako ( ) Igbo ( ) Yoruba ( ) Hausa ( ) Owan

( ) Urhobo ( ) Others _____ please specify

A9. Marital status: ( ) Married ( ) Single ( ) Divorced/Separated ( ) Cohabiting ( ) Widowed

A10. Level of Education: ( ) None ( ) Primary ( ) Secondary ( ) Tertiary

A11. Employment status: ( ) Employed ( ) Unemployed

A12. Occupation: _____ please specify

A13. Monthly income: ( ) < ₦70,000 ( ) ₦70,000–₦100,000

( ) ₦100,000-₦200,000 ( ) ₦200,000-₦500,000 ( ) > ₦500,000

A14. Type of Residence: ( ) Rural ( ) Peri-urban ( ) Urban

A15. Household size: _____

A16. Cooking Fuel used: ( ) Electric cooker ( ) Gas ( ) kerosene ( ) Firewood

( ) charcoal

A17. Is cooking done inside the house? ( ) Yes ( ) No

A18. Do you smoke cigarette? ( ) Yes ( ) No

A19. Does anyone else in the house smoke? ( ) Yes ( ) No

SECTION B: CAREGIVER KNOWLEDGE ABOUT ARI

B1. Have you ever heard of Acute Respiratory infection (ARI)? ( ) Yes ( ) No → If No, skip to B3

B1a. Where did you hear about it? ( ) Hospital ( ) Televison ( ) Radio ( ) Newspaper ( ) Friends ( ) Relatives ( ) Church ( ) others:_____ please specify

B2. What are common symptoms of ARI in children?(multiple): ( ) Cough ( ) Fast breathing ( ) difficulty breathing ( ) Chest Indrawing ( ) Fever ( ) Don't Know

B3. Causes of cough fast breathing (multiple): ( ) Germs ( ) Cold weather

( ) Teething ( ) Dust ( ) Smoke ( ) overcrowding ( ) Evil spirit ( ) Don't know

( ) Others: _____ please specify

B4. Can ARI be prevented: ( ) Yes ( ) No

B5. Which of the following can prevent ARI (multiple): ( ) Vaccination

( ) Breastfeeding ( ) Handwashing ( ) Avoiding sick people ( ) Good nutrition

( ) Coughing into your elbow ( ) Don't know

( ) Others:_____please specify

B6. Is your child fully immunized for age? ( ) Yes ( ) No

B6a. Immunization card seen? ( ) Yes ( ) No

B7. Was your child exclusively breastfed? ( ) Yes ( ) No

B8. Does your child currently attend daycare? ( ) Yes ( ) No

B9. Is each a danger sign? (Mark your answer for each sign)

B9a. Child unable to eat or drink: ( ) Yes ( ) No ( ) I don't know
B9b. Child unconscious or weak: ( ) Yes ( ) No ( ) I don't know
B9c. Convulsions: ( ) Yes ( ) No ( ) I don't know
B9d. Fast or difficult breathing: ( ) Yes ( ) No ( ) I don't know
B9e. High fever: ( ) Yes ( ) No ( ) I don't know
B9f. Chest in-drawing: ( ) Yes ( ) No ( ) I don't know

SECTION C: PREVALENCE OF ARI IN THE LAST TWO WEEKS

C1. In the last two weeks, has your under-five child had cough?: ( ) Yes ( ) No

C2. Did the child have the following symptoms?

C2a. Cough: ( ) Yes ( ) No

C2b. Fast breathing: ( ) Yes ( ) No

C2c. Difficulty breathing ( )Yes ( ) No

C2d. Fever: ( ) Yes ( ) No

C2e. Runny nose: ( ) Yes ( ) No

C3. Did the child have BOTH cough and fast breathing? ( ) Yes ( ) No

SECTION D: CARE-SEEKING BEHAVIOUR FOR ARI

D1**.** Did you seek treatment? ( ) Yes ( ) No → If No, skip to D6

D2**.** First place you sought care: ( ) Primary Health Centre ( ) Government hospital ( ) Private hospital ( ) Pharmacy ( ) Chemist ( ) Traditional healer ( ) Place of worship ( ) Market/shop ( ) Relative/friend ( ) Others: _____ please specify

