Health Seeking Behavior and Medical Management of Pneumonia among under Five Children in Alexandria, Egypt; Mothers' Perspective. (RPPH 16-105)

Introduction

Acute respiratory tract infection (ARI) is considered as one of the major public health problems and consistently ranked among the top causes of morbidity and mortality in developing countries. ARI are classified as upper respiratory tract infections (URTIs) and lower respiratory tract infections (LRTIs). [1] Pneumonia, a common and severe LRTI, is recognized as "the forgotten killer of children" [2] which kills 1.1–1.4 million children every year and accounted for 17–19% of all deaths in children under 5 years of age. [3] Children in low-income countries are nearly 18 times more likely to die before the age of five than children in high-income countries, due to mainly pneumonia and other acute infections. [4] Pneumonia has been one of the biggest barriers to the attainment of the Millennium Development Goal (MDG) 4; to reduce child mortality by two thirds by 2015. [5]

Despite causing about 16% of all child deaths, pneumonia receives little attention and a tiny fraction of global public health investment; less than 2% of total global development funding for health. Despite the existence of effective tools to prevent, diagnose and treat pneumonia, most of the countries struggling with high rates of pneumonia-related deaths allocate a tiny portion of their health budgets to fighting child pneumonia. [6]

It is estimated that over 120 million episodes of pneumonia among children younger than five years occurred during 2010–2011; of which over 10% were severe episodes. [7] A recent systematic review revealed 0.22 pneumonia episodes per child–year in developing countries alone [8], with nearly one in eight cases progressing to severe disease. Yet another systematic review estimated nearly 12 million hospitalizations in 2010 due to severe pneumonia and 3 million due to very severe episode which provide an indicator of the high burden of the disease. Even more, more than 80% of deaths occurred outside a hospital; 99% of deaths occurred in low- and middle-income countries. [9]

While for the first time in the Eastern Mediterranean Region (EMR) the annual number of under-five deaths has fallen below 1 million, reduction of under-five mortality remains an unfinished agenda, with 923,000 under-five children still dying every year in the Region, where pneumonia is the major killer (20%). [10] The Child Health Epidemiology Reference Group (CHERG) estimated 0.28 episodes per child-year for the EMR. These estimates translate to about 20 million cases of childhood pneumonia each year in the EMR,

with approximately 10% of cases requiring hospitalization. [11] Concerning Egypt, among the under-five children who die each year, 19% are due to pneumonia, [12] with estimated 0.11-.20 pneumonia episodes per child-year. [11]

The proportion of child mortality and morbidity attributable to pneumonia is not the only reason why pneumonia constitutes a major public health problem. Given the frequency of this illness in children under-five, the care that must be provided for them imposes a significant burden on parents and health services. In addition; the care provided by the family and the health services is not always the most efficient way to treat this illness. [1] Timely care seeking with an appropriate health care provider is one of the most important steps to saving the life of a child from pneumonia; yet, worldwide, only 3 in 5 children receive the necessary help and care. The fight against pneumonia-related deaths in children relies on the triad of prevention, protection and treatment, laid out in the Global Action Plan for Pneumonia and Diarrhoea (GAPPD). [6]

Regarding medical management, treatment failure can certainly be a result of many factors; non- compliance is an important factor but not an exclusive cause. In the case of antibiotic therapy, the right choice of medication, taking into account the pathogen's susceptibilities and appropriate dosage are especially important.[13] The excessive or improper use of antibiotics, is one of the main reasons for the recent rise in bacterial resistance to these drugs.[14] Other barriers that may impede caregivers from taking appropriate medical care are either financial (e.g., the cost of services or treatment, transportation costs, loss of wages) or non-financial such as social norms and previous experiences with health services. In some countries the age and the sex of the child can also influence care seeking behavior. [15]

Effective antibiotic treatment for pneumonia exists, and therefore timely recognition of these signs and symptoms by primary caregivers and subsequent care seeking for treatment from 'appropriate' providers can prevent many of these deaths. [15]

Because of that, it is imperative to identify gaps in management of pneumonia at health facility and at home in Alexandria, Egypt. This study was therefore conducted to address mothers'/ primary care givers' health seeking behaviors for their suspected pneumonic under-five children and first medical management received from mothers' perspective.

