



Knowledge, Attitudes, and Practices toward Acute Respiratory Infection among Parents of Children under Five Years

Nesrin N. Abu-Baker, RN, MSN, PhD^{1*}; Khwlah F. Shtayyat, RN, MSN¹; Jamila Abuidhail, RN, PhD²

¹ Community and Mental Health Department, School of Nursing, Jordan University of Science & Technology, Irbid, Jordan.

* Corresponding Author. Email: nesrin@just.edu.jo

² Department of Maternal, Child, and Family Health Nursing, Faculty of Nursing, The Hashemite University, Zarqa, Jordan.

ARTICLE INFO

Article History:

Received: January 29, 2024

Accepted: March 19, 2024

ABSTRACT

Background: Acute respiratory infection (ARI) causes high morbidity and mortality rates among children. As parents are the main caregivers for these children, it is essential to assess and strengthen their knowledge, attitudes, and practices (KAPs) toward ARI. **Purpose:** To assess KAPs toward ARI among Jordanian and Syrian parents with children under five years, and KAPs relationships with the parental sociodemographic variables. **Methods:** A cross-sectional design was conducted using a sample of 204 parents (124 Jordanians and 80 Syrians). The data was collected at community associations in Irbid city in the northern part of Jordan, between December 2021 and February 2022. A self-reporting questionnaire was used to measure parents' KAPs toward ARI in children under five years. **Results:** The results revealed that 48% of the fathers and 61% of the mothers were educated to college level. The total score of knowledge was 10 out of 18 ($SD = 2.75$), while that of attitudes was 8 out of 12 ($SD = 1.97$), and that of practices was 4 out of 5 ($SD = 0.89$). Spearman correlation indicated that mother's education and father's education were positively correlated with the knowledge, attitude, and practice scores. Pearson correlation indicated that family income was positively correlated with the attitude and practice scores. Independent sample *t*-test indicated that Jordanian parents reported significantly higher attitude and practice scores than Syrian parents ($p \leq 0.05$). **Conclusion:** Overall, Jordanian and Syrian parents' knowledge about ARI in Irbid city is insufficient and mainly correlated with their level of education. **Implications for Nursing:** The study highlights the need for health education in primary health care centers, public places, and community organizations. Health education should target parents with low socioeconomic status and Syrian refugee parents.

Keywords: Acute respiratory infection (ARI), Knowledge, Attitudes, and Practices (KAPs), Parents, Children under five years.

What does this paper add?

1. Jordanian and Syrian parents' knowledge about ARI in Irbid, Jordan is insufficient.
2. Income and parental education levels were positively correlated with KAPs. Jordanian parents reported higher attitude and practice scores than Syrian parents.
3. It is crucial to enhance the awareness of parents via

health education, especially among those with low socioeconomic status.

Introduction

Acute respiratory infection (ARI) is caused by viral, bacterial, or mixed bacterial-viral pathogens, such as influenza virus and streptococcus pneumonia (World Health Organization [WHO], 2014). It is classified into

two types: upper ARI and lower ARI. This depends on the infected organ. Examples of upper ARI are ear infections, common cold, sinusitis, and pharyngitis, while pneumonia and bronchiolitis are examples of lower ARI (WHO, 2014). The global under-5 mortality rate was 37 deaths per 1000 live births in 2020 (WHO, 2021). Acute respiratory infection is a cause of 20% of global deaths among children under five years (WHO, 2020). In Jordan, the mortality rate of children under five years is 15.6 deaths per thousand live births (UNICEF, 2019). Moreover, 60.9% of children under five years in Jordan are taken to health care professionals because of ARI-related symptoms (UNICEF, 2018).

Parents are the main caregivers of children. Their socioeconomic status may affect the child's lifestyle and his/her respiratory health (Ramani et al., 2016). To control ARI, it is essential to strengthen families' knowledge, attitudes, and practices (KAPs) toward ARI and to provide proper treatment. Moreover, early diagnosis, child case management, and continuous communication with the health care system are helpful processes to prevent complications and alleviate incorrect use of antibiotics (Forum of International Respiratory Societies, 2017).

Previous evidence examined KAPs of parents toward ARI and their relationships with sociodemographic variables. For instance, a cross-sectional study was conducted among a random sample of 733 mothers at primary health care centers in Saudi Arabia. The results revealed that 54% of mothers had insufficient knowledge about ARI. Moreover, more than a half of the mothers reported poor attitudes and practices. 64.5% of mothers did not use home remedies for the treatment of ARI, and 53% practiced self-medication without consulting doctors. Younger age of mother, shorter marriage duration, and higher educational level were all significantly associated with better knowledge (Alluqmani et al., 2017). Besides, a cross-sectional study among 1,301 Jordanian parents found that 65% of parents acquired their knowledge about antibiotics use for upper respiratory infection from doctors. Moreover, better knowledge and attitudes concerning antibiotics use among children were significantly linked with older age of parents and higher income. Higher attitude scores were significantly associated with more children as well (Abu Hammour et al., 2018).

Another cross-sectional study was conducted in Pakistan among 335 mothers of children under five years in the pediatric department. The results revealed that mothers reported good knowledge on ARI symptoms, worsening environmental circumstances, complications and aggravating factors. They approached ARI with the proper attitude and sought early advice from a qualified health care provider. An increase in the literacy rate enhanced mothers' knowledge, attitudes, and practices (Bham et al., 2016). Furthermore, a cross-sectional community-based study was conducted among 300 Sudanese mothers. The study revealed that over two-thirds of the mothers had limited understanding of symptoms, complications, and risk factors of ARIs. In addition, 51.3% of mothers had negative attitudes toward the disease, while only 25.7% of mothers had good practice regarding visiting a physician before taking any medicine. The results revealed a significant positive relationship between mothers' educational level and family income, and their KAPs toward ARI ($p = 0.000$) (Saeed et al., 2020).

In general, existing studies highlighted that parents of children under five years were unaware of ARI and its proper management. Their knowledge, attitudes, and practices were linked with sociodemographic data, such as age, education, and family income. In Jordan, there is a lack of studies that assessed KAPs among parents regarding ARI.

This study is influenced by the factors that affect the level of KAPs to highlight the gaps and to pave the way for professionals to conduct future parental educational programs to reduce the prevalence of ARI and mortality among children under five years. Jordanian society includes many Syrian refugees, especially in the north (UN Refugee Agency, 2021). Enrolling them in this study allows for a diverse sample and creates an opportunity to study different factors affecting KAPs toward ARI. Thus, this study aims to:

- 1- Assess knowledge, attitudes, and practices (KAPs) toward ARI among Jordanian parents and Syrian refugee parents whose children are under five years old.
- 2- Examine the relationship between KAPs toward ARI and parental sociodemographic variables, such as gender, mother's education, father's education, family income, and number of children.
- 3- Assess the differences between Jordanian parents and Syrian refugee parents in terms of their KAPs

toward ARI among children who are under five years of age.

Methodology

Research Design and Setting

A descriptive cross-sectional correlational design was used from December 2021 to February 2022. The study was conducted in Irbid governorate, located in the northern part of Jordan. Jordan society includes many Syrian refugees, especially in the north. Around 660,000 registered Syrian refugees are in Jordan, around 20% of whom live in Irbid (UN Refugees Agency, 2019).

Since the study targeted Jordanian and Syrian groups, it was conducted at the local community associations located in the city of Irbid. These associations provide a wide range of services and activities to the local community, including Jordanian and Syrian refugees. There is a regular connection between the associations and the local community members, which facilitated the availability of potential participants, especially during the COVID-19 pandemic.

Population and Sample

The target population of this study is Jordanian or Syrian parents with a minimum of one child under five years of age and who live in Irbid city in the northern part of Jordan. The accessible population is Jordanian and Syrian parents who meet the mentioned inclusion criteria and who attended the local community associations in Irbid city.

The convenience sampling method was used, while the sample size was calculated using G*Power statistical software with an alpha level of 0.05, a study power of 0.8, and a medium effect size of 0.5 for independent sample t-test. A minimum sample size of 102 participants was required. However, a total number of 216 participants was approached to enhance generalizability. Finally, 204 participants were recruited (124 Jordanians and 80 Syrians), with a 94.4% response rate.

Instrument

Parents' KAPs toward ARI in children under five years of age were measured through a self-administered questionnaire. The instrument was adopted from a study conducted by Saeed and Awadalla (2020) to measure parents' KAPs toward ARI, provided by the original authors in both Arabic and English languages. The study

questionnaire was composed of two main parts: the first covered demographic data, and the second was about KAPs toward ARI. The first part included sociodemographic data, such as parent's gender, age, level of education, occupation, income level, nationality, duration of marriage, and total number of children.

