ORIGINAL ARTICLE

MATERNAL KNOWLEDGE OF WHO GUIDELINES FOR TREATMENT OF ACUTE RESPIRATORY INFECTIONS IN CHILDREN UNDER FIVE IN PAKISTAN

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Background: Acute Respiratory Infections (ARIs) are among the leading causes of morbidity and mortality in children under the age of five in Pakistan. Gauging the knowledge and practices of mothers related to ARIs may hold a key role in reducing the incidence and complications. Our study assessed the knowledge of mothers regarding ARIs among children under five years in accordance with WHO guidelines, and its association with education and socioeconomic status of mothers. In addition, we studied the association between education of mothers and socioeconomic status with vaccination status of child. **Methods:** This cross-sectional study was conducted from May to December 2016 at Civil Hospital, Ziauddin Hospital and Gulshan-e-Sikanderabad PHC Karachi and involved mothers with at least one child under the age of five years. Four hundred mothers were interviewed using a questionnaire. Results were analysed using SPSS 20.0. **Results:** 51% of mothers were found to have an above average understanding about ARIs with a mean score of 13.35±3.03 out of a possible 20. There is no association between knowledge of mothers and their level of education. Education level of the mother was found to have a significant association with the vaccination status of youngest child. Mothers having no education or just religious education had the highest percentages of incomplete vaccinations. **Conclusion:** Most mothers had above average knowledge of what classified as an ARI and could identify the danger signs. Uneducated mothers had incomplete vaccinations of their youngest child. The majority of mothers had satisfactory breastfeeding habits.

Keywords: Acute Respiratory Infection; Maternal; Knowledge; WHO Guidelines; Children under five; Management of ARI; Vaccination; Breastfeeding; Self-medication; Pakistan

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INTRODUCTION

In 2016, an estimated 5.6 million children died before reaching their fifth birthday.[1] Almost half of these deaths were caused by infectious diseases such as Pneumonia.[2] Acute Respiratory Infections (ARI) like pneumonia are among the leading causes of morbidity and mortality in children under five in developing nations.[2] Following the UNICEF/WHO Meeting on Child Survival Survey-based Indicators, held in New York, 17–18 June 2004, a child suffering from Acute Respiratory Infection (ARI) has been defined as one who has a cough, is breathing faster than usual with short, quick breaths or is having difficulty breathing, excluding children that have only a blocked nose.[3] The Integrated Management of Neonatal and Childhood Illnesses (IMNCI) strategy has been devised based on WHO guidelines for ARI management, where health workers classify each ARI case into one of the following categories: severe or very severe pneumonia, pneumonia, or no pneumonia (cough and cold), and treat accordingly.[4] However, lack of health care services, poverty and low levels of education in developing countries are all major risk factors that are contributing to high mortality rates of ARI in under-5 children.[5] The World Health Organization (WHO) estimates that without any interventions, 69 million children under age 5 will die between 2016 and 2030.[1]

Sub-Saharan Africa and South Asia together contribute to about 80% of under-5 deaths globally.[2] As a result, these areas have been deemed high priority if we as a global community hope to achieve our Sustainable Development Goals (SDGs) and Millennium Development Goals (MDGs).[1] Half of these deaths occur in just five countries: Pakistan, India, Nigeria, The Democratic Republic of Congo and Ethiopia.[2] Pakistan is the riskiest place to be born as measured by its new-born mortality rate.[5] 1 in every 14 Pakistani children die before reaching age 1, while 1 in every 11 children do not survive to their fifth birthday.[5] Acute respiratory infection is still a leading cause of death among children under age 5 in Pakistan.[4] Annually, approximately 91,000 children in the country die from Pneumonia.[4]

The vast majority of deaths from ARI are preventable, and millions of lives each year can be saved by correct and early diagnosis, as well as seeking prompt medical care.[5] The IMNCI strategy understands the crucial role of mothers in identifying and treating ARI.[4] The objective of our study was to

assess maternal knowledge regarding ARI, their ability to correctly identify danger signs and seek help, and their care-giving behaviour, in accordance with WHO guidelines. We also focused on breastfeeding practices, malnutrition being a major risk factor for childhood illnesses.[1] Our study was done in the metropolitan city of Karachi, with particular focus on some of the underprivileged areas. These results will prove valuable for future health policies and education programs to help reduce childhood mortality on a national, regional and global level.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted at a private tertiary care hospital (Ziauddin Hospital, Clifton), public sector tertiary care hospital (Civil Hospital) and primary health care centre (Gulshan-e-Sikanderabad PHC), in Karachi, Pakistan. The study was carried out between May to December 2016. It was carried out among women of reproductive age having at least one child less than five years of age.

