Original article

Predicting factors of preventive and control behaviors of communicable diseases in children among teachers in child care centers, Bangkok Metropolitan Administration

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Background: Communicable diseases have become a major cause of death for children under the age of five years all over the world. Illness at this age will affect the growth, development and overall health of children.
Objectives: The aim of this study was to determine the predictive factors of preventive and control behaviors of teachers for communicable diseases in children in child care centers, Bangkok Metropolitan Administration (BMA).
Methods: The subject group consisted of 112 teachers and simple sampling selection criteria was: child care teacher working in child care centers for at least 1 year were recruited. The data were collected between April - May 2019 using personal data questionnaires, health literacy questionnaires, preventive and control behaviors of communicable diseases questionnaires.
Results: The results showed that age, experience of being a teacher, experience of training about communicable diseases, and health literacy of preventive and control of communicable diseases in children were able to predict 17.6 % ($R^2 = 0.176$, $P < 0.001$). It was found that only health literacy on preventive and control of communicable diseases was able to predict the preventive behavior of communicable diseases in children with statistical significance ($\beta = 0.42$, $P < 0.001$).
Conclusion: Teacher's health literacy of preventive and control of communicable diseases in children is important. Teachers should be provided with guidelines for the development of health literacy for preventive and control of communicable diseases in children which could lead to healthy children in child care centers.

Keywords: Teachers, child care centers, preventive and control behavior of communicable diseases, health literacy.

Communicable diseases are important problems for all people, particularly children. They have become a major cause of death for children under the age of five years. According to the global situation, the causes of death in children under the age of five are preventable or treatable conditions such as pneumonia, diarrhea, neonatal communicable diseases and malaria.[1] The top five most communicable diseases in early childhood in Thailand are diarrhea, pneumonia, hand-foot-mouth disease, influenza and chickenpox diseases.[2] Bangkok is the capital that is densely populated. Diarrhea had the highest accumulative morbidity rate for communicable diseases among children aged 0 - 4 years with an infection rate of 6,520.91 per hundred thousand had diarrhea, of which 2,870.08 people per hundred thousand had influenza and 3,464.01 people per hundred thousand had hand-foot-mouth disease.[3]

Children are important human resources for national development. Because children will become a national force in the future, young children from birth to 5 years or early childhood are in the most important period of human development. Illness at this age, particularly communicable diseases, will affect the growth, development and overall health of children. If children have health problems and frequent illnesses, children will be affected in various ways. Some parents have to stop working to take care of children, causing

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Received: September 6, 2019
Revised: September 30, 2019
Accepted: October 25, 2019

lack of income with effects on the family economy and society in addition to potentially causing family members or caregivers to be infected by caring for sick children.[4] Studies conducted in England showed most children with communicable diseases to have respiratory infections (2 out of 3 preschool children). Moreover, acute coughs incur domestic treatment that costs up to 31 million pounds per year.[5] Therefore, promoting health and preventing potential controllable diseases is vital in ensuring quality development among children to meet suitable standards for children's age. [6]

There are quite a few previous studies on preventive behavior factors for communicable diseases in young children. They aforementioned focused on factors affecting preventive behaviors for specific diseases such as hand-foot-mouth disease [7 - 10], influenza [11] and respiratory infections [12, 13] which are common diseases and important factors for disease prevention and control. Regarding the factors related to age and experience as teachers who supervised child care centers, persons who have worked for a long time would have more knowledge and experience. Moreover, trained personnel often have more experience and knowledge [14], teachers; they were of good level of preventive behavior for communicable diseases in young children. [8, 12, 13] However, frequent outbreaks of communicable diseases continue to occur among young children and including education by applying various conceptual frameworks for education such as Health Belief Model[12, 13, 15], PRECEDE model concept framework[8], that the study of concepts there are interesting, because the person will be perceived, knowledge and understanding, and can compare the advantages and disadvantages. Until the behavior of the prevention and control of communicable diseases in children is good, they must be able to access information from various sources so that they, can understand and apply the knowledge acquired to decide in the prevention and control of communicable diseases found in children. Their duties include, communication to personnel within the child care centers and parents: these are all important components of the health literacy of prevention and control of communicable diseases in children. Few studies have been conducted on preventive behaviors for controlling communicable diseases in children among teachers who supervise child care centers in the past. In addition, no studies were found to have introduced Nutbeam's health literacy concept [16] as a framework.

To study predictive power of co-factors consisting of age, experience of teachers in child care centers, training experience and health literacy in child care centers under Bangkok Metropolitan Administration (BMA).

Materials and methods

This study was a predictive design. The population was composed of 2,073 teachers who cared for children in child care centers in Bangkok in the academic year of 2018. The teachers cared for children under BMA for at least 1 year. The researchers calculated the sample size using the G*power program version 3.1.9.2. The subjects were 120 qualified applicants, got the name list from the district office. The researchers sent documents with explanations concerning the project's information to teachers in child care centers where the subjects were randomly selected and attached questionnaires by mail. Questionnaires did not specify the subjects' first names or last names and codes were used in questionnaires. Completed questionnaires were sealed in paper envelopes and sent back to the researchers by mail. The researchers received 114 questionnaires, accounting for 95.0% of the subjects. Questionnaire received sufficient data for statistical analysis from 112 questionnaires or 98.2%. The researchers presented a draft of the thesis to the Institutional Review Board (IRB), Faculty of Nursing, Mahidol University. The project and questionnaires were reviewed (COA No. IRB-NS 2019/492.1903). After receiving approval, the researchers conducted the research by beginning to collect data from the subjects by mail.

Measures

Research instruments had 3 parts consisting of the following: 1) The demographic data questionnaire contained six questions with multiple choice and fill-in-the-blanks responses on age, gender, marital status, level of education and work experience as teachers in child care centers; 2) The questionnaire on health literacy for prevention and control of communicable diseases in children was used to measure health literacy. The researcher used the health literacy questionnaire from the Division of Health Education [17] by modifying questionnaires appropriate for prevention and control of communicable diseases in child care centers and the researcher requests permission before modifying. This questionnaire contained 21 questions with a scoring range of 21 – 105 points. