Risk Factors Related to Complications of Acute Respiratory Infections among Children under Five Years Old in Yerevan, Armenia

A Case-Control Study

Master of Public Health Integrating Experience Project

Research Grant Proposal Framework

by

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2013

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LIST OF ABBREVIATIONS

ARI	Acute respiratory infections
ADHS	Armenian Demographic and Health Survey
AIDS	Acquired Immune Deficiency Syndrome
DALY's	Disability-adjusted Life-years
GBD	Global Burden of Disease
IMCI	Integrated Management of Childhood Illness
KAP	Knowledge, Attitudes and Practices
LRTI	Lower respiratory tract infections
MOH	Ministry of Health
RSV	Respiratory Syncytial Virus
SARI	Severe Acute Respiratory Infections
UNICEF	United Nations Children`s Fund
URTI	Upper respiratory tract infections
WHO	World Health Organization

ACKNOWLEDGEMENTS

I would like to express my deepest gratitude to my advising team: Dr. Byron Crape for his encouragement, continuous support and enthusiasm; Dr. Anahit Demirchyan for her valuable, constructive comments and useful critiques; Aida Giloyan for her help during my work.

I would like to express my appreciation to the Faculty of the School of Public Health for making this two year studying a valuable, interesting and life-changing journey for us.

Special thanks go to Kristina Akopyan for her contribution during my work.

Finally, I am very thankful to my family for their continuous support and understanding.

EXECUTIVE SUMMARY

Acute respiratory infections (ARI) are infections of any part of respiratory system (from para nasal sinuses to pleural cavity) lasting less than 30 days. ARI is the leading cause of morbidity and mortality in children under five years old worldwide. ARI is classified into upper and lower respiratory tract infections depending on the major affected part of the respiratory tract and anatomical localization. Upper respiratory tract infections cause fewer complications, mainly ear infections and tonsilopharyngitis which may lead to serious complications such as deafness and acute rheumatic fever. Lower respiratory tract infections (LRTI) are generally more severe and are responsible for the large majority of complications especially in young children. The complications of ARI, which include the lower respiratory tract, are severe pneumonia, obstructive bronchitis, severe bronchiolitis, respiratory deficiency, acute respiratory distress syndrome, emphysema or lung abscesses, and meningoencephalitis. Ahough there are some risk factors identified for complications of ARI in the published findings, the published research evaluating risk factors of complications of acute respiratory infections among children under five years old is limited. Further clarification and evaluation of risk factors could lead to interventions that prevent complications of ARI, thus reducing ARI-caused mortality.

A case-control study was designed for a study population of children under five years old with present/recent (30 days prior to the day of interview) ARI with/without complications living in Yerevan. ARI cases are children under-five years old with a diagnosis of LRTI and hospitalized with/without complications within 30 days of the time of the interview during data collection. Cases will be identified through random sampling of children with/without LRTI complications from the two Yerevan sentinel pediatric hospitals. The control group are children who received a diagnosis of ARI and had ARI within 30 days of the interview, showing recovery and having no ARI complications. These children with ARI will be

identified by a census of eligible children from six randomly selected polyclinics in Yerevan. The calculated sample size is 426 total. A trained study team will conduct telephone interviews with case and control participants. The study questionnaire includes 57 questions and includes the following domains: socio-demographic questions, knowledge, attitude and practice of management of disease and potential risk factors for complications of ARI. The estimated budget of the study is 2,128,800 AMD.

The Institutional Review Board (IRB)/ Committee on Human Research of the American University of Armenia has approved the study proposal.

INTRODUCTION

1. Literature review

1.1. Acute respiratory infections

Acute respiratory infections (ARI) are infections of any part of respiratory system (from para-nasal sinuses to pleural cavity) lasting less than a month. According to the World Lung Foundation, ARI is the leading cause of morbidity and mortality among children under five years old worldwide [1]. ARI is classified into upper and lower respiratory tract infections depending on the major affected part of respiratory tract and anatomical localization (nose, sinuses, middle ear, larynx and pharynx, trachea, bronchi and lung).

Upper respiratory tract includes the area from the nasal cavity to the larynx, whereas the lower tract includes trachea, bronchi and lungs [2]. Upper respiratory tract infections (URTI) occur more often, but the course of these infections is usually milder, with few complications. Though URTI cause fewer complications, but lead to worldwide outbreaks that are responsible for continuous spread of pathogens [3]. The main etiological agents of upper respiratory tract infections are viruses [4]. There are about 200 types of viruses and a few types of bacteria that cause URTI. The main pathogens which affect the URT are Respiratory Syncytial Virus, Adenovirus, Parainfluenza viruses, Rhinoviruses, Influenza virus type A and B, Human metapneumovirus, Coronavirus and Bocavirus [5]**.** The main symptoms of URTI in children include fever, runny nose, sore throat and cough which lasts up to fourteen days. The URI include rhinitis, sinusitis, ear infections, and tonsilopharyngitis out of which mainly ear infections and tonsilopharyngitis cause the fairly uncommon complications such as deafness and acute rheumatic fever.

Lower respiratory tract infections (LRTI) have generally more severe course and are a major cause of morbidity and mortality in children under five. The LRTI mainly affect the bronchioles and lungs and more frequently than URTI lead to complications and hospitalization. Causative agents of LRTI are both viral and bacterial, but viruses are the more common [5]. Pneumonia is the most common complication of LRTI requiring hospitalization. The most common pathogens that cause pneumonia are Respiratory Syncytial Virus (RSV), Influenza-type A and B, Streptococcus pneumonia and Haemophilus influenza type B. According to the European Society for Pediatric Infectious Diseases, RSV was the major cause of LRTI in children worldwide, with outbreaks often starting in winter and lasting till May [6]. The identifiable signs of LRTI are difficulty in breathing, wheezing, stridor, cyanosis, lethargy, and chest in-drawing [7].

Viruses make the tissue of the lower respiratory tract more susceptible to invasion by bacterial and other microorganisms through inflammation, leading to complications. The ARI complications include pneumonia, obstructive bronchitis, prolonged bronchiolitis, respiratory deficiency, acute respiratory distress syndrome, emphysema or lung abscesses, and meningoencephalitis [8, 9].