On the basis of 72% prevalence[6] of knowledge of ARI among mothers and at 95% confidence level with 0.05 margin of error; sample size was calculated as 310 by using WHO sample size estimation calculator, however adding wastage it was taken as 400. Convenience sampling was done, and data was collected via a structured questionnaire constructed after thorough literature search.[6] It was pretested by a pilot study of 50 individuals before final data was recorded via personally conducted interviews. Informed consent was taken from each individual, and data confidentiality and anonymity were ensured. Ethical approval was obtained from Ziauddin Institutional Review Board.

The questionnaire assessed the risk factors for ARI such as the vaccination status and breast feeding, and was designed to calculate knowledge regarding ARI according to the WHO guidelines.[7] The questions assessed knowledge regarding the symptoms and care of a child with ARI. On basis of correct response, the total score of knowledge was taken out to be 20. Mean score of the knowledge of mothers in our study came out to be 13.35±3.03 SD. Taking this as the average, the knowledge of mothers was qualitatively divided into groups of above and below average knowledge.

Data was analysed on SPSS version 20.0. Frequencies and percentages were collected for the qualitative variables, and mean and standard deviations were collected for the quantitative variables. Chi square test of significance was applied to find association of maternal knowledge with level of education, household income and vaccination status, and p-value <0.05 was calculated as significant.

RESULTS

The mean age of the 400 mothers interviewed for this study was calculated to be 27.46±5.61. Out of the total sample of 400 mothers, n=166 (41.5%) had no education, n=105 (26.3%) had primary education, n=55 (13.8%) matriculated, and n=42 (10.5%) had some religious form of education.

The majority of our participants were from lower socioeconomic background with the monthly household income of n=307 (76.8%) of mothers less than 10,000 PKR. n=72 (18%) had a monthly household income more than 10,000 PKR and only n=21 (5.3%) had a greater than 20,000 PKR monthly income.

In this study we assessed maternal knowledge regarding acute respiratory tract infections (ARIs) and their management in accordance with WHO guidelines. The total score as per correct responses was calculated to be 20. The mean score of the knowledge of mothers in our study came out to be 13.35±3.03. Taking this as the average, the knowledge of mothers was qualitatively divided into groups of above and below average knowledge. n=204 (51%) of the total mothers had an above average (score more than 13/20) knowledge. No association was found between knowledge of mothers regarding ARI and their level of education p- value 0.74. (Figure-1)

We found that n=326 (81.5%) of mothers had either completed the vaccination of their children less than five years of age or kept it up-to-date. (Figure 2)
As shown in table-2, education level of the mother was found to have a significant association with the vaccination status of the youngest child (p value ≤0.001). n=45 (27.1%) of mothers with incomplete vaccination had no education and n=10 (23.8%) with incomplete vaccination had religious education. We also found an association between age of the mother at marriage and vaccination status of the child (p value ≤0.014). Mothers who were married before the age of 15 were responsible for 29.7% of incomplete vaccinations. (Table-2)

Due to its importance and direct impact on a child's immunity, our study also interviewed the mothers regarding their breastfeeding habits. When asked about their youngest child, n=378 (94.5%) of mothers reported that they had breastfed them. The majority of the participants (31.75%) were following the WHO recommended duration[8] of breastfeeding for 18–24 months. 21.5% of children were breastfed for six months or less, while 28.3% were breastfed for 6–12 months and 18.3% for 12–18 months.

The majority n=180 (45%) of mothers reported their children falling sick from ARI 3–4 times a year. Figure-3 shows how often the youngest child had an episode of ARI in the past one year (%).

