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Knowledge and Practices Among Mothers in Detection, Treatment and Prevention of Acute Respiratory Tract Infections in Children Under Five Years in Kandy Municipal Council Area

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ABSTRACT

Introduction: Acute Respiratory Tract Infections (ARTI) cause childhood morbidity and mortality worldwide. Mothers play a crucial role, identifying early symptoms and obtaining proper medical advice. It was the aim of this study to assess the knowledge and practices regarding symptoms, treatment and prevention of ARTIs among mothers of children less than five years of age in the Kandy Municipal Council. **Materials and Methods:** A cross-sectional study was conducted with the participation of mothers having one or more children less than five years of age living in the Kandy Municipal Council Area. A questionnaire was used to assess the knowledge level regarding detection, prevention and treatment of ARTIs and values were compared with demographic factors. **Result:** Total of 424 mothers were recruited age range 22-35 years. The majority of mothers (83.73%) identified pneumonia as a severe ARTI. The majority (74.23%) gathered health information from public media. Many children suffered from several episodes of ARTI during the previous year. A cold was the commonest symptom and 68.87% identified viruses as the cause. Half the mothers (50.24%) sought medical advice immediately, while 33.96% gave home remedies. Family members with ARTI were separated from the child (66.04%), and 86.79% tried to improve the immunity as preventive measures. A significant relationship was found between the knowledge score and educational level, income, and employment, but not the age, and number of children. **Conclusion:** Overall knowledge of the mothers regarding ARTIs was not satisfactory. Mothers with a high income, high level of education and employment had better knowledge.

Keywords: Acute respiratory tract infection, children under five, detection, prevention, treatment

INTRODUCTION

Acute respiratory tract infection (ARTI) is a general term used to describe a short-term

infection anywhere along the respiratory tract. ARTIs are classified as upper respiratory tract infections (URIs) or lower respiratory tract infections (LRIs). The upper respiratory tract



consists of the airways from the nostrils to the vocal cords in the larynx, including the paranasal sinuses and the middle ear. URIs are the most common ARTIs and include the common cold, sinusitis, tonsillitis, pharyngitis, otitis media, and laryngitis. The lower respiratory tract covers the continuation of the airways from the trachea and bronchi to the bronchioles and the alveoli. LRIs include pneumonia, acute bronchitis, bronchiolitis, and exacerbations of chronic lung disease.

ARTIs are considered as one of the leading causes of mortality and morbidity in children less than five years of age worldwide. It is believed that about 33% out of the total number of children under five years of age in the world complain of a cough or difficulty in breathing due to ARTIs annually (1, 2, 3). They are the leading cause of death among children under five years of age and are estimated to be responsible for between 1.9 million and 2.2 million childhood deaths globally (4, 5).

The problem is quite serious in Sri Lanka as well with, the population of children less than five years of age nearly accounts for 8.6% of its whole population (6, 7). The prevalence of acute respiratory tract infections and their impact on overall health and well-being of children under five years of age in Sri Lanka is quite similar to that of the world. Acute respiratory tract infections are considered leading causes of childhood morbidity and mortality in Sri Lanka as well (8).

The World Health Organization has identified the population movement, overcrowding and poor ventilation, poor access to health services, food shortages, low birth weight, lack of safe water, poor hygiene practices and poor sanitation as the common risk factors for increased disease burden for acute respiratory tract infections in Sri Lanka (9).

Even though ARTIs can be prevented if appropriate preventive measures are taken and proper hygiene is practiced, children under 5 years of age can still be a victim of respiratory infections. However early detection and proper management of the illness can significantly reduce morbidity and mortality of ARTs. In this regard, the knowledge of the parents especially the mother is of great importance (10 - 14).

It is believed that five aspects of care given by the parents greatly influence the course and outcome

of respiratory illnesses. They are the parents' perception of the disease, patterns and habits of care administered to child during the illness, the level of concern in terms of the decision to seek assistance outside the home, the manner in which that outside care is sought, and the extent to which the recommendations regarding care are followed (15). A low level of knowledge and concern is generally associated with delays in utilizing the available health services, and in cases where the illness progresses rapidly, with the greater risk of the child dying at home.

As far as Sri Lanka is concerned, to the best of our knowledge not many studies have assessed the knowledge of mothers on respiratory diseases affecting their children. Such assessments will ensure appropriate levels of knowledge in mothers and help in reducing the risk of illnesses, ultimately leading to healthy growth and development of children.

