COLLEGE OF HEALTH SCIENCE
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ACUTE RESPIRATORY TRACT INFECTIONS AND INFANT AND YOUNG CHILD FEEDING PRACTICES AMONG 6 TO 23 MONTHS OLD CHILDREN IN ADDIS ABEBA, ETHIOPIA, 2023

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Acronyms and Abbreviations

ARI Acute Respiratory Tract Infection

ALRI Acute Lower Respiratory Tract Infection

EIBF Early Initiation of Breast Feeding

EBF2D Exclusively Breastfed for the first two days after birth

EDHS Ethiopian demographic and health survey

IYCF Infant and Young Child Feeding

LRTI Lower Respiratory Tract Infection

MAD Minimum Acceptable Diet

MDD Minimum Dietary Diversity

MMF Minimum Meal Frequency

MOH Ministry of Health

OR Odds Ratio

RTI Respiratory Tract Infections

SSA Sub-Saharan Africa

SNNPR Southern Nations Nationalities and Peoples Region

UNICEF United Nations Children's Fund

URTI Upper Respiratory Tract Infection

WHO World Health Organization

Abstract

Background: Suboptimal child feeding practice may lead to malnutrition which in turn is associated with an increased risk of morbidity and mortality from respiratory tract infections among under two children. In Ethiopia, an encouraging progress in the reduction of ARI was observed until 2010; however, since then the national prevalence is unchanged. Therefore, the need to uncover the role of infant and young child feeding practice is to provide information for interventions aiming to reduce under-five children morbidity and mortality due to childhood infections.

Objective: The aim of this study is to determine the association between acute respiratory tract infections and infant and young child feeding practices among 6 to 23 months old children attending public health centers in Addis Ababa, Ethiopia, 2023.

Methods: Facility based analytical cross-sectional design was conducted from August to September, 2023 among 342 children aged 6- to 23-months paired with their mothers in public health centers located in Addis Ababa. Multistage sampling technique was used to recruit the study participants. Data was collected from mothers of the infants and children using electronic method. Data was entered and analyzed using the statistical package for social sciences (SPSS) version 26. The association between IYCF practices and ARI were investigated using Chi-square test and binary logistic regression model.

Result: The overall proportion of infants and children with acute respiratory tract infection was 31%. Early initiation of breastfeeding (AOR 0.57; 95% CI: 0.39, 0.82) and Exclusively Breastfed for the first two days after birth (AOR 0.64; 95% CI: 0.45, 0.91) were associated with lower risk of ARI. Infants and children who were frequently fed (AOR 0.54; 95% CI: 0.38, 0.76) and who consumed fruits and vegetables (AOR 0.37; 95% CI: 0.23, 0.61) were also less likely to experience ARI compared to their counterparts.

Conclusion: The findings of the study indicate that the magnitude of acute respiratory tract infection is high among under two years children as upper respiratory tract infection being commonest cause and the recommended IYCF practices to reduce the occurrence of ARI in infants and children are early initiation of breastfeeding, exclusive breastfeeding in the first two days after delivery, consumption of vegetables or fruits and frequent feeding of infants and children.

Key Words: Acute respiratory tract infections, WHO infant and young child feeding indicators

1. Introduction

1.1. Background

Acute respiratory infections (ARIs) are infections of the airways from nostrils to the alveoli. They are classified as upper respiratory tract infections (URIs) or lower respiratory tract infections (LRIs). The upper respiratory tract consists of the airways from the nostrils to the vocal cords in the larynx, including the paranasal sinuses and the middle ear. The lower respiratory tract covers the continuation of the airways from the trachea and bronchi to the bronchioles and the alveoli [1].Acute respiratory tract infection is one of the most common childhood illnesses, and it almost invariably results in major health problems and death in children under the age of five years [2].It account for 6% of global disease burden, which is greater than the burden of diarrheal illness and malaria combined [3]. ARI also accounts for up to 50% of visits of children to health facilities globally[4].The prevalence of ARIs are determined individually or collectively by a number of factors, which include age, sex, nutritional status, breastfeeding (type and duration), socio-economic status, overcrowding, indoor pollution, passive smoking, etc. [5].

About two-third of malnutrition is associated mortality with inappropriate feeding practices during the first year of life[6].Globally, about 40% of under two years of deaths are associated with poor feeding practices[7]. Significant associations have also been observed regarding type of feeding and ARI in which breastfeeding appears to be highly protective against the occurrence of ARI in infants[8].Every day, three to four thousand infants die in the low-income countries from diarrhea and acute respiratory infections because they are given inadequate amounts of breast milk[9].In Ethiopia, efforts are being made in implementing a multi-sectorial plan of nutrition intervention (as prescribed in Sekota Declaration and National Nutrition program) to end high burden of undernutrition. However, the most recent national survey indicates nearly half of all infants <6 months of age were not exclusively breastfed. More than one in four infants still received pre-lacteal feeds that may predispose the child to infectious disease [10]. Similarly, acute respiratory infections are one of the leading causes of morbidity and mortality in children under 5 years in Ethiopia. According to the 2016 Ethiopian Demographic and Health Survey, the prevalence of ALRI was 11.7% [11].

1.2. Statement of problem

Adequate nutrition during infancy and early childhood is essential to ensure the growth, health, and development of children to their full potential [12]. On the other hand, malnutrition is a major contributor to the total global disease burden. It has been estimated that malnutrition is the underlying cause of approximately half of the fatal acute lower respiratory tract infections [13]. Similarly, malnourished children with severe acute upper respiratory tract infection (URTI) were shown to have a 2–3 times higher mortality rate than healthy children. [14]. Poor feeding practices in infants and young children may lead to malnutrition, which, in turn, is associated with an increased risk of infectious diseases, such as respiratory tract infections (RTIs), a leading cause of under-five mortality [15]. In this case, nutrition in children determines the tendency to be affected by ARIs in children. Good nutrition will form a good endurance in children against the environment. Conversely, children with poor nutrition do not develop strong endurance so that these children are more likely to have the diseases, especially infections [16].

Acute respiratory infections are major causes of morbidity and mortality in the children of developing countries [17]. According to the World Health Organization (WHO), respiratory infections account for 6% of the total global disease burden. Around 6.6 million, under-five aged children years of age die each year worldwide; 95 percent of them belong to low-income countries and one third of the total deaths is due to ARI[18]. Sub-Saharan Africa (SSA) remains with the highest childhood deaths from infectious causes. In this region, under-5 children mortality is 20 times higher compared with high-income countries [19]. Nearly all (97%) of ALRI cases occur in low and middle-income countries with about 70% occurring in South Asia and sub-Saharan Africa [20]. Many studies have shown that comorbid illnesses especially HIV, malnutrition, prematurity or measles, family history of ARI, low socioeconomic status, inappropriate weaning time, pallor, severe malnutrition and cooking fuel other than liquefied petroleum gas, indoor air pollution, maternal illiteracy, parental smoking behavior male gender, rural residency and overcrowding associated with ARI [21].

According to the Ethiopian demographic and health survey (EDHS), the prevalence of ARI among under-five children was 13% in 2005, and therefore the magnitude reduced to 7% in EDHS 2011, however, the prevalence remained 7% in EDHS 2016[22]. In Ethiopia, about 3.4 million children suffer from ARI annually and Ethiopia is among the top 15 countries with highest burdens of ARI.

It accounts for 18% of all deaths, and kills over 40,000 under-five children every year [23]. Recent studies indicate that Ethiopia has achieved significant results in improving child survival, where under-5 mortality has decreased by two-thirds[24].Studies done in different regions of Ethiopia show that household use of high-pollution biomass fuel (charcoal, wood, dung, or straw) for cooking, household overcrowding, small height for age, lack of a separate kitchen, and being carried on the mother's back while cooking are primary risk factors for development of ARI in children under the age of 5 years [25,26]. Several studies were conducted in our country assessing Infant and Young Child Feeding practices and their disparities between regions. Similarly, some studies also assessed the prevalence and determinant factors of acute respiratory tract infection among under-five children. Nevertheless, there are limited studies assessing the role of IYCF practices on the occurrence of acute respiratory tract infections among under-two children especially in urban and sub urban settings. Therefore, the study aims to investigate the relationship between acute respiratory infection and IYCF practices among 6 up to 23 month old children attending public health centers in Addis Ababa.

1.3. **Significance of the study**

The study availed information on the role of IYCF practices on acute respiratory tract infections for child health programs and policies aiming to reduce under-five child morbidity and mortality. It also contributes to the current efforts of IYCF policy maker's advocacy regarding its impacts on child's health. Furthermore, it informs health professionals to integrate counseling on improved IYCF practices along with their routine child healthcare services. The result of the study will also serve as baseline information for other researchers to conduct further studies on the same problem at different study settings.

1.4. Research question

What is the association between acute respiratory tract infections and infant and young child feeding practices?

2. Literature review

2.1. Acute Respiratory Tract Infection

2.1.1 Overview of Acute Respiratory Tract Infection

Acute respiratory infection are defined as infections in the respiratory tract (lower and/or upper), resulting in obstruction of the air passage at the nasal and/or bronchial system, causing a spectrum of manifestations, from acute symptoms, like common colds, to more serious conditions such as pneumonia or lung collapse[27]. Upper respiratory tract infections (URTIs) include the common cold, laryngitis, pharyngitis/tonsillitis, acute rhinitis, acute rhinosinusitis and acute otitis media. Lower respiratory tract infections (LRTIs) include acute bronchitis, bronchiolitis, pneumonia and tracheitis [28]. Bacteria and viruses have been reported as the main causes of ARIs [29, 30]. Among ARI, infections of the upper respiratory tract are the most frequent, but the majority of respiratory deaths are attributed to acute lower respiratory infections [31]. Most children have one or more symptoms of mucosal irritation or inflammation (e.g. rhinorrhea, cough). Children with infections of the lower respiratory tract (e.g. pneumonia,bronchiolitis) may demonstrate signs of compensation for impaired gas exchange (e.g. elevated respiratory rate, chest indrawing), and those with severe ARI (e.g. associated with sepsis or hypoxemia) often display ‘danger signs’ (e.g. cyanosis, altered mental status)[32,33].

Acute respiratory tract infection is a leading cause of morbidity and mortality in children under the age of 5 years throughout the world. Pneumonia is one of the most serious manifestations of ARI. Each year, ARI causes 15% of all deaths in children under the age of 5 years globally. About 50% of these deaths occur in Sub-Saharan Africa [34]. According to the 2011 Ethiopia Demographic and Health Survey (EDHS), the prevalence of ARI was 7% [35]. In Ethiopia, about 190, 000 children are still dying each year, although Ethiopia has achieved MDG 4 target three years earlier by reducing under-five mortality by 67% from the 1990 estimate. It is ARI (ALRI most common cause) the leading causes of under-five mortality which accounts for 18% of total death among under five children [36].

2.1.2. **Risk factors associated with Acute Respiratory Tract Infection**

Acute respiratory infection is linked to various modifiable risk factors including demographic, environmental, socio-economic, and nutritional factors [37]. Research has shown that many factors are associated with ARI. These factors differ from one country to another. Evidence from developing countries reveals that low birth weight, exposure to indoor air pollution, non-exclusive breast feeding, incomplete immunizations, crowding (more than seven members per household), poor nutrition, formula feeding, weaning, young maternal age, low educational status of mothers and fathers, and premature birth are consistently associated with severe ARI [38]. A similar study in Ethiopia revealed that mothers' education level, age of children, mothers occupational status, source of drinking water, type of toilet facility and economic status of family significant factor associated with symptoms of acute respiratory infections[39].If the associated modifiable risk factors could be modified and/or avoided through the implementation of various intervention strategies then, the disease burden in the community could be reduced [40].

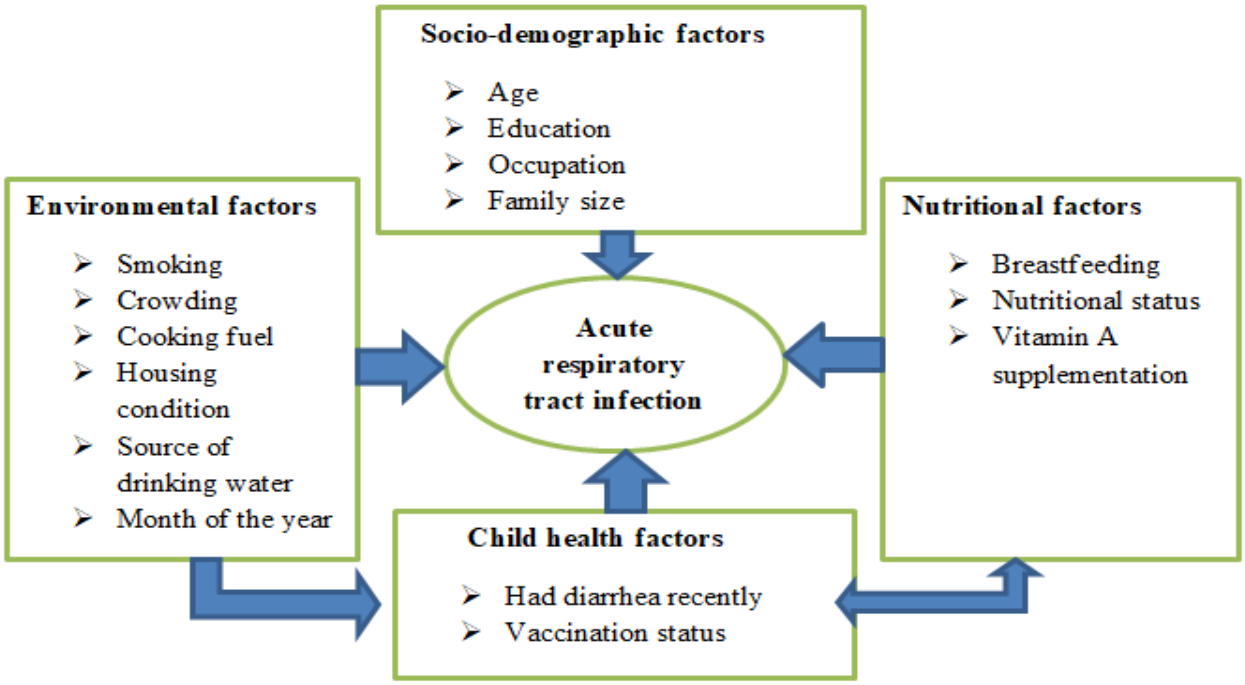

Figure 1: Conceptual framework to assess risk factors of acute respiratory infections among under-five children [22]

2.1.2.1 Socio demographic and economic factors

Socio-demographic factors are one of the contributing factors for acute respiratory tract infections which include mother's age group, mother's occupation, marital status, education level of mother, number of living child, birth spacing between the children, wealth Index and residence as mentioned on the diagram.

Maternal related factors: Maternal age and educational status are characteristics of a mother that highly associated health care of a child. Mothers younger than 35 years and also mothers who have completed secondary education exhibit more help seeking behavior for their sick children[41].Similarly, another study assessing factors of ARI showed that maternal age was associated with children's ARI status. The adjusted odds of developing ARI were 1.95 and 2.73-folds higher among children having mothers aged 16 to 27 and 28–33 years, respectively [42].

Family Education: Study conducted in Nigeria on risk factors of ARI showed that more cases of acute upper respiratory tract infections were noted among children of well-educated mothers probably due to their greater health seeking behavior[11]. On the other hand, another similar study conducted in Ethiopia showed that having a paternal educational status of secondary school or higher is a factor protecting against ARI in children under the age of 5 years[38].A father's literacy has also an impact on childhood pneumonia; a higher-class level resulted in a diminished risk of pneumonia. A child whose father did not finish primary school (1 - 4) and (5 - 8) is 10.7 (AOR = 10.7, 95%CI: 2.69, 42.7) and 4.67 (AOR = 4.67, 95%CI: 1.2, 17.9) times more likely to develop pneumonia as compared to child whose father received higher education[43].

Family Occupation: The study done in India have produced evidence that on multivariate logistic regression analysis, low socio-economic status (OR 4.89, 95% CI 1.93–12.36), were found to be significant risk factors [37]**.** Study done in Ethiopia showed that maternal occupation had a statistically significant association with ARI; accordingly, compared with children of employed mothers, children whose mothers were not worked had 22.7% reduced odds of having ARI (AOR = 0.773; 95% CI 0.630–0.948)[22].

Family size: A study conducted in Ethiopia showed that over 50% of the homes had between 5 and 7 persons living in the house. A significant association was found between family size and risk of ARI by bivariate analysis (OR = 0.237 (0.101–0.555, p = 0.02)[44].

2.1.2.2 Environmental Factors

Sanitation related factors: Hand washing can reduce ARIs by interrupting the transmission of respiratory pathogens. A recent systematic review on randomized controlled trials conducted in low- and middle-income countries found strong evidence of hygiene interventions (including education and infrastructure) reducing caregiver-reported ARI symptoms in children living in urban households, but no effects were observed in rural households[45]. A cluster-randomized controlled trial in urban Bangladesh, however, did not detect impacts of handwashing and water treatment promotion and hardware provision on reported respiratory illness. This finding was likely explained by moderate adherence to the handwashing intervention because reported respiratory illness was 18% lower (95% CI: 2–31%) among people who had soap and water present at the handwashing station than those who did not[46].

Type of cooking materials: study done in Western Sierra Leone indicated that ARI prevalence revealed 32% and 24% for women, 64% and 44% for children in homes with wood and charcoal stoves, respectively. After adjusting for potential confounders for each group, the odds ratio of having suffered from ARI was similar for women, but remained large for children in homes with wood stoves relative to charcoal stoves (OR = 1.14, 95%CI: 0.71–1.82) and (OR = 2.03, 95%CI: 1.31–3.13), respectively [47].Another study conducted in Bangladesh showed that study found a statistically significant association between solid fuel consumption and the occurrence of ARI in children in households [48].

Cigarate and Tobaco smoking: Maternal smoking has greater detrimental effects than paternal smoking on the respiratory health of children and maternal smoking during pregnancy has been associated with adverse respiratory outcomes in children [49]. Meta-analysis of six studies from Cameroon, Ethiopia, India, Nepal, and Nigeria reported that tobacco smoke exposure increased the risk of acute respiratory infection in children under five (AOR=1.39; 95% CI= 1.22 to 1.58; p<0.001)[50].

Housing ventilation and presence of window: study conducted in southern Ethiopia should that children from houses of unclean fuel sources and poorly ventilated houses were more likely to be affected by acute respiratory infection [51].

Overcrowding: A study conducted in Bangladesh revealed that In-house overcrowding was associated with 2.9-fold (95% confidence interval 1.80–4.73) greater adjusted odds of hospitalization for ARI compared to children from less crowded houses [52].

Climate change: A study done in Semarang indicated that humidity had a significant correlation to ARI on female children and total ARI (r=0.3 and r=0.26; p–value=0.02 and 0.04 respectively). Rainfall and temperature had no correlation to total ARI. This study concluded humidity has potential impact to ARI[53].

2.2.1.3. Child Related Factors

Child Age: study done in Rwanda showed that ALRI was particularly high among children less than two years (0–11 months: 5.2 %; 12–23 months: 5.1 %)[54].Another study conducted in Ethiopia showed that based on a multivariable logistic regression analysis, the odds of ARI decreased as the age of the child increased. [22].

Child nutritional status: Childhood wasting is the leading risk factor for mortality in under-fives with lower RTI worldwide, which may be attributed to insufficient breastfeeding practices and inadequate complementary feeding in early life. Malnutrition also has a detrimental effect on cognitive and physical development in children, perpetuating health inequalities [54].

Breastfeeding: In view of the benefits of breastfeeding, starting breastfeeding in the first hour of delivery, exclusive breastfeeding (EBF) for the first 6 months of life and continued breastfeeding together with suitable complementary foods for up to 2 years or beyond are recommended as the best infant feeding plan for optimal growth, development and health[55]. The study done on breastfeeding for 6 months or longer was significantly associated with a reduced risk of LRTI up to 4 years of age (OR: 0.71; 95% CI: 0.51–0.98). Similar ORs for LRTI were found with breastfeeding for less than 3 months and 3–6 months [56]

2.2. Infant and Young Child Feeding (IYCF) Practices

2.2.1. Overview of Infant and Young Child Feeding

Infant and young child feeding practices have an immediate effect on children's nutrition status of less than two years of age and greatly on the survival of a child [40].Thus, promoting proper IYCF practices is rated one of the most successful interventions in ameliorating the health of a child [57].World Health Organization (WHO) and United Nations Children's Fund (UNICEF) set a global strategy for optimal infant and young child feeding (IYCF). The strategy recommends the initiation of breastfeeding within one hour of birth, exclusively breastfed for the first six months, after which nutritiously appropriate, adequate, and safe complementary foods should be introduced along with continuing breastfeeding up to two years and beyond. Improving IYCF practices based on this recommendation when children are well and sick is important to ameliorate undernutrition and its consequences[58]. According to the 2016 EDHS, 58 percent of children were exclusively breastfed during the first six months of their lives. At two years, 76 percent of mothers continued to breastfeed their infants, while 60 percent of mothers began supplemental feeding on time[59]. Efforts to enhance the nutritional status of children in Ethiopia have been made at various times, including the adoption of IYCF recommendations [60].

2.2.2 Assessment of Infant and Young Child Feeding Practices

Unlike in 2008, no distinction is made between core and optional indicators in this set of recommendations mentioned on 2021 guideline. It is important to assess data using the full set of indicators for any given population and to report all findings. [41]. A summary of the revised set of IYCF indicators is presented in Box **1.**

1. Ever breastfed
2. Early initiation of breastfeeding
3. Exclusively breastfed for the first two days al
4. Exclusive breastfeeding under six months
5. Mixed milk feeding under six months
6. Continued breastfeeding 12–23 months
7. Introduction of solid, semi-solid or soft fo months
8. Minimum dietary diversity 6–23 months
9. Minimum meal frequency 6–23 months
10. Minimum milk feeding frequency for non-b children 6–23 months
11. Minimum acceptable diet 6–23 months
12. Egg and/or flesh food consumption 6–23 mont
13. Sweet beverage consumption 6–23 months
14. Unhealthy food consumption 6–23 months
15. Zero vegetable or fruit consumption 6–23 mon
16. Bottle feeding 0–23 month
17. Infant feeding area graphs

Box 1 : WHO Indicators for assessing infant and young child feeding practices, 2021 [41]

2.3. Malnutrition and Acute Respiratory Tract Infection

Malnutrition is an important risk factor for acute respiratory infection (ARI), which is a leading cause of mortality and morbidity among children aged < 5 years [51]. The most frequent causes of death in children under 5 years old are acute diarrhea and acute respiratory infection. Several studies have shown that malnutrition is frequently causally associated with these deaths [61]. Malnutrition is known to impair immunocompetence, causing increased susceptibility to infectious diseases. In turn, infections may deteriorate nutritional status through the loss of critical body stores and reduced intake [62]. Likewise, study conducted on evidence from the 2011 Ethiopia Demographic and Health Survey also showed that prevalence of ARI was found to be higher in children with malnutrition [63].

2.4. Infant and Young Child Feeding Practices and Acute Respiratory Tract Infections

Appropriate infant and young child feeding (IYCF) improves childhood growth (through reduced risk of diarrhea and respiratory infections as well as improved nutrition), increases the intellectual capacity of children and reduces the risk of mothers experiencing diabetes mellitus, overweight and obesity [64].