When asked about preferred modality of treatment, (mothers could choose more than one modality in the questionnaire) n=388 (97%) preferred allopathic treatment of ARI for their child, n=13 (3.3%) preferred homeopathic treatment, and n = 23 (5.8%) preferred *hakeem*. Out of those mothers who preferred allopathic, n=224 (56%) said they seek help from private clinics before resorting to hospitals. Figure-4 shows the percentage of mothers self-medicating their children.

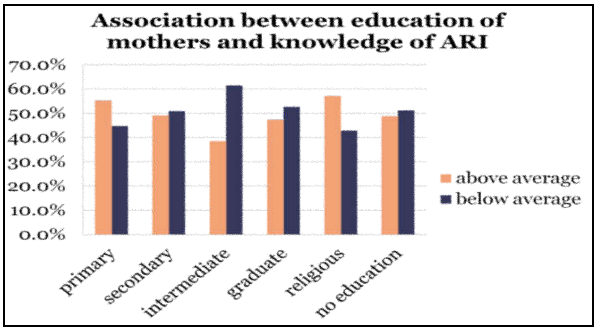

Figure-1: There was also no association between knowledge of mothers regarding ARI and their monthly household income (*p*- value 0.510)

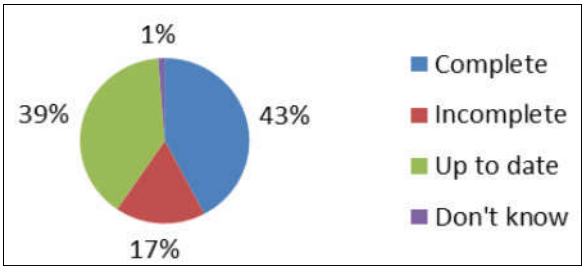

Figure-2: Vaccination status of children under five years

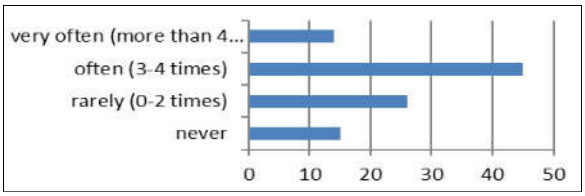

Figure-3: How often has the youngest child has an episode of ARI in the past one year

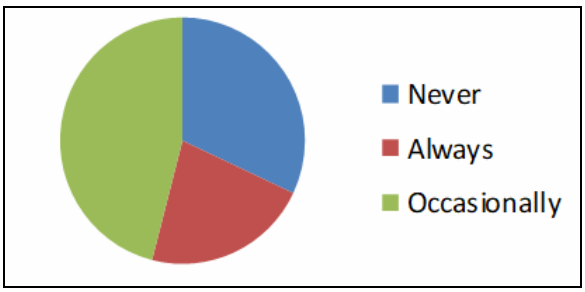

Figure-4: percentage of mothers self-medicating their children

Table-1: Socioeconomic status of mother

	Monthly household income	
	Frequency (n)	Percentage %
Less than Rs. 10,000	307	76.8
Higher than Rs. 10,000	72	18
Higher than Rs. 20,000	21	5.3

Table-2: Vaccination status of youngest child and its association with maternal education and age at marriage

		Vaccination status			
		Complete	Incomplete	Up to date	P value
		%	%	%	
Association with education	*Primary*	41.0	11.4	47.6	0.001
	Secondary	47.3	9.1	43.6	
	Intermediate	30.8	7.7	61.5	
	Graduate	57.9	5.3	36.8	
	Religious	52.4	23.8	23.8	
	No education	38.0	27.1	34.9	
Association with age of mother at marriage	*<15 years*	32.7	29.7	37.6	0.014
	16 - 20 years	46.1	17	36.9	
	21 - 25 years	40.2	9.7	50.0	
	>26 years	72.7	9.1	18.2	

DISCUSSION

This study, conducted in Karachi, Pakistan, assessed maternal knowledge regarding ARIs and their management in children under five in accordance with WHO guidelines. Since mothers are usually the primary care providers for their children, it is imperative that they have the ability to recognize symptoms of ARI early so that they can initiate prompt management and thereby reduce child mortality.[9]