With this background this study aims to assess the knowledge regarding symptoms, treatment, and prevention of acute respiratory tract infections among mothers of children under five years of age in the Kandy Municipal Council area.

METHODOLOGY

Ethical clearance was granted by the institutional ethics committee (Faculty of Medicine, University of Peradeniya). Written permission was sort from all relevant health administrative personals. Mothers of children under five years of age, who were permanent residents of Kandy Municipal Council area, with the ability to speak and understand Sinhala or English, were recruited for the study. Sample size for the study was calculated according to the formula for cross sectional studies (16). The final sample size was 424.

The Kandy Municipal Council area is comprised of 10 ongoing well baby and antenatal clinics. An average of 40 mothers attends each clinic. Out of the ten clinics, seven were selected randomly by the lottery method. Every second mother based on the order of attendance to the clinic was selected for participation. Critically ill and mentally unsound mothers were excluded.

The independent variables included age, level of education and family income. The dependent

variable was the knowledge regarding identification, management and prevention of ARTIs.

Written informed consent was obtained from all participants. An interviewer administered questionnaire was used for data collection. Questionnaire was designed to assess knowledge on identification of signs and symptoms of acute respiratory tract infections and its preventive methods. Most questions used in the questionnaire were close ended with few open-ended questions. The questionnaire consisted of three sections, demographic details, structured knowledge questionnaire and structured practice questionnaire.

Ten interviewers participated in data collection. Interviewers were trained under the guidance of the coauthor experienced in conducting interviews. A pretest was conducted on a group of 20 mothers attending the well-baby clinic in Asgiriya. Issues that occurred at pretesting were discussed with the coinvestigators. The questionnaire was reformulated using the information gathered from these interviews. Since all mothers recruited for the pretest were fluent in Sinhalese, all interviewers were advised to collect data using the Sinhala translation of the questionnaire to avoid and minimize biases in questioning.

Data were entered into a Microsoft Excel datasheet. Analysis of the bivariate data was done using one-way ANOVA test with the Bonferroni procedure and independent samples t test was performed with SPSS version 20.

RESULTS

Four hundred and twenty-four mothers were recruited for the study. The age range of the mothers was 22-35 years with an average of 28.5(SD=6.2). Of the mothers, 43.40% had a single child, while 37.50% had two children and 19.10 % had three or more children. Of the sample 36.56% of mothers were educated up to G.C.E ordinary level while 43.16% of mothers were educated up to the G.C.E advanced level and only 8.73% mothers had higher education with a degree or a diploma. Most mothers were unemployed (78.54%). Occupations were categorized according to the

International Standard Classification of Occupation (ISCO-88). Of the mothers 8.73% were professionals, 4.48% and 2.36% respectively were in the clerks, technicians and associate professional category. In the majority of families, the monthly income was between Rs. 20,000 and 50,000 (51.18%) while 26.65% had an income more than Rs. 50,000 per month and 22.17% had an income less than Rs.20, 000.

Out of the participants 83.73% of mothers identified asthma as a respiratory disease while 61.56% were aware that pneumonia was a severe respiratory infection. Of the sample only 12.97% and 12.50% of mothers identified bronchitis and laryngitis as respiratory illnesses respectively. Of the mothers only 6.37% have mentioned tuberculosis, as a respiratory illness in the free comments section.

Most of the mothers (74.23%) stated that they got information about respiratory infections from television and radio, while 58.49% got information from health care workers, and 46.93% from newspapers and other publications.

Out of the sample 24.77% of children developed a respiratory tract infection once a year while 36.08% of mothers mentioned that their child developed a respiratory tract infection once in a few months. Of the children 20.76% developed a respiratory tract infection once every three months and 14.15% of the children had one monthly. Of the mothers 4.24% mentioned that their children developed respiratory tract infections as frequently as once a week. Out of the sample 14.39% of mothers mentioned that her child had been admitted to the hospital due to a respiratory tract infection during the previous year.

Table 1 depicts the symptoms of respiratory tract infections identified by mothers. A running nose and cough being the commoner symptoms identified.

Table 2 gives information regarding the knowledge on infective agents. While 68.87% identified viruses as an infective agent, 1.89% stated that dust was a cause of infection.