Study conducted in India showed that prevalence of ARI was least (22.74%) when breast-feeding was started within 1st hour of birth and it was highest (58.82%) in children whose breastfeed-ing was

initiated after 2nd day or more of birth. [65].Another study conducted in Suriname revealed that children meeting the MDD and MAD had significantly lower odds on RTIs (OR 0.53; 95%CI: 0.37–0.74, $p < 0.001$; OR 0.55; 95%CI: 0.39–0.78, $p < 0.001$, respectively)[66].Several studies conducted on assessing the factors affecting acute respiratory tract infections revealed that socio-demographic (maternal factors, family education, occupation, income and size),Environmental (sanitation, overcrowding, cooking fuel, smoking and house ventilation) and child related factors(child age, nutritional status, vaccination status and breastfeeding). However, only limited studies assessed the role of infant and young child feeding practices on the occurrence of acute respiratory tract infections which showed significant association with breastfeeding practices among under two children. Therefore, this study aims to determine the association between acute respiratory tract infections and infant and young child feeding practices.

3. Objectives

3.1. General Objective

The general objective of the study is to determine the association between acute respiratory tract infections and infant and young child feeding practices among 6 to 23 months old children attending public health centers in Addis Ababa, Ethiopia, 2023.

3.2. Specific Objective

1. To determine the proportion of acute respiratory tract infection among 6 up to 23 month old children attending public health centers in Addis Ababa, Ethiopia, 2023.
2. To describe the infant and young children feeding practices among 6 up to 23 month old children attending public health centers in Addis Ababa, Ethiopia, 2023.
3. To determine the association between acute respiratory tract infections and IYCF practices of infants and children aged 6-23 months attending public health centers in Addis Ababa, Ethiopia, 2023.

4. Methods

4.1. Study area

The study was conducted at Addis Ababa public health centers located in Bole, Arada and Lideta subcities. Addis Ababa has 11 sub cities and 118 district administrations. The city has 110 health centers and 12 state run hospitals, two of which are referral and more than 40 private hospitals. Arada subcity have six general hospitals, eleven health centers, 60 private clinics and drug retail outlets. Janmeda health center in one of the health centers located in Arada subcity consisting of emergency unit, adult and under-five OPD, EPI vaccination section, ANC, family planning service, delivery room, pharmacy, minor and major operation rooms. Lideta has six hospitals, eight health centers, and 52 private clinics. Hidase Fire health Center is one of the health centers located in Lideta subcity. It consists of Adult and Under-five OPDs, Emergency unit, EPI vaccination room, Nutrition room, ANC, delivery room, family planning services and drug retail outlets. Bole has 14 woredas (districts) and 10 health centers providing healthcare service to 415,572 population based on the report from the subcity. Bole 17/20 health center is one of the health centers located in bole subcity which has emergency unit, adult OPD, under-five OPD, family planning service, EPI vaccination section, minor operation room, youth friendly services section, laboratory and pharmacies.

4.2. Study design and study period

Facility based analytical cross-sectional study design was conducted from August - September 2023

4.3. Source population

All infants and children paired with their mothers who attended public health centers located in Addis Ababa.

4.4. Study Population

Infants and children who attended the selected public health centers located in Bole, Lideta and Arada subcities in Addis Ababa.

4.5. Eligibility Criteria

4.5.1. Inclusion Criteria

Infants or children from 6 up to 23 months paired with their mothers who visited under-five OPD and immunization section of the selected health centers.

4.5.2. Exclusion Criteria

Children who were on treatment for confirmed severe respiratory illness, cardiopulmonary disease and chronic respiratory illness. In addition to this, mothers who were not willing to participate due to different reasons.

4.6. Sampling procedure

The study used multistage sampling procedure. The selected sub-cities were 30% of the total sub-cities located in Addis Ababa. Three health centers were selected using simple random sampling from the total of health centers located under each subcity. All infants and children who attended the public health centers during the data collection period and fulfill the inclusion criteria were included. The sample allocated for each health centers depended on the patient flow and ARI case load of the previous month before data collection period.

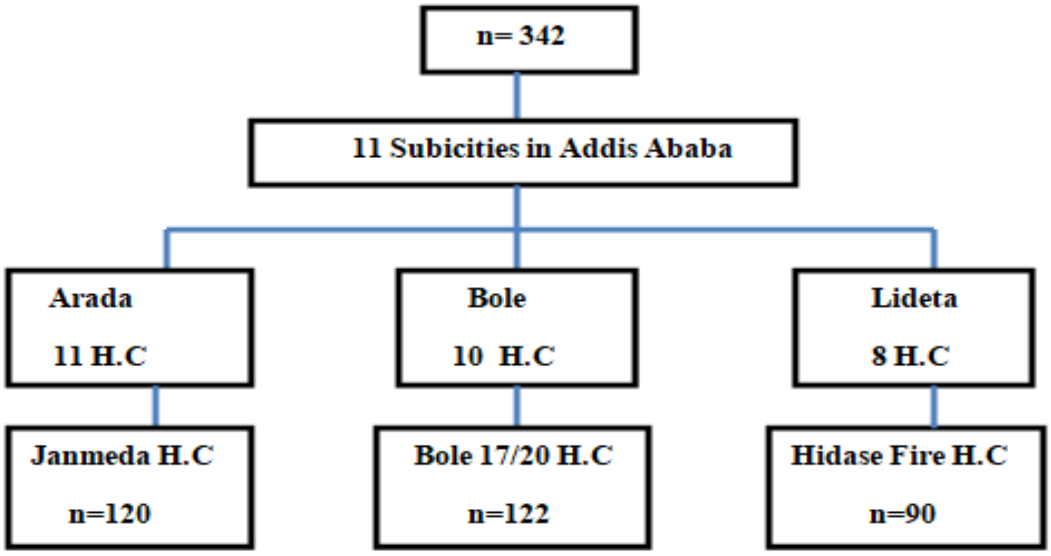

Figure 2: Schematic representation of the sampling procedure

4.7. Sample size Determination

SS for objective 1: was calculated by using single population proportion formula with overall prevalence of ARI (7.8%) taken from study conducted in rural Ethiopia [22]

$$n = \frac{Z^2_{\alpha/2} P(1-P)}{d^2}$$

i.e.; **n** desired sample size, $\mathbf{Z}_{\alpha/2}$ critical value at 95% CI (1.96), **P** prevalence of ARI and **d** degree of precision

P	$Z_{\alpha/2}$ (95% C.I.)	d	n
0.07	1.96	0.05	100

Adding a 5% non response rate, the final sample size became: 100/1-NR=100/1-0.05= **105**

SS for objective 2: used single population formula with overall prevalence of appropriate IYCF practice (65.8%) taken from study conducted in Northern Shewa, Ethiopia [67]

P	$Z_{\alpha/2}$ (95% C.I.)	d	n
0.66	1.96	0.05	344

Adding a 5% non response rate and design, the final sample size became: 344/1-NR=344/1-0.05= **362**

SS for objective 3: was calculated using double population proportion formula. The prevalence of ARI with appropriate IYCF practice (P1-15.58%) and without appropriate practice (P2-84.5%) taken from study conducted in India [68]

$$n = \frac{(Z_{\alpha/2}+Z\beta)^2 * (p_1(1-p_1)+p_2(1-p_2))}{(p_1-p_2)^2}$$

i.e.; **n** desired sample size, $\mathbf{Z_{\alpha/2}}$ critical value at 95% CI (1.96), **Zβ** statistical power of 80%,

p1 proportion of outcome in exposed group and **p2** proportion of outcome in unexposed group

Zα/2	Zβ	p1	p2	n
1.96	0.84	0.15	0.84	242

Adding a 5% non response rate and design, the final sample size became:242/1-242=242/1-0.05= **254**

Since the sample size estimated for IYCF accommodates all the others, 362 was taken as the working sample.

4.8. Study Variables

Outcome Variables: were acute respiratory tract infections (ARI) measured based on maternal recall for symptoms of ARI and diagnosis of clinicians for physical signs.

Exposure Variables: were IYCF indicators (Ever breastfed, EIBF, EBF2D, the introduction of solid and semi-solid foods, continued breastfeeding at two years, bottle feeding, MMF, MDD, MAD and zero vegetable or fruits consumption).

Potential confounding variables: were broadly classified into socio-demographic and economic characteristics, household characteristics, child health and nutrition.

4.9. Data Collection Procedure

Data was collected through face to face interview using electronic method i.e; KOBO collect tool by three trained, female and experienced Bsc degree health professionals (health officers).The questionnaire consisted of four sections which included sociodemographic and socio-economic characteristics, household characteristics, child health and nutrition and child feeding practices. The socio-demographic and economic, household characteristics, child health and nutrition sections were developed based on EDHS standards. Infant and young child feeding practices were assessed by using the recently revised WHO indicators for assessing infant and young child feeding practices guideline [41]. It included early initiation of breastfeeding, exclusive breastfeeding in the first two days after birth, continued breastfeeding 12-23 months, introduction of soft or semi-solid and solid foods at 6 to 8

months, Minimum meal frequency (MMF), Minimum dietary diversity (MDD), minimum acceptable diet, Minimum milk frequency for non-breastfed children, Egg or flesh consumption, Sweet beverage consumption, Unhealthy food consumption, Zero vegetable or fruit consumption and bottle feeding. For each indicator, the appropriate feeding practice was assessed based on compliance with WHO recommended practices. A 24 hour recall approach was used to assess minimum dietary diversity, minimum meal frequency, minimum milk frequency, continued breastfeeding and bottle feeding. Presence or absence of ARI was determined by the clinicians working in under-five OPD with any one or combination of symptoms and signs like cough, runny nose, sore throat, short and rapid breathing, noisy breathing, chest in-drawing and crackles or wheezing at any time in the last 2 weeks.

4.10. Data Quality Management

For the purpose of data quality control, one-day theoretical and practical training was given by the principal investigator for the data collectors on data collection techniques and procedures based on the questionnaires and about the main purpose of the study. The questionnaire was prepared in English and translated to Amharic and back to English to check the consistency of the questions. The translated Amharic version questionnaire was pretested before the actual data collection and modification of some of the questions was done based on the result of the pretest. Principal investigator was closely checking data collection techniques on daily bases and review for its completeness. The health professionals working in under-five OPD were also checking for the activities of each data collector by random spot-checking to ensure the reliability of the data. Any error, ambiguity, incompleteness, or any other problems were addressed on the following day before starting the next day's activities.

4.11. Operational Definition

Acute Respiratory Tract Infection (ARI): was defined as children that had history of cough, accompanied by short rapid breathing and/ or difficulty of breathing reported by mothers or caregivers within two weeks preceding the survey [23].

Type of cooking fuel: households that used electric stove, natural gas, biogas or kerosene as a cooking fuel were classified as ‘improved’ while those households that used charcoal, wood and animal dung were grouped as ‘not improved’[69].

Source of drinking water: households that used piped water, public tab or stand pipe**,** a tube or a bore hole, protected well/spring, rain water and/or bottle water were classified as 'improved' while households that used unprotected well/spring, tanker truck cart, surface water and/or sachet were grouped as 'not improved water' [70].

Household ventilation: 'Poor Ventilation' is a house with only one room, one door and no or only one window while 'Good ventilation' is a house with three or more rooms, doors and windows[71]

4.12. Data Analysis

The questionnaire was checked for completeness and consistency before conducting data entry. The data in Excel sheet was exported from KOBO tool box. Data coding and analysis was conducted by using the statistical package for social sciences (SPSS) version 26. Descriptive statistics was used to present baseline characteristics of the participants. Categorical data was reported as frequencies and percentages. Mean and standard deviation were used for continuous variables. The IYCF Indicators were expressed as dichotomous variables: value 0 for not fulfilling the indicator criteria and value 1 for fulfilling the criteria. The proportions of children meeting and not meeting the MDD, MMF, and MAD were calculated. Chi-squared test was used to test the statistical significance of categorical data. Binary logistic regression models were fitted to adjust for confounding variables and determine the association between feeding practices and respiratory tract infections. Associations were presented as ORs with 95% confidence interval (CI) and p-values. Finally, the findings were reported in percent, mean, odd ratios were presented using text, frequency tables and charts.

