

Knowledge, Attitudes, and Practices to Prevent Pneumonia among Caregivers of Children Aged Under 5 Years Old in Cambodia

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Abstract— Pneumonia is a forgotten killer particularly in children under 5 years old. Their caregivers have adequate knowledge, attitude, and practice, the preventable measures can be achieved. This study was to determine the level and relationship of KAP among caregivers of children under 5 years old about pneumonia prevention at the National Pediatric Hospital in Cambodia. Total 113 caregivers were included by purposive sampling. The results revealed that the caregivers' knowledge (K) about pneumonia was good (77%), moderate (18.6%), and poor (4.4%). The attitude (A) towards pneumonia prevention was strongly agreed (55.8%), moderately agreed (16.8%), and disagreed (27.4%) and the practice (P) to prevent pneumonia was good (67.9%), moderate (23.9%), and poor (6.2%). The statistically significant positive linear correlation of K-P ($rs=0.401$, $p=0.000$) was found, while the correlation of K-A ($rs=-0.089$), and A-P ($rs=-0.015$) were negative linear correlations. Moreover, the significant demographic factors associated with the practice were the income of caregivers (p -value 0.003) and children's sex (p -value 0.032). This study revealed both good and poor portions of knowledge, attitude, and practice which is needed to improve more among the caregivers regarding pneumonia prevention in children under 5 years old. Therefore, effective intervention is required for caregivers to strengthen their KAP in certain parts regarding pneumonia prevention in children under 5 years old to reduce the incidence and mortality rate of this preventable disease.

Keywords— Attitude, Caregivers, Children, Knowledge, Pneumonia, Practice, and Prevention.

I. INTRODUCTION

Pneumonia is an overlooked killer particularly in children under 5 years old [1]. The mortality rate among this group of people was more than 809,000 children in 2017 which was indicated that children under 5 years old had died from this preventable disease every 39 seconds [2]. Moreover, the decrease in deaths by pneumonia in children has been significantly slower than another infectious diseases. This losing life is tragically concerned since this infectious disease has known to be preventable and treatable [3]. In Southeast Asia, there were 610 pneumonia cases per 100,000 children [4]. Specifically, in Cambodia, which is one of the countries in that region, pneumonia ranked in the top 2 out of 10 leading causes of death among children in both private and national hospitals in 2017 [5]. In the national hospital, it was ranked in the top 2 out of 10 in IPD (12,673) and top 3 out of 10 in OPD (139,224) [6].

Various types of viruses, bacteria, or fungi are the cause of pneumonia. The most common type of bacteria is *Streptococcus pneumoniae* which occurs in several ways of body weakness by illness, malnutrition, or impaired immunity. While the most common virus type that caused pneumonia is the Influenza virus (Flu) [7].

Additionally, pneumonia risk factors have been classified into three categories: host factors, such as low birth weight, lack of exclusive breastfeeding, and malnutrition. Indoor air pollution, a crowded home, and smoking parents are all environmental risk factors; and the infection factors include a weakened immune system, such as HIV or Measles infection, and a lack of immunization [2, 8].

Concurrently, children are vulnerable to long-term complications such as reduced lung function, asthma, and possibly chronic obstructive pulmonary disease in later life or death, which is a major public health concern [9]. Although pneumonia is a leading cause of death among children, particularly in developing countries. However, it can be prevented, which could save millions of lives. Furthermore, WHO and UNICEF have just produced an integrated global action plan to end this preventable child death by 2025 including a pneumonia prevention framework as the goal of this action is to protect and prevent children from contracting pneumonia [10].

Disease prevention in young children mainly relies on preventive measures of their caregivers [11]. There is significant evidence that caregivers' health information, defined as the understanding and effective application of health information in making health decisions, is linked to early childhood health-related practices [12]. Parents can provide all of the care for their children to keep the conditions under control [13]. Subsequently, primary caregivers' knowledge, attitudes, and practices determine the quality of care that they provide to children to ensure their survival and development as they play such an essential role in disease prevention, particularly pneumonia [14].

Hence, the objective of this study was to describe the level and relationship of knowledge (K), attitude (A), and practice (P) among the caregivers of children under 5 years old regarding pneumonia prevention.

II. MATERIALS AND METHODS

Study Design

This cross-sectional descriptive research study was conducted to investigate the levels of knowledge, attitude, and practice and the relationship between KAP regarding pneumonia prevention among the caregivers of children under 5 years old. The duration of this study was conducted from March to April 2021.

Study Setting

Out-patient department in well-child service of the National Pediatric Hospital (NPH) in Phnom Penh, Cambodia.

Study Populations

The target population in this study was the caregivers (at least 18 years of age) of children under 5 years old who visit the outpatient department in a well-child service at the National Pediatric Hospital in Cambodia.

Study Variables

Caregivers: Age, gender, residence, income/month, and level of education, knowledge about pneumonia, attitude towards pneumonia prevention, and practice to prevent pneumonia.

Children under 5 years old: Age and sex.

Inclusion Criteria

Caregivers who are willing to participate in a study and who be able to read and write in the Cambodian language.

Exclusion Criteria

Caregivers of sick children that come for disease consultation.

Sample Size

$$\text{Cochran formula: } n_0 = (Z^2 pq)/e^2$$

Cochran (1977) formula had been used to calculate the sample size. (n_0 refers to sample size, Z refers to the value of desired confidence level (95%) = 1.96, p refers to the estimate of the proportion of an attribute = 0.5 (Maximum variability), q refers to (1-p), and e refers to the acceptable sampling error (10%) = 0.1). Moreover, to prevent losing cases during data collection, 20% more of the total samples had been added so, the given sample size is 116. However, the reported results were from only 113 due to 3 incomplete questionnaires had been cut off.

Sampling Technique

The eligible caregivers of children under 5 years old who met the inclusion criteria have been selected by using the purposive sampling method. The number of respondents by this selected sample fits the profile of the target population that representing the hospital. The selection of those respondents had been conducted from the well-child service in the out-patient department until the target sample figure had been achieved.

Instrument

The questionnaire which was developed by the researcher has been used in this study as the research instrument to assess the knowledge, attitude, and practice of caregivers regarding

pneumonia prevention of children under 5 years old. The contents of the questionnaire have been reviewed from 48 studies and followed the cultural sensitivity in Cambodia. The test of questionnaire's content validity index (CVI) score for K was 0.93, A was 0.86, and P was 0.82 by one expert as a physician of pediatric specialist from National Pediatric Hospital, Cambodia, and two experts as the assistant professor doctors in the pediatric nursing from the Faculty of Nursing, Khon Kaen University, Thailand. Moreover, the translation and back-translation method has been performed by a bilingual translator and tested for content reliability with 30 samples which got the score of K section was 0.84, A section was 0.88 and the P section was 0.81.

The questionnaire consisted of 4 sections: Demographic characteristics, Knowledge about pneumonia, Attitude towards pneumonia prevention, and Practice of pneumonia prevention. The knowledge section has 20 items divided by 10 positive items and 10 negative items with two choices of Right/Wrong (Scoring 1/0 and reversely for negative items). The attitude has 10 items divided by 5 positive items and 5 negative items with 3 choices of Agree/Disagree/Not sure (Scoring 2/1/0 and reversely for negative items). Lastly, the practice section consisted of 17 positive items with three choices of Every time/Sometimes/Never (Score 3/2/1). The interpretation was divided into 3 levels (Poor/Moderate/Good) by calculating the range of score divided by interval of 3 groups.

Ethical Considerations

This study got approval from the Ethics Committee for Human Research (KKUEC) based on the declaration of Helsinki and the ICH Good Clinical Practice Guideline of Institutional Review Board (IRB) at Khon Kaen University of Thailand to obtain ethical approval and protection of human subjects (No: 4.3.02: 39/2020). Next, this study has been approved by the National Ethics Committee for Health Research at the National Institute of Public Health of the Ministry of Health in Cambodia (N^o 067 NECHR). The participants were well informed about the purpose, the process, the right to participate, reject or withdraw anytime from the study. The privacy and confidentiality of the participants have been implemented.

Data Collection and Procedures

The data collection procedure followed the announcement of Khon Kaen University No. 913/2020 on Guidelines for Conducting Human Research during the outbreak of Coronavirus Disease 2019 (COVID-19) No. 2 dated 29 May 2020 guideline to prevent the spreading of the COVID-19 based on the principles of social distancing, wearing face masks, maintaining personal hygiene during this COVID-19 pandemic situation. The data collection was conducted during the schedule of immunization and well-child service. The explanation of the information sheet and the informed consent have been performed on the voluntary participants. The participants picked up the questionnaire that put in the box, which was located in a private room, after they finish completing the questionnaire, they returned it to the box. The duration of this study was conducted from March to April 2021.

Data Analysis

The data analysis process had been used the Statistical Package of Social Science (SPSS) version 26. The demographic characteristics data such as frequency, percentage, range, mean, and standard deviation have been analyzed by descriptive statistics. Moreover, the correlation between independent variables knowledge, attitude, and practice on pneumonia prevention had been analyzed after testing for normality by Kolmogorov Smirnov and Shapiro Wilk test before choosing the statistics to analyze, the probability value (sig) is ≤ 0.05 then this means that it not normally distributed, the Spearman correlation coefficient (r_s) had been used. Finally, the multiple linear regression analysis had been used to study the demographic factor associated with practice to prevent pneumonia after the assumption test had been met.

III. RESULTS

The reported result and data analysis from a completed questionnaire of the participants in this study were 113 participants while 88.8% were the mother of children under 5 years old. The caregiver’s age ranges from 20 to 38 years old. Most of the residence of caregivers were from Urban (Phnom Penh City) 89.7%. Among the total caregiver’s income per month for the salary which is below the average salary per month in Cambodia 46.9 %, and the participants with no salary 30%. The level of education, for bachelor’s degree 54.9%, Grade 7-12 (Secondary school) 26.5%, Grade 1-6 (Primary school) 14.2%, and Never study 4.4%.

TABLE I. Demographic Characteristics

Caregivers		
Role	Frequency	%
Mother	100	88.5%
Father	13	11.5%
Age	Range 20-38	Mean=29.9 (SD=4.61)
Residence		
Urban	102	90.3%
Rural	11	9.7%
Income/month		
No Salary	35	31.0%
Below Average	53	46.9%
Average	25	22.1%
Level of Education		
Never Study	5	4.4%
Primary School	16	14.2%
Secondary School	30	26.5%
Bachelor’s degree	62	54.9%
Children under 5 years old		
Sex		
Male	76	67.3%
Female	37	31.7%
Age	Range 1.5m-4y	Mean=3.85 (SD=2.2)
1 month and a half	20	17.7%
2 months and a half	20	17.7%
3 months and a half	22	19.5%
9 months old	8	7.1%
1 year old and a half	24	21.2%
More than 2 years old	19	16.8%

The demographic data of the children under 5 years old have shown about the children’s sex was male 67.3. The age of children who were 1 month and a half 17.7%, 2 months and

a half 17.7%, 3 months and a half 19.5%, 9 months old 7.1%, 1-year-old and a half 21.2%, and more than 2 years old 16.8% (Table I).