Objectives

General objective:

- The aim of the present work was to identify health seeking behavior and medical management of pneumonia among under-five children in Alexandria, Egypt; from mothers' perspective.

Specific objectives:

1. To address mothers'/ primary care givers' health seeking behaviors for their suspected pneumonic/ pneumonic under-five children.
2. To assess first medical management received for pneumonic under-five children from mothers' perspective.
3. To investigate barriers in management of pneumonic under-five children from mothers' perspective.

Material & Methods

Study design: This was a cross-sectional study. The study was conducted over a 4 -month period, between August and November 2017 in Alexandria Governorate, Egypt.

Study setting: The pilot study that was carried out in El-Shatby Univerity Hospital, revealed that the rate of under-five admitted cases with pneumonia was very low due to seasonal variation. Therefore, the study setting was extended to involve three general pediatric hospitals in Alexandria to achieve the required sample size. The study was conducted in inpatients departments of the following hospitals: 1. El-Shatby Univerity Hospital

2. Al Raml Pediatric Hospital
3. Al Anfoshy Pediatric Hospital
4. Fawzy Moaz General Hospital

-The selected hospitals are the main general hospitals providing low-cost health services to the pediatric population from Alexandria and surrounding rural areas.

Study population: The study population included mothers/ primary caregivers of under-five children with established diagnosis of pneumonia, who were hospitalized in the selected general hospitals. Regarding inclusion criteria, all children aged 2-59 months with established diagnosis of pneumonia were enrolled in the study. On the other hand, under-five children who had confirmed diagnosis of congenital malformation, tuberculosis, HIV, cardiac or other chronic conditions that might be complicated by pneumonia were excluded from the study. Those who had cough because of recent history of aspiration of a liquid or of a foreign body and those who refuse to participate in the study were also excluded.

Sample size and sampling method

-The expected sample size, that was calculated according to the rate of admitted pneumonic cases in El-Shatby University Hospital during high season through records review, was 720 cases. However, the pilot study revealed that the rate of admitted cases was very low due to seasonal variation, also most of admitted cases were secondary to chronic or congenital diseases. Thus, the study setting was extended to involve other three general hospitals. All admitted cases who fulfill the inclusion criteria, in the aforementioned hospitals, were included in the sample.

- The average duration of stay in the sampled hospitals for pneumonic children ranged from 5-7 days. Also, due to limited number of beds available/ hospital, the average number of new cases recruited from each hospital/ week were about 10 cases. The total sample size during 4-months period in the four sampled hospitals ended up to be 507 cases.

Data collection: Data were collected by six trained data collectors using:

a) A pre-designed semi structured questionnaire through face to face interview to collect the following data from mothers'/ primary caregivers' children under-five with pneumonia (Annex I):

1) ***Socio-demographic Characteristics****:* The following socio-demographic variables of respondents were assessed: place of residence, age of mother, parents' highest educational attainment and parent's working status, income, crowding index, smoking history, home aeration.
2) ***Child health:*** The following variables of were assessed: age in months, sex, vaccination, exclusive breastfeeding, birth order and other health conditions.
3) ***Health Seeking Behavior of mothers/ primary caregiver:*** Health seeking behavior of mothers/primary caregiver was assessed by determining the treatment given before seeking medical advice, the time difference between onset of illness and getting in contact with a healthcare provider and source of first consultation. In addition, compliance to the recommended treatment and barriers in obtaining health services (reasons for delayed seeking medical help or non-compliance) were assessed. Moreover, knowledge of symptoms, possible causes and perceived seriousness of pneumonia were assessed.
4) ***Medical Management of pneumonia:*** Mothers/ primary caregivers were asked about first medical management delivered to the child from their perspective. Diagnosis of first consultation source, requested investigation, prescribed drugs,

duration of antibiotics if prescribed, counseling on how to take the treatment and whether a follow-up investigation was requested were determined.

b) Digital scales appropriate for child age for measurement of child's weight.

Definition of measured variables:

- **Diagnosis of Pneumonia** was based on hospital records through clinical examination and x-ray findings.
- **Child's nutritional status** assessed according to WHO child growth standards weight for age. Children below 5th percentile were categorized as underweight, meanwhile those plotted above 95th percentile were considered to be overweight.
- **Exclusive breastfeeding** is defined as no other food or drink, not even water, except breast milk (including milk expressed or from a wet nurse) for 6 months of life, but allows the infant to receive ORS, drops and syrups (vitamins, minerals and medicines).
- **Delayed seeking medical advice** was considered if mother/ primary caregiver of a pneumonic child sought medical help two days or more after onset of illness.
- **Inappropriate health seeking behaviors:** include delayed seeking medical advice, seeking advice from inappropriate providers or non-compliance. Appropriate providers included all government and private health practitioners, but not traditional healers and pharmacists.
- **Misdiagnosis:** the diagnosis was other than pneumonia at first consultation.
- **Mismanagement:** was considered if improper examination, improper investigation, inappropriate treatment or no counseling on how to use the prescribed drugs.

Data collectors: Six trained data collectors were distributed to the selected hospitals to cover all cases admitted within the period of 4 months, using a regular schedule and under supervision of 3 field supervisors.

Pilot study: After getting approvals for entry of the selected hospitals, pilot studies were conducted aiming at:

I) Evaluating the rate of under-five pneumonic cases to put a regular schedule for the data collection team.

II) Testing the applicability of the structured questionnaire and corrective measures were taken.

III) Estimating the time required to fill the questionnaire.

IV) Re-estimating the time frame needed to collect the required sample size.

Data management plan

Collected data was reviewed for completeness and accuracy, coded, computed, cleaned and analyzed using statistical package for social science (SPSS version 21.0. Armonk, NY: IBM Corp). Descriptive statistics included the mean and standard deviation for quantitative data and frequency for qualitative data. For skewed data, median was used instead of mean and standard deviation. Chi square test was used to test for association in qualitative variables while independent t-test was used for quantitative variables. Statistical significance was set at *P* value < 0.05.

Coordination, monitoring and quality control

- To ensure reliability of data, training workshop was given to data collectors on the objectives of the study, techniques of face to face interview, how to approach respondents, how to keep confidentiality, and how to measure weight of the child. Another workshop about etiology, prognosis, and complications of pneumonia was presented by a pediatric specialist to enhance the knowledge of the data collection team.
- Each team member carried identification card (ID) indicating that the interviewer was a representative of a survey sponsored by EMRO/ WHO and High Institute of Public Health, University of Alexandria.
- For anonymity and confidentiality, the questionnaires were securely stored within locked location and only the research teams had the access to it. Questionnaires were coded by serial number and not by name.
- Questionnaires were reviewed for completeness and accuracy by 2 personnel. Data were coded, computed and cleaned by data collectors who take the questionnaires.
- To ensure accuracy of data entry, training workshop was held to demonstrate how to use SPSS version 21.

Ethical clearance

- Ethical clearance was obtained from the Ethics' Committee of the High Institute of Public Health before conducting the research (Annex II).
- Approvals from local authorities were obtained as the following:
    - Approval from the director of El-Shatby Univerity Hospital was obtained.
    - Approvals from the Central Directory for Research and Health development, Ministry of Health and Population, Cairo, were obtained to facilitate entry to the

following general hospitals in Alexandria: Al Raml Pediatric Hospital, Al Anfoshy Pediatric Hospital and Fawzy Moaz General Hospital

- After explanation the purpose of the study, informed consent was obtained from every mother/ caregiver in her own right and on behalf of her child before recruitment. Participation in the study was entirely voluntary. They were assured that they have the right to withdraw or not responding to any question without giving a reason. Also, they were assured that choosing to participate will not affect the health service delivered to her child in any way. All information was handled with strict confidentiality (Annex III).