The second part measured KAPs toward ARI and included three sub-parts (knowledge, attitudes, and practices). Firstly, the knowledge part consisted of nine items with a total score of 18 points (minimum = 0, maximum = 18) to evaluate parents' knowledge about ARI. Multiple-choice questions were used. Questions with 0 correct answer earned 0 point, questions with one correct answer earned up to 1 point (four questions: Q1, Q3, Q6, and Q9), questions with two correct answers earned up to 2 points (one question: Q5), and questions with three or more correct answers earned up to 3 points (four questions: Q2, Q4, Q7, and Q8). Secondly, the attitude part included 12 items with a total score of 12 points (minimum = 0, maximum = 12). This part contained a set of sentences that the participants answered with (Yes/No), where each correct answer earned one point. Thirdly, the practice part included five items with a total score of 5 points (minimum = 0, maximum = 5). This part also contained a set of sentences that the participants answered with (Yes/No), where each correct answer earned 1 point. In general, the items tested the participants' knowledge about signs and symptoms of pneumonia and acute bronchitis, risk factors for ARI, complications of ARI, main causes of ARI, times and situations regarding medical consultation in ARI cases, and questions about whether parents use home remedies, self-treatment, or antibiotics at home.

The reliability of the instrument was checked by conducting a pilot study with 25 parents who visited local community associations in Irbid city. The Cronbach's alpha for the KAPs toward ARI scale was 0.75. The reliability of the instrument was checked for the main study as well. The Cronbach's alpha for the KAPs toward ARI scale was 0.78. Having a Cronbach's alpha of more than 0.7 indicated that the instrument used in this study is reliable, as previous evidence offered indications of alpha having a cut-off as an acceptable or satisfactory level. This was normally seen as ≥ 0.70 (Taber, 2018).

Ethical Considerations

The study was conducted after obtaining the approval of the Institutional Review Board of the primary investigator’s university (Ref. # 5/145/2021). Permission from the Ministry of Social Development and the directors of the community associations was also obtained to facilitate the data collection process. Furthermore, the original researchers’ permission to use their instrument was obtained by e-mail. The consent form was on the cover page of the questionnaire, which was distributed and explained to all parents who participated in the study. The confidentiality of the data and the anonymity of parents were also maintained.

Data Collection

One of the researchers collected the data through the community associations. The researcher visited the associations three days a week in the period between December 2021 and February 2022. The aim of the study was explained and the consent form was obtained from each participant who met the eligibility criteria and agreed to participate. The questionnaire was filled by the researcher through face-to-face interview and collected back at one point of time to avoid missing data. The time needed to answer the questionnaire was around 15 minutes.

Data-analysis Procedures

To analyze the data, the Statistical Package for Social Sciences (SPSS), version 22, was used. To describe demographic data, descriptive statistics, such as means, standard deviations, percentages, and frequencies were used. To test the correlations between KAPs total scores and the continuous variables, Pearson’s correlation was used. To test the correlation between KAPs scores and the ordinal variables,

Spearman’s correlation was used. To compare KAPs scores toward ARI between Jordanian and Syrian refugee parents, as well as between mothers and fathers, an independent sample *t*-test was used. The level of significance was 0.05.

Results

Sample Description

The study sample included 204 Jordanian and Syrian parents from a local community association in Irbid city. The Jordanian parents represented 60.8% of the sample. The mean age of the participants was 32.0 years (*SD* = 6.06). The mothers comprised 70.1% of the study sample. The average number of children was 2.54 (*SD* = 1.36), and the mean duration of marriage was 8.88 years (*SD* = 5.26). The number of participants who used social-media platforms was 98%. Finally, 48% of the fathers and 61% of the mothers were educated to college level.

Knowledge, Attitudes, and Practices Toward Acute Respiratory Infection

Regarding knowledge, the results showed that the total mean score of knowledge of all participants was 10.14 (*SD* = 2.75) out of 18. The Jordanian mean score was 10.41 (*SD* = 2.56), while the Syrian mean score was 9.71 (*SD* = 2.98). Most participants (91.2%) had heard about pneumonia, while 78.4% had heard about acute bronchitis. Only 29.9% of the participants correctly answered that bacteria are one of the main causes of ARI in children under five. Regarding the item “Should antibiotics be used in all cases of acute respiratory infection?”, 51.5% of the participants answered no, which is the correct answer (Table 1).