This present study revealed the level of knowledge about pneumonia among 113 caregivers. There were 77% have good knowledge, 18.6% have moderate knowledge, and 4.4% have poor knowledge about pneumonia in children under 5 years old. Moreover, there was only 55.8% Strongly Agree, 16.8% Moderately Agree, and 27.4% Disagree with attitude toward pneumonia prevention. For the level of practice found that 69.9% of participants have good practice, 23.9% have moderate practice, and 6.2% have poor practice to prevent pneumonia among the children under 5 years old as shown in table II.

TABLE II. Level of KAP towards pneumonia prevention

Level of KAP		
Knowledge	Frequency	(%)
Poor (0-6)	5	(4.4)
Moderate (7-12)	21	(18.6)
Good (13-20)	87	(77.0)
Attitude		
Disagree (0-6)	31	(27.4)
Moderately Agree (7-12)	19	(16.8)
Strongly Agree (13-20)	63	(55.8)
Practice		
Poor (17-27)	7	(6.2)
Moderate (28-38)	27	(23.9)
Good (39-51)	79	(69.9)

Table III shows the mean, standard deviation, minimum, maximum, and percentage of questionnaire items in knowledge about pneumonia.

TABLE III. Questionnaire items of Knowledge

Dimension of K	\bar{X}	SD	Min	Max	Good (%)
Cause and Definition of Pneumonia	1.82	0.40	0	2	
Item 1	0.93	0.24	0	1	106(93.8%)
Item 2	0.88	0.32	0	1	100(88.5%)
Risk factors of pneumonia	3.61	0.82	1	5	
Item 3*	0.53	0.50	0	1	61(54%)
Item 4*	0.72	0.44	0	1	82(76%)
Item 5	0.76	0.42	0	1	86(76.1%)
Item 6*	0.79	0.40	0	1	90(79.6%)
Item 7	0.79	0.40	0	1	90(79.6%)
Item 8*	0.43	0.49	0	1	49(43.4%)
Signs and symptoms of pneumonia	2.14	0.81	0	3	
Item 9	0.95	0.20	0	1	108(95.6%)
Item 10*	0.56	0.49	0	1	64(56.6%)
Item 11	0.61	0.48	0	1	70(61.9%)
Transmission of pneumonia	2.53	1.14	0	4	
Item 12*	0.61	0.48	0	1	70(61.9%)
Item 13	0.67	0.47	0	1	76(67.3%)
Item 14	0.82	0.38	0	1	93(82.3%)
Item 15*	0.42	0.49	0	1	48(42.5%)
Prevention of pneumonia	3.68	1.13	0	5	
Item 16*	0.62	0.48	0	1	71(62.8%)
Item 17	0.92	0.27	0	1	104(92%)
Item 18*	0.56	0.49	0	1	64(56.6%)
Item 19*	0.65	0.47	0	1	74(65.5%)
Item 20	0.91	0.28	0	1	103(91.2%)
Summary of K (20 Items)	13.8	2.55	5	17	113

(* means negative item)

Table IV shows the mean, standard deviation, minimum, maximum, and percentage of questionnaire items in attitude towards pneumonia prevention.

TABLE III. Questionnaire items of Attitude

Dimension of A	\bar{X}	SD	Min	Max	Strongly Agree (%)	Moderately Agree (%)
Pneumonia	2.29	1.60	0	4		
Item 21	1.45	0.88	0	2	82(72.6%)	31(27.4%)
Item 22*	0.84	0.92	0	2	40(35.4%)	58(51.3%)
Vaccination	2.07	1.53	0	4		
Item 23	1.35	0.88	0	2	70(61.9%)	31(27.4%)
Item 24*	0.73	0.81	0	2	26(23%)	56(49.6%)
Early consultation and illness management	5.80	3.88	0	12		
Item 25*	0.83	0.91	0	2	39(34.5%)	58(51.3%)
Item 26	1.34	0.88	0	2	69(61.1%)	31(27.4%)
Item 27	1.03	0.98	0	2	56(49.6%)	53(46.9%)
Item 28	1.35	0.89	0	2	71(62.8%)	32(28.3%)
Item 29*	0.48	0.74	0	2	17(15%)	76(67.3%)
Item 30*	0.79	0.74	0	2	22(19.5%)	46(40.7%)
Summary of A (10 Items)	10.17	6.60	0	20	113	

("*" means negative item)

Table V shows the mean, standard deviation, minimum, maximum, and percentage of questionnaire items in practice to prevent pneumonia.