Table 1: Symptoms by which mothers recognize the onset of respiratory tract infections

Symptom	No. of mothers	Percentage
Cough	282	66.51%
Running nose (cold)	307	72.41%
Sneezing	191	45.05%
Sore throat	106	25.00%
Fever	179	42.22%
Difficulty in breathing	132	31.13%
Abnormal breathing sounds	140	33.01%
Chest pain	23	5.42%
Sleeping difficulties or snoring	134	31.60%

Table 2: Causes of respiratory tract infections as identified by mothers

Causes of respiratory tract infections	No. of mothers	Percentage
Virus	292	68.87%
Bacteria	153	36.08%
Fungi	29	06.84%

Most of the mothers (62.74%) stated that they will seek medical advice first, while 46.46% of mothers said that they give some medicine/home remedies to the child before getting medical advice. Majority of mothers (48.11%) who were medicating the child at home, mentioned that they calculate the dose according to the weight of the child, while 28.30% calculated according to the age of the child.

As a preventive measure 66.04% of mothers claimed they separate the child from family members with respiratory infections. Further, isolation of the patient was a common practice among 32.78% of mothers, while 21.70% and 13.21% of mothers have mentioned that they will limit the utensils which are common to the child and the patient and try to protect the child against the infection.

Of the mothers 86.79% mentioned that they try to improve the immunity of the child. Out of these, 74.06% stated that they provide the child with nutritious food, 50.47% mentioned that they breast feed the child to improve the immunity and 46.93% that they vaccinate the child to improve the immunity. Further, boiling of utensils was considered as an act that improved immunity by 28.07% of mothers.

Only 23.35% of mothers said that their child has been immunized against respiratory tract infections while 76.65% said that their child has not been immunized against any respiratory tract infection even by the public clinic.

Marks were given to close ended questions in the questionnaire and grouped as excellent >90 marks, very good 75-89 marks, good 60-74 marks, 45-59 fair, 30-44 poor, <30 extremely poor. Scores are presented in table 3.

According to our grading scale, no mother scored over 90 marks. Two mothers scored between 75 and 85, (0.47%). Of the mothers 5.66% have scored between 60 and 74, while 16.27% of mothers scored between 45 and 59. Consecutively 40.80% and 36.79% of mothers scored between 30 and 44 and less than 30 (Table 3).

Table 3: Distribution of mothers according to their knowledge

Knowledge level	No. of mothers	Percentage
Excellent	0	0.00%
Very good	2	0.47%
Good	24	5.66%
Fair	69	16.27%
Poor	173	40.81%
Extremely poor	156	36.79%

There was no significant relationship between age, number of children and the knowledge score (ANOVA test between four age groups and number of children as single, two, three or more) ($p > 0.05$).

Relationship between educational level and knowledge score is presented in table 4. The ANOVA test revealed that there is a significant difference between the knowledge score and education level ($p < 0.05$).

Table 4: Score according to the education level of the mothers (last Exam faced)

Education Level	No. of mothers	Mean score
Up to Ordinary Level	204	32.25
Up to Advanced Level	183	36.16
Diploma or Degree	37	38.22
Total	424	34.46

Scores were cross-tabulated under 03 main income categories namely, less than Rs. 20 000, Rs. 20 000 – 50 000 and more than Rs. 50 000. The mean knowledge score for each category was 27.94 (SD=11.955), 34.93(SD=14.080), and 38.99 (SD=4.460) respectively.

There was a statistically significant association between income categories and knowledge scores (Table 5).

Table 5: Score according to family income

Income (Rs.)	No of mothers	Mean score
<20,000	94	27.94
20,000 – 50,000	217	34.93
>50,000	114	38.99
Total	424	34.46

Mothers who were, employed had a mean score of 39.63 (SD=13.165) while the unemployed mothers had a mean score of 33.05 (SD= 14.228).

An independent sample T-test was done for these two groups and a statistically significant difference between scores of employed and unemployed mothers was observed ($p<0.05$). Therefore, employed mothers have a higher level of knowledge regarding acute respiratory tract infections than unemployed mothers.

Among the occupation categories, professionals had a higher mean score of 43.14 (SD=12.49)

followed by clerks (39.05(SD=13.41). Occupations categorized as 'other' (armed forces, legislators, senior officials and managers, service workers and shop and market sales workers, skilled agricultural and fishery workers, craft and related workers, plant and machine operators and assemblers, elementary occupations) had a mean score of 36.32 (SD=13.67) and technicians and associated professional's category had a mean score of 36.00 (SD=12.495). The unemployed category which consisted of house wives, had a mean score of 33.05 (SD=14.23) (Table 6).