Several studies show that a mother's lack of education is a major risk factor for not recognizing childhood pneumonia.[10–12] A study done in Kenya showed a significant association between mothers' level of education and knowledge of pneumonia.[13] Mothers with a higher level of education were approximately 14 times more likely to have knowledge of pneumonia compared to those lacking an education.[13] They were also more likely to seek immediate medical help compared to those with low levels of education.[13] Another study done in Mirpurkhaas, where a staggering 88.9% of mothers were either illiterate or only primary educated, revealed that identification of pneumonia symptoms was statistically significant with higher educational status.[14] Out of the mothers who were illiterate, only 11% were able to correctly diagnose pneumonia, while 94.4% of primary educated and 98.1% of higher educated mothers had correct diagnoses.[14] This proves that even a basic education can drastically change the way mothers provide care for their children. In

contrast, the results of our research did not find an association between the knowledge and level of education of mothers. Although more than half of the mothers were literate, a very small percent had received secondary education. Nevertheless, roughly half of the mothers had an above average score of knowledge. One explanation for this could be that Karachi, being an urban population, has a relatively higher level of awareness than the rural areas of Pakistan.[15,16] These findings demonstrate how beneficial health education programs are and how crucial a role the media plays in relaying health related information to the masses.

A study in Jordan reported a significant difference between women with higher education and those with secondary education or less when it came to practices of fever management.[17] The findings of Matziou *et al* in Greece[18] and Oshikoya and Senbanjo in Nigeria[19] were similar, where mothers' educational level positively affected their knowledge and management of fever. The mothers in our study who had received secondary education and higher, demonstrated a far superior knowledge of management of fever and other symptoms of ARI, further proving how positive an impact an education can have.

Childhood pneumonia is also associated with poverty[20] and results from suboptimal child rearing and care-seeking practices.[21] Wealthier households are more likely to seek care or advice outside the home compared to poorer households.[22] A study in Mawatch Goth, Keamari reported 67% of mothers having household incomes less than four thousand rupees per month, while only 5% reported an income of more than ten thousand rupees.[23] The Mirpurkhaas study also showed that a vast majority of mothers (81.6%) belonged to a low socio-economic class.[14] There was a significant positive correlation between mothers' household income and their ARI management score in the study in Jordan[17] as well as Parimi *et al*.[24] In Nepal, mothers sought prompt care more often when the monthly family income was more than ten thousand Nepali rupees.[25] Although our research did not find an association between mothers' knowledge of ARI and their socioeconomic class, we did find that 76.8% of mothers had a monthly household income of less than ten thousand Pakistani rupees. (Table-1) Early diagnosis of pneumonia and effective case management by trained healthcare providers can save lives. Yet children from the poorest households who develop symptoms of pneumonia, and face the greatest risks, are least likely to be taken to a health facility.[2]

Vaccination against Streptococcus Pneumoniae and Haemophilus Influenzae type B, the two most common bacterial causes of childhood pneumonia, as well as against measles and pertussis substantially reduce the ARI disease burden and mortality.[4, 26] We asked mothers about the vaccination status of their children under five years of age and found that 81% had either completed or kept it up-to-date. (Figure-2) A significant association was found between the vaccination status of the youngest child and the education level of the mother (p value ≤ 0.001). 27.1% of mothers with incomplete vaccination of their child were illiterate, while 23.8% had religious education. A study conducted in Kenya reported that women with primary, secondary or higher education were between 2.21–9.10 times more likely to immunize their children than those who had less than a primary education.[27] Similarly, in a research done in Bangladesh, maternal education was shown to positively affect the number of children receiving vaccination.[28] This data further reinforces the findings of our study in which uneducated mothers and those with religious education were responsible for almost half of all incomplete vaccinations, showing that maternal education is a powerful and significant determinant of child health status not only in Pakistan, but also other South Asian and African countries.

