ACUTE RESPIRATORY INFECTIONS IN RURAL SAMIA-BUGWE COUNTY
TORORO DISTRICT, UGANDA: KNOWLEDGE, ATTITUDES AND
PRACTICES OF MOTHERS, AND MORTALITY.

A THESIS AS PART FULFILLMENT FOR THE DEGREE OF MASTER OF PUBLIC
HEALTH IN THE DEPARTMENT OF COMMUNITY HEALTH
UNIVERSITY OF NAIROBI

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ABBREVIATIONS

ALRI: Acute lower respiratory infection
ARI: Acute respiratory infection
AURI: Acute upper respiratory infection
CHW: Community Health Worker
HIV/AIDS: Human Immune Deficiency Virus/Acquired Immune Deficiency Syndrome
KAP: Knowledge, attitudes, practices
TBA: Traditional Birth Attendant
UNICEF: United Nations Children’s Fund
Ug. : Uganda
USAID: United States Agency for International Development
WHO: World Health Organization
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ABSTRACT

A study of 300 mothers who had children aged below five years was carried out to describe their KAP concerning ARI, their health seeking behaviour and also describe some risk factors and estimate ARI mortality among young children.

The causes of pneumonia and measles were not known by 66% and 51% of the mothers respectively. Mothers with a better education were more likely to know the causes of measles. While 30% of the mothers had good knowledge of symptoms of pneumonia, only 19% had good knowledge of symptoms which indicate its severity. As for measles, 70% of the mothers had good knowledge of its symptoms. Though most mothers considered measles to be a serious disease, only 46% knew vaccination as a preventive measure against it. Breastfeeding, giving of fluids and food during ARI illness were frequently practised in this community. Mothers usually gave drugs to their children who had cough or common cold. The better educated mothers were more likely than others to use cough medicines to treat their childrens' coughs. When consultation was sought for a sick child, health centres/clinics were preferred to drug shops and hospitals. Through verbal autopsy, it was found that 63% of the child deaths below five years of age, in this area, were probably due to pneumonia.

Indoor air pollution due to a high proportion of poorly ventilated cooking places and highly prevalent use of wood fuel for cooking is a possible risk factor for ARI in this area.

ARI intervention should be planned and implemented in Samia Bugwe.
Acute respiratory infection (ARI) is a complex, heterogeneous group of diseases caused by many different microbial agents, which may affect any site of the respiratory tract (1). The upper respiratory tract includes the nose, pharynx, middle ear and paranasal sinuses. The lower respiratory tract includes the epiglottis, larynx, trachea, bronchi, bronchioles and the lungs, as shown in Appendix C (2).

Acute respiratory infections are a big public health problem. They are the commonest form of disease in children throughout the world (3). They cause 4.5 million deaths among children every year, the overwhelming majority occurring in the developing countries (4). Pneumonia (unassociated with measles) causes 70% of these deaths, post-measles pneumonia, 15%, pertussis, 10% and bronchiolitis and croup syndromes, 5% (4). About two-thirds of the total deaths due to ARI occur in the first year of life and about one-fifth, in the first month of life (5). It is estimated that ARI is the single largest cause of death in young children, associated with 33% of all the childhood deaths in developing countries (5).
The incidence of acute respiratory infections is high everywhere and is about the same in developing as in developed countries (1). Health statistics show that ARI is the leading cause of use of health services with 35% to 50% of paediatric outpatient attendances and 10% to 30% of child admissions being due to ARI (1). In urban areas children get 5 to 8 attacks per child per year with mean duration of 7 to 9 days while in rural areas the incidence is lower, with 1 to 3 attacks per child annually (1).

The World Health Organization (WHO) has recognized the importance of ARI as a major cause of morbidity and mortality in many countries and in 1976 initiated a programme to tackle the problem especially in the developing countries (6). The ARI Control Programme of the WHO recommends three main strategies for controlling ARI at community and first referral health care levels in developing countries. These are:

- proper case management,
- preventive measures, and
- health education (1).

Standard ARI case management

Proper case management includes differentiation of clinical condition by degree of severity. Selected, easily recognizable symptoms and signs are used to facilitate diagnosis and early identification of severe acute respiratory infections
especially pneumonia. In such cases, use of appropriate antimicrobial drugs can be life-saving (1).

Prevention of ARI

Diphtheria, measles, pertussis and childhood tuberculosis are some of the most important acute respiratory infections causing much morbidity and mortality (4). Immunization against them is therefore a very useful specific preventive measure.

Health Education

Health education of families and communities is another crucial strategy (1). Its aims should include:

- increasing the capability of families to recognize severe ARI and to promote appropriate and timely health seeking behaviour.

- encouraging use of simple supportive therapy,

- promoting timely immunization,

- reducing parental smoking and other domestic air pollution,

- promoting proper nutrition especially breast feeding.

Many developing countries are implementing the above strategies to combat the ARI problem. They do so through their national ARI Control Programmes with support from WHO, UNICEF and organizations like USAID.

An essential component of these ARI Control Programmes is
research (7). Health systems research, for example, can be used to monitor and evaluate the application of standard case management of ARI by health personnel (7). It can also be applied in the study of family behaviour in relation to health care practices with regard to ARI.

The Ministry of Health (Uganda), in 1992, launched a national ARI Control Programme (8). The Programme set objectives which may be difficult to evaluate in future due to lack of adequate baseline data on ARI in the country. The Programme intended to reduce pneumonia-related case fatality rate by 15% of the level at that time, which level was not known. Research should be done to find out such basic information.

Studies of ARI so far done in Uganda have already provided useful information. A study by Kiboneka in Entebbe Sub-District showed that 42% of respondents did not know the causes of ARI which may not be true in other parts of the country (37). Therefore there is need for more studies to give a complete picture of ARI in Uganda.
CHAPTER TWO

2.0 LITERATURE REVIEW

2.1. EPIDEMIOLOGY OF ARI

Acute respiratory infections are the result of interaction between the infective agent, factors in the host and the environment (6).

2.1.1. INFECTIVE AGENTS

Viruses account for 90% of cases of community acquired acute upper respiratory infections (9). The most frequent viral agents of the respiratory tract illness in infants and young children are the respiratory syncytial viruses (RSV), adenoviruses, the parainfluenza and the influenza A and B viruses and measles (9).

In Kenya, studies at Kenyatta National Hospital, revealed viral agents in 54% of children with pneumonia (9).
In a Gambian study, viruses were cultured from 19% of the children with ALRI, in a rural community (10). The Bostid studies concluded that recovery of virus from children with ALRI ranges from 14% to 64% and that RSV was the viral agent most frequently recovered (11).
Viral infections seem to predispose the respiratory tract to secondary bacterial infection. Respiratory viruses impair local mucosal immunity thus allowing pathogenic bacteria to invade the lower respiratory tract (7). This has been shown to
be true especially with the influenza and measles viral infections.

The bacterial agents which most commonly cause pneumonia are *Streptococcus pneumoniae* and *Haemophilus influenza* (7). The Gambian study found evidence of infection with bacterial pathogens in 14.4% of the clinical cases of ALRI, with *Streptococcus pneumonia* and *Haemophilus influenza* bacteria being the most frequent (10).

In some newborns with protracted pneumonia, *Chlamydia trachomatis*, acquired from the mother’s genital tract during parturition, has been implicated (7). *Staphylococcus aureus* is also important in the first six months of life while *Mycoplasma pneumoniae* is said to be frequent in children over three years of age (7). *Streptococcus pyogenes* causes pharyngo-tonsillitis commonly in children over five years of age, the sequelae of which include rheumatic fever, and nephritis (7). The Bostid studies found evidence of bacterial agents in 4.5% to 40% of cultured specimens of children with ALRI (11).

It is now apparent that bacterial pathogens play a greater role as causes of ALRI in developing countries than in the developed ones (7). Reasons for this are: lowered immunity in
malnourished children, low immunization coverage, high prevalence of low birth weight, low level of education of mothers, poor hygienic conditions, lack of early health care, overcrowding and a large population of underfives who are approximately 20% of the total population in developing countries compared to approximately 5% in industrialised countries (7).

2.1.2. HOST FACTORS ASSOCIATED WITH ARI

Low birth weight and malnutrition are associated with high risk of dying from ARI (1,3). A prospective study of pre-school Nigerian children with severe ALRI showed that malnutrition was strongly associated with ALRI-related death (14). It further showed that bacteremia is common in malnourished subjects with ALRI.

In Thailand, malnutrition was also found to be a high risk factor for ARI in underfives in a low socio-economic community (13). Similar results were obtained in Metro Manila, Philippines (14).

Vitamin A deficiency is associated with increased risk of respiratory disease (15). The deficiency causes the epithelial lining of the respiratory tract to undergo patchy keratinization. These changes in the mucosal lining predispose it to bacterial colonization (15).
In Australia, it was observed that children who received Vitamin A supplementation experienced fewer episodes of respiratory infection than the controls (16).

Age is another factor which seems to affect incidence of ARI. Children below the age of two years were found to have a higher incidence of ARI than older ones (5). Researchers in Nigeria confirmed this finding and also observed that ARI was much more common in boys than in girls (17).

2.1.3. ENVIRONMENTAL FACTORS ASSOCIATED WITH ARI

In developed countries, air pollution has been identified as a risk factor for ARI, particularly environmental tobacco smoke (ETS) (18). In many developing countries, in addition to tobacco smoke, many homes contain high levels of smoke from combustion of biofuels such as wood, crop residues and animal dung. These fuels are used for cooking or heating, usually without a flue or chimney and with poor ventilation of the houses (18). Tobacco and biofuel smoke contain chemicals like carbon monoxide, benzo-apyrene, sulphuric oxides and formaldehyde which are toxic to the respiratory tract thus rendering it susceptible to infection. A good indicator of pollution is the concentration of respirable particulates. Indoor respirable particulate concentrations in rural areas of developing countries range from a few hundred to more than 10,000μg/m³. It is estimated that daily exposure to indoor
particulates in villages in developing countries are twenty times greater than in developed countries (18).

A study by Collings and others, in Zimbabwe, showed a significant association between lower respiratory diseases in young children and exposure to woodsmoke pollution (19). Air sampling within kitchens of 40 children revealed levels of atmospheric pollution far in excess of WHO recommended 24-hour exposure limits of 100 - 150μg/m3. Elevated carboxyhaemoglobin concentrations confirmed childhood smoke inhalation (19). For tobacco smoke, it has been shown that household exposure is significantly associated with hospitalization for respiratory illness with the association being more marked in the first six months of life (20). When both parents smoke the risk of pneumonia is almost double that of infants with non-smoking parents (21).

2.1.4. SOCIO-ECONOMIC STATUS AND ARI

Socio-economic status appears to have an effect on the epidemiology of ARI. Most risk factors for ARI appear to be related to low socio-economic status. In the Bostid ARI studies, most human populations studied were poverty-stricken (11).

2.2. ARI IN DEVELOPING COUNTRIES

Acute respiratory infections are a worldwide problem. The incidence is high everywhere and 70% of the infections are of the upper respiratory tract and therefore less serious (1).
Nevertheless, a child dies from ARI every 7 seconds, mostly from pneumonia (6). In a Bangkok study, the incidence of ARI was 11.2 episodes per child per year (13). High risk factors for ARI were low family income, working mothers, mothers with allergies, chronic malnutrition and crowding in the home (13). In Manila, Philippines, the incidence of ARI was 6.1 episodes per child per year with peak age-specific incidence occurring in children 6 - 11 months in the case of ALRI (14). Age less than 2 years, malnutrition, household crowding and parental smoking were associated with statistically significant increase in ARI morbidity (14).

In Ibadan, Nigeria, the annual incidence of ARI ranged from 6.1 to 8.1 episodes per child per year with ARI occurring in all seasons of the year (17). The most common symptoms were cough, nasal discharge and fever while the common signs were abnormal breathing sounds, tachypnea and chest retraction (17).

In Papua New Guinea ALRIs are the commonest cause of death in children (22), as it is the case among Bangladeshi children aged 1 - 59 months with mortality rates being highest among those aged 1 - 5 months (23). Significant predisposing factors were malnutrition and measles (23).

In Kenya, studies at Maragua revealed that ARI was mainly of the upper respiratory tract, with incidence of 5.0 per child
year compared with 0.18 per child year for the lower respiratory tract (24). The infections were generally mild and over 80% of them lasted less than 2 weeks (24).

Epidemiology of ARI in developing countries is being highlighted, because in these countries ARI causes 30 - 70 times more deaths than in developed countries (6).

2.3. CONTROL OF ARI

2.3.1 CASE MANAGEMENT

Management of cases of ARI is based on assessment of the patient's clinical condition, correct classification of the illness and proper treatment (2). This is facilitated by use of case management charts based on selected symptoms and signs of ARI (1). The symptoms and signs are simple and reliable so that village health workers can use them to identify children with pneumonia from other ARI cases.

Researchers at Vellore, India found that respiratory rates of over 50/minute in infants and over 40/minute in children 12 - 35 months of age were sensitive and specific indicators of ARI (25). In the same study, history of rapid breathing as well as chest retractions were also found to be good indicators of ALRI (25). Gove and Kumar, however argued that if village health workers relied only on history of rapid breathing to diagnose pneumonia, there would be over diagnosis and misuse
of antimicrobials and emphasized the accurate measurement of respiratory rate in a calm child as the most important detector of pneumonia (26).

In Kenya, Wafula and colleagues using radiological evidence of pneumonia, as the "gold standard", found that respiratory rates of over 50/minute, chest indrawing, flaring of alae nasi and a history of rapid breathing were all valuable indicators of pneumonia (27).

From the results of several studies on clinical predictors of ARI of different severity, the World Health Organization recommends respiratory rate and chest indrawing as the best predictors of the different severities of ARI (2). Based on these, the following categories of ARI severity emerge:

1. Very severe disease
   - child unable to drink,
   - convulsions,
   - abnormally sleepy or difficult to wake,
   - severe malnutrition,
   - stridor in a calm child;

2. Severe pneumonia - chest indrawing;
3. Pneumonia - No chest indrawing,
   - fast breathing (respiratory rates:
     more than 60/min. for children below 2 months, more than 50/min. for children 2 - 11 months, more than 40/min. for children 12 - 60 months)

4. No pneumonia: cough or cold
   - No chest indrawing,
   - No fast breathing (respiratory rates: less than 60/min. for children below 2 months, less than 50/min. for children 2 - 11 months, 40/min. for children 12 - 60 months).

Children with very severe disease or severe pneumonia must be referred urgently to hospital. The other two less severe categories can be treated at home (2).

2.3.2. INTERVENTION STUDIES

Mtango and Neuvans reported successful use of village health workers (VHWs) in reducing mortality due to pneumonia among children under five years of age in Bagamoyo District, Tanzania (28). The health workers visited families to treat children with pneumonia and to give health education. However, no household surveys to assess knowledge, attitudes and practices of mothers regarding ARI, were done. Evaluation of
the intervention would have been strengthened if this were done.

Khan and others also used community health workers, for active ARI case-finding, treatment, referral and health education (29). Results showed reduction in both total and ALRI-specific mortality rates among children (29). This intervention relied heavily on highly motivated CHWs and nurses. This might have introduced some bias in the findings.

In India, Bang and others used CHWs but also involved TBAs and paramedics in their intervention trial (30). No active case-finding was done by health workers, but because of mass education community response was good. Pneumonia-specific childhood mortality was significantly lowered in the intervention more than in the control area (30).

At Matlab, Bangladesh, a combination of specific and non-specific ARI interventions resulted in a reduction in ALRI mortality by 50% among under fives (31).

A meta-analysis of six intervention studies, including all the above, revealed consistency in findings (32). For all the studies infant mortality due to ALRI was reduced by 10.7 (range: 4.8 - 16.7) deaths per 1000 live births. The pooled estimates of relative risk were consistent with a 20% reduction in infant mortality and a 25% reduction in under
five mortality. Thus, the case management strategy has a substantial effect on infant and under five mortality at least in settings where infant mortality rates are greater than 40/1000 live births (32).

2.3.3. KAP STUDIES

The role of mothers in the control of ARI cannot be overemphasized. Tupasi and co-workers studied an urban community in the Philippines where they showed that mothers were unable to recognize severe ARI (33). This resulted in inappropriate action like self-medication and low rate of health service utilization.

In Nigeria, Osinusi and others, also found a high rate of self-medication (34). Children with ARI were treated at home with any of the following: cough medicines, antipyretics, antibiotics, haematinics and herbs (34).

An Indian study showed that more than 50% of the mothers either gave no treatment for ARI or gave home remedies (35). For cases of pneumonia, the majority of mothers preferred to consult a qualified doctor. Pneumonia was recognized by fast breathing and difficulty in breathing. During an ARI episode, 25% of the mothers would either stop or decrease food, breastfeeding or fluids to the sick child (35).
In Malaysia, Chinese and Malay mothers, who were interviewed concerning ARI, felt that they did not know much about ARI. They, however, mentioned the following as the causes of ARI: germs, food, and change of climate (36). The Chinese mothers were less willing to take their children to a health unit and had a 24% rate of self-medication (36).

Kiboneka's study in Uganda, found that only 19% of the respondents mentioned difficult breathing as an indicator of more serious ARI illness (37). Concerning mild ARI, 59% of the respondents would clear the child's nose and give extra fluids. Only 32% mentioned immunization as a preventive measure for ARI (37).

Mothers in Gambia recognized acute lower respiratory infection as a severe disease and also recognized that fast breathing or difficult breathing are features that discriminate acute lower respiratory infection (38).

A study in Baringo, Kenya, also found that mothers recognized severe forms of ARI and sought help for it (39). A high rate of self-medication was also prevalent.
CHAPTER THREE

STATEMENT OF THE RESEARCH PROBLEM

Acute respiratory infections are the third commonest cause of hospital deaths among infants in Uganda (malaria and diarrhoea are first and second respectively), accounting for 10.4% of the deaths (40). This may be an underestimate considering that the data is hospital-based and from only 26 hospitals in Uganda. A survey in South West Uganda revealed that ARI was the second commonest cause of death among under fives, accounting for 20% of the deaths (41). In Kenya, the Maragwa studies, showed that about 50% of deaths in underfives, mainly young infants, occurred at home hence the importance of home-based studies on a child killer like ARI (24).

Most probably many underfives are dying of ARI in Ugandan villages especially due to geographical and financial inaccessibility to health care which is common in rural areas of most developing countries. Therefore there is need to ascertain the nature and magnitude of the problem in Samia-Bugwe county.

One of the strategies for controlling ARI is health education of families and communities (1). This can be initiated by identifying gaps in the knowledge of ARI, attitudes towards it and practices in its management. The study of mothers in Samia-Bugwe is an effort to identify such gaps.
3.2. JUSTIFICATION OF THE STUDY

The National ARI Control Programme of Uganda has suggested that KAP studies be carried out in the country to provide information useful in planning, implementing and in the evaluation of ARI interventions both in the local study areas and in the country as a whole (8). No such studies have been done in Samia-Bugwe. In addition a KAP study of mothers in Samia-Bugwe might give different findings from those of other studies done elsewhere in Uganda. This is because of differences in culture and socio-economic status.

The study in Samia-Bugwe will in addition include mortality aspects of ARI.

For studies on family health issues like ARI, mothers are an important target group. This is because in most developing countries women are the main providers of health care to their children and families (42).

3.2. STUDY OBJECTIVES

3.2.1. GENERAL OBJECTIVES

1. To assess the KAP of mothers in Samia-Bugwe County, concerning ARI.

2. To describe some risk factors associated with ARI.

3. To determine ARI mortality in children under five years of age in Samia-Bugwe County.
3.2.2. SPECIFIC OBJECTIVES

1. To assess the mothers': (a) knowledge of ARI, (b) attitudes regarding ARI, (c) practices regarding management of ARI among under five year old children.

2. To describe the demographic and socio-economic status of the mothers.

3. To describe some ARI-associated risk factors in the households of mothers.

4. To describe the health seeking behaviour of mothers whose children get ARI.

5. To estimate the proportion of under-five year old children who die of pneumonia in the households of mothers.

3.3. HYPOTHESES

1. More than 50% of the mothers in Samia Bugwe do not know the causes of ARI.

2. The proportion of children under five years of age dying of pneumonia in Samia Bugwe is not more than 30%.

These hypotheses were made considering that in Kiboneka's study 42% of the respondents did not know the causes of ARI (37) and that ARI in developing countries is responsible for 33% of deaths among young children (5).
CHAPTER FOUR

4. METHODS OF STUDY

4.1. STUDY DESIGN

The study was cross-sectional and descriptive.

4.2. VARIABLES

4.2.1. DEMOGRAPHIC AND SOCIO-ECONOMIC VARIABLES

1. Age - of mothers.
2. Marital status of the mother.
3. Education of the mothers.
4. Religion of the mother.
5. Gender of the head of household.
6. Main occupation of the head of household.
8. Types of materials used in construction of the living house of the head of the household.

4.2.2. DOMESTIC AIR POLLUTION VARIABLES

1. Ventilation of living house and kitchen
2. Tobacco smoking.
3. Use of biofuels for cooking.
4.2.3. VARIABLES RELATED TO KNOWLEDGE OF ARI

Knowledge of:
- pneumonia and measles,
- causes of pneumonia, measles,
- symptoms of pneumonia, measles,
- preventive and other measures against measles.

4.2.4. VARIABLES RELATED TO ATTITUDES ABOUT ARI

1. Attitudes about pneumonia - whether pneumonia is a serious disease,
   - whether the mother feels she knows enough about pneumonia.

2. Attitude about measles - whether measles is a serious disease, whether it is curable by traditional methods of treatment, whether there is preference between traditional and modern methods of treatment of measles.

4.2.5. VARIABLES RELATED TO PRACTICES REGARDING ARI

1. What is done when a child has a common cold.
2. Whether breast feeding and other foods are given during a severe ARI illness.
3. Whether fluids are given during ARI illness.
4. Whether self-medication is practiced during ARI illness and the medicines given.
4.2.6. **PLACE OF RESORT FOR MEDICAL ASSISTANCE**

Where the mothers take their under five year old children when ARI illness is serious. Reasons for the choice. Why help is not sought if at all.

4.2.7. **ARI MORTALITY**

Deaths due to pneumonia among children under five years of age in the last one year.

4.3. **STUDY AREA**

Samia-Bugwe County forms the southern part of Tororo District, Eastern Uganda. It is bordered to the north by West Budama and Tororo Counties, to the east by Busia District (Kenya), to the south by Lake Victoria and to the west by Iganga District.

The County is made up of 10 subcounties. One of these subcounties is Busia Town, the commercial and administrative centre of the county. The subcounties are further subdivided into 33 parishes, the smallest official administrative units.

The County had a population of approximately 163,597 people in 1991 (43). Females of child-bearing age (15-49 years) were approximately 38,582 (24%). Under-five year olds were about 30,743 (19%) (43).
The people of the area are the Bantu-speaking Basamia-Bagwe. The majority are farmers. They earn their income by selling cotton, food crops including maize, millet, cassava and fish from the nearby lake. Cross-border trade with Kenya thrives in the area.

Infrastructure like roads, is poor with only one tarmac road in the area.

The County has an agricultural college, teacher training college, and eight secondary schools. Primary schools are many but most of them have poor facilities. Despite the availability of these institutions, literacy among mothers is thought to be low.

Health services in the County are inadequate. There is no hospital, but there are three (3) health centres, three (3) dispensaries and three sub-dispensaries. In the urban and market centres there are also private clinics and drug shops. Due to shortage of trained health personnel and irregular supply of drugs and equipment, most health units are underutilized.

Traditional medicine plays a big role in the provision of health care. Cultural beliefs including witchcraft are still strong and influence health behaviour in this county. The health problems of the area have not been
studied, but communicable diseases like malaria, ARI, diarrhoeal diseases, tuberculosis, HIV/AIDS, sleeping sickness seem to be common (44).

The infant mortality rate for the area is not known but may be no different from the national one of 105 per 1,000 live births (8). The under-five mortality rate (U5MR) is probably also similar to the national figure of 172 per 1,000 livebirths (8).

4.4. STUDY POPULATION

The study population consisted of mothers who had children under five years of age.

4.5. SAMPLING

4.5.1. SAMPLING UNIT

The household was used as the sampling unit.

4.5.2. SAMPLING FRAME

All the households in the sampled villages.

4.5.3. SAMPLING METHOD

Samia-Bugwe County has 33 parishes. Excluding the 4 urban parishes of Busia Town Council, 10 out of the remaining 29, were selected using systematic sampling based on population size.
Thirty (30) villages were selected randomly, three (3) per parish, out of 148 villages in the ten (10) sampled parishes. In a sampled village households visited were found by going to the centre of the village (the centre was located through assistance of Resistance Council guides) and choosing the direction of movement randomly (spinning and letting a ball-point pen fall to the ground). The direction where the writing end of the ball-point pen pointed was chosen and then households along that direction were counted and given numbers from which the first household to be visited was randomly selected. Thereafter the household nearest was visited and then the next nearest and so forth until ten households were visited. In a selected household only one mother was interviewed (where there was more than one mother, random selection was done). In this study, a household was taken to be a group of persons living in a house or within a compound and sharing a common source of food.

4.6. INCLUSION AND EXCLUSION CRITERIA

INCLUSION CRITERIA
Mothers who had under five year old children of their own.

EXCLUSION CRITERIA
1. Mothers in the parishes of Busia Town Council since it is not rural.
2. Mothers who were medically qualified.