TABLE V. Questionnaire items of Practice

Dimension of P	\bar{X}	SD	Min	Max	Good (%)
Vaccines prevent pneumonia	13.07	2.56	5	15	
Item 31	2.81	0.52	1	3	99(67.6%)
Item 32	2.82	0.53	1	3	101(89.4%)
Item 33	2.77	0.57	1	3	97(85.8%)
Item 34	2.66	0.70	1	3	90(79.6%)
Item 35	2.00	0.91	1	3	47(41.6%)
Nutrition prevent pneumonia	11.23	2.99	5	15	
Item 36	2.19	0.84	1	3	53(46.9%)
Item 37	2.19	0.78	1	3	48(42.5%)
Item 38	1.86	0.89	1	3	38(33.6%)
Item 39	2.53	0.75	1	3	78(69%)
Item 40	2.45	0.76	1	3	70(61.9%)
Practice to prevent spreading infected agents that caused pneumonia	12.21	3.43	5	15	
Item 41	2.39	0.77	1	3	65(57.5%)
Item 42	2.32	0.84	1	3	65(57.5%)
Item 43	2.59	0.67	1	3	79(69.9%)
Item 44	2.46	0.77	1	3	72(63.7%)
Item 45	2.45	0.78	1	3	71(62.8%)
Practice for illness management	4.57	1.45	2	6	
Item 46	2.40	0.72	1	3	62(54.9%)
Item 47	2.16	0.85	1	3	52(46%)
Summary of P (17 Items)	41.10	8.55	17	51	113

The relationship between knowledge, attitude, and practice has been tested for normal distribution by Kolmogorov-Smirnov and Shapiro-Wilk using SPSS before choosing the statistics for analysis. As the result of the p-value (≤ 0.05) from Kolmogorov-Smirnov and Shapiro-Wilk test: Assumption significance of knowledge ($p=0.000$), attitude ($p=0.000$), and practice ($p=0.000$). These were not normally distributed. Thus,

the Spearman correlation coefficient (r_s) has been used to study the correlation between knowledge, attitude, and practice towards pneumonia prevention among caregivers of children under 5 years old. The correlation revealed negative linear correlations between knowledge and attitude ($r_s = -0.089$, $p = 0.349$), and negative linear correlations between attitude and practice ($r_s = -0.015$, $p = 0.872$). By the way, this study revealed the statistically significant positive linear correlations between knowledge and practice ($r_s = 0.401$, $p = 0.000$), (the correlation significant at the p-value 0.01) (Table VI).

TABLE VI. Questionnaire items of KAP

Correlations					
Spearman's rho	K	Correlation Coefficient	K	A	P
		Sig. (2-tailed)	.	.349	.000
		N	113	113	113
	A	Correlation Coefficient	-0.089	1.000	-.015
		Sig. (2-tailed)	.349	.	.872
		N	113	113	113
	P	Correlation Coefficient	.401**	-.015	1.000
		Sig. (2-tailed)	.000	.872	.
		N	113	113	113

The coefficient of determination of factors associated with practice to prevent pneumonia based on the value of R Square ($R^2=0.155$) means that the demographic factors influence 15.5% of the practice to prevent pneumonia in children under 5 years old as shown in table VII.

TABLE VII. Multivariate regression between demographic factors and P

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.394 ^a	.155	.099	8.12183	.933

a. Predictors: (Constant), Demographic factors

b. Dependent Variable: Practice

Multiple linear regression has been used to study the relationship between Practice and Demographic Factors (caregiver's role, age of caregivers, residence, income per month, level of education, child's age, and child's sex) after testing the assumption. To be done by the Scatterplots showed that there was a linear or curvilinear relationship and multivariate normality assumes that the residuals were normally distributed by the P-P Plot of Regression Standardized Residual of Practice variable and the absence of multicollinearity using VIF values (< 10) means that the assumption met by VIF values. The variances were the income of the caregivers which showed a significant value at $p=0.003$ (≤ 0.05) and Children's sex $p=0.032$ (≤ 0.05) means that the income of the caregiver and the sex of children significantly affects the practice to prevent pneumonia in children under 5 years old. However, based on these results would indicate that the other factors of caregiver's role, age of caregivers, level of education, and children's age were influent the practice but not significantly affected the practice to prevent pneumonia in children under 5 years old (Table VIII).

TABLE VIII. Factor associated with Practice.

Model	B	Beta	Sig	VIF
(Constant)	41.562		.000	
Caregiver's role	2.542	.095	.349	1.273
Age of caregivers	-.339	-.183	.076	1.288
Residence of caregivers	-2.531	-.088	.445	1.642
Income (per month)	4.049	.344	.003	1.536
Level of Education	-.424	-.044	.702	1.601
Children's sex	4.229	.233	.032	1.420
Children's age	.209	.054	.608	1.372

Note: The significance at $p \leq 0.05$

IV. DISCUSSION

Demographic Characteristics

The finding of this study revealed the demographic characteristics of the caregivers of children under 5 years old that the majority of the caregivers who participated in the study were the mother 88.5% more than father and other family members followed the previous study [15]. The participant's residences were mostly from Urban (Phnom Penh City) 90.3%. Additionally, the income of the participants, there were 30% have no income, while there were 46.9% that stay below the average monthly income and 22.1% equal the average monthly income in Cambodia [16]. Moreover, the majority of participants were 54.9% who graduated bachelor's degree while the participants 4.4% have never studied [17]. Another study found that participants with an urban background had a greater level of education, and this finding highlights the need for the government to undertake efforts to raise the level of education among people in rural areas [15].