4.13. Ethical Consideration

Ethical clearance was obtained from the Ethical review committee of School of Public Health, College of Health Science, Addis Ababa University and Addis Ababa health bureau. A legal permission letter was written to the selected public health centers which were addressed to the respected responsible bodies. The data collectors clearly explained the aim of the study and that it has no harm and participation is on voluntary basis to the participants who fulfills the eligibility criteria and written informed consent was obtained from participants. Participants had also the right to refuse and discontinue and withdraw at any time they want during the data collection time.

The information obtained from the study was used only for the purpose of the study and the recorded data was not accessible by a third party except the principal investigator, and confidentiality was kept. All children who were undernourished were linked to the nutrition rehab center.

4.14. Dissemination of result

After the completion of the study, the thesis report will be submitted to Addis Ababa University, College of health science and School of public health. Result will be disseminated to the selected health Centers and Addis Ababa Health Bureau. Efforts will be made to publish in journals.

5. Result

From 362 eligible samples, about 342 infants and children participated in this study, attaining a 95% response rate.

5.1. Socio-demographic and economic characteristics

Among study participants, more than half 201(58.8%) of mothers were in 26-35 years age group. One hundred and seventy-five (51.2%) children aged from 6-11 months and one hundred sixty-one (47.1%) were between 12-23 months. Of these, one hundred seventy (50.3%) were females. The majority of mothers were married, housewife and who attained primary level education; 331(96.8%), 233(68.3%) and 130(38.2%) respectively. One hundred fifty one (44.9%) of the fathers attained secondary level education and 195(58.4%) were private employee (**Table 1**).

Table 1: Socio-demographic and economic characteristics of the study participants attending public health centers in Addis Ababa, Ethiopia 2023 (n=342)

Variables	Frequency	%
Maternal age		
18-25	115	33.6
26-35	201	58.8
>35	26	7.6
Child Age		
6-11	175	52.1
12-23	161	47.9
Child Sex		
Male	170	49.7
Female	172	50.3
Marital status of the mother		
Single	11	3.2
Married	331	96.8

Maternal educational level		
Not able to read and write	17	5.0
Read and write	8	2.4
Primary education(1-8)	130	38.2
Secondary education(9-12)	111	32.6
Technical or vocational training	20	5.9
Tertiary education(above 12)	54	15.9
Maternal occupation		
Housewife	233	68.3
Daily Laborer	3	0.9
Merchant	9	2.6
Government employee	51	15.0
Private employee	45	13.2
Father's education level		
Not able to read and write	6	1.8
Read and write	5	1.5
Primary education(1-8)	67	19.9
Secondary education(9-12)	151	44.9
Technical or vocational training	23	6.8
Tertiary education(above 12)	84	25.0
Father's Occupation		
Daily Laborer	14	4.2
Merchant	39	11.7
Government employee	76	22.8
Private employee	195	58.4
Not employed	10	3

5.2. Household Characteristics

The household size of the respondents ranged from 2 to 9 with mean and standard deviation of 0.08 ± 0.26 SD respectively. The number of under-five children in the household ranged from 1 to 3 with mean and standard deviation of 1.31 ± 0.48 SD respectively. All of the study participants reported that they used improved type of drinking water supply (piped water) and majority of the mothers 339(99.7%) practiced hand washing before child feeding. Regarding the house ventilation, 271(79.5%) of the households had good ventilation and 70(20.5%) poor ventilation. Of these, only 128 (37.8%) of the households used improved type of cooking fuel. The majority of the households 310(91.7%) had no passive cigarette smoking exposure (**Table 2**).

Table 2: Household characteristics of the study participants attending public health centers in Addis Ababa, Ethiopia, 2023 (n=342)

Variable	Frequency	%
Household size		
≤5	315	92.4
>5	26	7.6
House Ventilation		
Good ventilation	271	79.5
Poor ventilation	70	20.5
Type of fuel used for cooking		
Improved	128	37.8
Not improved	211	62.2
Passive cigarette smoking exposure	28	8.3
Yes	310	91.7
No		
Hand washing before child feeding	339	99.7
	1	0.3

Yes

No

5.3. Child health and nutrition

Among 342 of the infants and children, 205(59.9%) had health facility visit for immunization and 123(36%) for medical care. Two weeks preceding the survey, sickness was reported by 199(58.4) of the respondents. From these, 134(39%) presented with ARI clinical symptoms and physical signs which included 44(13%) fever, 7(2%) short and rapid breathing, 4(1.2%) wheezing or crackles and 50(15%) runny nose. Based the diagnosis of the clinicians, the proportion of infants and children with ARI diagnosis were 31% which consisted of 41(12%) common cold, 47(14%) upper respiratory tract infection, 7(2%) pneumonia, 5(1.5%) acute tonsilo-pharyngitis, 4(1.2%) acute bronchitis and 2(0.6%) acute otitis media. Of these, 95(27.8%) had upper respiratory tract infection and 11(3.2%) had lower respiratory tract infection. All of the children were vaccinated according to their ages. Of these, 214(62.8%) received BCG, PENTA 1, PENTA 2, PENTA 3 and measles vaccinations. 296(86.5%) of the infants and children received vitamin A dose(**Table 3**).

Table 3: Child health and nutrition of the study participants attending public health centers in Addis Ababa, Ethiopia, 2023 (n=342)

Variable	Frequency	%
Reason for health facility visit		
Immunization	205	59.9
Medical care		36.0
Both	123	4.1
	14	

Illness in the past two weeks		
Yes	199	58.4
No		41.6
	142	
Presence of ARI symptoms in the past two weeks		
Yes	134	39
No	65	19
ARI physical signs		
Fever	44	13
Short and rapid breathing	7	2
Wheezing or crackles	4	1.2
Chest retraction	1	0.3
Runny nose	50	15
No physical sign	58	17
Diagnosis of the physician		
Acute otitis media	2	0.6
Common cold	41	12
Acute tonsillopharyngitis	5	1.5
Acute bronchitis	4	1.2
Pneumonia	7	2
Upper respiratory tract infection	47	14

Type of ARI		
Upper respiratory tract infection	95	27.8
Lower respiratory tract infection	11	3.2
Type of Vaccination		
BCG, PENTA1, PENTA 2	16	4.7
BCG, PENTA1, PENTA2, PENTA 3	111	32.6
BCG, PENTA 1, PENTA 2, PENTA 3, Measles	214	62.8
Vitamin A dose		
Yes	296	86.5
No	46	13.5

5.4. Child feeding practices

The majority of respondent mothers 331(97.6%) practiced breastfeeding and 278(84.5%) initiated breastfeeding with in the first 1 hour after delivery while the rest 51(15.5%) initiated within hours or days. Of these, only 74(22.4%) practiced exclusive breastfeeding for the first two days after birth. From total of 342 study participant, 125(77.2%) of 12-23 months old children continued to breastfeed within the last 24hrs before the study. 235(69.3%) of the respondent mothers practiced bottle feeding in 24 hours prior to data collection. Two hundred sixty-four (77.2%) of the mothers introduced solid, semi-solid or soft foods within 6-8months of age. From these, 96(77.2%) were 6–8-month-old children who were fed with solid or semi-solid foods in the last 24hours (**Table 4**). The common fluids or liquids taken in last 24hrs were plain water 249(72.8%), animal milk 160(46.7%), Tea or coffee 98(28.6%) and fruit juice or fruit flavored drinks 45(13.1%) respectively.

Among 342 study participants,222(65.7%) consumed foods made from cereals and grains,103(30.5%) commercially fortified baby foods (Fafa, Hilina, Cerilak, Cerifam),119(35.2%) foods made from roots and tubers,60(17.8%) vitamin A rich fruits and vegatables,40(11.8%) Eggs, 28(8.3%) other vegetables and fruits, 13(3.8%) pulses & nuts,13(3.8) flesh foods (meat, fish, poultry, organ meat), 8(2.4%) dairy products,8(2.4%) fried foods and 5(1.5%) sweet foods in 24 hours prior data collection(**Figure 3**). From

these, 53(15.5%) of children consumed either egg or flesh, 67(19.5%) sweet beverage, 13(3.8%) unhealthy foods(sweet and fried foods) and 88(25.7%) any type of fruits or vegetables.

Out of total numbers of breastfed children, 21(19.6%) aged 6-8 months complemented less than two times, 85 (79.4%) aged 6-8 months complemented two or more times, 48(21.5%) of 9-23 months aged children complemented twice or less times and 170(76.2 %) aged 9-23 months complemented three or more times respectively. Among 6-23 months old non-breastfed children, 2(26.6%) consumed less than two milk feeds and 5(71.4%) consumed two or more milk feeds. Regarding dietary diversity, 306(89.5%) of children consumed less than five food groups and 26(7.6%) five food groups or above (**Table 4**).

Table 4: Frequency distribution of feeding practices of the study participants based on the revised WHO indicators for assessing infant and young child feeding practices (n=342)

Variables	Frequency	%
Ever breastfed		
Yes	331	97.6
No	8	2.4
Early initiation of breastfeeding		
Yes	279	84.5
No	51	15.5
Exclusive breastfeeding for the first two days after birth		
Yes	74	22.4
No	257	77.6
Continued breastfeeding in the last 24hrs	125	77.2

Yes	35	22.8
No		
Bottle feeding in the last 24hrs		
Yes	235	69.3
No	104	30.7
Introduction of solid, semi-solid or soft foods 6-8months		
Yes	96	77.2
No	11	22.8
Minimum meal frequency in the last 24hrs		
Yes	255	74.6
No	70	20.4
Minimum dietary diversity in the last 24hrs		
Yes	26	7.6
No	306	89.5
Minimum milk feeding frequency for 6-23 months non-breastfed children		
Yes	5	71.4
No	2	26.6
Minimum acceptable diet for 6-23 months children		
Yes	26	7.6
No	313	91.5
Egg and or flesh food consumption 6-23 months		

Yes	53	15.5
No	289	84.5
Sweetened beverage consumption 6-23 months		
Yes	67	19.5
No	275	80.4
Unhealthy food consumption 6-23 months		
Yes	13	3.8
No	329	96.2
Zero vegetable or fruit consumption 6-23 months		
Yes	254	74.3
No	88	25.7

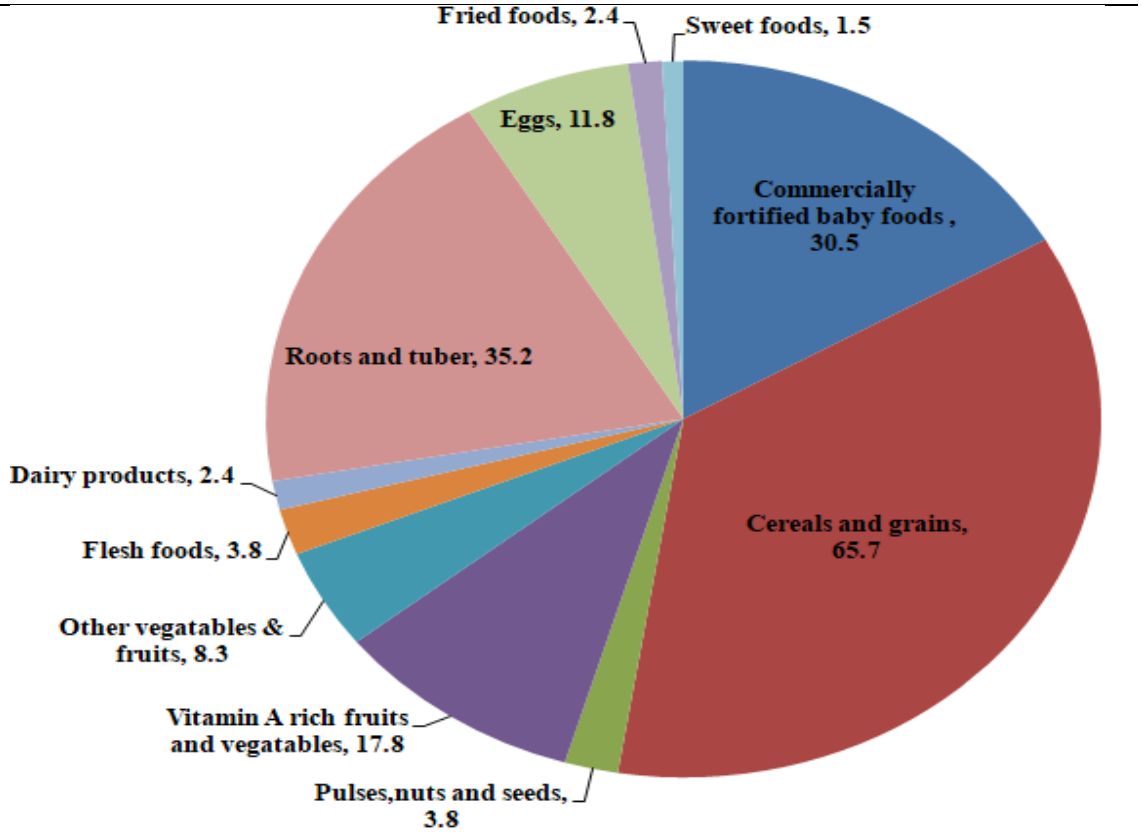

Figure 3: Food groups consumed among 6-23 months infants and children in 24 hours prior the study