D3. Time before seeking care: ( ) Same day ( ) 1-2 days ( ) 3 days or more

D4. Reason for choosing this provider: ( ) Quality ( ) Nearness ( ) Affordable ( ) Recommendation ( ) Past experience ( ) Others:_____please specify

D5. Satisfaction with care: ( ) Very satisfied ( ) Satisfied ( ) Neutral ( ) Dissatisfied ( ) Very dissatisfied

D6. Main reason for NOT seeking care: ( ) Illness not serious ( ) Home remedies ( ) Cost ( ) Distance ( ) No one to accompany ( ) Others:_____please specify

SECTION E: FACTORS INFLUENCING ARI MANAGEMENT

Statement	**Strongly agree**	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
E1. Cost of treatment is a barrier					
E2. Distance to health facility is too far					
E3. I trust government health facilities					
E4. Herbal remedies are effective					

E5. Pharmacy medicines are strong enough					
E6. Long waiting times discourage me					

SECTION F: TREATMENT METHODS USED

F1. What treatments were given? (multiple): ( ) Prescribed drugs ( ) Patent medicine drugs ( ) Herbal mixtures ( ) Home remedies ( ) Prayer ( ) None ( ) Others:_____ Please specify

F2. : Did the child improve after treatment ( ) Completely ( ) Partially

( ) No improvement

F3: Were there complications? ( ) Yes ( ) No, if Yes, Specify: _____

F4: Was Hospitalization required? ( ) Yes ( ) No

APPENDIX III

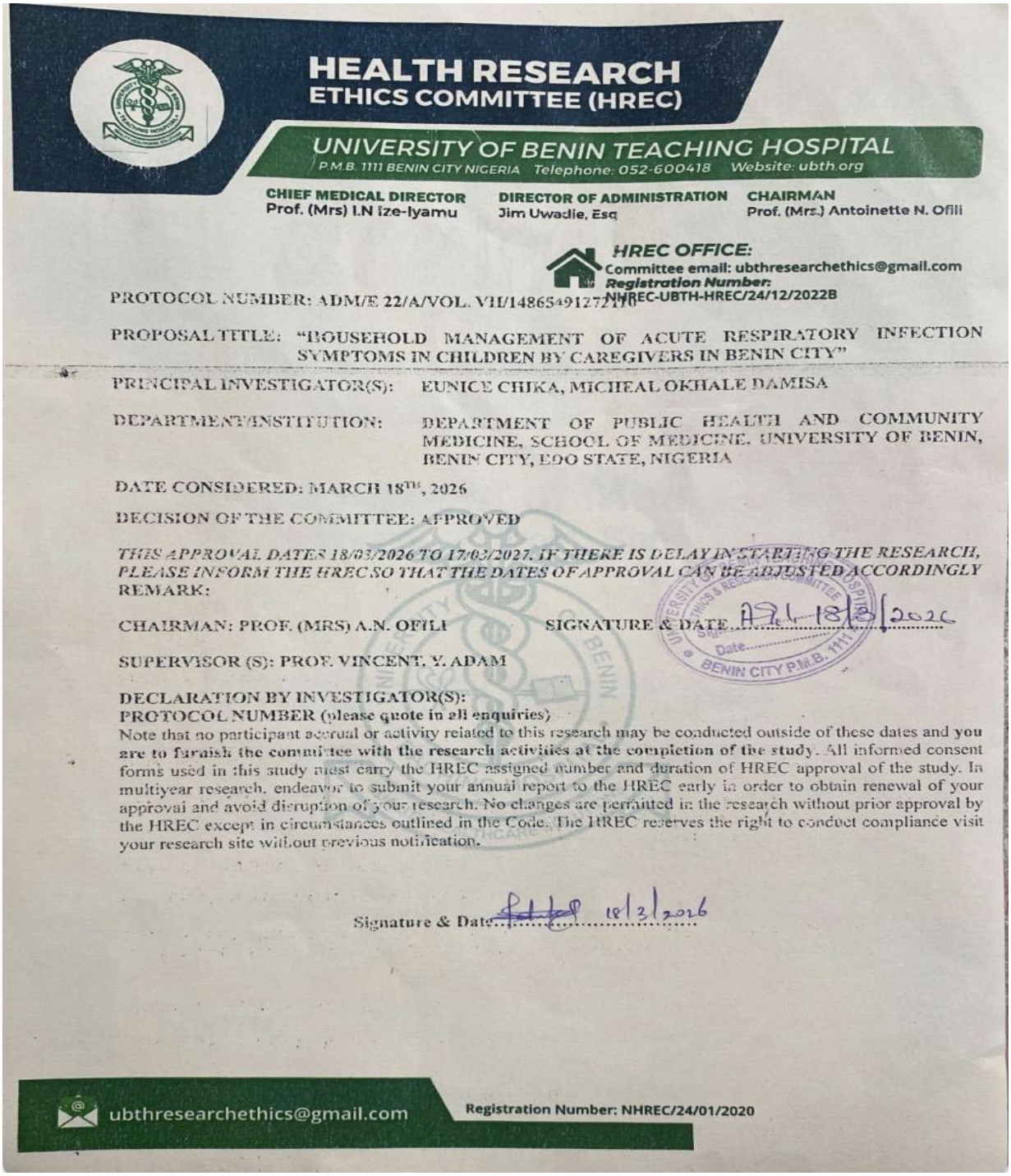
List of Wards in Egor LGA[40]