Knowledge

Pneumonia is a contagious disease that can be fatal in children under the age of five. Caregiver's knowledge is important in preventing and taking care of children from pneumonia. It is only possible if caregivers are aware of pneumonia, the signs, and symptoms, and preventive measures [18]. The result of this study showed the majority of caregivers have good knowledge regarding pneumonia disease. However, looking closely into the score of items there were still the noticeable results of knowledge under the risk factors which stated about the low immunity in children is one of the risks of pneumonia (Item 3) showed only 54% have good knowledge which means that the other 46% of participants chose the wrong answer since the low immunity is one of the most concern factors for children under 5 years old to pneumonia [2]. The study in Kenya also found out similar results of mother's responses to knowledge regarding improving a child's immune system for pneumonia prevention showed 65.4% have low knowledge regarding immunity factor and pneumonia in children [19]. Moreover, Item 8 about the risk factors of cigarette smoke by family members showed that 43.4% had good knowledge while other 56.6% of participants have poor knowledge regarding environmental risk factors of pneumonia supported by the study in developing countries [8]. The caregiver's response of pneumonia/non-severe pneumonia (Item 9) was 96% choosing correct responses. For severe pneumonia (Item 10) only 56.6%

had good knowledge while the other 43.4% were choosing incorrect responses and for very severe pneumonia (Item 11) were 38.1% were also choosing incorrect responses to this item. This means almost half of caregivers have misunderstandings and poor knowledge regarding signs and symptoms of severe and very severe pneumonia in children. Similarly, The study in Egypt has shown that only 42% of mothers know the signs and symptoms of pneumonia while 58% did not know which was very important for mothers or caregivers of children should have appropriate knowledge regarding the detection of clinical signs and symptoms to preventing death from childhood pneumonia [20]. Furthermore, the transmission of pneumonia (Item 15) about sharing a cup and eating utensils with an infected person showed only 42.5% have good knowledge. This means that half of caregiver's knowledge was still limited regarding separating the eating utensils of their children from sick people that could help prevent them to get infected by pneumonia supported by the study in India showed that there were only 19.4% among 568 participants that know about this transmission mode of pneumonia [21]. Lastly, the dimension of prevention of pneumonia about the exclusive breastfeeding the first 6 months could help to prevent children from pneumonia (Item 18), there were only 56.6% that chose the right answer which means that the other half of participants have poor knowledge regarding exclusive breastfeeding which is very important to prevent children from getting pneumonia. This result of the study was co-related with another study [15, 22].

Attitude

The finding of this study based on the score in attitude item about the seriousness of pneumonia that could kill children (Item 22) showed only 35.4% strongly agreed, while other 51.3% were not sure about the danger of pneumonia in children under 5 years old. While the similar study has stated that the complications can be serious, including congestive health failure, respiratory failure or arrest, sepsis leading to organ shutdown, and lung abscess when pneumonia occurs in children in this group of age [23]. In another item talked about the necessity of Flu vaccine for preventing pneumonia in children (Item 24) 49.6% were not sure about one of the important methods for preventing the complication of pneumonia which is the Influenza vaccine (Flu Vaccine) [24]. Furthermore, the item about the un-safety of buying medication from the pharmacy directly for children without any prescription when they have respiratory infections including pneumonia (Item 25) 51.3% was unsure about this illness management. A study in Kenya that was gathering through focus group discussion has revealed that certain mothers were using non-prescribed medication on their sick children by stated about "using leftover drugs or buy from nearby shops/chemists, even when the child's illness is different...". This negative attitude may hinder effected to illness management in childhood pneumonia [19]. Additionally, the item about consulting with a pharmacist

when children have a fever with respiratory distress (Item 27) shown that 46.9% of them were not sure about this illness management. Previously, a similar study in Cambodia reported the home treatment 11.1% and no-healthcare seeking 20.6% during child illness. The healthcare options that were mentioned about seeking care from a local nurse or midwife's private residence included a report of antibiotics use besides physician consultation [25]. Likewise, going to private pharmacies for antibiotics when illness presented with fever was how the way Cambodian caregivers do to their children [26]. The next item towards providing enough food for children (Item 29) showed 67.3% of caregivers were not sure regarding the importance of enough food with disease prevention as one of the risk factors of pneumonia is under-nutrition [27]. The report of the world vision in Cambodia had stated about malnutrition resulted from a lack of food even though they eat plenty of food yet not proper meals at the right time they are still malnourished [28]. Lastly, the attitude section about providing antibiotics immediately when children have coughing (Item 30) showed 40.7% of caregivers were also not sure about the appropriate use of antibiotics. Supporting by the previous study on mother's KAP toward antibiotics use in their children for upper respiratory tract infections (URTIs) including coughing that is normally caused by a virus or allergies, but their attitude often contributes to the inappropriate use of antibiotics. Thus, promoting antibiotics resistance. This similar result the mother's attitude that more than half 60% was neutral as they believed that taking antibiotics in advance could protect and shorten the duration of URTI symptoms [29]. Moreover, the misconception of antibiotics for common respiratory illnesses and their effectiveness may help them recover faster from the common cold 44% [30].

Practice

The practice section showed the result of a great score among 69.9% of caregivers who have a good practice. However, in the first dimension of vaccination prevent pneumonia has one item about bringing children to inject Flu vaccine besides the national vaccination schedule at the first 2 doses in the first year (Item 35) showed 41.6% chose "Never" this result could refer to the inappropriate practice among half of them. As flu vaccine is importantly enabled to prevent their children from pneumonia [24]. However, another study mentioned that parents were more likely to vaccinate their children against influenza if this vaccine was included in the national immunization program [31]. In addition, the other item on the dimension of Nutrition prevents pneumonia about continue to breastfeed their child until 2 years old (Item 38) showed that almost half of caregivers 46.9% chose "Never" which refer to the inappropriate practice to the risk of disease like pneumonia. According to the study on nutritious and safe complementary foods, breastfeeding should be added together until their child reaches 2 years old or beyond. Unfortunately, only 2.3% of 220 mothers in that study continue their child breastfeed for 24 months or longer [32]. Last practice section

on illness management about giving antibiotics which prescribes by the pediatrician to their child when got sick (Item 47) only 46% of caregivers have appropriate practice. Through home treatment with antibiotics has been restricted use is importantly limited the progress of antibiotics resistance [33].