Table 1. Frequencies and percentages of Jordanian and Syrian parents’ knowledge scores towards acute respiratory infection (N= 204), (Jordanians = 124, Syrians = 80)

Item	Response	Jordanian n (%)	Syrian n (%)	All n (%)
Q1. Have you ever heard of the term (pneumonia or pneumococcal)?	Yes	119 (96)	67 (83.)	186 (91.2)
	No	5 (4)	13 (16.3)	18 (8.8)
Q2. What are the symptoms of pneumonia disease in children under five years old? (<i>difficult & rapid breathing, wheezing, fever, cough, shivering, vomiting, chest pain, anorexia, poor feeding or abstaining from breastfeeding</i>)	0: no answers	5 (4)	13 (16.3)	18 (8.8)
	1: 1 to 3 correct answers	34 (27.4)	14 (17.5)	48 (23.5)
	2: 4 to 6 correct answers	59 (47.6)	34 (42.5)	93 (45.6)
	3: 7 to 9 correct answers	26 (21)	19 (23.8)	45 (22.1)

Q3. Have you ever heard of (acute bronchitis)?	Yes	102 (82.3)	58 (72.5)	160 (78.4)
	No	22 (17.7)	22 (27.5)	44 (21.6)
Q4. What are the symptoms of acute bronchitis in children under five years old? (<i>Throat's dry, runny nose, muscle pain, fever, fatigue</i>)	0: no answers	23 (18.5)	23 (28.7)	46 (22.5)
	1: 1 to 2 correct answers	34 (27.4)	20 (25)	54 (26.5)
	2: 3 to 4 correct answers	58 (46.8)	33 (41.3)	91 (44.6)
	3: 5 correct answers	9 (7.3)	4 (5)	13 (6.4)
Q5. What is the main cause of acute lower respiratory tract infection in children under the age of five?	Bacteria	39 (31.5)	22 (27.5)	61 (29.9)
	Viruses	98 (79)	69 (86.3)	167 (81.9)
	Others	10 (8.1)	3 (2.8)	13 (6.4)
Q6. Does treatment vary according to the type of pathogen?	Yes	113 (91.1)	71 (88.8)	184 (90.2)
	No	11 (8.9)	9 (11.3)	20 (9.8)
Q7. What are the risk factors for acute lower respiratory tract infections in children under five years of age? (<i>passive smoking, weakened child's immunity, continuous exposure to respiratory irritants</i>)	0: no answers	5 (4)	12 (15)	17 (8.3)
	1: 1 correct answer	51 (41.1)	34 (42.5)	85 (41.7)
	2: 2 correct answers	77 (62.1)	49 (61.3)	126 (61.8)
	3: 3 correct answers	74 (59.7)	44 (55)	118 (57.8)
Q8. What are the complications of acute lower respiratory tract infection in children under five? (<i>pericarditis, bacteremia, atelectasis of the lung, pleural effusion, lung abscess, tracheal obstruction</i>)	0: no answers	9 (7.3)	4 (5.0)	13 (6.4)
	1: 1 to 2 correct answers	92 (74.2)	61 (76.3)	153 (75)
	2: 3 to 4 correct answers	20 (16.1)	15 (18.8)	35 (17.2)
	3: 5 to 6 correct answers	3 (2.4)	0 (0)	3 (1.5)
Q9. Should antibiotics be used in all cases of acute lower respiratory tract infection?	Yes	54 (43.5)	45 (56.3)	99 (48.5)
	No	70 (56.5)	35 (43.8)	105 (51.5)

* Bold text reflects the correct answer.

Regarding attitudes, the results revealed that the total mean score of attitudes of all participants was 8.09 ($SD=1.97$) out of 12, whereby the Jordanian mean score was 8.4 ($SD = 1.96$), and the Syrian mean score was 7.6 ($SD = 1.89$). Regarding the item “When do you think we should see the doctor in cases of bronchiectasis?”, 80.9% of the participants correctly answered when the child’s temperature is higher than 38 degrees Celsius,

while 73% correctly answered when symptoms are associated with wheezing and shortness of breath. Regarding the item “What is the appropriate attitude when your child under 5 has acute respiratory infections?”, 99.5% of the participants correctly answered that they needed to consult a doctor, while 48.5 % correctly answered that analgesic and antipyretic drugs should be given (Table 2).