5.5. Association between ARI and infant and young child feeding practices

Infants and young children aged 6-23 months who were breastfed within the first hour of birth were less likely to experience ARI compared to those who were not breastfed within the first hour of birth (AOR:0.57;95% CI:0.39,0.82). Exclusive breastfeeding for the first two days after birth was also associated with lower odds of ARI (OR: 0.64; 95% CI: 0.45, 0.91). Infants and young children who consumed fruits and vegetables were less likely to develop ARI compared to their counterparts (AOR: 0.37; 95% CI: 0.23, 0.61). Infants and children aged 6-23 months who were frequently fed in according to their age categories were less likely to experience ARI compared to those who were not frequently fed (AOR:0.54; 95% CI:0.38,0.76). Nevertheless, continued breastfeeding at 12-23 months, bottle feeding, MDD and MAD showed no significant association with ARI. Maternal age, maternal education, vitamin A supplementation, type of cooking fuel and household ventilation were the adjusted variables that showed significant association with lower odds of ARI.

Table 5: Logistic regression for association between ARI and infant and young child feeding practices (IYCF)

IYCF indicators	Prevalence of ARI			
	Yes (%)	No (%)	AOR (95% CI)	P value
Ever breastfed				
Yes	103(31)	227(69)	0.2 (0.21, 1.39)	0.211
No	1(12.5)	7(87.5)	1	
Early initiation of breastfeeding				
Yes	84(30.3)	193(69.7)	0.57(0.39,0.82)	
No	18(35.3)	33(64.7)	1	0.003*
Exclusive breastfeeding for the first two days after birth				
Yes	21(28.4)	53(71.6)	0.64(0.45, 0.91)	
No	81(31.4)	175(68.6)	1	0.008*
Continued breastfeeding 12-23 months				
Yes	92(31.9)	196(68.1)	0.67(0.41,1.11)	
No	11(26.2)	31(73.8)	1	0.118
Bottle feeding in the last 24hrs				
Yes	69(29.5)	165(70.5)	0.97 (0.60, 1.58)	
No	35(33)	69(67)	1	0.921
Introduction of solid and semi-solid foods 6-8 months				
Yes	32(33.7)	63(66.3)	0.57(0.31, 1.08)	
No	5(45.5)	6(54.5)	1	0.086
Minimum dietary diversity 6-23 month old				
Yes	11(42.3)	15(57.7)	1.08(0.48, 2.43)	
No	94(30.8)	211(69.2)	1	0.845
Minimum meal frequency 6-23 old months				
Yes	77(29.5)	184(70.5)	0.54 (0.38,0.76)	
No	27(37)	46(63)	1	<0.001*
Minimum acceptable diet 6-23 old months				
Yes	11(42.3)	15(57.7)	1.13(0.50,2.55)	
No	94(30.12)	218(69.88)	1	0.765
Zero vegetable or fruit consumption 6-23 months				
Yes	22(25)	63(75)	0.37(0.23, 0.61)	
No	82(32.5)	170(67.5)	1	< 0.001*

Type of cooking fuel				
Improved	43(34)	85(66)	0.43(0.32,0.59)	
Not Improved	61(29)	149(71)	1	<0.001*
Passive cigarette smoking exposure				
Yes	8(29)	20(71)	0.73(0.31,1.74)	
No	96(31)	213(69)	1	0.489
Vitamin A supplementation				
Yes	97(72)	37(28)	0.38(0.17,0.86)	
No	9(4)	198(96)	1	0.020*
Household size				
<=5	99(32)	215(68)	0.53(0.21,1.39)	0.201
>5	6(23)	20(77)	1	
Household ventilation				
Good ventilation	82(30)	188(70)	0.53(0.32,0.90)	
Poor ventilation	23(33)	47(67)	1	0.019*
Maternal age				
18-25	31(27)	83(73)	0.68(0.48,0.98)	0.039*
26-35	65(32)	136(68)	0.92(0.38,2.19)	0.921
>35	10(38)	16(62)	1	
Maternal education				
Not able read and write	6(37)	10(63)	0.43(0.08,2.32)	
Read and write	2(25)	6(75)	0.49(0.26,0.92)	0.029*
Primary education	36(28)	94(72)	0.71(0.38,1.34)	
Secondary education	40(36)	71(64)	0.46(0.15,1.46)	
Technical/Vocational training	5(25)	15(75)	0.49(0.23,1.00)	
Tertiary education	15(28)	39(72)	1	

***Predicator variables adjusted for IYCF indicators**

6. Discussion

The present study assessed infant and young child feeding practices and their associations with the prevalence of ARI in the selected health centers located in Addis Ababa. The overall proportion of infants and children with ARI was 31% in the study as maternal age, maternal education, Vitamin A supplementation, type of cooking fuel and household ventilation were factors which showed significant association with ARI in bivariate analysis. However, the finding of this study was lower compared to similar study conducted in India that revealed overall prevalence of ARI was observed to be 59.1%, with prevalence in urban and rural areas being 63.7% and 53.7%, respectively [72]. On the other hand, it is higher than a study conducted in rural Ethiopia that showed the overall prevalence of ARI to be 7.8% [22].The discrepancy between these findings could be attributed to the effect of overcrowding in densely populated urban and rural regions of India compared to our study setting and the higher prevalence could be probably due to the difference in predicator factors for urban and rural regions of Ethiopia.

The current study showed higher prevalence in timely initiation of breasting (84.5%), continued breastfeeding at 12-23 months (77.2%) , introduction of solid, semi-solid and soft foods 6-8 months(77.2%), minimum meal frequency (74.6%) and minimum milk frequency (71.4%) for non-breastfed infants based on the recent WHO recommendations. On the other hand, lower prevalence was shown in exclusive breastfeeding in the first two days after delivery (22.4%), minimum dietary diversity (7.6%), minimum acceptable diet (7.6%), consumption of egg or flesh (15.5%), fruits and vegetables (25.7%). The findings of the study compared to similar previous study conducted in Southern Ethiopia which documented that 22.2% achieved for minimum dietary diversity, 12% minimum acceptable diet and 39.8% bottle feeding [11].the present finding is lower in MDD and MAD probable due to the change of cutoff point for the food groups to five on recent WHO guideline which considered breast milk as an additional category and problems related to affordability and accessibility of food items resulting in household food insecurity.

Breast feeding in Ethiopia is almost universal. This study also showed these facts. WHO recommend that mothers initiate breastfeeding within one hour of birth, it has dual advantage for the mothers and infant, it stimulates breast milk production and releases a hormone that helps the uterus to contract and reduces postpartum blood loss of the mothers and reduce maternal death due to puerperal sepsis and

anemia [73] The level of initiation of breastfeeding within one hour of birth in this study (84.5%) was relatively higher than similar studies conducted in SNNPR and Ethiopian national average; 61.5% and 69% respectively[73].This finding could be probablely due to majority of the mothers in urban and suburban residence deliver their babies in health facilities in which early initiation of breastfeeding is highly encouraged and supported by health professionals.

Despite of this, even though most of the mothers initiated breastfeeding within the first hour, only 22.4% practice exclusive breastfeeding in the first two days after delivery probably due to maternal illness (sore nipples, pain, engorged breasts, mastitis or insufficient milk production), difficulty in suckling of the new born baby or socio-cultural pressures to introduce water or soft foods which is believed to improve the digestive system.

From six month onwards children need complementary foods in addition to breast milk. Introduction of appropriate complementary food is needed at six months to ensure children's growth and thrive [74] In this study, optimal complementary feeding practice for breast fed children shows 7.6% which means proportion of infants and children who had fulfilled the minimum dietary diversity and minimum meal frequency 24 hr preceding the survey which is lower than similar study done in Ethiopia [75]

Early initiation of breast feeding (EIBF) and exclusive breastfeeding in the first two days after delivery (EBF2D) were significantly associated with lower risk of ARI for breastfed infants and children compared to their counterparts (OR 0.579; 95% CI: 0.39, 0.82) and (OR 0.64; 95% CI: 0.45, 0.91) respectively which was consistent with other study conducted in Ethiopia EIBF (OR: 0.81; 95% CI: 0.72, 0.92) [75].On the other hand, study conducted in India showed that initiating breastfeeding within first hour had no association with acute lower respiratory tract infections(ALRI)[76].The discrepancy between these findings could be attributed to the classification of ARI into subcategory(ALRI) which may differ on the level of its risk.

Continued breasting feeding at 12-23 months old age was individually associated with reduced risk of ARI in the study. The biological mechanism for the protective effect of optimal breastfeeding against ARI may be due to the presence of immunological substances (such as oligosaccharides, immunoglobulins, hormones, and enzymes) in breastmilk. These immunological substances provide

passive immunity to the infant, as well as assist in the maturation of the infant immune system Also, improved childhood nutrition status from optimal breastfeeding can partially explain the protective effect of breastfeeding against ARI[75].

Bottle feeding was not significantly associated with ARI in this study whereas other study conducted in Ethiopia that showed bottle-fed children had higher odds of ARI (OR: 1.36; 95% CI: 1.10, 1.68) [75]. A systematic review conducted in Costa Rica also revealed that there is evidence of medium quality that supports the association between feeding bottle use and an increased incidence of upper respiratory infections in the lower infants[77].

WHO Global Strategy for infant and young child feeding recommends that solid,semi-solid and soft foods be introduced at six months of age.After the first six months of life infants nutrient demands start to exceed what breast milk alone can provide and it leaves them vulnerable to malnutrition unless solid are introduced[41]. Early initiation of complementary feeds can lead to the displacement of breast milk and increased risk of infections, which further contributes to weight loss and malnutrition. Conversely, late initiation of complementary food is also associated with negative consequences to the infant's health[78].Despite of this fact, this study has shown no significant association between timely introduction of complementary feeding and ARI.

MDD and MAD were not significantly associated with ARI whereas MMF was associated with lower odds of ARI for breastfed and non-breastfed infants ; OR:0.56; 95% CI:0.35,0.88 .These findings were in contrast with other study conducted in suriname which revealed that MDD and MAD were significantly associated with upper respiratory tract infections. The study also showed in contrast to that the MMF indicator was not significantly associated with respiratory tract infections[66].However, this result was not fully in line with intial expectations of the study due to being fed from varity of food groups has essential contribution for child health and development.