All categories of occupation showed higher knowledge levels than the unemployed group and the differences were statistically significant ($p<0.05$).

Table 6: Score according to the occupation of the mother

Occupation	No. of mothers	Mean score
Professionals	37	43.14
Clerks	19	39.05
Other	25	36.32
Technicians and associated professionals	10	36.00
Unemployed	333	33.05
Total	424	34.46

DISCUSSION

It is evident that respiratory tract infections are extremely common in Sri Lanka, especially during the monsoon season. It is evidenced by more than one-third of the participating mothers stating that their children had contracted an acute respiratory tract infection every few months during the previous year. It is reported that nearly 50% of children contracted 2-3 episodes of ARTI per year, this number increasing due to low birth weight, poor living conditions and illiterate mothers (17-19).

Overall knowledge score was quite low in our study sample. This may have been due to the fact that they scored very low in some of the questions. Mothers were unaware that there was a distinction between upper and lower respiratory tract

infections, with only a few mothers having some knowledge regarding this. However, most mothers were able to identify pneumonia as a serious ARTI. Similar findings are reported by Galvez et al (20).

Majority of mothers gathered information regarding acute respiratory tract infections from television, radio and from health workers. A study conducted in Iran however, reports that most mothers gathered knowledge and information from health care workers rather than public media (14). Public media is not always reliable and sometimes provide wrong information to the public. Therefore, mothers should be advised to rely on reliable sources of health information. However, if used wisely public media can be used as a reliable resource by health care professionals to spread correct health advice and warnings regarding spread of respiratory diseases.

Mothers were well aware that sneezing and cough heralded a respiratory infection. Rhinorrhea, fever, chest and throat pain and cough are common symptoms reported by mothers as symptoms of respiratory tract infections (21). A majority of mothers were aware that respiratory infections can be caused by viruses while, around 1/3 also knew about bacterial infections, understandably only a handful were aware of fungal infections.

Even though most ARTIs are self-limiting, and home remedies and proper care maybe enough to control the infection, some require medical care and intervention and it is imperative to recognize and treat such children diligently (22). Around 1/3 of mothers mentioned that they will seek medical advice immediately, while around half admitted that they will start home remedies first. Further analysis showed that younger the child more likely it was for the mother to seek medical advice early. A study done in Pakistan reveals that 64% of mothers will visit a doctor immediately. It is reported that mothers are not sure when to seek medical advice in the case of ARTIs and a wide range of views existed ranging between first few days to when alarming symptoms arise (23, 12). In some countries like Ethiopia a majority of mothers were seen to choose home remedies as the first line of treatment and showed reluctance to seeking medical treatment for ARTIs (24).

Even though deaths due to ARTIs are on the decline in the developing world, much morbidity is seen (25). Identification of risk factors and preventive procedures are important in reducing ARTIs among children (26, 27). In this survey we observed that mothers were aware of the fact that ARTIs are contagious and can spread to their child from a family member. A majority of mothers mentioned that they will keep the child separated from a family member suffering from ARTI in order to prevent disease transmission. Isolation of the patient, limitation of utensils which are common to both child and the patient are the other common preventive methods. The preventive methods may depend on the personal experiences, health education and the attitude of the mother. Further, a majority of mothers mentioned that they practice certain measures to improve the immunity of their child. This shows that the mothers are aware of the importance of a good immune system in preventing diseases. Breast feeding, providing nutritious food and vaccinations against respiratory pathogen were identified as methods to improve immunity by many mothers. Half of the mothers said that they breast feed their child in order to improve the immune system. In a study done on mothers' knowledge regarding breast feeding in Iraq 95% of subjects said that breast milk contains antibodies which protect a baby against infections (28). Further, close to half the mothers have mentioned that they vaccinate the child to improve the immunity. However, it was observed that some mothers had wrong views regarding immunity and disease prevention. One of the misconceptions regarding immunity recognized in this study was that some mothers were of the opinion that boiling of utensils is a way to improve immunity. It's important to educate mothers regarding disease preventive methods such as destruction of infectious agents by washing with soap and water and boiling of utensils.