Table 2. Percentages and frequencies of Jordanian and Syrian parents’ attitude scores toward acute respiratory infection (N= 204), (Jordanians = 124, Syrians = 80)

Items	Correct response	Jordanian n (%)	Syrian n (%)	All n (%)
1. Do you think that consulting a physician is necessary in cases of pneumonia?	No	3 (2.4)	1 (1.3)	4 (2.0)
2. When do you think that we should see a doctor in cases of bronchiectasis?				
<u>A.</u> Symptoms persist for more than three weeks.	Yes	94 (75.8)	47 (58.8)	141 (69.1)
<u>B.</u> Symptoms prevent a child from sleeping.	Yes	89 (71.8)	42 (52.5)	131 (64.2)
<u>C.</u> A child produces discolored phlegm or bloody phlegm.	Yes	98 (79.0)	53 (66.3)	151 (74)
<u>D.</u> The child's temperature is higher than 38 Celsius.	Yes	102 (82.3)	63 (78.8)	165 (80.9)
<u>E.</u> Acute bronchitis associated with wheezing and shortness of breath.	Yes	95 (76.6)	54 (67.5)	149 (73)

3. What is the appropriate attitude when your under-5 child has an acute lower respiratory tract infection?				
A. Doctor consultation.	Yes	124 (100)	79 (98.8)	203 (99.5)
B. The use of analgesic and antipyretic drugs.	Yes	62 (50)	37 (46.3)	99 (48.5)
C. The use of antibiotics found at home.	No	102 (82.3)	64 (80.0)	166 (81.4)
D. The use of home remedies such as compresses.	Yes	73 (58.9)	35 (43.8)	108 (52.9)
E. The use of alternative medicine and herbal medicine.	No	91 (73.4)	57 (71.3)	148 (72.5)
F. Waiting until the symptoms subside automatically without the need to use anything.	No	109 (87.9)	76 (95)	185 (90.7)

Regarding practices, the results revealed that the total mean score of practices was 4.04 (*SD* = 0.89) out of 5. The Jordanian mean score was 4.18 (*SD* = 0.86), whereas the Syrian mean score was 3.84 (*SD* = 0.91). For example, 92.2% of the participants correctly answered that they would consult a pediatrician when

signs and symptoms of the disease began to appear. However, 14.2% of the participants incorrectly answered that they would ask the pharmacist to prescribe antibiotics for their child without knowing the cause of the disease (Table 3).

Table 3. Frequencies and percentages of Jordanian and Syrian parents' practice scores toward acute respiratory infection (N= 204), (Jordanians = 124, Syrians = 80)

Item	Correct response	Jordanian n(%)	Syrian n(%)	All n(%)
1. Practicing self-treatment without the need to consult a doctor.	No	115 (92.7)	75 (93.8)	190 (93.1)
2. Consulting a pediatrician when signs and symptoms of the disease begin to appear.	Yes	117 (94.4)	71 (88.8)	188 (92.2)
3. Asking the pharmacist to prescribe antibiotics for my child without knowing the cause of the disease.	No	109 (87.9)	66 (82.5)	175 (85.8)
4. Consulting my physician for home remedies.	Yes	79 (63.7)	44 (55.0)	123 (60.3)
5. Consulting experienced family and friends about what to do.	No	98 (79.0)	51 (63.7)	149 (73)

The Relationship between Demographic Variables and Knowledge, Attitudes, and Practices Scores toward Acute Respiratory Infection

The data was checked for the assumptions of correlation and the variables were normally distributed with a linear relationship and no outliers. Pearson's correlation was used to test the correlations between KAPs total scores and the continuous variables (number of total children and family income). Spearman's correlation was used to test the correlation between

KAPs scores and the ordinal variables (father's education level and mother's education level). The results revealed that father's and mother's education levels were positively correlated with the knowledge scores ($p \leq 0.05$). Total number of children, family income, father's education, and mother's education were positively correlated with the attitude scores. Finally, family income and father's and mother's education were positively correlated with the practice scores ($p \leq 0.05$) (Table 4).

Table 4. Pearson and Spearman correlations of knowledge, attitudes, and practices toward acute respiratory infection with the socio-demographic data (N= 204)

KAP Variables	Other variables	Correlation(r)	P-value
Knowledge toward ARI	Total number of children	0.008	0.914
	Family income	0.093	0.185
	Father education	0.264	0.000*
	Mother education	0.272	0.000*

Attitudes towards ARI	Total number of children	-0.175	0.012*
	Family income	0.29	0.000*
	Father education	0.172	0.014*
	Mother education	0.145	0.039*
Practices towards ARI	Total number of children	-0.049	0.491
	Family income	0.156	0.026*
	Father education	0.141	0.044*
	Mother education	0.184	0.008*