3. Mothers who had not been resident in Samia-Bugwe County during the preceding one year.

4.7. SAMPLE SIZE

Nineteen (19) percent of mothers in Entebbe (Uganda) knew the symptoms of severe ARI disease (37). This proportion was used to calculate sample size.

The following formula was applied to determine the minimum sample size:

\[ n = \frac{Z^2 P(1-P)}{D^2} \]

Where,

\[ n \] = sample size

\[ Z \] = 1.96 at 95% confidence level.

\[ P \] = estimated population proportion

(set at 0.19)

\[ D \] = precision desired (set at 5%)

Therefore, 

\[ n = \frac{1.96^2 \times 0.19 \times (1-0.19)}{0.05^2} \]

\[ = 236 \text{ mothers.} \]

Three hundred (300) mothers were sampled (10 per village), more than the minimum sample size, to reduce sampling error and to take care of non-response.
4.8. DATA COLLECTION

4.8.1. QUESTIONNAIRE

The questionnaire consisted of two parts, Parts A and B. The latter was for verbal autopsy, to collect data on pneumonia as a cause of death in children aged 0-59 months. Criteria suggested by Bang and co-workers for verbal autopsy were adopted (45).

4.8.2. INTERVIEWERS

Five interviewers were recruited for the study. All of them had a minimum "ordinary" level school education and were fluent in Lusamia-Lugwe, the language of the area. They were trained for three days, during which time they got theoretical instruction on research and ARI. They also participated in reviewing and pre-testing the questionnaire in a non-sampled parish.

5. DATA ANALYSIS AND PRESENTATION

Raw data was coded then entered and analysed by computer using the SPSS/PC package. Summary measures, e.g. means, proportions, were calculated. Cross-tabulations between variables were done. The Chi-square test was performed for statistical associations. Tables and bar charts were used to present results.
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6. ETHICAL ISSUES

Clearance to carry out the study was obtained from the National Council of Science and Technology of Uganda, the District Executive Secretary and the District Medical Officer, both of Tororo District.

All participants in the study gave verbal consent, after the purpose of the study was explained to them. They were assured of the confidentiality of the information gathered and had the right to refuse to participate in the study.

7. LIMITATIONS OF THE STUDY

1. The study excluded other child care takers e.g. grandparents. However mothers form the majority of care takers.

2. Questions on KAP were not exhaustive and not backed by observation of practices. This was due to the little time and financial resources.

3. Socio-economic status was difficult to ascertain. Income levels in the area have not been studied by experts.

4. ARI morbidity was not studied due to lack of time to interview intensively.

5. Verbal autopsy for studying mortality has an inherent limitation on validity. However it has been shown that the method is useful, and reliable enough (46).
CHAPTER FIVE

5.0 RESULTS

This study involved 300 mothers, of whom 299 completed the interviews. One young mother refused to continue with the interview after being asked about her level of education in the presence of her husband.

SOCIO-DEMOGRAPHIC CHARACTERISTICS

Age

The ages of the mothers ranged from 14 years to 49 years with a mean age of 27 years (SD 7.36). Two-thirds of the mothers were relatively young, being below 30 years of age. Table 1. shows the age distribution.

Table 1. Age distribution. (n=300)

<table>
<thead>
<tr>
<th>Age in years</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>56</td>
<td>19</td>
</tr>
<tr>
<td>20-29</td>
<td>141</td>
<td>47</td>
</tr>
<tr>
<td>30-39</td>
<td>88</td>
<td>29</td>
</tr>
<tr>
<td>40-49</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>
Marital status

The majority of the mothers were married. Of the 299 mothers, 275 (92%) were married, 9 (3%) were single, 11 (4%) were widowed and 4 (1%) were divorced/separated.

Level of education

Although more than half of the mothers had primary level education, less than 10% had attended secondary school and a big proportion (38%) had no formal education, (see Table 2).

Table 2. Mothers' education (n=299)

<table>
<thead>
<tr>
<th>Level of education</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>114</td>
<td>38</td>
</tr>
<tr>
<td>primary</td>
<td>160</td>
<td>54</td>
</tr>
<tr>
<td>secondary</td>
<td>25</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
</tbody>
</table>

Religious belief

Most mothers were mainstream Christians, 134 (45%) being Roman Catholics and 123 (41%) Protestants. Muslims were 19 (6%) and other believers 23 (8%).
Gender of the head of the household
Females headed only 24 (8%) of the households whereas males headed 275 (92%) of the 299 households.

Main occupation of the head of the household
Most heads of household were farmers, 222 (74%), while the self-employed were 42 (14%), the salaried 29 (10%) and the unemployed 6 (2%).

Table 3. Main occupation of head of household. (n=299)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>peasant</td>
<td>222</td>
<td>74</td>
</tr>
<tr>
<td>self-employed</td>
<td>42</td>
<td>14</td>
</tr>
<tr>
<td>salaried</td>
<td>29</td>
<td>10</td>
</tr>
<tr>
<td>unemployed</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>299</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Yearly household income
Yearly household income was estimated by 159 (53%) mothers to be less than Uganda shillings 250,000 while 34 (11%) mothers had 250,000 - 500,000 and 14 (5%) mothers had income of over 500,000 shillings. Mothers who did not know their household income were 92 (31%).
Table 4. Yearly household income. (n=299)

<table>
<thead>
<tr>
<th>Income in Ug. shs.</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;250,000</td>
<td>159</td>
<td>53</td>
</tr>
<tr>
<td>250,000 - 500,000</td>
<td>34</td>
<td>11</td>
</tr>
<tr>
<td>&gt;500,000</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Unknown</td>
<td>92</td>
<td>31</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>299</td>
<td>100</td>
</tr>
</tbody>
</table>

Relationship of mothers' education with yearly household income: there was a statistically significant association between mother's education and yearly household income. Households with incomes below Uganda shillings 250,000 had proportionately more mothers with no formal education than those with secondary education whereas households with incomes above Uganda shillings 500,000 had proportionately more mothers with secondary education than those with no formal education (See Table 5).
Table 5. Relationship between mother's education and yearly household income

<table>
<thead>
<tr>
<th>Education\Income</th>
<th>&lt;250,000 no. (%)</th>
<th>250,000-500,000 no. (%)</th>
<th>&gt;500,000 no. (%)</th>
<th>Not known no. (%)</th>
<th>Total no. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>64 (56)</td>
<td>9 (8)</td>
<td>4 (4)</td>
<td>37 (32)</td>
<td>114 (38)</td>
</tr>
<tr>
<td>primary</td>
<td>87 (54)</td>
<td>20 (13)</td>
<td>6 (4)</td>
<td>47 (29)</td>
<td>160 (54)</td>
</tr>
<tr>
<td>secondary</td>
<td>8 (32)</td>
<td>5 (20)</td>
<td>4 (16)</td>
<td>8 (32)</td>
<td>25 (8)</td>
</tr>
<tr>
<td>Total</td>
<td>159 (53)</td>
<td>34 (11)</td>
<td>14 (5)</td>
<td>92 (31)</td>
<td>299 (100)</td>
</tr>
</tbody>
</table>

\[ X^2 = 13.05790 \quad 6 \text{df} \quad p = 0.04213 \]

HOME ENVIRONMENT

The mothers' homes were observed for the type of construction materials, ventilation of the living houses and presence or absence of kitchens. The kitchens were observed for ventilation.

Whereas 233 (78%) households had kitchens, 66 (22%) households had none.

Tables 6 and 7 show the other findings.
### Table 6. Characteristics of the mothers' living houses

<table>
<thead>
<tr>
<th>Status</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Roof</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>grass-thatch</td>
<td>282</td>
<td>94</td>
</tr>
<tr>
<td>iron-sheet</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
<tr>
<td><strong>Wall</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mud</td>
<td>283</td>
<td>95</td>
</tr>
<tr>
<td>bricks</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
<tr>
<td><strong>Floor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>earthen</td>
<td>288</td>
<td>96</td>
</tr>
<tr>
<td>cemented</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
<tr>
<td><strong>Ventilation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eaves spaces</td>
<td>289</td>
<td>97</td>
</tr>
<tr>
<td>none</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
<tr>
<td><strong>Windows</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>present</td>
<td>197</td>
<td>66</td>
</tr>
<tr>
<td>absent</td>
<td>102</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
</tbody>
</table>
Kitchens

Table 7. Kitchen ventilation

<table>
<thead>
<tr>
<th>Status</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eaves spaces</td>
<td>225</td>
<td>97</td>
</tr>
<tr>
<td>None</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>100</td>
</tr>
<tr>
<td>Windows</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>132</td>
<td>57</td>
</tr>
<tr>
<td>Absent</td>
<td>101</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>233</td>
<td>100</td>
</tr>
</tbody>
</table>

Cooking inside living houses
Most mothers, 238 (80%) said they never cooked inside their living houses, but 44 (15%) mothers said they cooked inside sometimes, while 17 (5%) mothers always did so.