Relationship of KAP

The relationship between KAP from the result of Spearman rank correlation revealed weak negative linear correlations between K and A ($r_s = -0.089$, $p = 0.349$), also A and P ($r_s = -0.015$, $p = 0.872$), but revealed statistically significant and fair positive linear correlations between K and P ($r_s = 0.401$, $p = 0.000$) at the p-value 0.01. This study correlation was similar to the report of KAP towards prevention respiratory infection which conducted in Malaysia revealed a negative linear correlation between K and A ($r = -0.059$, $p = 0.378$), between A and P ($r = -0.134$, $p = 0.045$), and between K and P was a positive correlation ($r = 0.232$, $p < 0.001$) [34]. The positive linear correlation between knowledge and practice confirms the association between caregivers' knowledge and practice in preventing pneumonia in children under the age of five, implying that adequate knowledge can lead to good practice. While there was a negative correlation between knowledge and attitude, it could be inferred that having more knowledge about pneumonia did not correspond with their attitude to prevent pneumonia. In contrast to other studies that knowledge had a direct effect on people's attitudes [35-36]. Moreover, knowledge prerequisite for promoting prevention measures and forming a positive attitude towards fighting against the disease [37]. Since attitudes are not as easily observed as practice, it is a good idea to examine them. It is indeed important to note that various studies also have found little, or sometimes no connection between attitude and practice [38].

Factors related Practice

By multiple linear regression analysis, only two variables were found to be significant as caregivers' income and children's sex ($p \leq 0.05$; 0.003 and 0.032, respectively). To sum up, two demographic characteristics, namely caregiver's income and the sex of the children have an impact on the total value of practice among caregivers to prevent pneumonia in children under the age of five. Since one of the socio-economic determinants is family income, the previous study believed that the drop in pneumonia mortality was due to both higher socio-economic development and preventative efforts that resulted in decreased incidence and risk factor exposure [39]. Furthermore, the children's sex was a significant factor with the practice. A previous study found that six males were affected for every ten cases of pneumonia in children under the age of five, resulting in a male-to-female ratio of 1.5:1. Perhaps this is since male children are more susceptible to pneumonia and provide more care than female children [40]. However, another study on the factor association of ARIs prevention in children indicated that sex differences were not statistically significant, meaning that there is no significant male-female disparity for ARIs [41].

V. CONCLUSION

This study found the majority of caregivers have a high level of knowledge, attitude, and practice in preventing pneumonia in children under the age of five. However, there was still a lack of knowledge about low-immunity risk factors, cigarette smoke, severe and very severe signs and symptoms of pneumonia, pneumonia transmission mode, and the importance of exclusive breastfeeding. For attitude towards the seriousness of pneumonia, necessity of flu vaccine, unsafe of buying medication, disease consulting with the pharmacist, providing enough food, and lastly about antibiotics use for their children were also found negative among some of the caregivers. Finally, some practice dimensions were found to be inappropriate on the flu vaccine, prolong breastfeeding until 2 years, and the practice of antibiotics uses. Associated with the lower score of knowledge, attitude, and practice among caregivers of children under the age of five could be highlighted as a significant challenge in the prevention of pneumonia in children. This study finding points the specific set of information sources which all these emphasize parts could be used as the key information that benefits for developing an effective intervention, such as an educational program directly to improve their knowledge, attitude, and practice, or another feasible intervention to protect Cambodian's children from pneumonia in the future.

Limitation

The study results could be partial since the participants who joined in this study majority of their residence were from the urban area (Phnom Penh City) because the data collection procedure was undertaken during the COVID-19 outbreak in Cambodia which the traveling in the country had been restricted people from the rural or provincial areas.

ACKNOWLEDGMENT

This research is supported by Research and Training Center for Enhancing Quality of Life of Working-Age People.