The existing literature identifies some risk factors for complications of ARI; however, publications evaluating risk factors of complications of acute respiratory infections among children under five years old are limited. Further clarification and evaluation of risk factors could lead to interventions that prevent complications of ARI, thus reducing ARI-caused mortality.

1.2. ***Epidemiology of ARI***

ARI is a universal problem found in all age groups and in all countries. According to the WHO, LRTI are the second major cause of illness (429.2 million episodes) worldwide annually [10]. In developing countries, a quarter of all pediatric hospital admissions are due to ARI. Twenty-percent to 40% of all hospitalizations of children under five years of age worldwide are due to ARI [1]. Each year, approximately 3% of all children less than twelve months of age need to be admitted to the hospital for moderate or severe viral lower respiratory tract infections [11].

An estimated 156 million new cases of pneumonia, the leading complication of ARI, are registered annually, with 97% of them residing in the developing world. An estimated 7% to 13% of all pneumonia cases are severe enough to require emergency hospitalization [12].

RSV, a cause of LRTI, is the major cause of ARI in children worldwide. According to the American Lung Association, from 75,000 to 125,000 children are hospitalized due to RSV each year and about 0.2%-7% of them die, of which 20-25% of the deaths are attributable to pneumonia cases and 70% to bronchiolitis [13]. Influenza viruses also lead to severe respiratory disease in the youngest population group. Annual hospitalization rates from influenza viruses are 3 per 1,000 for 6 to 23 months old children worldwide [14]. Mortality rate from LRTI is 10 to 50 times higher in developing countries than in developed countries [15]. In middle income countries, LRTI ranks at 4th place among causes of death with 5.4% of all deaths. In lower-income countries, LRTI is ranked as the first leading cause of death, consisting 11.3% of all deaths among children and adults [16].

The mortality rate from pneumonia is 215 times higher in low income countries than higher income ones. It is estimated that one-out-of-every-five pediatric deaths worldwide are

due to pneumonia, estimated at 1.6 million deaths annually. This is more than malaria, AIDS and tuberculosis deaths combined.

Acute respiratory infections are also the main causes of disability-adjusted life-years (DALYs) lost in developing countries [17]. Global burden of RSV disease is assessed at 64 million cases and 160,000 deaths annually [18].

1.3. ***Situation in Armenia***

In 2010, among children under five years of age, girls suffered from ARI more frequently (5.4%) than boys (4.9%). Cases of childhood ARI were more frequent in Armenian urban (7.3%) than in rural areas (2.0%) in 2010 [19]. In Armenia, only 36% of children under five years of age with suspected pneumonia were taken to a health care provider [20].

The under-five mortality rate in Armenia was 17 deaths per 1,000 live births in 2011 [21]. The under-five mortality rate in Armenia from acute respiratory infections such as pneumonia is comparable to that in other Former Soviet Union countries. Under five years of age proportionate mortality for pneumonia was 11% in 2010 [22]. In Armenia there were 72 reported deaths due to LRTI under five years of age in 2010 [23].

In 2010, a severe acute respiratory infections (SARI) sentinel surveillance program was initiated in six general medicine hospitals and pediatric wards in Yerevan. There are two multi-profile hospitals currently part of this sentinel surveillance program: St. Astvatsamayr Medical Center and the Arabkir Medical Center Institute of Adolescent and Child Health. According to sentinel data, just in February, 965 children under five years old with acute respiratory infections were hospitalized in St. Astvatsamayr Medical Center, of which 221 had complications [24].

Surveillance for SARI is ongoing and each day case-based data are reported to the State Hygiene and Anti-epidemic Inspectorate. SARI for children under five years of age is defined as pneumonia or severe pneumonia, according to the Integrated Management of Childhood Illness (IMCI) [25]. The IMCI was first introduced by the Armenian Ministry of Health in 1999. It includes the most common illnesses affecting children under five-diarrhea, respiratory infections, nutritional problems, anemia and malaria [26]. Although IMCI training for health personnel were carried out during several years in outpatient medical facilities throughout the country, the morbidity and mortality rates due to ARI among under-five children remain excessively high, according to the Armenian Demographic and Health Survey (ADHS) 2010.

1.4. *Risk factors of acute respiratory infections*

In 1984 Mosley and Chen offered a new analytical framework for investigating child survival in developing countries. They classified the known determinants of child survival into 5 categories: maternal factors such as birth interval; environmental factors like indoor and outdoor air pollution: nutrition deficiency (malnutrition), birth trauma and individual illness control. They also indicated the importance of socioeconomic factors at the levels of community (urban/rural setting), household (income, housing quality) and individuals (mother's or other caretaker's characteristics) [27].

Several studies explored the risk factors of acute respiratory infections in children under five years old.

One of the recent studies found that the occurrence of ARI was higher in children who were living in overcrowded houses. It also revealed that the rate of ARI were higher among low birth weight infants (36.1%) as compared to normal birth weight infants (17.3%). Birth order and the occurrence of ARI were correlated: the ARI rate was the lowest among children who

were in the 1st birth order (14.6%), whereas it was the highest among children in the 5th birth order (78.5%)[28, 29].

Another study conducted in Greenland in 2003 has showed that the major risk factors of LRTI are the outdoor air pollution, attending the daycare centers, and sharing a bedroom with others[30].

In one of those studies, premature babies had nearly 7.5 times more risk of developing ARI. Not fully immunized or not immunized children had 2.6 times more risk of ARI compared to fully immunized children. A significant association was also found between poor nutritional status, parental smoking and ARI[31, 32].

A study conducted in India revealed that the monthly incidence of acute respiratory infections were higher in urban rather than in rural areas and malnourished children had higher chance to develop ARI[33].

Another study conducted in Gambia revealed that smoke while cooking could be one of the strongest risk factors for death from ARI among young children[34].

A study conducted in Chile revealed a significant association between pneumonia and many risk factors including socioeconomic status, duration of breastfeeding, maternal education, exposure to smoke, etc [35].