Result

1) Socio-demographic Characteristics: (Annex IV: Table 1)

A total of 507 mothers with under-five pneumonic children were interviewed, out of which 82.1% were urban residents and 17.9% were rural residents. The mean age of participating mothers was 28.36 ±5.76 years. Regarding parents' educational status, 29.4% of mothers and 32.1% of fathers were illiterate. Among the interviewed mothers, the majority (91.7%) were housewives. In terms of paternal occupation, 58% were skilled workers, 20.3% were employees, and 3.6% were unemployed. As regards crowding level, the household crowding index was 2 or less in the majority of the respondents (92.5%). Concerning ventilation status of the house, 16.8% of mothers reported having bad aeration and 57.4% reported paternal smoking at home.

2) Child general health: (Annex IV: Table 2)

Of all the 507 under-five children enrolled in the study, two-thirds of them were male (66.1%) and 33.9% were females. The mean age of the studied children was 18.2 ±16.8 months with a range of 2 - 59 months. Regarding the nutritional status, 15.4% were underweight and 6.1% were overweight.

For breastfeeding practice, 78.7% of children were breast fed with a mean duration of 9.76 ± 6.47 of months. About one third of the breastfeeding mothers (32.5%) fed their infants nothing other than breast milk until 6 months of age (exclusive breastfeeding).

In relation to vaccination status of the child, the majority (86.4%) were either completely vaccinated or vaccinated up to their age, 12.2% were partially vaccinated and only 1.4% were not immunized at all. Vitamin D and Iron were the most common supplements given to the children (21.5% and 11.2% respectively). About 41% of the

children had history of diarrhea in the last three months and 9.1% reported presence of rickets.

3) Mothers' knowledge about pneumonia: (Annex IV: Table 3)

About half of the mothers (50.7%) had not heard of pneumonia before the recent onset of their children's pneumonia. 60.8% of those who knew about pneumonia before was through previous experience with their child. 68.2% believed that pneumonia is dangerous. The most commonly recognized symptoms of pneumonia were fast breathing/difficult breathing, fever and cough (46.7%, 21.1% and 20% respectively). Weather change/ cold weather, poor immunity and smoking were thought to be responsible for pneumonia occurrence by 24.1%, 17% and 10.8% of the mothers, respectively. Only 12% stated that infectious agents cause pneumonia. On the other hand, about 38% had no idea about symptoms and predisposing factors of pneumonia.

4) Child disease status and mother's health seeking behaviors: (Annex IV: Table 4,5)

It was not the first time to acquire pneumonia among 31.4% of cases, more than half of them (58.5%) experienced 1-2 previous episodes, 32.7% experienced 3-5 episodes and 8.8% experienced more than 5 episodes. About half of the mothers reported fast breathing/difficult breathing and fever as the first symptoms of illness followed by cough (41.1%), refusal to feed (14.8%), nasal blockage (10.7%) and chest retraction (7.9%).

Regarding health services accessibility, 50.3% of mothers reported that time needed to nearest health care facility was less than 30 minutes; while 17.2% reported time was over 60 minutes. Generally, doctors were the usual source of advice regarding child illness (66.8%) followed by pharmacists (15.8%), family (6.5%) and friends (2.4%).

In terms of mothers' health-seeking behavior, 57.2% of the children received home treatment before seeking medical advice. Antipyretic and cough-relieving drugs were the most frequently given medications (39.6% and 19.7%, respectively). Herbs and antibiotics were given by 13% and 5% of the mothers, respectively. 26.8% of mothers waited for two days or more until seeking medical advice, with higher rates among rural (38.5%) than urban residents (24.3%, p=0.006). Insufficient knowledge of danger signs/ waiting until child got better was the main claim (89.0%), followed by cost of health services/ transportation (17.6%), unavailability of a nearby health facility (10.3%), inappropriate clinic appointments (7.3%) and previous bad experiences (6.6%) (Figure 1).