Our study further identified that the age of the mother at marriage had a profound effect on the vaccination status of the child. Almost a third of the mothers with incomplete vaccinations of their child had been married before the age of 15. (Table-2)

Correct breastfeeding practices and nutrition interventions in early childhood reduce the onset and severity of diseases and improve child survival.[26] The benefits of breastfeeding are still under-recognized in many countries. A study in Lucknow showed that the importance of exclusive breastfeeding was appreciated by few.[29] Only 26.7% of the caregivers cited breastfeeding as a prevention of childhood pneumonia.[29] Research found that if breastfeeding were scaled up to near universal levels, the lives of 823,000 children under age 5 would be saved annually in 75 low- and middle-income countries.[2] In addition, bottle feeding is one of the risk factors of ARI as improper sanitation can cause pathogen entry. Our data concluded that 94.5% of mothers had breastfed their youngest child. Only 31.75% of children were breastfed according to WHO guidelines for 18–24 months. The results of our study can be attributed to a lack of knowledge among mothers of the WHO breastfeeding guidelines, as well as poverty and poor family planning. The latter is again influenced by maternal level of education, and early age of marriage. Infants born from unplanned and mistimed pregnancies are at risk of poor nutrition and infections because mothers are unable to maintain breastfeeding and meet the nutritional requirements of multiple children, especially in a low socioeconomic setting.[30]
The World Health Organization (WHO) and UNICEF initiated a strategy for integrated management of

childhood illnesses (IMCI) such as pneumonia at the health facility and community level.[13] In our study, we assessed care-seeking behaviour among the mothers, and their preferences for modality of treatment both at home, and at health care facilities. When asked about their preferred modality of treatment of ARI for their child (mothers had the option to choose more than one option) 97% preferred allopathic. 56% of those who chose allopathic treatment said they would seek help from private clinics before visiting a hospital. A study in Bangladesh reported that 42% of the caregivers came straight to the hospital while 58% chose to treat at home.[31] 33% preferred giving both allopathic and homeopathic treatment at the same time.[31] In Burdwan, West Bengal 70% of mothers preferred allopathic whereas 21.5% preferred home treatment.[32] At Civil Hospital Mithi, Tharparkar 64% of mothers visited a doctor while 36% started home remedies.[6] Two thirds of mothers (74.1%) visited the physician when their child complained of ARI symptoms in Jordan.[17] In a study conducted in Multan, 53% of mothers had not sought help from a doctor for treating their child's pneumonia.[33] Only 21% had visited a qualified physician.[33] It is evident from these studies that a large percent of women still chooses to treat their children at home, or delay seeking medical help.

Irrational use of medicines is a major problem worldwide. WHO estimates that more than half of all medicines are prescribed, dispensed or sold inappropriately, and that half of all patients fail to take them correctly.[13] 68.1% of the mothers in our study self-medicated their children with over-the-counter (OTC) drugs without consulting a doctor. 22.3% of mothers claimed to always self-medicate, while 45.8% did so occasionally. Self-administration of medications was reported in 24% of mothers in the Mirpurkhaas study.[14] In the Jordan study, 41.1% of mothers answered that using antibiotics when their child complains of ARI is necessary even if not prescribed by a doctor.[17] 46.2% of episodes of childhood illnesses were treated by pharmacists, with 15.1% of them purchased without consultation, in the Nepalese study.[25] Self-medication was also relatively common in the Bangladesh study,[31] as well as the Multan study (19%).[33] Given the large proportion of mothers who are self-medicating in our study, it is imperative that steps be taken to limit this misuse to achieve adequate treatment, limit the development of drug resistance, and to avoid health hazards and wasting of precious resources.

CONCLUSION

Our results showed that although maternal education had no association with knowledge of ARI, it did have a strong, positive effect on the child's vaccination. Although the majority of mothers breastfed their children, very few continued breastfeeding for the proper duration of 2 years, and most were unaware of the importance of breast milk in preventing childhood illnesses. The majority of mothers in our study reported their child falling sick from ARI very frequently and self-medicated their children with over-the-counter drugs. Maternal education is a strong predictor of a child's chance to survive. It enables women to delay and space births, secure access to maternal and child health care and seek treatment for children when they fall ill.[2] There needs to be collaboration between health care providers and policy makers to create a system of accurate and efficient health education, with special attention to the under-privileged population by providing affordable treatment options.

AUTHORS' CONTRIBUTION

BTS: Writer of all components of paper except methodology. Major contributor of literature search. Proof reading, minor role in data collection. SW: Data collection, literature search, proof reading. HY: Data analysis and interpretation, wrote material and methodology, proof reading. SK: Data collection, proof reading. MMSM: Data collection, compilation, proof reading.

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