Some studies explored the relation between mother`s education and knowledge of ARI prevention and management in children. The studies showed that less educated mothers had lower knowledge of acute respiratory infections mostly in disease management and prevention [36, 37]. A study conducted in Bangladesh revealed that the prevalence of severe ARI among children of mothers with primary or less education is 8.1% compared to 5% among children of mothers with secondary education [32, 38].

Several studies have been conducted to detect the knowledge, attitudes and practice (KAP) of the caretakers of children suffering from the ARI [39-42]. A study performed in Cambodia found insufficient maternal knowledge, attitude and practice on this matter. The investigators have measured mothers' knowledge by concentrating on etiology, signs and treatment of the disease in childhood; questions concerning the practice included the treatment, health seeking behavior of mothers and preventive measures taken by the mother for her child[41].

A study conducted in Egypt has shown the importance of mother`s KAP on the factors predisposing to ARI for prevention and management of the disease in children[43]. A children`s hospital study in Bangalore has shown that 76% of mothers had inadequate knowledge on controlling their child`s ARI[44].

In 1997, the United Nations Children`s Fund (UNICEF) in collaboration with the American University of Armenia, Center for Health Services Research (CHSR) conducted a KAP survey concerning caretakers` KAP on ARI in children and revealed very low rate (5%) of seeking medical care for children with ARI in Armenia[45].

The study conducted in Bangladesh has shown that caregivers` health education can change the health care seeking behavior[46].

There has been limited research in the literature dealing with risk factors of complications of acute respiratory infections in under five years old children.

The risk factors of complications of ARI could be prematurity, lack of mothers` knowledge, lack of timely treatment, chronic lung illnesses, low birth weight, atelectasis, malnutrition and other premorbid conditions in children under five years old[47, 48].

Meanwhile, knowledge on the risk factors could help to prevent complications of ARI and thus reduce the ARI-caused mortality.

1.5. *Study aim*

The aim of this study is to determine the risk factors contributing to complications of acute respiratory infections among children under five years old in Yerevan, Armenia.

The research questions are the following:

- What are the risk factors associated with complicated course of ARI among children under five years old?
- Whether mothers' knowledge of management of ARI is associated with complications of ARI among children under five years old?

2. METHODOLOGY

2.1. Study design

A case-control study design was selected for this study for feasibility considerations, as it is less time consuming and can be conducted with minimal financial expenditures[49].

2.2. Study population

The target population of the study are children under five years old with present/recent (30 days prior to the day of interview) ARI with/without complications living in Yerevan. To assure the representativeness of the sample, cases will be identified through random sampling of the children with LRTI from the two Yerevan sentinel pediatric hospitals: St. Astvatsamayr Medical Center and Arabkir Medical Center: Institute of Adolescent and Child Health. The control group are children who received a diagnosis of ARI and had ARI within 30 days of the interview, showing recovery and having no ARI complications. These children with ARI will be identified by a census of eligible children from six randomly selected polyclinics in Yerevan.

Definition of cases (inclusion criteria for cases): children under-five years old who within 30 days were hospitalized because of LRTI with/without complications.

Definition of controls (inclusion criteria for controls): children under-five years old who within 30 days suffered/are suffering from ARI without complications.

Exclusion criteria: residency outside of Yerevan, absence of contact information, as well as not understanding Armenian language.

2.3. Sample size:

Several studies showed that regular exposure to tobacco smoke is one of the important risk factors for acute respiratory infections in children[31, 32, 35]. There is evidence suggesting that smoke from cooking and parental smoking are associated with increased risk of child's death from ARI [34].

Thus, this factor was selected as the main exposure of interest for the calculation of the sample size. As there was no evidence on the proportion of children with non-complicated course of ARI who are regularly exposed to smoke in Yerevan, we assumed this percentage to be 50% (to produce higher sample size). The sample size was calculated so that the study could detect 15% difference between the groups with 95% confidence level and 80% power. We took 1:1 ratio of cases to controls.

Sample size calculation was based on a formula for two-sample comparison of proportions

Where: n is appropriate sample size;

z is the value of adequate significance level;

P_1- Exposed with complications (cases)- 0.65

P_2- Exposed without complications (controls)- 0.5

Type I error was specified as α=0.05,

$$n = \frac{\left\{z_{1-\alpha/2}\sqrt{2\overline{P}(1-\overline{P})} + z_{1-\beta}\sqrt{P_1(1-P_1) + P_2(1-P_2)}\right\}^2}{(P_1 - P_2)^2}$$

$$N = \frac{(1.96\sqrt{2 * 0.575 * 0.425}) + 0.84\sqrt{0.65 * 0.35 + 0.5 * 0.5)}^2}{(0.65 - 0.5)^2}$$

The calculation resulted in 340 total numbers of children (170 cases and 170 controls). Finally, considering the potential non-response rate of the telephone interviews (80%)[50], the sample size was increased to 426 in total or 213 respondents for each group.

2.4. Data collection:

The project will last three months. The duration of the data collection will be about four weeks. Table 1 presents the timeline of activities. Interviews will be conducted via telephone to obtain the required data in a cost-effective way during relatively short period of time. The study will acquire contact information for the study population from the hospital/outpatient charts of children under five years of age in the selected facilities. The student investigator will conduct telephone interviews with the identified mothers/primary caregivers of cases/controls using the structured questionnaire for identifying risk factors related to complications of acute respiratory infections among their under five years of age children. Oral consent will be acquired before starting the interview. The interview will last approximately 15 minutes.

2.5. Study instrument:

Interviewer-administered questionnaire will be used for data collection. The questionnaire contains questions adapted from instruments used in several studies on acute respiratory infections and questions developed by student investigator [51-53].

There are 57 questions and the main domains of the questionnaire are socio-demographic characteristics, knowledge, attitude and practice of management of disease and potential risk factors for complications of ARI.

2.6. Study variables

The dependent variable is the absence or presence of complications of ARI. Complications of ARI include pneumonia (mild pneumonia-fast breathing; severe pneumonia - chest indrawing; very severe pneumonia-not able to drink, convulsions and drowsiness, not able to eat), obstructive bronchitis/bronchiolitis, meningoencephalitis.