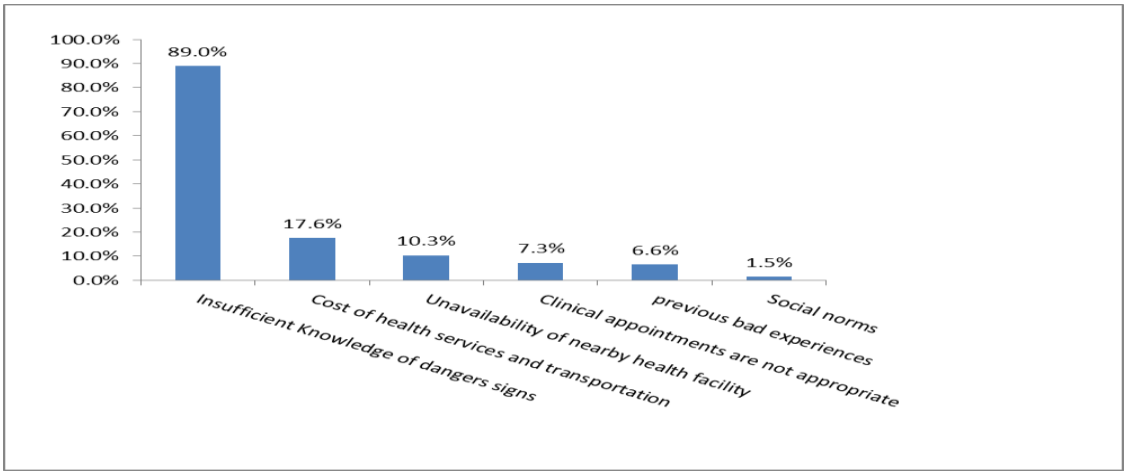

Figure 1: Causes of delayed seeking medical advice among mothers of pneumonic under-five children

Socio-demographic characteristics, health service accessibility, child disease status and mother's health seeking behaviors were compared with care-seeking timing for pneumonia. Factors that were significantly associated with delayed seeking medical care for suspected pneumonia were: living in a rural area (p=0.006); low income (p=0.002); treatment given at home before seeking medical advice (p=0.000); acquiring pneumonia before (p=0.002) and when usual source of advice regarding child illness other than a doctor (p<0.000).

5) Medical management of pneumonia from mothers' perspective (Annex IV: Table 6,7)

General health care providers were the first source consulted by 62.7% of the mothers. Meanwhile, private hospitals/clinics were consulted by 35.1% of mothers. Only 2.2% sought inappropriate providers (pharmacists) (Figure 2).