Differences between Jordanian and Syrian Parents' Knowledge, Attitudes, and Practices toward Acute Respiratory Infection

Based on the independent sample *t*-test, the results showed that there was no significant difference between Jordanian parents (mean = 10.41, *SD* = 2.56) and Syrian parents (mean = 9.71, *SD* = 2.98) in terms of their knowledge scores [$t(202) = 1.783, p = 0.076$]. There was a significant difference between Jordanian parents (mean = 8.4, *SD* = 1.96) and Syrian parents (mean = 7.6, *SD* = 1.89) in terms of their attitude scores. The Jordanian parents had a significantly higher mean compared with Syrian parents [$t(202) = 2.9, p = 0.004$]. There was a significant difference between Jordanian parents (mean = 4.18, *SD* = 0.86) and Syrian parents (mean = 3.84, *SD* = 0.91) in terms of their practice scores. The Jordanian parents had a significantly higher mean than Syrian parents [$t(202) = 2.706, p = 0.007$]. Finally, there was no significant difference between fathers and mothers in terms of KAPs scores ($p = 0.243; 0.324; 0.556$, respectively).

Discussion

The data of the current study indicated that the total mean score of knowledge was 10 out of 18. This score may reflect insufficient knowledge regarding ARI among the study participants. The findings of this study are supported by studies in Saudi Arabia and Sudan which revealed that more than a half of the parents were not knowledgeable about ARI (Alluqmani et al., 2017; Saeed et al., 2020). The results of this study confirmed that most parents (82%) recognized viruses as a cause of ARI, but only a small percentage was able to identify bacteria as another cause (30%). In comparison, the two studies in Saudi Arabia and Sudan found that most caregivers were unable to identify bacteria or viruses as causes of ARI (Alluqmani et al., 2017; Saeed et al., 2020). The data of this study indicated that Jordanian and Syrian parents were not sufficiently familiar with the risk factors, signs and symptoms, and complications

of ARI. These findings are supported by a study in India which showed that caregivers had insufficient knowledge regarding ARI signs and symptoms and risk factors (Minz et al., 2019).

In the current study, the score of attitudes was 8 out of 12. The overall score may reflect neutral attitudes towards ARI among study participants. While the responses to some items reflect positive attitudes among the study participants, some other responses reflect negative attitudes. In comparison, the finding of the study in Saudi Arabia showed that mothers' attitudes were poor in more than a half of the participants (Alluqmani et al., 2017). In the current study, 98% of parents believed that it was necessary to consult a doctor when their child had pneumonia. This finding is similar to the finding of the study in Sudan, where 91% of mothers reported that consulting the physician in cases of pneumonia was necessary (Saeed et al., 2020). Moreover, 48.5% of parents in this study reported using self-medication, such as the use of analgesic and antipyretic drugs. This finding is congruent with the study in Saudi Arabia which showed that the use of paracetamol and ibuprofen without contacting a doctor was favored by 55.8% of mothers (Alluqmani et al., 2017). Furthermore, more than 80% of parents in this study reported that home antibiotics should not be used, which reflects a positive attitude. This finding is supported by the study in Pakistan which showed that antibiotics were considered necessary for ARI by only 8% of the mothers (Bham et al., 2016). Another promising result is that 72.5% of parents in the current study reported that alternative medicine and herbal medicine should not be used, which is also considered a positive attitude. This percentage is a little higher than the one reported in the study in Sudan which showed that 56.7% of mothers disagreed with using alternative medicine to treat ARI (Saeed et al., 2020). The differences in percentage might be because of the differences in culture, as culture plays an important role in the individual's concepts of health and disease.

The data of the current study indicated that parents of children under five reported an overall practice score of 4 out of 5. This result may reflect appropriate practices among the study participants. Although the participants themselves are not knowledgeable about ARI, they consult doctors and follow their orders. Furthermore, the data indicated that Jordanian parents' practices toward ARI were better than those of Syrian parents. This might be explained by the fact that the percentage of college-educated people in the Jordanian sample was higher than in the Syrian sample. This is exactly what a study in Pakistan reported, where more educated mothers scored more highly in terms of better practices toward ARI than lower-educated mothers (Bham et al., 2016). This study showed that over 90% of parents reported appropriate practices, as they did not use self-treatment without consulting a doctor, and they consulted a pediatrician when signs and symptoms of the disease began to appear. In comparison, the study in Saudi Arabia showed that self-medication without consulting a doctor was not practiced by 47% of mothers, while 62% of mothers reported contacting a pediatrician (Alluqmani et al., 2017).