7. Strength and Limitation

7.1. Strength

- This study assessed the new indicators which are recently included on the revised WHO indicators for assessing infant and young child feeding practices
- Electronic data collection was conducted using KOBO collect to improve the quality of the data and reduce missing data
- The study used the final diagnosis of the clinicians on the medical record of each infant and child to diagnose ARI in order to avoid misclassification of cases
- Some of the observed associations are consistent with previously published studies

7.2. Limitation

- The cross sectional nature of the study design may not be appropriate to measure the temporal relationship between IYCF and ARI
- IYCF indicators should be assessed at community level with larger size
- Household characteristics variables were assessed based self-report of the mothers which may be prone to recall bias
- Some of the predicator variables such as household income, wealth index, type of toilet and nutritional status of the child were not assessed in this study

8. Conclusion

Based on the finding of this study, acute respiratory tract infection is one of the leading causes of morbidity among under two years infants and children as upper respiratory tract infection being the commonest. The current study also identified that the predicator factors associated with ARI were maternal age, maternal education, Vitamin A supplementation, type of cooking fuel and household ventilation. Therefore, interventions need to aim for the significant improvement of the major modifiable predicator factors to decrease the occurrence of ARI among under two infants and children.

In general, majority of infant and young child feeding practices assessed in the study were practiced according to WHO recommendations. However, exclusive breastfeeding in the first two days after delivery, minimum dietary diversity, minimum acceptable diet and consumption of fruit or vegatables were not appropriately practiced among majority of the mothers or care givers. Early initiation of breastfeeding and exclusive breastfeeding in the first two days of delivery was observed to be protective against ARI. Infants and young children who were frequently fed in respective of their age category and who consumed fruits and vegetables were less likely to experience ARI than those of their counterparts. The current study findings suggest that adherence to the WHO recommended IYCF practices can reduce the morbidity due to acute respiratory tract infections.

9. Recommendation

The following recommendations have been forwarded to all concerned bodies based on the findings of the study.

Ministry of Health (MOH)

- Promotion of early initiation of breastfeeding and exclusive breastfeeding in the first two days after delivery health benefits through the baby friendly hospital initiatives and mass media

Government and Non-Governmental organizations

- Government and non-governmental organizations should give especial attention to socio-economic empowerment of the mothers especially on nutritional literacy and maternal education

Health Professionals

- Health professionals who work in child health and care need to provide counseling to the mothers or care givers of the infants and children on how to apply the recommended IYCF practices as part of the routine child care services.

Researchers

- Researchers need to conduct further researches on the same problem at community level and with larger sample size in different study settings

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11. Annex

Annex I. Information Sheet

Title of the study: Effect of infant and young child feeding practice on acute respiratory tract infection among 6 to 23 month old children attending public health center in Addis Abeba, Ethiopia, 2023

Name of Investigator: Selamawit Minwyelet (BSc.)

Name of the Organization: AAU

Name of the Sponsor: AAU

Introduction; This information sheet is prepared for primary health centers located Bole, Arada and Lideta subcity, Addis Abeba. The aim of the form is to make purpose of research, data collection procedures clear to the above concerned offices and get permission to conduct the research.

Purpose of the Research Project: To determine the association between Infant and Young Child Feeding (IYCF) practices and acute respiratory tract infections among 6 to 23 months old children attending public health centers.

Procedure: In order to conduct the study and achieve the above objective, necessary information will be obtained from questionnaire and assessment of acute respiratory symptoms and sign will be done by clinicians.

Risk and/or Discomfort: the information that will be obtained will not cause any harm to the participant. Any identification of the participant including the name will not be recorded on the questionnaire. And all information obtained will be kept secretly. Moreover, the information will only be used for the purpose of the study.

Benefit: The study will not have direct benefit for the participants. But the result of this study has direct benefit for health workers to give greater attention to the benefit of optimal infant and young child feeding practice in reducing childhood morbidity and quick recovery from an illness.

Confidentiality: To assure the confidentiality of the information, data will be collected by trained health professionals without the name of the participants. The information obtained from this study will only be revealed to principal investigator and will be stored in a computer locked by password.

Person to contact: the following contact addresses will be given to contact investigators at any time

Selamawit Minwyelet, AAU University, College of Health Sciences, Department of Nutrition and Dietetics: principal investigator

Phone: 0929106125

Email: minwyeletselam@gmail.com

Annex II: Subject Information Sheet

Addis Ababa University, School of public health

Hello, my name is ———————————————— I work for Addis Ababa University, School of Public Health. I am studying the impact of Infant and Young Child Feeding Practice on acute respiratory tract infections among 6 to 23 months old children. I have received permission from Addis Ababa university school of public health. Your participation in this study is voluntary. You have the right not to participate in this study or option out even after the interview started. Deciding not to participate in the study will not undermine, whatsoever, the services you receive from this health facility. However, I encourage your participation in the study since the information you provide will help health system actors improve quality and comprehensiveness of health services.

If you agree to participate in the study, you will be interviewed about your overall social and economic status, household characteristics, child feeding practice and the health status of the child. Filling the questionnaire will take about 20 minutes. This study will help in creating awareness about the contribution of optimal infant and young child feeding practice on reduction of acute respiratory tract infection among under two children. The information that you provide will be kept confidential. The data will be anonymized by replacing all identifiers with codes. No one will have access to the non-coded data except the principal investigator and the data will not be used for purposes other than the intended study. If you have any question, comments, or complaints, you can reach the researcher through the following address.

Ms. Selamawit Minwyelet (Principal investigator), College of Health Sciences, Department of Nutrition and Dietetics: AAU, Tel: 0929106125

Annex III: Oral consent form

I have heard all the information stated above about the study as it was read to me by the data collector. I fully understand the purpose, benefit and risk of the study and I have freely decided to participate or not to participate in this study.

Tick “X” on Agree if the subject decided to participate or on disagree if not

Agree_____ I disagree_____ STOP

Thank You for willingness to participate

Annex IV : Questionnaire

Questionnaire code _____ Date _____ Location _____

Name of Data Collector_____ Name of the Health Center _____

Part I: Sociodemographic and Socioeconomic status

1.	Age of the mother	Years_____	
2.	What is your marital status?	1. Not Married. 2. Married 3. Widowed . Divorced 5. Living together 8. No response 9. Missing	
3.	What is your educational level(mother)?	1. Illiterate 2. Can read and write(Informal education) 3. Primary Education(Grade 1-8) 4. Secondary Education(Grade 9-12) 5. Technical/Vocational training 6. Tertiary Education and above	
4.	What is your occupation(mother)?	1. Student 2. Housewife 3. House Servant	

		4. Daily Laborer 5.Merchant 6.Government Employee 7.Non-government employee 8.Private employee	
5.	What is your husband's education level?	1. Illiterate 2. Can read and write(Informal education) 3. Primary Education(Grade 1-8) 4. Secondary Education(Grade 9-12) 5. Technical/Vocational training 6. Tertiary Education and above	
6.	What is your partner /husband's occupation?	1. Student 2. Daily Laborer 3. Merchant 4. Government employee 5. Non-government employee	

		6. Private employee 7. Not employed	

Part II: Child Health and Nutrition			
7.	What is the age of the child? *In complete months	Months_____	
8.	What is the Sex of the child?	1. Male 2. Female	
9.	Why do you bring (Name) to the health center currently?	_____	
10.	Was there any illness in the past two weeks?	1. Yes 2. No	
11.	Has (NAME) had an illness with a cough, fever, fast, short, rapid breaths or difficulty breathing at any time in the last 2 weeks?	1.Yes 2. No	Skip question if the answer of question is "No"
12.	Was the fast or difficult breathing due to a problem	1.Chest Only 2.Nose Only 3.Both	

	in the chest or to a blocked or runny nose?	4.Other 5. Don't Know 8. No response 9. Missing	
13.	Check for the physical signs such as fever, short, rapid breathing or breathlessness or wheezing and chest retractions	1.Yes 2. No	
14.	Did you seek advice or treatment for the illness from any source?	1. Yes 2. No	
15.	Where did you seek advice or treatment? Anywhere else?	1. Public Sector (Government Hospital, Health Center, Health post) 2. NGO (Health facility or Other NGO) 3. Private medical sector (Private Hospital, clinical and other) 4. Shop or Drug Vendor 5. Traditional practioner	Skip this question if the answer is "no" for question 18

16.	At any time during the illness, did (NAME) take any drugs or other treatment options for the illness?	1.Yes 2.No	
17.	What drugs or treatment did (NAME) take?	1. Anti-malarial drugs 2. Anti-biotics 3. Others drugs 4. Home remedies	Skip this question if the answer is “no” for question 21
18.	Did he/she receive any vaccination?	1.Yes 2. No	
19.	If yes, for question check the type of vaccine the child received	1. BCG only 2. BCG, Penta1 3. BCG, Penta 2 4. BCG, Penta3 5. BCG, Penta3, Measles	Skip this question if the answer is “no” for question 23
20.	In the last six months, was (NAME) given a vitamin A dose like [this/any of these]?	1.Yes 2. No 3.Dont know	

Part III: Household Characteristics

21.	How many people currently live in your house? List all the current residents living in the house based on their relationship to the respondent (Household Head, Spouse of HH head, Child, Grandparents, Uncle/Aunt, In-law, Nephew/Niece, Non-relative and Other (specify)	Number_____	
22.	How many children do you have?	Number_____	
23.	How many of them are less than 5 years?	Number_____	
24.	Do you wash your hands whenever you feed your child?	1.Yes 2.No	
25.	What is the main source of drinking water for members of your household?	1.Piped water (Piped into dwelling, yard/plot, neighbor and stand pipe) 2. Dug well(Unprotect and Protected well) 3. Water from spring (Protected and unprotected spring)	

26.	Does your house have good ventilation (by considering the window)?	1. Yes 2. No	
27.	What type of fuel does your household mainly use for cooking?	1. Electric stove 2. Natural gas 3. Biogas 4. Kerosene 5. Charcoal 6. Wood 7. Animal Dung 8. Other	
28.	How often does anyone smoke inside your house? Would you say daily, weekly, monthly, less often than once a month, or never	1.Daily 2.Weekly 3.Monthly 4.Less often than once a month 5. Never	

Part IV. Infant and Young Child Feeding Practice

29.	Was [NAME] ever breastfed?	1. Yes 2. No	
30.	How long after birth did you first give your breast to the child (Name)?	1. Immediately 2. Hours 8. Days	
31.	In the first two days after delivery, was [NAME] given anything other than breast milk to eat or drink – anything at all like water, infant formula, or [insert common drinks and foods, including ritual feeds, that may be given to newborn infants]?	1.Yes 2.No	
32.	Was [NAME] breastfed yesterday during the day or at night?	1.Yes 2.No 8.Dont know	
33.	Did [NAME] drink anything from a bottle with a nipple yesterday during the day or at night?	1. Yes 2. No 8. Don't know	
34.	Now I would like to ask you about liquids that [NAME] had yesterday during the day or at night. Please tell me about all drinks, whether [NAME] had them at home, or somewhere else. Yesterday during the day or at night, did [NAME] have…? A. Plain water B. Infant formula C. Milk from animals, such as fresh, tinned or powdered milk D. Yogurt	Yes No Dk A 1 2 8 B 1 2 8 C 1 2 8 D 1 2 8	

	E. Chocolate-flavoured drinks F. Fruit juice or fruit-flavoured drinks G. Tea, coffee, or herbal drinks H. Other sweetened beverages or drinks	E 1 2 8 F 1 2 8 G 1 2 8 H 1 2 8	
35.	At what age did you start to give food in addition to your breast milk?	Month_____	
36.	Now I would like to ask you about everything that [NAME] ate yesterday during the day or the night. I am interested in foods your child ate whether at home or somewhere else. Think about when [NAME] woke up yesterday. Did (he/she) eat anything at that time? If "yes" ask: Please tell me everything [NAME] ate at that time. Probe: Anything else? Record answers using the food groups below. What did [NAME] do after that? Did he/she eat anything at that time? A. Any commercially fortified baby food like Fafa, Hilina, Cerilak, Cerifam, Mother Choice B. Injera, bread, rice, noodles, porridge, or other foods made from grains such as tef, oats, maize, barley	Yes No Dk A 1 2 8 B 1 2 8 C 1 2 8 D 1 2 8 E 1 2 8 F 1 2 8 G 1 2 8 H 1 2 8	