1. Ugbowo
2. Okhoro
3. Uwelu
4. Uselu I
5. Uselu II

6. Ogida I
7. Ogida II
8. Useh
9. Egor
10. Evbuotubu

APPENDIX IV

ETHICAL APPROVAL



HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR Prof. (Mrs) I.N Ize-Iyamu
DIRECTOR OF ADMINISTRATION Jim Uwadie, Esq
CHAIRMAN Prof. (Mrs.) Antoinette N. Ofili

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com
Registration Number: NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/1486549127/TH

PROPOSAL TITLE: "HOUSEHOLD MANAGEMENT OF ACUTE RESPIRATORY INFECTION SYMPTOMS IN CHILDREN BY CAREGIVERS IN BENIN CITY"

PRINCIPAL INVESTIGATOR(S): EUNICE CHIKA, MICHEAL OKHALE DAMISA

DEPARTMENT/INSTITUTION: DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA

DATE CONSIDERED: MARCH 18TH, 2026

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 18/03/2026 TO 17/03/2027. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY
REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE 18/3/2026

SUPERVISOR (S): PROF. VINCENT. Y. ADAM

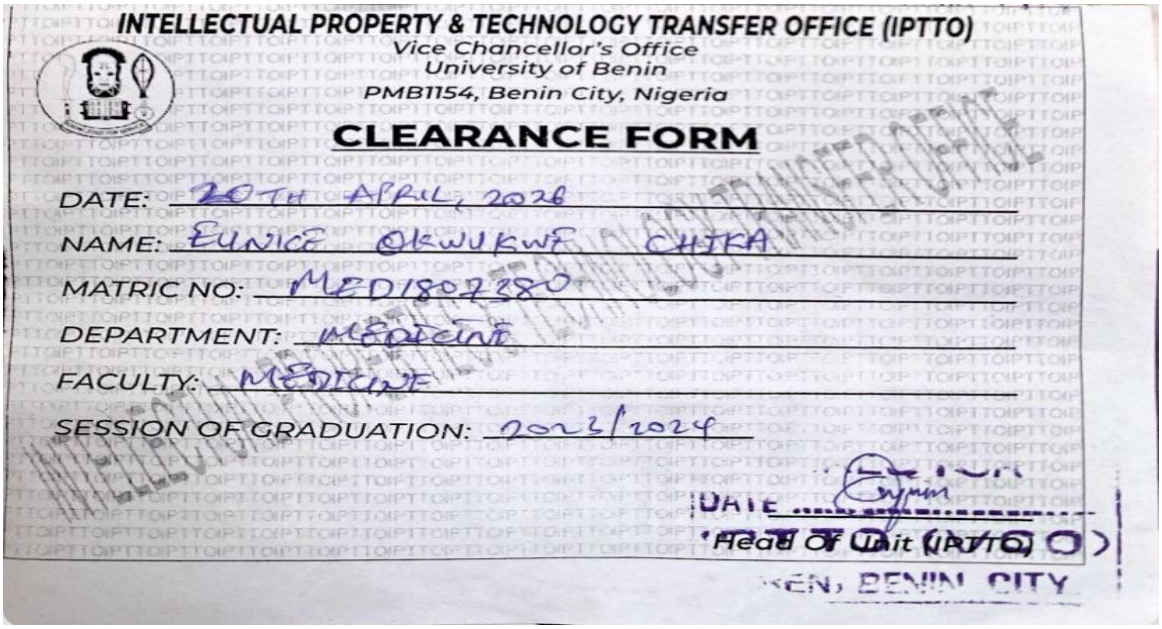
DECLARATION BY INVESTIGATOR(S):
PROTOCOL NUMBER (please quote in all enquiries)
Note that no participant accrual or activity related to this research may be conducted outside of these dates and **you are to furnish the committee with the research activities at the completion of the study**. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification.