REFERENCES

- [1] World Health Organization (2014). Revised WHO classification and treatment of childhood pneumonia at health facilities. Retrieved on 15 August 2021 from: https://apps.who.int/iris/bitstream/handle/10665/137319/9789241507813_eng.pdf, accessed August 2021.
- [2] World Health Organization (2019). Pneumonia. Retrieved on 30 August 2021 from: <https://www.who.int/news-room/factsheets/detail/pneumonia>, accessed August 2021.
- [3] International Vaccine Access Centre (2019). Pneumonia-Diarrhea-Progress-Report-Card.pdf. Retrieved on 30 August 2021 from: <https://www.jhsph.edu/ivac/wp-content/uploads/2019/10/2019-Pneumonia-Diarrhea-Progress-Report-Card.pdf>. Accessed August 2021.
- [4] M. Ghimire, S.K. Bhattacharya, J.P. Narain, "Pneumonia in South-East Asia Region: Public health perspective," *Indian J Med Res*, vol.135, issue 4, pages 459-468, 2012.
- [5] Institute for Health Metrics and Evaluation (2017). Cambodia. Retrieved on 29 August 2021 from: <http://www.healthdata.org/cambodia>, accessed August 2021.
- [6] Ministry of Health (2017). MOH-Report-Kh. Retrieved on 22 August 2021 from: <http://moh.gov.kh/content/uploads/2017/05/MOH-Report-Kh-V6.pdf>, accessed August 2021.
- [7] Johns Hopkins Medicine (2020). Pneumonia. Retrieved on 30 August 2021 from: <https://www.hopkinsmedicine.org/health/conditions-and-diseases/pneumonia>, accessed August 2021.
- [8] D.A. McAllister, L. Liu, T. Shi, Y. Chu, C. Reed, J. Burrows, D. Adeloje, I. Rudan, R. Black, H. Campbell, H. Nair, "Global, regional, and national estimates of pneumonia morbidity and mortality in children younger than 5 years between 2000 and 2015: a systematic analysis," *The Lancet Global Health*, vol. 7, issue 1, pages e47-e57, 2019.
- [9] J. Y. C. Chan, D. A. Stern, S. Guerra, A. L. Wright, W. J. Morgan, F. D. Martinez, "Pneumonia in Childhood and Impaired Lung Function in Adults: A Longitudinal Study," *Pediatrics*, vol. 135, issue 4, pages 607-616, 2015.
- [10] WHO&UNICEF (2013). Final_GAPPD_main_Report-_EN-8_April_2013. Retrieved on 6 September 2021 from: https://www.unicef.org/media/files/Final_GAPPD_main_Report-_EN-8_April_2013.pdf, accessed September 2021.
- [11] R. Charoenchokpanit, T. Pumpaibool, "Knowledge attitude and preventive behaviors towards hand foot and mouth disease among caregivers of children under five years old in Bangkok, Thailand," *Journal of Health Research*, vol. 27, issue 5, pages 6, 2013.
- [12] F. Ashkanani, M. Al-Sane, "Knowledge, Attitudes, and Practices of Caregivers in Relation to Oral Health of Preschool Children," *Med Princ Pract*, vol. 2, issue 22, page 167-72, 2013.
- [13] M. H. Karani, M. Angolkar, A. B. Narasannavar, A. D. Hirachand, J. K. Sah, "Assessing the Knowledge, Attitude and Practice Regarding Child Care among the Fathers of Under-five Children in Ramnagar Area: A Cross-sectional study", *International Journal of Interdisciplinary and Multidisciplinary Studies (IJIMS)*, vol. 2, issue 6, pages 113-117, 2015.
- [14] G. J. Mosweu, "Knowledge, attitude, and practices of caregivers (KAP) on management of childhood diarrheas among children aged between 0-5 years attending child welfare clinic (CWC) in Mogoditshane Village, Botswana," M.S. Thesis, Department of Paediatrics and Child Health, University of the Witwatersrand, Johannesburg, South Africa, 2018.
- [15] S. Q. Bham, F. Saeed, M. A. Shah, "Knowledge, Attitude and Practice of mothers on acute respiratory infection in children under five years," *Pak J Med Sci.*, vol.32, issue 6, pages 1557-1561, 2016.
- [16] National Institute of Statistics Ministry of Planning (2016). Cambodia Socio-Economic Survey. Retrieved on 24 August 2021 from: <https://www.nis.gov.kh/nis/CSES/Final%20Report%20CSES%202016.pdf>, accessed August 2021.
- [17] T. Verulava, M. Jaiani, A. Lordkipanidze, R. Jorbenadze, B. Dangadze, "Mothers' Knowledge and Attitudes Towards Child Immunization in Georgia," *The Open Public Health Journal*, vol. 12, issue 1, pages 232-237, 2019.
- [18] A. Eliyas, B. D. Goil, S. Sherali, I. Khan, K. Khan, F. Hashmi, "Mothers knowledge related preventive measure of pneumonia in Slum community, Karachi, Pakistan," *Pakistan Journal of Public Health*, vol. 8, issue 3, pages 156-159, 2018.
- [19] P. K. Keter, "Knowledge, Attitudes, and Practices of Mothers in relation to Childhood Pneumonia and factors associated with Pneumonia and Seeking Health Care in Kapsabet District Hospital in Nandi County, Kenya," M.S. Thesis, Department of Public Health, University of Agriculture and Technology, Jomo Kenyatta, Kenya, 2015.
- [20] N. F. Abolwafa, A. H. Mohamed, "Effect of Educational Program on Mothers Knowledge about Prevention of Pneumonia for their Children under Five Years," *IOSR Journal of Nursing and Health Science*, vol. 6, issue 5, pages 8, 2017.
- [21] A. Minz, M. Agarwal, J. V. Singh, V. K. Singh, R. Sahu, "Caregiver's Knowledge about Childhood Pneumonia: A Study from Rural Areas and Urban Slums of Lucknow," *National Journal of Community Medicine*, vol. 10, issue 2, pages 8, 2019.
- [22] N. Akand, P. K. Sarkar, J. Alam, M. Hossain, U. Salma, "Mothers Knowledge Related To Preventive Measure of Pneumonia in Hospitalized Children Under 5 Years Age: A Tertiary Care Center Experience," *IOSR Journal of Nursing and Health Science*, vol. 9, issue 2, pages 7, 2020.
- [23] J. Fletcher (2019). Lower respiratory tract infection: Symptoms, diagnosis, and treatment. Retrieved on 7 July 2021 from: <https://www.medicalnewstoday.com/articles/324413>, accessed July 2021.
- [24] A. Kaya, N. Altinel, G. Karakaya, F. Cetinkaya, "Knowledge and attitudes among patients with asthma and parents and physicians towards