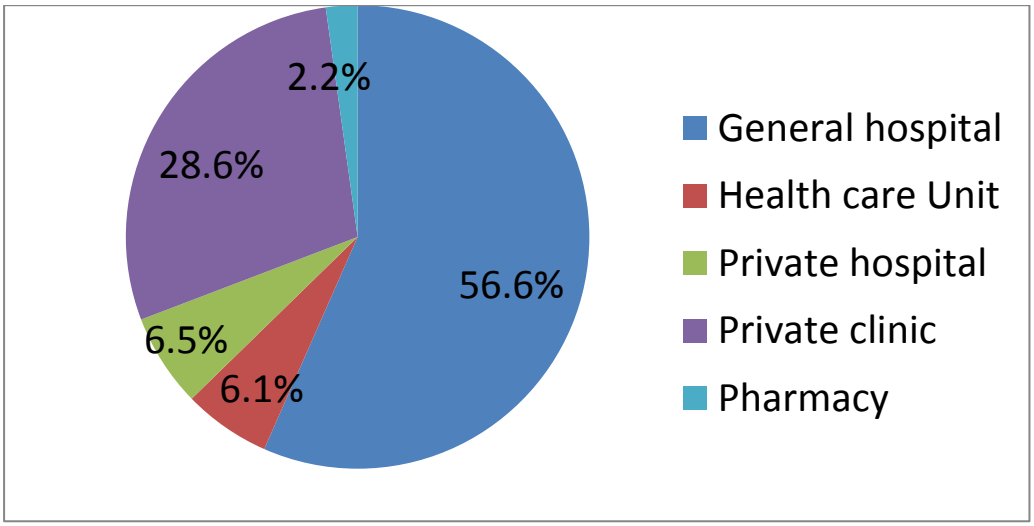

Figure 2: First consultation source

About 20% of the first consulted source didn't examine the child. Majority of them didn't ask for any investigation neither for diagnosis nor follow-up (60.2% and 87.3% respectively). Among those who asked for diagnostic investigation, 44.7% were general health care provider and 30.2% belonged to the private sector (p=0.001) (Table 7). Chest x-ray was the most common request (94.4%) followed by blood tests (44.7%). Most of the requested investigations (83.4%) were carried out in general hospital/lab. Misdiagnosis of pneumonia by the first consultant was reported by more than half of the mothers (52.7%).

In terms of treatment prescribed by the first consulted source, two-thirds of children (63.7%) received home treatment; antipyretics, antibiotics and cough-relieving drugs were the most commonly prescribed treatment (78%, 70% and 53.9% respectively). Meanwhile, about one-quarter of children (23.5%) were directly admitted to the sampled hospital and received hospital treatment, while, 11% of the sample, the first consulted source referred them to a specialized hospital without prescribing treatment, and only 1.8% didn't receive any treatment at all.

Majority of mothers reported high compliance practices. Only 1.9% of the mothers didn't buy the prescribed treatment either due to uncertainty, ignorance or high cost and 3.8% of the mothers weren't compliant to the prescribed treatment. Follow-up investigation was not conducted by one-fifth of mothers (19.5%) mostly due to insufficient knowledge (it was not important/ the child got better).

Nearly two-thirds of the mothers (67.8%) reported visiting health professionals once or twice before hospital admission. Less than 100 Egyptian Pounds were spent by nearly two-thirds of the mothers for their child's pre-hospital management. Not surprisingly, the cost was significantly higher among those who sought private health service than public ones (p<0.000).

Discussion

Pneumonia remains the leading infectious cause of death among under-five children. Poor or delayed care accounts for up to 70% of child mortality in developing countries. Timely institution of appropriate treatment is dependent on early recognition of the symptoms by parents, decision to seek care from appropriate sources, availability, accessibility and affordability of the necessary treatment. [16] Our study found that a considerable percent of the mothers had no idea about symptoms, predisposing factors and perceived seriousness of

pneumonia. The poor knowledge and perceived seriousness in this study could be related to the high number of mothers without any formal education or lack of awareness sources about pneumonia. Another figure of poor knowledge about pneumonia (71%) was reported in another developing country; Bangladesh (2014). [17] A UNICEF/WHO report showed that only 1 in every 5 knew the two tell-tale or indicative symptoms of pneumonia: fast breathing and difficult breathing. [2]

Despite the fact that most of the mothers lived nearby a health care facility, more than half of the mothers were reluctant to seek medical advice and giving treatment at home before seeking medical advice, which concurs with findings that health care in developing countries occurs at home. [18] Most of the practices mentioned were related to symptomatic relief (antipyretic, cough-relief drugs, herbs), which can be beneficial but not sufficient for improvement of health outcomes for children with pneumonia. However, antibiotics were rarely reported to be used at home. Mothers were aware of antibiotics but expressed limited experience of handling these drugs at home without a prescription from a health professional, especially during this critical young age. While home treatment with antibiotics has been reported from a variety of studies [19,20], a restricted use of antibiotic is imperative to limit the progress of antibiotic resistance.