Cooking fuels
Of the 299 mothers, 295 (99%) use wood as cooking fuel, 91 (31%) also use crop residues and 28 (9%) also use charcoal.

Tobacco smoking
Only 13 (4%) mothers were smokers but 73 (24%) mothers had members in the household who smoked (see Table 8).
Table 8. Smoking in the household

<table>
<thead>
<tr>
<th>mother smokes</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>13</td>
<td>4</td>
</tr>
<tr>
<td>no</td>
<td>286</td>
<td>96</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>other member smokes</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>73</td>
<td>24</td>
</tr>
<tr>
<td>no</td>
<td>226</td>
<td>76</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>100</td>
</tr>
</tbody>
</table>

KNOWLEDGE OF PNEUMONIA

Of the 299 mothers, 166 (56%) said that they knew pneumonia while 133 (44%) said they did not know.

(a) Causes of pneumonia

Of the 166 mothers who said they knew pneumonia, 22 (13%) had good knowledge of the causes of pneumonia, 79 (48%) had poor knowledge and 65 (39%) had no knowledge of what causes pneumonia, (see Figure 1).

[ Score used for knowledge of causes of pneumonia. good knowledge: knows germs and pollution and / or poor feeding. ]
poor knowledge: knows pollution and/or poor feeding.
no knowledge: causes not known

Figure 1.

Knowledge of causes of pneumonia

(b) Symptoms of pneumonia

Of the 166 mothers who knew pneumonia, 165 answered the question about symptoms of pneumonia and of these, 89 (54%) had good knowledge while 76 (46%) had poor knowledge.
[Score for knowledge of symptoms of pneumonia.

good knowledge: knows cough and fast breathing (and/or common cold or fever).

poor knowledge: knows cough alone (without fast breathing) and/or other symptom.

no knowledge: knows no symptom]

Table 9. Knowledge of symptoms of pneumonia (n=165)

<table>
<thead>
<tr>
<th>knowledge level</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>good</td>
<td>89</td>
<td>54</td>
</tr>
<tr>
<td>poor</td>
<td>76</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>165</td>
<td>100</td>
</tr>
</tbody>
</table>

Relationship with other variables: no significant association was found between mothers' age or education and knowledge of symptoms of pneumonia.

(c) Symptoms and signs which indicate severity of pneumonia

Of the 166 mothers who said they knew pneumonia, 56 (34%) had good knowledge of the symptoms which indicate worsening of pneumonia, while 110 (66%) of the mothers had poor knowledge, (see Figure 2).
[Score for knowledge indicating severity of pneumonia.
good knowledge : knows fast breathing and / or chest indrawing.
poor knowledge : knows fever or other (other than the above).

Figure 2.

Knowledge of symptoms indicating severity of pneumonia
(n=188)

<table>
<thead>
<tr>
<th></th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>good</td>
<td>34</td>
</tr>
<tr>
<td>poor</td>
<td>66</td>
</tr>
</tbody>
</table>

Mothers' knowledge level

Relationship with other variables: knowledge of these symptoms and signs was not significantly associated with mothers' age, or education, (p > 0.05).
ATTITUDES CONCERNING PNEUMONIA

Most mothers who said they knew pneumonia also thought that it was a serious disease, (see Table 10).
Nevertheless, 87 (53%) mothers said they did not know enough about pneumonia compared to 77 (47%) who thought they knew enough.

Table 10. Whether pneumonia is a serious disease. (n=164)

<table>
<thead>
<tr>
<th>Pneumonia serious</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>159</td>
<td>97</td>
</tr>
<tr>
<td>no</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>dont know</td>
<td>4</td>
<td>2.4</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Relationship with other variables: whether mothers considered pneumonia a serious disease was not associated with the mothers' age, or education.

KNOWLEDGE OF MEASLES

Most of the mothers, 280 (94%) said they knew measles disease compared to only 19 (6%) who said they did not.
(a) Causes of measles

Of the 280 mothers who stated that they knew measles, 40 (14%) had good knowledge of the causes of measles; 106 (38%) had poor knowledge and 134 (48%) had no knowledge of the causes of measles, (see Figure 3).

[ Score for knowledge of causes of measles.

good knowledge : knows germs and air pollution and /
or poor feeding.

poor knowledge : knows pollution and/or poor feeding.

no knowledge : knows no causes ]
Relationship with other variables: there was a statistically significant association between mothers' education and knowledge of causes of measles. Of the mothers with good knowledge of causes of measles there were proportionately more mothers with secondary education than those with no formal education. Meanwhile, of the mothers with no knowledge of causes of measles, there were proportionately more mothers who had no formal education than those with secondary education.
(see Table 11). No significant association was found between mothers' age and knowledge of causes of measles.

Table 11. Relationship between mothers' education and knowledge of causes of measles.

<table>
<thead>
<tr>
<th>Education\ Knowledge level</th>
<th>good no. (%)</th>
<th>poor no. (%)</th>
<th>none no. (%)</th>
<th>Total no. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td>11 (10.7)</td>
<td>29 (28.2)</td>
<td>63 (61.2)</td>
<td>103 (36.8)</td>
</tr>
<tr>
<td>primary</td>
<td>23 (15.1)</td>
<td>63 (41.4)</td>
<td>66 (43.4)</td>
<td>152 (54.3)</td>
</tr>
<tr>
<td>secondary</td>
<td>6 (24)</td>
<td>14 (56)</td>
<td>5 (20)</td>
<td>25 (8.9)</td>
</tr>
<tr>
<td>Total</td>
<td>40 (14.3)</td>
<td>106 (37.9)</td>
<td>134 (47.9)</td>
<td>280 (100)</td>
</tr>
</tbody>
</table>

\[ X^2 = 16.40779 \quad 4df \quad p = 0.00252 \]
Relationship between mothers' knowledge of causes of pneumonia and mothers' knowledge of causes of measles: mothers' knowledge of causes of pneumonia was found to be significantly associated with knowledge of causes of measles but not with mothers' age, mothers' education, yearly household income or occupation of the head of the household. Mothers with poor or no knowledge of causes of pneumonia were most likely to have poor or no knowledge of causes of measles as shown in Table 12.

Table 12. Relationship between mothers' knowledge of causes of pneumonia and mothers' knowledge of causes of measles. (n=160).

<table>
<thead>
<tr>
<th>Pneumonia know.</th>
<th>good no. (%)</th>
<th>poor no. (%)</th>
<th>none no. (%)</th>
<th>Total no. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measles know.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>good</td>
<td>7 (35)</td>
<td>9 (45)</td>
<td>4 (20)</td>
<td>20 (13)</td>
</tr>
<tr>
<td>poor</td>
<td>15 (20)</td>
<td>42 (55)</td>
<td>20 (26)</td>
<td>77 (48)</td>
</tr>
<tr>
<td>none</td>
<td>5 (8)</td>
<td>22 (35)</td>
<td>36 (57)</td>
<td>63 (40)</td>
</tr>
<tr>
<td>Total</td>
<td>27 (17)</td>
<td>73 (46)</td>
<td>60 (37)</td>
<td>160 (100)</td>
</tr>
</tbody>
</table>

\[X^2 = 20.95625 \quad 4df \quad p = 0.00032\]
(b) Symptoms of measles

Of the 280 mothers who said they knew measles, 210 (75%) had good knowledge of the symptoms of measles and 70 (25%) had fair knowledge, (see Figure 4).

Score for knowledge of symptoms of measles.

- good knowledge: knows 4 or more symptoms
- fair knowledge: knows 1-3 symptoms

[In this study, the symptoms of measles were: maculo-papular skin rash, fever, cough, red eyes and diarrhoea]
Relationship with other variables: there was a statistically significant association between the age of the mother, (but not her education) and her knowledge of symptoms of measles. The oldest mothers had the best knowledge of symptoms of measles, (see Table 13).
Table 13. Relationship between mothers' age and knowledge of symptoms of measles (n=280)

<table>
<thead>
<tr>
<th>Age in years\Knowledge level</th>
<th>Good knowledge no. (%)</th>
<th>Fair knowledge no. (%)</th>
<th>Total no. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>26 (58)</td>
<td>19 (42)</td>
<td>45 (16)</td>
</tr>
<tr>
<td>20-29</td>
<td>107 (79)</td>
<td>28 (21)</td>
<td>135 (48)</td>
</tr>
<tr>
<td>30-39</td>
<td>64 (75)</td>
<td>21 (25)</td>
<td>85 (30)</td>
</tr>
<tr>
<td>40-49</td>
<td>13 (87)</td>
<td>2 (13)</td>
<td>15 (5)</td>
</tr>
<tr>
<td>Total</td>
<td>210 (75)</td>
<td>70 (25)</td>
<td>280 (100)</td>
</tr>
</tbody>
</table>

\[X^2 = 9.51750\quad 3\,\text{df}\quad p = 0.02315\]

ATTITUDES CONCERNING MEASLES

(a) Treatment and prevention of measles

Out of 278 mothers, 277 (99.6%) thought that measles is treatable. Of those 277 mothers, 150 (54%) stated that treatment of measles is by modern methods alone. Whereas 8 (3%) of the mothers mentioned traditional methods, 119 (43%) mothers thought both methods could treat measles (see table 14).
Modern methods of treating measles were preferred by 233 (84%) of the mothers, traditional treatment by 14 (5%) while 32 (11%) of the mothers showed no preference between the two methods, (see table 15).