Independent variables are the possible risk factors for ARI complications such as mothers'/ caregivers knowledge of management of ARI in children, their educational level; day care attendance, low birth weight, inter-birth interval, household overcrowding, partial/no immunization, low socioeconomic status and indoor air pollution.

2.7. Data analysis

The statistical software SPSS (version 16.0) will be used for data entry, data cleaning by range checks and spot checks, and for data analysis. Double entry of data will be conducted with subsequent merging and cleaning to maximally avoid data entry mistakes. Descriptive analysis producing frequencies and means will be conducted separately for cases and controls. Following this, bivariate analysis for independent factors of interest and potential confounders with the dependent variable (presence and absence of ARI complications or case/control status) will be conducted.

Multivariate logistic regression analysis will be conducted to identify the independent risk factors for presence or absence of ARI complications among under-five children, including

only those variables showing statistical or near statistical significance with the outcome variable and potential confounders during the bivariate analysis.

The final multivariate logistic regression model will be produced by removing those covariates that are not statistically significant and are not substantial confounders.

3. ETHICAL CONSIDERATION

The Institutional Review Board (IRB) of American University of Armenia has approved the study proposal. The study team will obtain permission from administrations of all the selected polyclinics and pediatric hospitals to conduct the study.

4. BUDGET

The budget of this study is calculated taking into consideration the operational and administrative expenses. The total amount required is 2,128,800 AMD.

The salaries of personnel are based on the rates of International and non-governmental organizations operating in Armenian market. The team coordinator will receive salary on monthly basis. The interviewers will receive their payment after finishing the data collection, based on the number of conducted interviews. The data entry and cleaning staff will be paid by taking into account the number of hours worked. Table 2 presents the proposed budget for the study.

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TABLES

Table 1. Activity schedule

Project implementation												
	I month				**II month**				**III month**			
	1-15		16-31		1-15		16-28		1-15		16-31	
Preliminary contact with hospitals	✓											
Study population identification		✓										
Questionnaires printing preparation		✓										
Data collection			✓	✓	✓	✓						
Data entry personnel training				✓	✓							
Data entry and cleaning				✓	✓	✓	✓					
Data analyses								✓	✓	✓		
Preparation of final report											✓	✓

Table 2. Budget

Cost type	Type of payment	Number of Units	Amount in AMD	Total
Operational expenses				
Personnel				
• Team coordinator	Fixed monthly salary	3 months	200,000	600,000
• Data collector	Per complete interview	532	1,400	744,800
• Data enterer	Per hour	150 hours	1000	150,000
Telephone for interviews	Monthly	1	40000	40,000
Total				**1,534,800**
Administrative expenses				
Rent of the office	Fixed monthly	3 months	150,000	450,000
Office supplies (file, paper, pencil, pen etc.)		1	40,000	40,000
Internet	Per month	3 months	15,000	45,000
Print	Per sheet	10	400	4000
Miscellaneous		3	15,000	45,000
Transport	Per km/drams	100	100	10000
Total				**594, 000**
Grant total				**2,128,800**

Appendix 1

Criteria for ARI complications

Identifiable signs of ARI complications

- fast breathing/difficulty breathing
- tachypnea Less than 2 months > 60 /min
  2- 12 months > 50 /min
  12 months –5 years > 40/ min
- wheezing
- chest indrawing
- chest pain especially when breathing deeply
- blue lips and nail beds from lack of oxygen in the blood(cyanosis)
- seizures
- inability to swallow
- lethargy
- inability to drink or breastfeed
- vomiting after each drinking or breastfeeding
- irritation
- dehydration
- comorbiditites /polyorganic deficiency
- blood streaked sputum

Mild Pneumonia	Fast breathing
Severe pneumonia	Chest indrawing
Very severe pneumonia	Not able to drink
	Convulsions
	Drowsiness
	Malnutrition

Appendix 2. Questionnaire (English version)

Risk factors related to complications of acute respiratory infections among children under five years old in Yerevan, Armenia

Questionnaire

1. ID number _____

2. Date of interview: _ _/_ _ _ _/_ _ _ _ *(Day/Month/Year)*

3. Start time of the interview

(Hour)_____ (Minutes)_____

Socio-demographic characteristics

4.Date of the child's birth*: _ _/ _ _ _ _/ _ _ _ _ (Day/Month/Year)*

5. Child`s gender

1. Male

2. Female

6. Caretaker of the child

1. Mother

2. Other (specify)_____

7. Caretaker`s age (years) _____

8. Indicate the highest level of education that you have completed.

1. School (less than 10 years)

2. School (10 years)

3. Professional technical education (10-13 years)

4. Institute/University

5. Postgraduate

9. Which of the following describes your current work status best?

1. Employed

2. Unemployed (looking for a job)

3. Unemployed because of maternity or pregnancy leave

4. Unemployed (health issue)

5. Can not work (other issues)

6. Student

7. Other (specify)_____

10. How many children do you have?_____

If the respondent has 1 child, go to q. 12

11. What are the birth years of your children? *(Start with the earlier birth)*

	Year of birth
1st child	
2nd child	
3rd child	
4th child	

12. What type of house do you live in?

1. Multi-room dwellings

2. House

3. Dormitory

4. Other (specify) _____

13. What is the total number of people living in your household (including you and children under 18 years old)? _____

14. How many rooms are in your lodging? ____

15. Where do you prepare your food?

1. Kitchen

2. Bedroom

3. Living room

4. Other (please, specify)_____

16. Does the child attend a day care facility?

1.yes

2.no

3.other (specify)_____

17. Do you have any pets in your living place?

1.yes

2.no

Knowledge questions

18. In your opinion what warning signs should have the children with ARI?

Do not read, mark all listed symptoms

1. Cough

2. Difficult or fast breathing

3. Fever

4. Chest indrawing

5. Chest pain especially when breathing deeply

6. Blue lips and nail beds (cyanosis)

7. Seizures

8. Inability to swallow

9. Lethargy

10. Inability to drink or breastfeed

11.Vomiting after each drinking or breastfeeding

12. Irritation

13. Dehydration

14. Comorbiditites /polyorganic deficiency

15. Blood streaked sputum

16. Other (specify)_____

88.Do not know

Please answer the following questions

Please indicate the extent you agree or disagree with each statement below.	Completely Disagree	Disagree	Nether agree, nor disagree	Agree	Completely agree	Do not know
19. Pollution of air inside my house will not make the symptoms of ARI of my child worse.	1	2	3	4	5	88
20. Pollution of air outside my house will not make the symptoms of ARI of my child worse.	1	2	3	4	5	88
21. Indoor humidity will have an effect on respiratory diseases.	1	2	3	4	5	88
22. Indoor temperature will have an effect on respiratory diseases.	1	2	3	4	5	88
23. Cigarette smoke cannot make the ARI symptoms worse.	1	2	3	4	5	88