The results of this study indicated that the majority of mothers reported appropriate practices regarding asking a pharmacist to prescribe antibiotics, consulting experienced family and friends, and consulting the physician for home remedies (86%, 73%, and 60%, respectively). The results were in line with the findings of the study in Sudan which showed that the majority of mothers reported good practices regarding inquiring about antibiotics from a pharmacist, family consultation, and doctor consultation about home remedies (Saeed et al., 2020). An explanation for the appropriate practices in this study might be linked to the positive impact of the national awareness campaigns about the COVID-19 pandemic.

Regarding knowledge, the data indicated a significant positive relationship between knowledge of ARI and both mother's and father's education. The explanation is that higher education qualifies parents to read and investigate information more easily than parents with less education. The findings agree with the study in Saudi Arabia (Alluqmani et al., 2017). Regarding attitudes, the data of the current study showed a significant negative relationship between attitudes and the total number of children, which contradicts a study in Iran which showed no evidence of a link between

mothers' KAPs and the family's number of children (Farhad et al., 2014). This may be because having fewer children reduces the burden on parents and allows parents more time to take care of them. Hence, a more positive attitude is reported. Furthermore, the result showed a significant positive relationship between attitudes and family income, mother's education, and father's education. A higher income level makes it easier for parents to consult a doctor without money being an obstacle. In addition, the best level of education qualifies the parents to read, understand, and search to find a suitable solution for the health of their children. The result was compatible with the findings of the study in Sudan (Saeed et al., 2020). Regarding practices, the results revealed a significant positive relationship between practices toward ARI and family income, mother's education, and father's education. This result concurs with the study in Sudan (Saeed et al., 2020). This may be explained in that higher income and education levels of parents create greater awareness of consulting a doctor and applying appropriate practices.

Furthermore, the results revealed that Jordanian parents reported significantly higher scores than Syrian parents in terms of attitudes and practices toward ARI. This finding is compatible with a study in Iran that suggested an association between mothers' nationality and their attitudes toward ARI (Farhad et al., 2014). However, this result is inconsistent with the results of the Iranian study, which showed no difference in practices based on nationality (Farhad et al., 2014). Hence, the differences might be due to the Syrian crisis and its negative effects on the Syrians' living conditions which created a difference in the socioeconomic status between Jordanians and Syrians (UN Refugees Agency, 2021). Additionally, the availability of health insurance for many Jordanian parents has enhanced their attitudes and practices toward ARI.

Study Limitations and Recommendations

The methodology of this study has some limitations. Owing to the cross-sectional design of this study, it was not possible to test the causality between the variables. Moreover, the small sample size and the convenience sampling method may increase selection bias, and using a self-reporting questionnaire may cause recall bias. Finally, the setting of the study was confined to Irbid city in the northern part of Jordan. The results do not therefore represent all Jordanian and Syrian

communities who live in other Jordanian cities or camps or have different socioeconomic conditions. Future studies should be undertaken to explore the correlation with other variables with a randomization method and a larger sample size and other settings, as well as to test the effectiveness of education in raising awareness and enhancing KAPs among parents.

Implications for Nursing

The results of the study indicated limited levels of knowledge and attitudes of parents, and this means that they require health education. The best places for this task are the primary health care centers, hospitals, and public areas in general, or community organizations in particular to reach Syrian refugees. Raising awareness among parents is the responsibility of health care providers, such as doctors, nurses, and pharmacists. So, it is necessary to create a multidisciplinary taskforce team in each health institution for the purposes of education, follow-up, observation, and coordination of all aspects to form a connection between parents and health care providers for guidance and case management. Providing a highly qualified specialist

physician is also crucial to diagnosis of infectious diseases accurately before prescribing antibiotics. Finally, it is essential to emphasize the importance of health education in the curricula of all health professionals.

Conclusion

Overall, Jordanian and Syrian parents' knowledge about ARI in Irbid city is insufficient. Parental education and income levels were primarily correlated with KAPs. Jordanian parents reported higher attitude and practice scores compared to Syrian parents. Thus, it is necessary to enhance the awareness of parents *via* health education. Health education should target parents with low socioeconomic status, particularly Syrian refugee parents, who may be harder to reach.

Conflict of Interests

There is no conflict of interests in this study.