Many mothers, 179 (66%) thought measles is preventable but 93 (34%) thought otherwise, as shown in table 16.

Of the mothers who thought measles is preventable, 139 (78%) said vaccination is used, whereas 37 (22%) mentioned other methods.
Table 14. Whether measles is treatable and methods used
(n=278) and (277)

<table>
<thead>
<tr>
<th>Measles treatable</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>277</td>
<td>99.6</td>
</tr>
<tr>
<td>no</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>278</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Method of treatment</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>modern</td>
<td>150</td>
<td>54</td>
</tr>
<tr>
<td>traditional</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>both</td>
<td>119</td>
<td>43</td>
</tr>
<tr>
<td>Total</td>
<td>277</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 15. Treatment preferred and prevention of measles. (n=279) and (n=272)

<table>
<thead>
<tr>
<th>Treatment preferred</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>modern</td>
<td>233</td>
<td>84</td>
</tr>
<tr>
<td>traditional</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>both</td>
<td>32</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>279</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measles preventable</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>179</td>
<td>66</td>
</tr>
<tr>
<td>no</td>
<td>93</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>272</td>
<td>100</td>
</tr>
</tbody>
</table>

(b) Whether measles is a serious disease
Measles was considered a serious disease by 273 (98%) of the mothers while 6 (2%) considered measles a non-serious disease (see table 16).
Relationship with other variables: whether mothers thought measles is a treatable disease or not was not significantly associated with their age, or education.

There was also no significant association between age or education and whether mothers considered measles a serious disease.

However there was a statistically significant association between mothers' education and whether measles was thought to be preventable. Mothers with a secondary level of education were most likely to say that measles is preventable and those with no formal education were the least likely (see Table 17).
Table 17. Relationship between mothers' education and whether measles is preventable.

<table>
<thead>
<tr>
<th>Education\measles preventable</th>
<th>yes</th>
<th>no</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no.</td>
<td>(%)</td>
<td>no.</td>
</tr>
<tr>
<td>none</td>
<td>56</td>
<td>57.1</td>
<td>42</td>
</tr>
<tr>
<td>primary</td>
<td>102</td>
<td>68</td>
<td>48</td>
</tr>
<tr>
<td>secondary</td>
<td>21</td>
<td>87.5</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>179</td>
<td>65.8</td>
<td>93</td>
</tr>
</tbody>
</table>

\[ \chi^2 = 8.60949 \quad 2df \quad p = 0.01350 \]

PRACTICES CONCERNING ARI

(a) Breastfeeding

The majority of mothers said they continued to breastfeed their children during severe illness. Those who breastfed were 294 (98%) compared to 5 (2%) who did not.

Relationship with other variables: mothers' age, education and yearly income were not found to have any significant association with whether a mother continued to breastfeed a child during a serious illness or not.
(b) Giving fluids during child sickness.
Most mothers said that they gave fluids to their sick children. Mothers who gave fluids were 292 (98%) compared to 7 (2%) who did not. The fluids given included: milk, given by 227 (78%) mothers; porridge by 219 (75%); water by 39 (13%) and other fluids (fruit juice, tea, glucose solution) by 145 (50%) mothers.

(c) Giving food during child sickness.
The majority of the mothers (98%) continued to give food to their sick children compared to 6 (2.0%) who did not.

(d) Self-medication of ARI
When a child had cough, most mothers said they gave drugs; 276 (93%) gave drugs but 21 (7%) did not.
Cough mixtures/ linctus was given for cough by 193 (70%) of the mothers; antipyretics by 27 (10%); antimalarials by 29 (11%); herbs by 37 (14%) and other drugs by 74 (27%) mothers.

For children with common cold, 281 (94%) of the mothers said they gave drugs whereas only 18 (6%) mothers did not.
Cough mixture/linctus was given by 14 (5%) mothers; antipyretics by 169 (60%); antimalarials by 173 (62%); herbs by 19 (7%) and other drugs by 60 (21%) mothers.
Relationship of mothers' education to use of cough mixture/linctus to treat cough: there was a statistically significant relationship between mothers' level of education and use of cough mixture/linctus to treat cough. Mothers with a secondary level of education were the most likely to self-medicate their children who had cough using cough mixture/linctus (see table 18).

Table 18. Relationship between mothers' education and use of cough mixture/linctus to treat cough

<table>
<thead>
<tr>
<th>Education\ Cough mixt. for cough</th>
<th>yes</th>
<th>no</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>no.</td>
<td>(%)</td>
<td>no.</td>
</tr>
<tr>
<td>none</td>
<td>66</td>
<td>(65.3)</td>
<td>35</td>
</tr>
<tr>
<td>primary</td>
<td>104</td>
<td>(69.8)</td>
<td>45</td>
</tr>
<tr>
<td>secondary</td>
<td>23</td>
<td>(92)</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>193</td>
<td>(70.2)</td>
<td>82</td>
</tr>
</tbody>
</table>

\[ X^2 = 6.82569 \quad 2df \quad p = 0.03295 \]

Health seeking behaviour

According to 160 (54%) of the mothers, when a sick child required treatment elsewhere, the decision to take the child was usually made by the father. However, 120 (40%) of the mothers said that such a decision was taken by the child's
mother while 18 (6%) of the mothers stated that both parents or relatives could take the decision.

When help was required, the place of first resort for 276 (92%) of the mothers was the health centre/clinic while for 14 (5%) and 8 (3%) of the mothers, it was the drug shop and hospital respectively.

The commonest reason for the choice of the place of first resort was its proximity to the home, according to 172 (58%) mothers. Affordability of the service was of concern to 49 (16%) mothers.

VERBAL AUTOPSY

In the year preceding the study, 20 (7%) of the mothers experienced death of a child aged under five years. Of the 20 children who died, 12 (63%) probably died of pneumonia. The children who died of pneumonia had a mean age of 16.8 months (range 2-60 months and SD 17.6) and 60% of them were infants.

[ Score for verbal autopsy of pneumonia.

Pneumonia : cough + fast breathing and / or chest indrawing, difficult breathing ]
CHAPTER SIX

6.0 DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

6.1 DISCUSSION

In this community, most mothers were young and married which suggests that they started their families early. Many mothers also continued to have children till late. This certainly may result in high fertility or "too many" children with unfavourable consequences for child health.

The high proportion of mothers with no formal education coupled with a small proportion who go beyond primary school, worsens prospects for proper child care in the study area. This is in view of the finding that mothers with higher education were more likely to have better incomes than those with no formal education. With good incomes families are in a position to take care of their children well.

Christians were the majority in this area as well as in the whole of Uganda with Muslims constituting 10% of the population. Reasons for this religious structure are historical dating back to the pre-independence period.

Eight percent of the households studied were headed by females, which is slightly lower than was found by Barton and Bagenda, (47), who however noted that female household headship was higher in Central, (16%) and Western Uganda,
They further noted that female heads of household were less educated and had less income than their male counterparts, (47). As a result of this, children in female headed households were likely to be more vulnerable to poor health.

The predominance of agriculture, accounting for 74% of the occupations, was similar to that found by Barton and Bagenda (47). Salaried employment of heads of households, at 10% appears to be high for a rural area like this one but it probably includes heads of household who are away in towns and only come home occasionally.

More than half of the mothers estimated their yearly income at less than Uganda Shillings 250,000. This is less than US dollars 250 (at current rate of 1,000 Uganda Shillings to the US dollar) but realistic for a farming community in a poor developing country.

The proportion of mothers who did not know their incomes (31%), is alarming. It may be a pointer to the dependence of women on their husbands for financial decisions which affect child health.

Barton and Bagenda considered the quality of home construction as an indicator of affluence (47). Construction materials for the roof, the wall and the floor of living houses as found by
this study were similar to those found by them. However, the proportions of houses with poorer materials were higher in this study than in theirs. This probably implies that this community is less affluent than the national average.