- influenza vaccination,” *Allergologia et Immunopathologia*, vol. 45, issue 3, pages 240-243, 2017.
- [25] A. Miyazaki, R. Tung, B. Taing, M. Matsui, A. Iwamoto, S. Cox, “Frequent unregulated use of antibiotics in rural Cambodian infants,” *Transactions of The Royal Society of Tropical Medicine and Hygiene*, vol. 114, issue 6, pages 401-407, 2020.
- [26] K. Emary, M. Carter, S. Pol, S. Sona, V. Kumar, N. Day, C. Parry, C. Moore, “Urinary antibiotic activity in paediatric patients attending an outpatient department in north- western Cambodia,” *Trop Med Int Health*, vol. 20, issue 1, pages 24-28, 2015.
- [27] J. Gothankar, P. Doke, G. Dhumale, P. Pore, S. Lalwani, S. Quraishi, S. Murarkar, R. Patil, V. Waghachavare, R. Dhobale, K. Rasote, S. Palkar, N. Malshe, “Reported incidence and risk factors of childhood pneumonia in India: a community-based cross-sectional study,” *BMC Public Health*, vol. 18, issue 1, pages 1111, 2018.
- [28] World Vision International (2018). Ending Malnutrition Cambodia is possible. Retrieved on 1 September 2020 from: <https://www.wvi.org/sites/default/files/Cambodia%20Policy%20Brief%20on%20Nutrition%202018%20by%20World%20Vision%20International%20-%20Cambodia.pdf>, accessed September 2020.
- [29] M. M. M. Shimmaa, “Study of Maternal knowledge, Attitude and Practice on Antibiotic Use for Acute Upper respiratory Tract Infection in Children,” *IOSR Journal of Nursing and Health Science*, vol. 4, issue 4, pages 8, 2015.
- [30] J. M. Lim, P. Chhoun, S. Tuot, C. Om, S. Krang, S. Ly, L. Hsu, S. Yi, C. Tam, “Public knowledge, attitudes and practices surrounding antibiotic use and resistance in Cambodia. JAC-Antimicrobial Resistance,” *JAC-Antimicrobial Resistance*, vol.3, issue 1, pages 115, 2021.
- [31] E. Y. Abu-rish, E. R. Elayeh, L. A. Mousa, Y. K. Butanji, A. M. Albsoul-Younes, “Knowledge, awareness and practices towards seasonal influenza and its vaccine: implications for future vaccination campaigns in Jordan,” *FAMPRJ*, vol. 13, issue 6, pages 690-697, 2016.
- [32] M. Akinyinka, “Breastfeeding Knowledge and Practices among Mothers of Children under 2 Years of Age Living in a Military Barrack in Southwest Nigeria,” *International Journal of MCH and AIDS*, vol. 5, issue 1, pages 1-13, 2016.
- [33] F. Muro, J. Meta, J. Renju, A. Mushi, H. Mbakilwa, R. Olomi, H. Reyburn, H. Hildenwall, ““It is good to take her early to the doctor” – mothers’ understanding of childhood pneumonia symptoms and health care seeking in Kilimanjaro region, Tanzania,” *BMC Int Health Hum Rights*, vol. 17, issue 1, pages 27, 2017.
- [34] M.D. Goni, H. Hasan, N.N. Naing, N. Wan-Arfah, Z.Z. Deris, W.N. Arifin, A.A. Baaba, “Assessment of Knowledge, Attitude and Practice towards Prevention of Respiratory Tract Infections among Hajj and Umrah Pilgrims from Malaysia in 2018,” *International Journal of Environmental Research and Public Health*, vol. 16, issue 22, pages 4569, 2019.
- [35] G. Huynh, T.N.H. Nguyen, V.K. Tran, K.N. Vo, V.T. Vo, L.A. Pham, “Knowledge and attitude toward COVID-19 among healthcare workers at District 2 Hospital, Ho Chi Minh City,” *Asian Pacific Journal of Tropical Medicine*, vol. 13, issue 6, pages 260, 2020.
- [36] M. Zhang, M. Zhou, F. Tang, Y. Wang, H. Nie, L. Zhang, G. You, “Knowledge, attitude, and practice regarding COVID-19 among healthcare workers in Henan, China,” *Journal of Hospital Infection*, vol. 105, issue 2, pages 183-187, 2020.
- [37] R. McEachan, N. Taylor, R. Harrison, R. Lawton, P. Gardner, M. Conner, “Meta-Analysis of the Reasoned Action Approach (RAA) to Understanding Health Behaviors,” *Annals of Behavioral Medicine*, vol. 50, issue 4, pages 592-612, 2016.
- [38] R. Wang, Y. Yang, R. Chen, H. Kan, J. Wu, K. Wang, J. Maddock, Y. Lu, “Knowledge, Attitudes, and Practices (KAP) of the Relationship between Air Pollution and Children’s Respiratory Health in Shanghai, China,” *International Journal of Environmental Research and Public Health*, vol. 12, issue 2, pages 1834-1848, 2015.
- [39] X.L. Feng, E. Theodoratou, L. Liu, K.Y. Chan, D. Hipgrave, R. Scherpbier, H. Bixi, S. Guo, W. Chunmei, M. Chopra, R. Black, H. Campbell, I. Rudan, Y. Guo, “Social, economic, political and health system and program determinants of child mortality reduction in China between 1990 and 2006: A systematic analysis,” *Journal of Global Health*, vol. 2, issue 1, pages 010405, 2012.
- [40] A. Banstola, A. Banstola, “The Epidemiology of Hospitalization for Pneumonia in Children under Five in the Rural Western Region of Nepal: A Descriptive Study,” *PLoS ONE*, vol. 8, issue 8, pages e71311, 2013.
- [41] S. Yaya, G. Bishwajit, “Burden of Acute Respiratory Infections Among Under-Five Children in Relation to Household Wealth and Socioeconomic Status in Bangladesh,” *Tropical Medicine and Infectious Disease*, vol. 4, issue 1, pages 36, 2019.