Funding or Sources of Financial Support

This study has been funded by the Jordan University of Science and Technology (Grant # 20220092).

REFERENCES

- Abu Hammour, K.A., Abu Farha, R. A., Alsous, M., Rizik, M., & Hammour, W. A. (2018). Evaluation of risk factors affecting parental knowledge and attitude toward antibiotic use in children with upper respiratory tract infections. *European Journal of Integrative Medicine*, 17, 107-111. <https://doi.org/10.1016/j.eujim.2017.12.006>
- Alluqmani, M.F., Aloufi, A.A., Abdulwahab, A.M.A., Alsharif, A.I.K., AlShathri, A.A., AlShehri, M.S., Aharbi, S.A., Hawsawi, S.I., Alshmmari, N.A., & Alshammari, B.J.I. (2017). Knowledge, attitude and practice of mothers on acute respiratory infection in children under five years in Saudi Arabia, 2017. *The Egyptian Journal of Hospital Medicine*, 69 (2), 1959-1963. <https://doi.org/10.12816/0040629>
- Bham, S.Q., Saeed, F., & Shah, M.A. (2016). Knowledge, Attitude and Practice of mothers on acute respiratory infection in children under five years. *Pakistan Journal of Medical Sciences*, 32 (6), 1557-1561. <https://doi.org/10.12669/pjms.326.10788>
- Farhad, J., Malihe, A., Fatemeh, A., & Mahmood, S. (2014). The knowledge, attitude and practice of mothers regarding acute respiratory tract Infection in children. *Biosciences Biotechnology Research Asia*, 11 (1), 343-348. <https://doi.org/10.13005/bbra/1279>
- Forum of International Respiratory Societies. (2017). The global impact of respiratory disease. 2nd edn. In: *Forum of International Respiratory Societies*. https://www.firnet.org/images/publications/The_Global_Impact_of_Respiratory_Disease.pdf
- Minz, A., Agarwal, M., Singh, J.V., Singh, V.K., & Sahu, R. (2019). Caregiver's knowledge about childhood pneumonia: A study from rural areas and urban slums of Lucknow. *National Journal of Community Medicine*, 10 (02), 62-68.
- Ramani, V.K., Pattankar, J., & Puttahonnappa, S.K. (2016). Acute respiratory infections among under-five age group children at urban slums of Gulbarga city: A longitudinal study. *Journal of Clinical and Diagnostic Research*, 10 (5), LC08-LC13. <https://doi.org/10.7860/JCDR/2016/15509.7779>

- Saeed, E., & Awadalla, H. (2020). Knowledge, attitude, and practice among mothers of under- five children about acute lower respiratory tract infections in a locality in Khartoum urban area, Sudan. *Journal of Environmental Science and Public Health*, 4 (04), 455-468. <https://doi.org/10.26502/jesph.96120113>
- Taber, K.S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48, 1273-1296. <https://doi.10.1007/s11165-016-9602-2>
- United Nations International Children's Emergency Fund. (2019). *UNICEF data warehouse*. https://data.unicef.org/resources/data_explorer/unicef_f/?ag=UNICEF&df=GLOBAL_DATAFLOW&ver=1.0&dq=JOR.CME_MRYOT4.&startPeriod=1970&endPeriod=2022
- United Nations International Children's Emergency Fund. (2018). *DATA warehouse*. https://data.unicef.org/resources/data_explorer/unicef_f/?ag=UNICEF&df=G
- [GLOBAL_DATAFLOW&ver=1.0&dq=JOR.MNCH_PNEUCARE.&startPeriod=1970&endPeriod=2021](https://data.unicef.org/resources/data_explorer/unicef_f/?ag=UNICEF&df=GLOBAL_DATAFLOW&ver=1.0&dq=JOR.MNCH_PNEUCARE.&startPeriod=1970&endPeriod=2021)
- UN Refugees Agency. (2021). *Operational data portal refugees' situation*. <https://data2.unhcr.org/en/situations/syria/location/36>
- World Health Organization. (2021). *Child mortality (under 5 years)*. <https://www.who.int/news-room/fact-sheets/detail/levels-and-trends-in-child-under-5-mortality-in-2020>
- World Health Organization. (2020). *Severe acute respiratory infections treatment centre*. <https://www.who.int/publications/i/item/10665-331603>
- World Health Organization. (2014). *Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care*. <https://www.who.int/publications/i/item/infection-prevention-and-control-of-epidemic-and-pandemic-prone-acute-respiratory-infections-in-health-care>