Twenty percent of the mothers used their living houses as cooking places and 30% of the houses lack windows just like 40% of the kitchens. The highly prevalent use of woodfuel for cooking in this area, combined with the poor state of house and kitchen ventilation heightens exposure to indoor air pollutants. This is likely to put young children in this environment at risk of getting ARI.

The low level of smoking among mothers, (4%), would have been "protective" against ARI if there was no five-fold presence of other smokers in the households.

Sixty-six percent of the mothers did not know the causes of pneumonia and only 7% had good knowledge of the causes. Kiboneka's study found that 42% of the respondents did not know the causes of colds and coughs (37). Considering that pneumonia is more difficult to perceive, mothers' knowledge of its causes is likely to be lower than mothers' knowledge of the causes of colds and coughs.

Mothers' knowledge of causes of pneumonia is very low and there should be an effort to enhance it.
Forty-five percent of the mothers did not know the symptoms of pneumonia and those who had good knowledge of them were only 30%. This shows that many mothers need education about symptoms of pneumonia in children which should enable them to detect it early and take appropriate action.

Proportionately, more mothers had better knowledge of the symptoms of pneumonia than its causes. It may be that the symptoms can be learnt through experience more easily than the causes. Whereas health education stresses knowledge of symptoms and signs of pneumonia, it is relevant to teach about the causes in order to facilitate the understanding of the disease, its management and prevention.

The proportion of mothers who did not know the symptoms of pneumonia and symptoms which indicate its severity, was the same, (45%). However, the proportion who had good knowledge of symptoms, (29%), was higher than that for knowledge of symptoms which indicate severity of pneumonia, (19%). It could be that mothers' perception of severity of pneumonia is different from what is considered standard particularly if they have had no relevant education or experience.

A little more than a half of the mothers who said they knew pneumonia, (53%), considered it a serious disease. Pneumonia is definitely a very serious disease and if the mothers had a good understanding of it, a much higher proportion would have said so.

Generally mothers' knowledge of pneumonia and attitudes about
it were not significantly associated with mothers' age or education. This raises suspicion that pneumonia is not well understood in the local socio-cultural context and that access to knowledge about it is also limited. The mothers are therefore unlikely to be well prepared to deal with it hence mortality from it is likely to be high as was found in this study.

Whereas 13% of the mothers had good knowledge of the causes of measles, 51% did not know of its causes. Thus a significant proportion of mothers had low knowledge of the causes of measles, similar to pneumonia. However it was found that unlike for pneumonia, mothers who had a higher education also had a better knowledge of the causes of measles. This is probably because the better educated mothers have had access to information about measles and not pneumonia or they understand better the health messages of the national programme of immunization.

Seventy percent of all the mothers had good knowledge of symptoms of measles and only 7% did not know. Measles may still be common in this area and so the mothers, particularly the older ones, have good knowledge of its symptoms. It is a disease whose manifestations, like the skin rash and its often fatal outcome, leave most mothers who have seen it educated permanently. Over 90% of the mothers regarded measles as a
treatable disease, probably again, through experience.

Though 80% of the mothers said they preferred modern treatment of measles to the traditional, in practice this may not be so. This is because 40% of the mothers mentioned that measles is treated using both modern and traditional methods. Whereas 60% of the mothers knew that measles is preventable, only 46% knew that vaccination is used. This is despite the fact that the national programme of immunization has been around for over 10 years. Knowledge of prevention of measles was associated with formal education. In order to increase the awareness of even the less educated mothers about measles prevention it is necessary to carry out vigorous health education.

Not surprisingly, over 90% of the mothers considered measles a serious disease and this was not associated with mothers' age or education. If measles is a common experience for most mothers, the age and education factors are unlikely to have much influence on this attitude about measles.

The majority of mothers said that they continued to breastfeed, give fluids and food during childhood illness. Fluids and food given are the locally available ones like porridge, milk, fish, fruit juices and tea. These practices were not associated with mothers' age or education but are probably linked to the local culture. It is a local belief
that rejection of food or drink by a patient is ominous and because of this there is a tendency to offer the "best food" during serious illness, partly to gauge prognosis. The practices are good and should be promoted in the community since it is known that malnutrition is a risk factor for pneumonia among young children (14).

Most mothers were found to self-medicate their children who had cough or common cold. More mothers tended to use antipyretics and antimalarials for common cold than for cough though this was not statistically significant. Self-medication can be dangerous therefore mothers need to know the correct drugs to use and for which types of ARI and to refer when it becomes necessary.

Mothers with secondary school education were the most likely to use cough mixture/linctus for children with cough. It may be that they have more money to spend on their sick children since they were found to have better incomes than their less educated colleagues. It is also possible that they regard cough mixture/linctus to be a cure for coughs, which implies that they have little knowledge on the correct use of drugs.

Males headed most households and they played a bigger role in deciding when to seek help for a sick child and yet mothers who are the firstline health care providers are the secondline decision makers. This confirms the earlier suggestion that
when mothers depend on their husbands for financial decisions the health of their children can be affected. If mothers could be empowered economically, it is likely that they could share the decision-making role equally with the males.

Geographical access is the commonest reason which was given for choosing nearby health centres/clinics for consultation. Proximity is important probably because of lower costs to households since most of them had low incomes and could not afford to travel far for treatment especially when user fees are nowadays charged at most health facilities.

Sixty-three percent of the deaths of children under five years of age in Samia Bugwe were probably due to pneumonia. This is very high, 3 times more than was found in South West Uganda (41) and could be explained partly by the mothers' low knowledge of pneumonia. In developing countries generally ARI is responsible for up to 33% of deaths of young children (5). Malaria is common in the study area (44). The problem of differentiating between the symptoms of pneumonia and malaria may also explain the high proportion of child deaths attributable to pneumonia in the study area (48).
6.2 CONCLUSIONS

1. In Samia-Bugwe County most mothers were young, married, poorly educated and had low incomes.

2. The potential for indoor air pollution by wood fuel smoke was very high unlike for tobacco smoke.

3. Knowledge of causes, and symptoms of pneumonia (including symptoms which indicate pneumonia severity) was low. More than 50% of the mothers did not know the causes of pneumonia or measles but knowledge of symptoms of measles was very high.

4. Mothers were aware that measles is a serious disease which is treatable but many still did not know that it is prevented by vaccination. A few mothers were also aware that pneumonia is a serious disease.

5. Mothers had good nutritional practices during childhood illness.

6. Self-medication during ARI illness was commonly practised in this community.

7. Health centres/clinics were commonly preferred for consultation because of their proximity to the clients.

8. Pneumonia-related mortality seemed to be high among children under five years of age.
6.3 RECOMMENDATIONS

1. A phased ARI intervention should be planned and implemented in Samia-Bugwe County. The community, especially mothers should be educated about causes, symptoms and signs, case management and prevention of ARI including measles. This is likely to minimise the danger of self-medication and also reduce ARI mortality among underfives.

2. The community in Samia Bugwe should be encouraged to continue with the good nutritional practices during childhood illness.

3. Further research should be done to clarify issues of ARI morbidity and mortality in relation childhood malaria which mimics pneumonia in young children. Mothers need to know what to do when confronted with the problem of one or both of these diseases.

4. To avoid excessive indoor air pollution the community should improve house construction in future or even now to allow for proper ventilation. This is not difficult since most houses were made of non-permanent materials which are amenable to easy modification. If this is done the risk of ARI among young children will probably be reduced.
7.0 REFERENCES


Khan, A.M., Rehman, G. N., Qazi, S. A., 1990 "Control of Acute Respiratory Infections in Pakistan, Present Status and Future Developments".


16. Pinnock, C. B., Douglas, R. M., Badcock, N. R., 1986, "Vitamin A status in children who are prone to respiratory tract infections" Australian Paediatric Journal 22(2) pp 95-


47. Barton, T., Bagenda, D., 1993, "Family and Household Spending Patterns For Health Care " Child Health and Development Centre, Makerere University.

APPENDICES

(A) QUESTIONNAIRE

(Please fill in spaces provided)

SERIAL NUMBER /____/____/____/

DATE OF INTERVIEW /____/____/____/
    day month year

NAME OF INTERVIEWER ...........................................

NAME OF FIELD SUPERVISOR ....................................

VILLAGE .........................................................

PARISH ..........................................................

SUBCOUNTY ....................................................... 

COUNTY ...........................................................

PART A

RESPONDENT

1. Name? ..........................................................

2. Age? /____/____/____/ Years

3. Date of birth /____/____/____/ day month year

4. Marital status.

married = 1
Single = 2
Widowed = 3
Divorced = 4
Separated = 5

/.../
5. Number of children ever born.