	C. Pumpkin, carrots, squash, or sweet potatoes that are yellow or orange inside(ripe mangoes and papaya) D. White potatoes, white yams, bulla, kocho, manioc, cassava, or any other foods made from roots E. Any dark green, leafy vegetables like kale, spinach or any other fruits or vegetables F. Any meat, such as beef, pork, lamb, goat, chicken, or fish G. Eggs H. Any foods made from beans, peas, lentils, or nuts I. Cheese or other food made from milk J. Sweet foods such as chocolates, candies, pastries, cakes, biscuits, or frozen treats like ice cream and popsicles K. Chips, crisps, puffs, French fries, fried dough, instant noodles	I 1 2 8 J 1 2 8 K 1 2 8	
37.	How many times did (NAME) eat solid, semi-solid, or soft foods yesterday during the day or at night?	Number of Times ---------- Don't know----------	
38.	How many times did (NAME) drink milk yesterday during the day or at night(non-breastfed infants and children)?	Number of Times ---------- Don't know----------	

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የ ህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል

የ ተጠያቂው / የ መላሾች የመረጃ ቅፅ

ጤና ይስጥልኝ ስሜ ———— ይባላል።እኔ የምሰራው ለአዲስ አበባ ዩኒቨርስቲ የህብረተሰብ ጤና አጠባበቅ የስነምግብ ትምህርት ክፍል ነው። በአዲስ አበባ የተለያዩ ክፍለ ከተሞች ላይ በሚገኙ ጤና ጣቢያዎች ላይ" የህጻናት የአመጋገብ ሁኔታ በመተንፈሻ አካላት ላይ ለሚፈጠሩ ኢንፍክሽኖች ያለው አስተዋፅኦ" በሚል ርእስ ጥናት በማድረግ ላይ እገኛለሁ። ከአዲስ አበባ ዩኒቨርሲቲ የህብረተሰብ ጤና ትምህርት ቤት ጥናት ለመስራት ፈቃድ አግኝቻለሁ። በዚህ ጥናት ላይ ያለዎት ተሳትፎ በእርስዎ ፍላጎት ላይ የተመሰረተ ብቻ ይሆናል። ቃለ መጠይቁ ከተጀመረም በኋላ ጥናቱ ላይ ላለመሳተፍ የመምረጥ መብት አልዎት። ለመሳተፍ ከመረጡ በእዚህ ጤና ጣቢያ የሚያገኙትን አገልግሎት የሚያስተጓጉል አይሆንም።ነገር ግን በጥናቱ ላይ በመሳተፎት የጤና ስርአቱን ለማሻሻልና ሁሉንም አካታች የሆነ የጤና አገልግሎት ለመስጠት በሚደረገው ጥረት የበኩሎን አስተዋፆ ማድረግ ይችላሉ።በጥናቱ ላይ ለመሳተፍ ከተስማሙ ስለ ማኅበራዊ ፣ ኢኮኖሚያዊና የመኖሪያ አከባቢ ሁኔታ ፣ ስለ ህጻኑ ጤንነትና አመጋገብ ሁኔታ ቃለ መጠይቅ ይደረግልዎታል። ቃለ መጠይቁን ለመሙላት 20 ደቂቃ ያህል ይወስዳል።ይህ ጥናት ከሁለት አመት በታች ያሉ ህጻናት አመጋገብ ሁኔታ በመተንፈሻ አካላት ላይ ለሚፈጠሩ ኢንፍክሽኖች ስለሚኖረው አስተዋአ ግንዛቤ ለመፍጠር ይረዳል።እርሶ በጥናቱ ላይ የሚሰጡት ማንኛውም አይነት መረጃ በሚስጥር የሚጠበቅ ይሆናል። የሚሰጡት መረጃ ኮድ ቁጥሮችን ብቻ በመጠቀም እና በመቆለፍ በሚስጥር ይጠበቃል። ከመጠይቁ የሚገኘው መረጃ ለጥናቱ አላማ ብቻ የሚውል ይሆናል። የተገኘውንም መረጃ ከዋና ተመራማሪው ውጪ ሌላ ሰው የሚያገኝበት ሁኔታ አይፈጠርም። ማንኛቸውም ጥያቄዎች፣ አስተያየቶች ወይም ቅሬታዎች ካሉ፣ ተመራማሪውን በሚከተለው አድራሻ ማግኘት ይችላሉ።

ወይዘሪት ሰላማዊት ምንውየለት(ዋና ተመርማሪ) ፣ የ ህብረተሰብ ጤና አጠባበቅ ትምህርት ክፍል ፣ጤና ሣይንስ ኮሌጅ ፣ አዲስ አበባ ዩኒቨርስቲ

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የቃል ፈቃድ መጠየቂያ ቅፅ

የጥናቱን አላማና ይዘት በተመለከተ ከላይ ባለው ቅፅ ላይ በመረጃ ሰብሳቢው አማካኝነት ተነቦልኝ ለማዳመጥ ችያለሁ።በመሆኑም የጥናቱን አላማ፤ ጥቅምና ጉዳት በደንብ በመረዳት በጥናቱ ላይ ለመሳተፍ ወይም ላለመሳተፍ ነፃ በፍላጎቴ መርጫለሁ።

መስማቶትን ወይም አለመስማማቶትን በዳሹ ላይ "ኤክስ" ምልክት በማድረግ ያሳዩ

ተስማምቻለሁ_____ አልተስማማሁም_____

በጥናቱ ላይ ተሳታፊ ለመሆን ስለመረጡ አመሰናለሁ።

የመጠይቅ ኮድ_____ ቀን_____

ቦታ(ክፍለ ከተማ) _____መረጃ ሰብሳቢ ስም_____

የጤና ጣቢያ ስም_____

ክፍል አንድ፡ የማኅበራዊና ኢኮኖሚ ሁኔታ መግለጫ			
1.	የእናትየው እድሜ	በአመት_____	
2.	የትዳር ሁኔታ	1. ያላገባ 2. ያገባ 3. በሞት ያጣ 4. የተፋታ 5. አብሮ የሚኖር 6. መልስ የለም 7. የተዘለለ	
3.	የእናትየው ትምህርት ደረጃ	1. ያልተማረ 2. ማንበብ እና/ወይም መጻፍ ይችላል (መደበኛ ያልሆነ ትምህርት)	

		3. የመጀመሪያ ደረጃ ትምህርት (1-8ኛ ክፍል) 4. የሁለተኛ ደረጃ ትምህርት (ከ9-12ኛ ክፍል) 5. ቴክኒክና ሙያ 6. የከፍተኛ ትምህርት	
4.	የእናትየው የሥራ ሁኔታ	1. ተማሪ 2. የቤት እመቤት 3. የቤት ሰራተኛ 4. የቀን ሰራተኛ 5. ነጋዴ 6. የመንግስት ሰራተኛ 7. መንግስታዊ ያልሆነ ድርጅት ሰራተኛ 8. የግል ሰራተኛ	
5.	አጋር (ባል) የትምህርት ደረጃ	1. ያልተማረ 2. ማንበብ እና/ወይም መጻፍ ይችላል (መደበኛ ያልሆነ ትምህርት) 3. የመጀመሪያ ደረጃ ትምህርት (1-8ኛ ክፍል)	

		4. የሁለተኛ ደረጃ ትምህርት (ከ9-12ኛ ክፍል) 5. ቴክኒክና ሙያ 6. የከፍተኛ ትምህርት	
6.	የባልደረባ (ባል) የሥራ ሁኔታ	1. ተማሪ 2. የቀን ሰራተኛ 3. ነጋዴ 4. የመንግስት ሰራተኛ 5. መንግስታዊ ያልሆነ ድርጅት ሰራተኛ 6. የግል ሰራተኛ 7. ያልተቀጠረ	

ክፍል ሁለት : የህፃኑ ጤና እና አመጋገብ ሁኔታ			
7.	የህፃኑ/ኗ እድሜ ስንት ነው?	በወራት_____	
8.	የህፃኑ/ኗ ፆታ	1. ወንድ 2.ሴት	
9.	ህፃኑን ወደ ጤና ተቋም ያመጣሽበት ምክንያት ምንድን ነው?	1. ለህክምና 2. ለክትባት 3. ለሁለቱም	

10.	ህፃኑ/ኗ ባለፉት ሁለት ሳምንታት ውስጥ ማንኛውም አይነት የህመም ምልክት አሳይቱዋል?	1.አዎ 2.አላሳየም	
11.	ህፃኑ ባለፉት ሁለት ሳምንታት ውስጥ እንደ ሳል፤ ትኩሳት፤የትንፋሽ ማጠር ወይም ቶሎ ቶሎ መተንፈስ፤ከአንፍጫ የሚወጣ ፈሳሽና የምግብ ፍላጎት መቀነስ አይነት ምልክቶች ነበረው?	1.አለው 2.የለውም	ከላይ ያለው ጥያቄ መልስ አላሳየም ከሆነ ከ 12 እስከ 18ተኛ ድረስ ያሉትን ጥያቄዎች ዝለይ
12.	ህፃኑ የሚያሳያቸው እንደ ቶሎ ቶሎ መተንፈስ እና በአተነፋፈስ ላይ የሚኖር ችግር ከአፍንጫ መደፈን ወይስ የደረት ላይ ችግር ጋር ይያያዛል?	1.የደረት ላይ ብቻ 2.የአፍንጫ ላይ ብቻ 3. ከሁለቱም 4. ሌላ ምክንያት 5. አላውቅም 8. መልስ የለም 9. የተዘለለ	
13.	ህፃኑ ትኩሳት፤ አጭርና የፍጥነት አተነፋፈስ፤በሚተነፍስበት ወቅት የፉጨት አይነት ድምፅ የሚያሰማ ከሆነና የደረት ወደ ውስጥ መግባት ካለው በማየት ወይም በጥያቄ አረጋግጪ	1. ትኩሳት 2. የትንፋሽ ማጠር ወይም ቶሎ ቶሎ መተንፈስ 3. የፉጨት ድምፅ የሚመስል አተነፋፈስ 4. በሚተነፍስ ወቅት የደረት ወደ ውስጥ መግባት 5. ከአንፍጫ የሚወጣ ፈሳሽ 6.ምንም ምልክት አያሳይም	

14.	ከማንኛውም አይነት አካል ለህፃኑ ህመም ምክር ወይም ህክምና ለማግኘት ሞክረሻል?	3. አዎ 4. አልሞከርኩም	
15.	ለህፃኑ ህክምና ወይም ምክር ለማግኘት የሞከርሽው የት ነበር?	1. የህዝብ ጤና ተቋማት (የመንግስት ሆስፒታል፤ጤና ጣቢያ፤ ጤና ኬላ) 2. መንግስታዊ ያልሆነ ተቋም(የተራድኦ ድርጅት) 3. የግል የጤና ተቋም (የግል ሆስፒታል, ክሊኒክ ወይም ሌላ) 4. ከሱቅ ወይም መድሀኒት መደብር 5. ባህላዊ ህክምና	ከላይ ያለው ጥያቄ መልስ አልሞከርኩም ከሆነ ይሄን ጥያቄ ዝለይ
16.	በህፃኑ በተመመባቸው ጊዜያት የወሰደው መድሀኒት ወይም ተጨማሪ ህክምና አለ?	1. አዎ 2. የለም	
17.	ምን አይነት መድሀኒት ወይም ህክምና ወሰደ/ች?	1. ፀረ ወባ መድሀኒት 2. ፀረ ተዋስያን መድሀኒት 3. ሌሎች መድሀኒቶች 4. የቤት ውስጥ ህክምና	ከላይ ያለው ጥያቄ መልስ የለም ከሆነ ይሄን ጥያቄ ዝለይ