24. In your opinion, how do people get infected with acute respiratory infection?

Mark all that applies.

1. Air droplets

2. Fomites

3. Dirty hands

4. Others, specify _____

Practice

25. Have you ever smoked cigarettes?

1. Yes

2. No **(go to Q28)**

26. How often did you smoke when pregnant with this child?

1. Never

2. Once a month or less

3. Several days a month

4. Several days a week

5. Every day

27. Do you currently smoke cigarettes?

1. Yes

2. No

28. How many of your household members currently smoke? _____

29. How often do people smoke in the same room where your child is present?

1. Every day

2. Several days a week

3. Several days a month

4. Once a month or less

5. Never

30. How many times do you usually wash your child`s hands during the day? _____

31. While washing do you use soap?

1. Never

2. Rarely

3. Sometimes

4. Often

5. Always

32. For how long the child was breastfed?

1. _____ months (put 0, if less than a month and go to Q 34)

999. Currently on breastfeeding

33. For how long the child received exclusive breastfeeding (no water, other liquids or foods)

1. _____ months (put 0, if less than a month and go to Q 34)

999. Currently on breastfeeding

Child's food diversity during the last 24 hours:

34. Whether the child eat the following food items within the last 24 hours:

1. Any infant formula (baby food) [CERELAC, HIPP, NAN, VINNY, NESTOGENE]
2. Any bread, rice, noodles, biscuits, cookies, or any other foods made from grains?
3. Any dark green, leafy vegetables like parsley, spinach, or coriander?
4. Any vegetables/ cucumbers, eggplant, onion, tomato, pumpkins, carrots, potatoes?
5. Any fruits/ apricot, apples, strawberry, bananas?
6. Any meat/ beef, pork, lamb, chicken, fish?
7. Any eggs?
8. Any foods made from beans, peas, or lentils?
9. Any cheese, yogurt or cottage cheese?
10. Any food made with oil, fat, or butter?
11. Any other food? (specify? _____)

Attitude

Do you agree or disagree with the following statements?	**Strongly agree**	**Agree**	**Neither agree, nor disagree**	**Disagree**	**Strongly disagree**
35. Knowing the symptoms and warning signs of ARI will help to see the doctor in time	1	2	3	4	5
36. Immediate hospitalization will prevent ARI complications	1	2	3	4	5
37. Using doctors prescribed medicine is not important if the child recovered	1	2	3	4	5
38.ARI can be treated until a week period by homedies without visiting the	1	2	3	4	5

doctor					
39.Unsafe water, poor sanitation and hygiene can cause the diarrhea but not ARI	1	2	3	4	5
40. Fast breathing of the child is not related to the severity of ARI	1	2	3	4	5
41. Smoky surroundings (due to tobacco smoking, fires, etc) have no effect on whether a baby catches pneumonia	1	2	3	4	5

Morbidity of child

42. What was the child`s birth weight (kg)? _____ 88. Do not know

43. What is your child`s current weight (kg)?_____ 88. Do not know

44. What is your child`s current height? (sm)_____ 88. Do not know

45. How frequently does your child get ill?

1. More than once a month
2. Once a month
3. Once in two month
4. Once in three month
5. One- two times a year
6. Less than once a year

46. Whether the child has a permanent primary caregiver?

1. Yes
2. No

47. When was the last time when you took the child to policlinic for vaccination?_____day/month/year

48. Whether your child received vaccination according to the recommended schedule

1. Yes
2. No (if no, specify the reason_____)

49. Whether he/she has a chronic health problem?

1. Yes (if yes, specify_____).
2. No

50. Was your child recently hospitalized for ARI?

1. Yes
2. No (go to Q.52)

51. Was the child fully recovered during the recent hospitalization?

1. Yes
2. No
88. Don`t know/not sure

52. Did your child have any complications after the most recent ARI?

1.Yes (Q. 53)

2.No (Q.54)

4.Other (specify)____

88.Do not know

53. What kind of complications did your child have?

Indicate all options

1. Pneumonia
2. Obstructive bronchitis
3. Sinusitis
4. Respiratory deficiency
5. Laryngotracheitis
6. Others (specify)
7. None
88. Do not know

54. What was the duration of the recent ARI?

1. Few days
2.1-2 weeks
3. About a month
4. Other (specify)_____

55. How would you describe the health status of the child now?

1. Very good

2. Good

3. Fair

4. Poor

5. Very poor

56. Which of the following best describes the approximate amount of your household's average monthly income?

1. Less than 25.000 AMD
2. From 25.000 – 50.000 AMD
3. From 51.000 – 100.000 AMD
4. From 101.000 – 250.000 AMD
5. Above 250.000 AMD

88. Don't know

57. How would you rate your family's general standard of living?

1. Substantially below average
2. Little below average
3. Average
4. Little above average
5. Substantially above average

88. Don't know

End time of the interview

(Hour)_____ (Minutes)

Thank you!