Signature & Date 18/3/2026

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/2020

APPENDIX V

PLAGIARISM TEST RECIEPTS

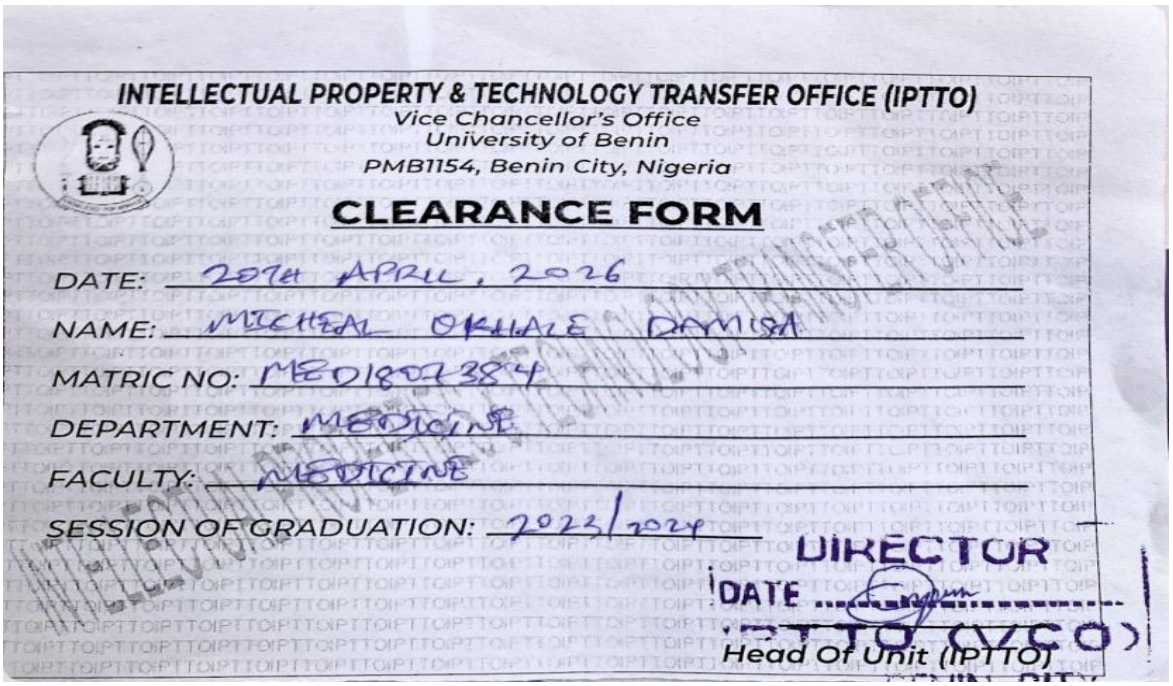


INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)
Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria

CLEARANCE FORM

DATE: 20TH APRIL, 2026
NAME: EUNICE OKWUKWE CHIKA
MATRIC NO: MED1807280
DEPARTMENT: MEDICINE
FACULTY: MEDICINE
SESSION OF GRADUATION: 2023/2024

DATE .....
Head Of Unit (IPTTO)
BENIN CITY



INTELLECTUAL PROPERTY & TECHNOLOGY TRANSFER OFFICE (IPTTO)
Vice Chancellor's Office
University of Benin
PMB1154, Benin City, Nigeria

CLEARANCE FORM

DATE: 20TH APRIL, 2026
NAME: MICHEAL OKHALE DAMISA
MATRIC NO: MED1807384
DEPARTMENT: MEDICINE
FACULTY: MEDICINE
SESSION OF GRADUATION: 2023/2024

DIRECTOR
DATE .....
Head Of Unit (IPTTO)