The national immunization program in Sri Lanka has scheduled vaccinations against tuberculosis, diphtheria and pertussis which are serious respiratory tract infections. These diseases have been made extremely rare due to this vaccination program. Further, measles vaccination has prevented the development of pneumonia as a complication which is a serious LRTI. The HiB vaccine for *Hemophilus influenza* type B prevents

pneumonia in children under five years of age and is available in well baby clinics in Sri Lanka. Seasonal flu vaccines and pneumococcal vaccines are not available in the government sector currently but can be obtained from the private sector. Even though all mothers included in the study had vaccinated their children according to the national immunization schedule, only around quarter of the mothers said that their child had been immunized against respiratory infections by the well-baby clinic. However, most of the mothers could not name a vaccine or a disease for which their child had been immunized against. A majority of mothers said that their child has not been immunized against any respiratory tract infections. This reveals that most of the mothers do not have knowledge on vaccines which are given by the national immunization program against ARTIs. It is important to educate mothers on this and conduct programs at well baby clinics to improve knowledge regarding available vaccines (29).

A majority of mothers had a good level of knowledge regarding the identification of the symptoms of ARTIs. Further most mothers had good practices which would help to prevent ARTI. However, the majority of mothers have a very low knowledge score suggesting that their overall knowledge on acute respiratory tract infections is inadequate. Studies done in Iran and Pakistan showed that weaknesses in awareness programs may be the reason for the low level of knowledge. They also suggest that health communication using public media will help in enhancing and promoting knowledge in mothers and pave the way for better practices (14, 30). This method would be practical in the Sri Lankan setting as public media including television and radio was observed to be the major mode of gathering information regarding ARTIs.

Contrary to what was expected no correlation could be demonstrated between the age of the mother and her knowledge level. However, other studies revealed a significant correlation between maternal age and mother's knowledge and attitude regarding acute respiratory tract infections, where increasing age improved mother's knowledge (14).

The findings in this study indicate that mothers with a higher level of education had better knowledge

regarding ARTIs in all categories. Studies done in Iran however, showed that, there was no relationship between educational level of the mothers and their attitude and practice levels regarding acute respiratory tract infections in children (14, 30). The evidence is conflicting with regard to education level and knowledge. However, it seems likely that those with a higher level of education may seek information regarding their child's health conditions. Further, education level may not reflect the intelligence level of mothers and those with lower level of education may actually be of above average intelligence and seek information.

Mothers with higher family income had a higher level of knowledge. This could be due to better accessibility to good health resources and information. Low-income populations may have limited access to media such as television, news papers and health information booklets. Further they may not attend well baby clinics due to financial constraints leading to transport difficulties and lack of information regarding times and dates of such clinics. This will lead to poor knowledge regarding ARTIs, which may invariably be commoner in such populations.

This study elaborates the need for conducting similar studies across the country. Further, this study was conducted mainly targeting the urban population living in a municipal council administrative area. Future research can be carried out with the aim of assessing the knowledge levels in mothers in rural areas as well. In addition, studies can be designed to compare knowledge of mothers before and after conducting awareness programs.

CONCLUSION

Overall knowledge of the mothers regarding respiratory tract infections were not satisfactory. However, health practices were generally good. Being better educated, employed and having a higher monthly income was associated with a better level of knowledge. Information regarding causative agents, environmental factors and vaccines available against ARTI should be disseminated through public media in order to improve the knowledge level of mothers.

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Authors' contributions:

Conceptualization and Design: HAA, MDSS, SLTS, TMSS, HDRR, KHAS, WDST, KHKVT, KSLJ; Data Collection: HAA, MDSS, SLTS, TMSS, HDRR, KHAS, WDST, KHKVT, KSLJ; Literature Review: HAA, MDSS, SLTS, TMSS, HDRR, KHAS, WDST, KHKVT, KSLJ; Data Analysis and Interpretation: HAA, MDSS, SLTS, TMSS, HDRR, KHAS, WDST, KHKVT, KSLJ; Writing - Original Draft: HAA, MDSS, SLTS, TMSS, HDRR, KHAS, WDST, KHKVT, KSLJ; Writing - Review & Editing: HAA; Supervision: HAA; Approval of Final Manuscript: All authors.

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The authors declare that there is no financial or non-financial conflict of interest.

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Statement on data availability:

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request

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