18.	ህፃኑ/ኗ ክትባት ወስዷል/ች?	1.አዎ 2. አልወሰደችም	
19.	ከላይ ያለው ጥያቄ መልስ አዎ ከሆነ የትኞቹን የክትባት አይነቶች እንደወሰደ/ች በማየት አረጋግጭ	1. ቢሲጂ ብቻ 2. ቢሲጂ ፤ ፔንታ 1 3. ቢሲጂ ፤ ፔንታ 2 4. ቢሲጂ ፤ፔንታ 3 5. ቢሲጂ ፤ ፔንታ 3 ፤ የኩፍኝ ክትባት	ከላይ ያለው ጥያቄ መልስ አልወሰደችም ከሆነ ይሄን ጥያቄ ዝለይ
20.	ህፃኑ/ኗ ባለፉት ስድስት ወራት ውስጥ የቫይታሚን ኤ ክትባት ወስዷል/ች?	1.አዎ 2. አልወሰደም/ችም 3.አላስታውስም	

ክፍል ሶስት፡ የመኖሪያ አከባቢ ሁኔታ			
21.	አሁን በቤታችሁ ውስጥ ምን ያህል ሰው ይኖራል? በቤት ውስጥ የሚኖሩት አባላት ከተጠያቂዋ ጋር ያላቸውን ዝምድና በመግለፅ ዘርዝሪ(የቤት አስተዳዳሪ፣የቤቱ አስተዳዳሪ የትዳር አጋር፣ልጅ፣አያቶች፣አክስት/አጎት፣አማት፣የአጎት ወይም የአክስት ልጆች፣እንግዳ ወይም ሌላ ሰው(አሳውቂ))	በቁጥር_____	
22.	ምን ያህል ልጆች አሉሽ?	በቁጥር _____	
23.	ምን ያህሎቹ ከአምስት አመት በታች ናቸው?	በቁጥር _____	
24.	ልጅሽን ልትመግቢ ስትይ እጅሽን ትታጠቢያለሽ?	1.አዎ 2.አልታጠብም	

25.	በቤታችሁ የምትጠቀሙበት ውሀ ምንጭ ምንድን ነው?	1. የቧንቧ ውሀ 2. የጉድጓድ ዉሀ (የተጠበቀ ወይም ያልተጠበቀ) 3. የምንጭ ውሀ (የተጠበቀ ወይም ያልተጠበቀ)	
26.	ቤታችሁ የሚያስፈልገውን ያህል በቂ አየር ያገኛል?(የቤቱን መስኮት ብዛት፣አቀማመጥ እና አገልግሎት ላይ መዋል ከግምት ውስጥ በማስገባት ግለጪ)	1. አዎ 2. አያገኝም	
27.	ምግብ ለማብሰል እንደ ሀይል ምንጭ የምትጠቀሙት ምንድን ነው?	1. የኤሌክትሪክ ምጣድ 2. የተፈጥሮ ጋዝ 3. ባዮ ጋዝ 4. ኬሮዚን 5. ከሰል 6. እንጨት 7. የከብቶች ኩበት 8. ሌላ	
28.	በቤታችሁ ውስጥ የሚያጨስ ሰው አለ?ካለ በምን ያህል ድግግሞሽ ያጨሳል	1.በየቀኑ 2.በሳምንት 3.በወር 4.በወር ጥቂት ጊዜ 5. መቼም	

ክፍል አራት፡ የህፃኑን አመጋገብ ልምምድ መገምገሚያ		
29.	ልጆትን በአጠቃላይ እስካሁን ባለው ጡት አጥብተዉታል(የህጻኑ ስም)?	1.አዎ 2.አይደለም

		3. አላስታውስም/ፍቃደኛ አይደለሁም
30.	ህፃኑ ከተወለደ በኋላ ጡት መጥባት የጀመረው መቼ ነው (የህጻኑ ስም) ?	1. ወዲያው እንደተወለደ 2. ሰአታት 3. ቀናት
31.	እንደተወለደ እስከ 2 ቀን ድረስ ባለዉ ግዜ ዉስጥ ከጡት ወተት ሌላ የሚጠጣ ወይም የሚበላ ነገር ተሰጥታል?(ለምሳሌ፡- ዉሀ፣ ፎርሙላ ወይም ከባህላዊ ልማዶች ጋር የተያያዙ ምግቦች ወይም መጠጦች)	1.አዎ 2.አልተሰጠውም
32.	ልጆት ትላንትና ቀን ወይም ማታ ላይ ጡት ጠብቷል?	1.አዎ 2.አልጥባም 8. አላስታውስም/አላውቅም
33.	ከዚህ ቀደም/ትናንትና ቀን ወይም ማታ ላይ ህፃኑን በጡጦ አጥብተውት ያውቃሉ	1.አዎ 2.አልጥባም 8. አላስታውስም/አላውቅም
34.	አሁን ህፃኑ ትላንትና ቀን ወይም ማታ ላይ ቤት ውስጥ ወይም ውጪ ላይ የወሰደው ማንኛውም የሚጠጣ ነገር ካለ የምታስታውሽውን ንገሪኝ ሀ. ንፁህ ዉህ ለ. የህፃናት ፎርሙላ ሐ. የእንስሳት ወተት(ለምሳሌ፡- ጥሬ፣የታሸገ ወይም የፓውደር ወተት) መ እርጎ ሠ. የቸኮሌት ፍሌቨር ያላቸው መጠጦች ረ. የፍራፍሬ ጭማቂ ወይም ፍራፍሬ ፍሌቨር መጠጦች	አዎ አልወደሰም አላስታውስም ሀ 1 2 8 ለ 1 2 8 ሐ 1 2 8 መ 1 2 8 ሠ 1 2 8 ረ 1 2 8 ሰ 1 2 8 ሸ 1 2 8

	ሰ. ሻይ፣ቡና እና የቅጠል ሻይ ሸ. ሌሎች ጣፋጭ፣ለስላሳ እና ፍሌቨር ያላቸው መጠጦች	
35.	ለህጻኑ/ኗ በየትኛው እድሜ ተጨማሪ ምግብ የጀመሩለት/ላት	በወር_____
36.	አሁን ህፃኑ ትላንትና ቀን ወይም ማታ ላይ ቤት ውስጥ ወይም ውጪ ላይ ጠዋት ከተነሳ ጀምሮ የወሰደው ማንኛውም የሚበላ ነገር ካለ የምታስታውሽውን ንገሪኝ ሀ. በፋብሪካ ተዘጋጅተው የሚሸጡ እንደ ፋፋ፣ህሊና፣ሴሪላክ፣ሴሪፉምና ማዘርስ ቾይዝ ለ. እንጀራ፣ዳቦ፣ሩዝ፣ኑድል፣ገንፎ ወይም ሌሎች ከእህል(ጤፍ፣አጃ፣በቆሎ ወይም ገብስ) የሚዘጋጁ ምግቦች ሐ. ዱባ፣ ካሮት፣ስኳር ድንች ወይም ውስጣቸው ቢጫ ወይም ቡርቱካናማ የሆኑ አትክልቶች(የበሰለ ማንጎ ወይም ፓፓያ) መ. ድንች፣ ያም፣ቡላ፣ቆጮ፣ ካሳቫ ወይም ሌሎች የስራስር ምግቦች ሠ. ደማቅ አረንጓዴ ቀለም ያላቸው ቅጠላ ቅጠሎች ለምሳሌ ቆስጣ እና ጥቁር ጎመንና ሌሎች ፍራፍሬዎች ወይም አትክልቶች ረ. ማንኛውም ስጋ ለምሳሌ እንደ በግ፣አሳማ፣በሬ፣ፍየል፣ዶሮ እና አሳ በ. እንቁላል ሰ. ከምስር፣ለውዝ፣ባቄላ ወይም አተር የተሰሩ ምግቦች	አዎ አልወደሰም አላስታውስም ሀ 1 2 8 ለ 1 2 8 ሐ 1 2 8 መ 1 2 8 ሠ 1 2 8 ረ 1 2 8 ሰ 1 2 8 ሸ 1 2 8 ቀ 1 2 8 በ 1 2 8

	ሸ. አይብ ወይም ሌሎች ከወተት ተዋፅኦ ውጤቶች /የተሰሩ ምግቦች ቀ. ጣፋጭ ምግቦች ለምሳሌ፡-ቸኮሌት፣ከረሜላ፣ኬክ፣ብስኩት ወይም አይስክሬም በ. የተጠባበሱ ምግቦች ለምሳሌ፡- ቺብስ	
37.	ማንኛውም ወፈር ወይም ለስለስ ያለ ምግብ ከፈሳሽ ውጪ ትናንትና ቀንና ማታን ጨምሮ ስንት ጊዜ ተመግቧል/ች?	ቁጥር_____ አላውቅም_____
38.	ትናንትና ቀንና ማታን ጨምሮ ስንት ጊዜ ወተት ጠጥታለች/ቷል(ጡት ላልጠቡ ህፃናት)?	ቁጥር_____ አላውቅም_____

Annex V: Assurance of Principal Investigator

(USE THE FOLLOWING IN ONE PAGE)

I, the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I will communicate timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the student: Selamawit Minwyelet Wendmeneh

Date: 5/12/2023

Signature: _____

Approval of the primary Advisor

Name of the primary advisor: Professor Jemal Haidar Ali

Date: December 6, 2023

Signature: _____

Annex V: Curriculum Vitae of Principal Investigator

1. Personal Details:

Full Name: Selamawit Minwyelet Wendmeneh

Sex: Female

Age: 25 years

Date of birth: 25/08 /1998 G.C

Current Place of residence: Addis Abeba, Ethiopia

Nationality: Ethiopian

Contact Address: Mobile No: 0929106125

Email address: minwyeletselam@gmail.com or minwyeselam@gmail.com

2. Language Skills: Amharic, English and French (Basic)

3. Educational Background:

- **Primary Education:** Nazareth School (2003-2012 G.C)
- **Secondary and preparatory Education:** Nazareth School (2012-2016 G.C)
- **Higher Education:** Bachelor degree of Public Health from Mizan- Tepi University (2016-2021G.C), CGPA 3.83(Very Great Distinction)

4.Professional experience:

- Volunteer healthcare provider in Bole 17/20 health center from May 23 to July 23, 2021
- Healthcare consultant and health content writer on social media's in Doctor ale (private company) starting from July 24 to August 1,2021
- Volunteer trainer on reproductive health for level one and two female students in PROJECT- E hospitality institute (International NGO) September to December,2022.
- Note taker and Event coordinator for USAID Health Office Industry Day events in Addis Abeba, Hawassa and Bahirdar organized by U^3 Systems Work international from October 6 to November 11, 2022.

- Project assistant at Nexus Ethiopia (National NGO) from March 27,2023 up to now(volunteer)

5. Training and Certificates

- Trained on Reproductive Health Commodity Security(RHCS) organized by Addis Abeba University in collaboration with UNFPA country office, Ethiopia
- Trained on "COVID-19 clinical management and Infection prevention & control" and certified by Ethiopian Ministry of Health(MoH) on July 27 & 28, 2020
- Certified for academic performance with ***Certificate of Appreciation prepared for best performing female students*** from Health Science College at Mizan- Tepi University and ***Certificate of Recognition on 16th of March prepared for outstanding female students*** from each college at Mizan- Tepi University.

6. Computer & Programming Skills:

- MS-office including MS-Word, MS-Excel, MS-PowerPoint and Google Workspace
- SPSS, Epi data manager and Epi Data Entry client

7. Personal skills and competences:

- Self-reliant, hard worker with ability to work under stress and flexible conditions and in dynamic environment.
- Ready to work under Good interpersonal communication, sociable and cooperative with others.
- Good skills in planning, organizing, evaluating and monitoring of different tasks
- Likes to try different options to improve her skills in various disciplines
- Likes to work for her country and Society

8. References

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