<table>
<thead>
<tr>
<th>Child</th>
<th>Date of birth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

6. Children below 5 years of age?

7. Sorry for this question. Have any of your children died? (please exclude abortions)
   Yes = 1
   No = 2

8. If yes, how many died?

<table>
<thead>
<tr>
<th>Child</th>
<th>Date of birth</th>
<th>Date of death</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Number of children died below age of 5 yrs
   /___/___/
10. What is your religious belief?
   Catholic = 1
   Protestant = 2
   Muslim = 3
   Other = 4

11. What is the gender of the head of this household?
   Female = 1
   Male = 2

12. What is the main occupation of the head of this household?
   Peasant = 1
   Salaried worker = 2
   Self-employed = 3
   Unemployed = 4

13. How much income does your household earn every year? (from all sources)
   Less than Ug. Shs. 250,000 = 1
   Ug. Shs. 250,000 - 500,000 = 2
   Over Ug. Shs. 500,000 = 3

Before we continue, I request you to let me have a brief look at how your living house and kitchen are constructed.

14. The roof of the house
   Grass-thatched = 1
   Iron sheets = 2
   Tiles = 3
   Other = 4 (specify)..........................

15. The wall
   Mud = 1
   Bricks = 2
   Timber = 3
   Other = 4 (specify)..........................

16. The floor
   Earth = 1
   Cemented = 2

77
17. Ventilation of living house

Eaves spaces present = 1
Eaves spaces absent = 2

18. Windows on living house

Present = 1
Absent = 2

19. KITCHEN

Present = 1
Absent = 2

20. KITCHEN VENTILATION

Eaves spaces present = 1
Eaves spaces absent = 2

21. KITCHEN WINDOWS

Present = 1
Absent = 2

22. Cooking inside living house

Always = 1
Sometimes = 2
Never = 3

23. FUELS USED FOR COOKING

Wood = 1
Charcoal = 2
Animal dung = 3
Crop residues = 4
Other = 5 (specify)

24. Do you smoke? (any tobacco)

Yes = 1
No = 2

25. Does any other member of the household smoke?

Yes = 1
No = 2

26. If yes, how many members do smoke?

One = 1
Two = 2
Three = 3
More than three = 4
ARI MORTALITY

27. Has any of your children under five years of age been sick in the last 2 months?

Yes = 1
No = 2

28. If yes, what did the child have?

Cough = 1
Common cold = 2
Fever = 3
Other = 4 (specify) ..........................
Dont remember = 5

K.A.P

29. Do you know what pneumonia is?

Yes = 1
No = 2

If no, SKIP to Q.38.

30. If yes, what causes pneumonia?

Germs = 1
Polluted environment = 2
Poor feeding = 3
All the above = 4
Other = 5 (specify) ..........................
Don't know = 6

1. What are the symptoms of pneumonia?

Fever = 1
Cough = 2
Common cold = 3
Fast breathing =4
All the above = 5
Don’t know = 6

Which symptoms indicate to you that the pneumonia is becoming worse?

Fever = 1
Fast breathing = 2
Chest in-drawing = 3
Other = 4 (specify) ..........................
Don’t know = 5
33. Is pneumonia a serious disease?
   Yes = 1
   No = 2
   Don’t know = 3

34. Do you feel you know enough about pneumonia?
   Yes = 1
   No = 2

35. If no, are you willing to spare time to learn more about it?
   Yes = 1
   No = 2
   Not decided = 3

36. Do you know what measles is?
   Yes = 1
   No = 2

If no, SKIP to Q.44

37. If yes, what causes measles?
   Germs = 1
   Polluted environment = 2
   Poor feeding = 3
   All the above = 4
   Other = 5 (specify) .........................
   Don’t know = 6

38. What are the symptoms of measles?
   Fever = 1
   Cough = 2
   Red eyes = 3
   Skin rash = 4
   Diarrhoea = 5
   Other = 6 (specify) ..........................
39. Is measles curable?
   Yes = 1
   No = 2

40. If yes, how can measles be cured?
   Using traditional methods of treatment = 1
   Using modern methods of treatment = 2
   Other = 3 (specify)

41. What is your preference between traditional and modern methods of treatment of measles?
   Traditional treatment preferred = 1
   Modern treatment preferred = 2
   No preference = 3

42. Is measles be preventable?
   Yes = 1
   No = 2

43. If yes, how is measles prevented?
   Vaccination = 1
   Other = 2 (specify)
   Don't know = 3

44. Is measles a serious disease?
   Yes = 1
   No = 2
   Don't know = 3

45. What do you do when a child has a stuffy nose (common cold) ?
   Clear the nose = 1
   Give drugs = 2
   All the above = 3
   Do nothing = 4 (specify)

46. If you take no action, why is that so?
   It is not a problem = 1
   Too busy with my domestic work = 2
   Other = 3 (specify)
   No reason = 4
47. Do you continue to breastfeed a child who is very sick with pneumonia?
   Yes = 1
   No = 2

48. Do you give any other fluids?
   Yes = 1
   No = 2

49. If yes, what fluids do you give?
   Milk = 1
   Porridge = 2
   Water = 3
   Other = 4 (specify)

50. Do you give food to a child very sick with pneumonia?
   Yes = 1
   No = 2
   Don't know = 3

51. If yes, what food do you give?
   Food(s) given

   (Interviewer should classify the foods mentioned, as below.)
   Energy giving food = 1
   Protein = 2
   Fat = 3
   Fruits and vegetables = 4
   All the above = 5
   Don't know = 6

52. Do you give drugs to a child who has a cough before you consult anybody else?
   Yes = 1
   No = 2

53. Do you give drugs to a child who has common cold before you consult anybody else?
   Yes = 1
   No = 2
54. If yes, what drugs do you give to such a child?
Cough mixture/linctus = 1
Antipyretics = 2
Antimalarial = 3
Herbs = 4
Other = 5 (specify)..........................

55. Who decides that the sick child should get help elsewhere if there is no improvement with the treatment you give?

The child's father = 1
The child's mother = 2
Other relative = 3 (specify)...................

56. Where do you first seek help?

Drug shop = 1
Traditional healer = 2
Health Centre/clinic = 3
Hospital = 4
Does not seek help = 5

57. What is the reason the place you have mentioned is chosen?

It is near my home = 1
The service is affordable = 2
Treatment is readily available = 3
The health care providers are sympathetic = 4
My family approves of it = 5
Other = 6 (specify) ...........................

58. If you do not seek help, why not?

I cannot afford to pay for it = 1
The health care provider facility is far away = 2
My family does not approve of it = 3
Other = 4 (specify) ..........................
PART B (VERBAL AUTOPSY)

QUESTIONS TO ELICIT INFORMATION ABOUT PNEUMONIA AS CAUSE OF DEATH IN CHILDREN AGED 0-59 MONTHS

You have patiently answered many questions. Thank you but before we finish, please tell me if anything serious may have happened to any of your children.

59. Has any of your children died in the last six months?
   Yes = 1
   No = 2

60. When was he or she born?

61. When did he or she die?

62. Did the child have a cough before he or she died?
   Yes = 1
   No = 2
   Don’t know = 3

63. If yes, how long before death?
   ........................................................ hours
   ........................................................ days

64. Did the child have difficult breathing?
   Yes = 1
   No = 2
   Don’t know = 3

65. Did the child have fast breathing before he or she died?
   Yes = 1
   No = 2
   Don’t know = 3

66. If yes, how long before death?
   ........................................................ hours
   ........................................................ days
67. Was the child having chest indrawing?
   Yes = 1
   No = 2
   Don't know = 3

68. If yes, how long before death?

   ..................................................... hours
   ..................................................... days

69. Did the child have fever?

   Yes = 1
   No = 2
   Don't know = 3

70. If yes, how long before death?

   ..................................................... hours
   ..................................................... days

71. Do you remember anything else that the child had before he or she died?

   Yes = 1
   No = 2

72. If yes, what did the child have?

   ..............................................................
Acute Respiratory Infections (ARI): Clinical syndromes

Upper respiratory tract
- Nasal cavities
- Pharynx
- Epiglottis
- Larynx
- Eustachian tube
- Rib
- Right bronchus
- Right lung
- Diaphragm

Lower respiratory tract
- Tongue
- Trachea
- Esophagus
- Left lung
- Left bronchus
- Small bronchi
- Bronchioles
- Alveoli

Acute upper respiratory infections (AURI)
- Cold
- Otitis media
- Pharyngitis

Acute lower respiratory infections (ALRI)
- Epiglottitis
- Laryngitis
- Laryngotracheitis (causing Stridor)
- Bronchitis
- Bronchiolitis
- Pneumonia
- Croup
- Conditions causing Stridor