Reviewing care-seeking timing, nearly one-quarter of the mothers delayed seeking medical advice. Their main claim was insufficient awareness about the danger signs and/or waiting until their child got better. Similarly, Hill et al. reports that in addition to poor maternal recognition, health beliefs may also act as barriers to care seeking for childhood illnesses; for example, some illnesses are categorized as ‘not for hospital’ and past experience with similar illnesses can motivate mothers to play a ‘waiting game’ to see if illness subsides on its own. [21]

It is not unexpected that receiving treatment before seeking medical advice is significantly associated with delaying to reach an outside care provider, our result was similar to Ferdous et al. and Källander et al. findings.[22,23] It was further noted that mothers from rural area or those with low income were more likely to postpone visiting health professional, this may be explained by poorer accessibility to health care facilities (cost of health services/ transportation or unavailability of a nearby health facility). In accordance to our finding, a community based study in Ethiopia, showed that more caregivers in urban area (75.0%) sought healthcare for acute respiratory tract infection in their children from healthcare institution compared to those in rural areas (34.4%).[24] In addition, Noordam et al. stated

that there is a strong association between wealth and care seeking in Ethiopia, Tanzania, Nigeria and Burkina Faso.[15] Mothers of children with recurrent episodes of pneumonia tended to defer their health care visits. It might be explained by mothers' poor seriousness perception of the disease and/or using of previous prescriptions at home.

Concerning the medical management, majority of the first consulted sources didn't ask for any investigation neither for diagnosis nor follow-up. Although, chest x-ray is the most widely used diagnostic tool for pediatric pneumonia, its use in the clinical context is controversial with recent guidelines advocating that chest x-ray for the diagnosis of pneumonia in the community setting are warranted. Its use should be limited to children with clinical signs suggesting severe pneumonia who require hospitalization. The chest x-ray also has a limited role in the follow-up unless cough persists, and/or other signs suggest incomplete recovery of the child. However, like the many knowledge gaps in the management of childhood pneumonia, questions on radiology application remain. [25]

Although most of first consultant source were medical providers, misdiagnosis was reported by nearly half of the first consultation source; questioning the quality of health service provided to children. Studies show that many developing countries still face significant challenges in the provision of effective health care diagnosis and treatment of pneumonia. [26] Antibiotics were prescribed by the majority of first consulted source with a median duration of 3 days. A recent UNICEF report states that 55% of caregivers sought appropriate care for children with suspected pneumonia, but only 39% of children received antibiotics, [27] reflecting high antibiotic misuse in our study that is contributing to increased antibiotic resistance.

In terms of compliance practices, majority of the mothers were compliant to the health provider instructions. This is further strengthened by the finding of Onwunaka et al., reporting that 76.4% of mothers with pneumonic children adopted compliance to treatment regimen, follow-up and referral practices. [28] The reason for the high compliance practices among mothers in our study could be as a result of better attention given by health care provider to mothers. Prompt care seeking through wider disease awareness and early, accurate diagnosis is pivotal to preventing the untimely mortality of children from pneumonia. [6]

Policy Recommendations

Community-based health education campaigns complementing clinic-based IMCI programs can reinforce mothers' abilities to recognize childhood pneumonia, appreciate

seriousness of the disease and subsequently enhance behavior change in health care seeking. Increase mothers' awareness regarding causes, predisposing factors, indicative symptoms and danger signs of pneumonia could be achieved through facility-based health education. Also, health care providers ought to counsel mothers on preventive measures, including avoiding air pollution, updating all routine vaccinations, promoting exclusive breast feeding for the first six months of child life, continued breastfeeding, adequate complementary feeding and good nutrition supports. Media also could play an important role in raising mothers' awareness about the disease. This way, mothers who waited until her child got better by home management, will receive appropriate care and hopefully reduce morbidity and mortality from childhood pneumonia.

In addition, steps should be taken to improve quality of services, since good perception and mother satisfaction with the care will greatly enhance their health seeking behavior. It is imperative to embark on continuous training for health care providers to be capable of accurately identifying, diagnosing and treating fast breathing and chest indrawing pneumonia with the proper antibiotics. Also, training should be carried out to emphasize their adherence to updated diagnostic and treatment guidelines of pneumonia, and to avoid the misuse of antibiotics. Furthermore, there is an urgent need for training of health care providers on communication and counseling skills with mothers. These training settings could be conducted through corporation between medical syndicate, ministry of health and university hospitals.

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