Appendix 3. Questionnaire (Armenian version)

Մինչև 5 տարեկան երեխաների մոտ սուր շնչառական վարակների բարդությունների առաջացման ռիսկի գործոնների հետազոտության

Հարցաթերթիկ

1. ID_____

2. Հարցման օր/ամիս/տարի ____/____/____

3. Հարցման սկիզբը (ժամ)_____ (րոպե)_____

Սոցիալ դեմոգրաֆիկ տեղեկություններ

4. Երեխայի տարիքը __/_____/_____

օր/ամիս/տարի

5. Երեխայի սեռը

1.Արական

2.Իգական

6. Երեխայի հիմնական խնամողը

1.մայրը

2.այլ (նշել)_____

7. Խնամողի տարիքը (տարիներով) _____

8.Նշեք Ձեր ստացած կրթության ամենաբարձր մակարդակը

1. Թերի բարձրագույն (10 տարուց պակաս)

2. Միջնակարգ (10 տարի)

3. Միջնակարգ մասնագիտական (10-13 տարի)

4. Համալսարան, ԲՈՒՀ

5. Հետդիպլոմային

9. Նշվածներից ո՞րն է լավագույնս նկարագրում Ձեր զբաղվածությունը ներկայումս

1. Աշխատում եմ

2.Չեմ աշխատում՝աշխատանք եմ փնտրում

3.Չեմ աշխատում հղիության կամ մայրության պատճառով

4. Չեմ աշխատում՝ առողջական վիճակի պատճառով

5. Չեմ աշխատում՝ այլ նկատառումներից ելնելով

6. Ուսանող եմ

7. Այլ (նշել) _____

10.Քա՞նի երեխա Դուք ունեք _____

Եթե հարցվողը ունի 1 երեխա, անցնել Հ.12

11. Նշեք Ձեր երեխաների ծննդյան տարեթվերը (Սկսել ամենավաղ տարեթվից)

	Ծննդյան տարեթիվը
1 երեխա	
2րդ երեխա	
3րդ երեխա	
4րդ երեխա	

12. Որտե՞ղ եք բնակվում

1. Բազմաբնակարան շենքում

2. Առանձնատանը

3. Հանրակացարանում

4. Այլ (նշել)_____

13.Քա՞նի մարդ է բնակվում Ձեր տանը ((ներառյալ Դուք և մինչև 18 տարեկան երեխաները) _____

14. Քա՞նի սենյակ ունի Ձեր կացարանը _____

15. Ո՞րտեղ եք պատրաստում ուտելիքը

1. Խոհանոցում

2. Ննջարանում

3. Ճաշասենյակում

4. Այլ (նշել) _____

16. Ձեր երեխան հաճախու՞մ է ցերեկային հաստատություն

1. Այո

2. Ոչ

3. Այլ (նշել) _____

17. Ձեր կացարանում ունե՞ք արդյոք կենդանիներ

1. Այո

2. Ոչ

3. Այլ (նշել) _____

Գիտելիքի վերաբերյալ հարցեր

18. Ձեր կարծիքով ի՞նչ վտանգավոր նախանշաններ կարող է ունենալ երեխան ՍՇՎ-ի ժամանակ (նշել բոլոր հնարավոր տարբերակները)

1. Հազ

2.Դժվարացած կամ հաճախացած շնչառություն

3.Ջերմություն

4. Կրծքավանդակի ներքաշում

5. Խորը ներշնչելիս կրծքավանդակում ցավ

6. Կապույտ շրթունքների և եղունգների առկայություն

7. Ցնցումներ

8. Կլման անկարողություն

9. Անտարբեր վիճակ

10. Խմելու կամ կրծքով սնվելու անկարողություն

11. Յուրաքանչյուր սննդի ընդունումից հետո փսխում

12. Գրգռվածություն

13. Ջրազրկված վիճակ

14. Հարակից հիվանդություններ/պոլիօրգանային անբավարարություն

15. Արյան հետքերով խորխի առկայություն

16. Այլ (նշել) _____

88. Չգիտեմ

Խնդրում եմ պատասխանել հետևյալ հարցերին.

Որքանո՞վ եք համաձայն ստորև նշված պնդումներին	Ամենևին համաձայն չեմ	Համաձայն չեմ	Ոչ համաձայն եմ ոչ էլ՝ ոչ	Համաձայն եմ	Լիովին համաձայն եմ	88. Չգիտեմ
19. Ձեր կացարանի աղտոտվածությունը չի հանգեցնի Ձեր երեխայի մոտ ՍՇՎ ախտանշանների վատթարացմանը:	1	2	3	4	5	88
20. Դրսի օդի աղտոտվածությու-նը չի հանգեցնի Ձեր երեխայի մոտ ՍՇՎ ախտանիշների վատթարացմանը:	1	2	3	4	5	88
21. Ներսի խոնավությունը նպաստում է ՍՇՎ առաջացմանը:	1	2	3	4	5	88
22. Ներսի ջերմաստիճանը նպաստում է ՍՇՎ առաջացմանը:	1	2	3	4	5	88
23. Ծխախոտի ծուխը կարող է ծանրացնել	1	2	3	4	5	88

Ձեր երեխայի ՍԾՎ-ը:						

24. Ձեր կարծիքով, ինչպես՞ են մարդիկ հիվանդանում ՍԾՎ (նշել բոլոր հնարավոր տարբերակները)

1. Օդի միջոցով

2. Կենցաղային իրերի միջոցով

3.Կեղտոտ ձեռքերի միջոցով

4.Այլ (նշել) _____

Գործառույթ

25. Դուք երբևէ ծխե՞լ եք:

1. Այո

2. Ոչ (անցեք Հ. 28)

26. Այս երեխայով հղիության ընթացքում ի՞նչ հաճախականությամբ եք ծխել

1. Երբեք

2.Ամիսը մեկ անգամ կամ ավելի քիչ

3. Ամիսը մի քանի անգամ

4. Շաբաթը մի քանի անգամ

5. Ամեն օր

27. Ներկայումս ծխու՞մ եք:

1. Այո

2. Ոչ

28. Ձեր տան անդամներից քանի՞սն են ներկայումս ծխում _____

29. Ինչքա՞ն հաճախ են մարդիկ ծխում Ձեր երեխայի ներկայությամբ:

1. Ամեն օր

2. Շաբաթը մի քանի անգամ

3. Ամիսը մի քանի օր

4. Ամիսը մեկ անգամ կամ ավելի քիչ

5. Երբեք

30. Օրվա ընթացքում քանի՞ անգամ եք դուք լվանում Ձեր երեխայի ձեռքերը:_____

31.Դուք օճառ օգտագործու՞մ եք:

1. Երբեք

2. Հազվագյուտ

3. Երբեմն

4. Հաճախ

5. Միշտ

32. Ինչքա՞ն ժամանակ է Ձեր երեխան կրծքով կերակրվել:

1. _____ ամիսներ (նշել 0, եթե ամսից քիչ է, անցնել Հ. 35)

999. Այժմ կրծքով է կերակրվում

33.Ինչքա՞ն ժամանակ է երեխան միայն կրծքով կերակրվել:

1. _____ ամիսներ (նշել 0, եթե ամսից քիչ է, անցնել Հ. 34)

999. Այժմ միայն կրծքով է կերակրվում

Երեխայի սննդի բազմազանությունը վերջին 24 ժամվա ընթացքում

34. Արդյո՞ք երեխան կերել է հետևյալ սննդամթերքները վերջին 24 ժամվա ընթացքում

1. Ցանկացած մանկական սնունդ (CERELAC, HIPP, NAN, VINNY, NESTOGENE)

2. Հաց, բրինձ, լապշա, թխվածքաբլիթներ, բլիթներ կամ այլ սնունդ պատրաստված ձավարեղենից

3. Կանաչեղեն, ինչպիսիք են մաղադանոսը, սպանախը կամ համեմը

4. Բանջարեղեն (վարունգ, սմբուկ, սոխ, լոլիկ, դդում, գազար, կարտոֆիլ)

5. Մրգեր (ծիրան, խնձոր, ելակ, բանան)

6. Միս (տավարի, խոզի, գառան, հավի, ձկան)

7. Ձու

8. Լոբի, սիսեռ կամ ոսպ

9. Պանիր, մածուն կամ կաթնաշոռ

10. Որևէ սնունդ պատրաստված յուղով կամ կարագով

11. Այլ սնունդ (նշել _____)

Վերաբերմունքը

Համաձա՞յն եք, թե ոչ հետևյալ պնդումներին.	Լիովին համաձայն եմ	Համաձայն եմ	Ոչ համաձայն եմ, ոչ էլ՝ ոչ	Համաձայն չեմ	Ամենևին համաձայն չեմ
35. Երեխայի մոտ ՍՇՎ վտանգի նշանների իմացությունը կարևոր է ժամանակին բուժօգնության դիմելու համար:	1	2	3	4	5
36. Երեխայի հոսպիտալիզացիան կարող է օգնել կանխելու ՍՇՎ բարդությունները:	1	2	3	4	5
37. Բժշկի նշանակումներին մինչև վերջ ճշգրտորեն հետևելը կարևոր չէ, եթե երեխայի վիճակը լավացել է:	1	2	3	4	5
38. Մինչև մեկ շաբաթ երեխայի ՍՇՎ-ն կարելի է բուժել տնային միջոցներով, առանց	1	2	3	4	5

բուժաշխատողի դիմելու:					
39. Կեղտոտ ձեռքերը, անմաքուր ջուրն ու սնունդը կարող են առաջացնել փորլուծություն, բայց ոչ՝ ՍՇՎ:	1	2	3	4	5
40. Երեխայի շնչառության հաճախացումը ՍՇՎ-ի ծանրության հետ կապ չունի:	1	2	3	4	5
41. Ծխախոտի կամ առհասարակ ծուխը չի կարող ազդեցություն ունենալ երեխայի մոտ թոքաբորբի առաջացման վրա	1	2	3	4	5

Երեխայի առողջության և տվյալ հիվանդության հետ կապված հարցեր

42. Ձեր երեխայի քաշը ծնվելիս (կգ)_____ 88. Չգիտեմ

43. Ձեր երեխայի քաշը ներկայումս (կգ)_____ 88. Չգիտեմ

44. Ձեր երեխայի հասակը ներկայումս (սմ)_____ 88. Չգիտեմ

45. Որքա՞ն հաճախ է Ձեր երեխան հիվանդանում:

1. Ամիսը 1 անգամից ավել
2. Ամիսը մեկ
3. Երկու ամիսը մեկ
4. Երեք ամիսը մեկ
5. Տարեկան 1-2 անգամ

6. Տարեկան մեկ անգամից քիչ

46. Ձեր երեխան ունի՞ մշտական խնամող:

1. Այո

2. Ոչ

47. Վերջին անգամ ե՞րբ եք այցելել պոլիկլինիկա երեխայի պատվաստումների համար:

Օր ____ամիս_____տարի_____

48. Արդյո՞ք Ձեր երեխան ստացել է պատվաստումները՝ օրացուցային պլանի համաձայն:

1. Այո

2. Ոչ (եթե ոչ, նշել պատճառը_____)

49.Ձեր երեխան ունի՞ արդյոք քրոնիկ առողջական խնդիր:

1. Այո

2. Ոչ

50. Ձեր երեխան վերջերս հոսպիտալիզացվե՞լ է ՍՇՎ-ով:

1. Այո

2. Ոչ (անցեք Հ. 52)

51. Ձեր երեխան լիովին ապաքինվե՞լ է վերջին հոսպիտալիզացիայի ընթացքում:

1. Այո

2. Ոչ

88. Չգիտեմ

52.Ձեր երեխան ունեցե՞լ է որևէ բարդություն վերջին ՍՇՎ հետ կապված:

1. Այո

2. Ոչ (Անցնել Հ. 54)

88. Չգիտեմ

53. Ի՞նչ բարդություններ է Ձեր երեխան ունեցել:

Ներառեք բոլոր տարբերակները

1. Թոքաբորբ

2. Օբստրուկտիվ բրոնխիտ

3. Սինուսիտ

4. Շնչական անբավարարություն

5. Լարինգոտրախեիտ

6. Այլ (նշել) _____

7. Նշվածներից ոչ մեկը

88. Չգիտեմ

54. Որքա՞ն ժամանակ է տևել ՍՇՎ:

1. Մի քանի օր

2. 1-2 շաբաթ

3. Մոտ 1 ամիս

4. Այլ (նշել)_____

55. Ինչպե՞ս կբնութագրեք երեխայի առողջական վիճակն այժմ:

1. Շատ լավ

2. Լավ

3. Բավարար

4. Վատ

5.Շատ վատ

56. Մոտավորապես որքա՞ն է Ձեր ընտանիքի ամսական միջին եկամուտը

1. Ոչ ավելի քան 50,000 դրամ

2. 50, 000-100, 000 դրամ

3. 101, 000-200, 000 դրամ

4. 201, 000-300, 000 դրամ

5. Ավելի քան 300, 000

88. Չգիտեմ

57. Ընդհանուր առմամբ ինչպե՞ս կգնահատեք Ձեր ընտանիքի նյութական վիճակը

1. Միջինից բավականին ցածր

2.Միջինից մի փոքր ցածր

3.Միջին

4.Միջինից մի փոքր բարձր

5.Միջինից բավականին բարձր

Շնորհակալություն մասնակցության համար

Appendix 4. Consent form (English version)

American University of Armenia

Institutional Review Board #1/Committee on Human Research

Consent form

Hello, my name is Lilit. I am a physician and currently work on my master thesis as a graduate student in the College of Health Sciences, in American University of Armenia. My master thesis is dedicated to the investigation of risk factors related to complications of acute respiratory infections among children under five years old.

You have been selected to participate in this study because you are the mother of children under five years old suffering from acute respiratory infections. You will be one of approximately 532 people who will participate in this study.

Your participation in this study is voluntary. There is no penalty if you refuse to participate in this study.

Your participation will involve telephone interview with the duration of 15 minutes. You can skip any questions you don't want to answer or even stop the interview.

Your participation in the study poses no risk for you. The information received from you is important for the study. There is no direct benefit from the participation in this study, but your participation will contribute to better understanding of risk factors of complications of acute respiratory infections in children.

The information provided by you and the data obtained from the medical records are fully confidential and will be used only for the study. Your name will not appear on the questionnaire. Only the general findings will be presented in the report. Your contact information will be destroyed upon the completion of data collection.

If you have any questions regarding this study you can contact the Principal Investigator Dr. Anahit Demirchian by email: ademirch@aua.am . If you feel you have not been treated fairly or think you have been hurt by joining the study you should contact Dr. Kristina Hakobyan, the Human Subject Protection Administrator of the American University of Armenia (37410) 51 25 61.

Do you agree to participate? Thank you.

If yes, shall we continue?

Appendix 4. Consent form (Armenian version)

Հայաստանի Ամերիկյան Համալսարան

Հանրային առողջապահության բաժին

Գիտահետազոտական էթիկայի թիվ 1 հանձնաժողով

Իրազեկ համաձայնության ձև

Բարև Ձեզ, իմ անունը Լիլիթ է: Ես բժիշկ եմ և որպես Հայաստանի ամերիկյան համալսարանի Հանրային առողջապահության բաժնի ուսանող իմ ավարտական թեզի շրջանակներում այժմ կատարում եմ հետազոտություն: Ավարտական թեզս նվիրված է մինչև 5 տարեկան երեխաների մոտ սուր շնչառական վարակների բարդությունների առաջացման ռիսկի գործոններին:

Դուք հրավիրված եք մասնակցելու այս հետազոտությանը, քանի որ հանդիսանում եք մինչև 5 տարեկան սուր շնչառական վարակով հիվանդացած երեխայի մայր: Դուք կլինեք ընտրված 532 մասնակիցներից մեկը, ով կմասնակցի հետազոտությանը:

Ձեր մասնակցությունն այս հետազոտությանը կամավոր է և հրաժարվելու դեպքում Ձեզ ոչինչ չի սպառնում: Ձեր մասնակցությունը ներառում է 15 րոպե տևողությամբ հարցազրույց: Դուք կարող եք հրաժարվել պատասխանել ցանկացած հարցի կամ ցանկացած պահի ընդհատել հարցազրույցը:

Ձեր մասնակցությունն այս հետազոտությանը որևէ վտանգ չի ներկայացնում Ձեզ համար: Ձեր կողմից տրամադրված տվյալներըկարևոր են հետազոտության համար: Այս հարցազրույցին Ձեր մասնակցությունը չի ենթադրում որևէ ուղղակի շահ Ձեզ համար, բայց Ձեր տրամադրած տեղեկատվությունը կարող է օգնել հասկանալու սուր շնչառական վարակների բարդությունների առաջացման ռիսկի գործոնները երեխաների մոտ, ինչը կարող է նպաստել բարդությունների նվազեցմանը:

Ձեր տրամադրած տվյալները պահվելու են գաղտնի և օգտագործվելու են միայն հետազոտության նպատակով: Ձեր անունը չի հիշատակվելու հարցաթերթիկի վրա և պահպանվելու է անանունության սկզբունքը: Հետազոտության զեկույցում ներկայացվելու են միայն ամփոփիչ արդյունքները: Ձեր հեռախոսահամարը կոչնչացվի տվյալների հավաքագրումից անմիջապես հետո:

Այս հետազոտության վերաբերյալ հարցեր ունենալու դեպքում կարող եք դիմել հետազոտության համակարգողին՝ Անահիտ Դեմիրճյանին, հետևյալ էլեկտրոնային փոստի հասցեով `ademirch@aua.am: Եթե Դուք կարծում եք, որ այս հետազոտությանը մասնակցելու ընթացքում Ձեզ լավ չեն վերաբերվել կամ մասնակցությունը Ձեզ վնաս է պատճառել, կարող եք զանգահարել Հայաստանի ամերիկյան համալսարանի էթիկայի հանձնաժողովի քարտուղար Քրիստինե Հակոբյանին՝ (37410) 51 25 61 հեռախոսահամարով:

Համաձա՞յն եք մասնակցել:

Շնորհակալություն: Կարո՞ղ ենք շարունակել: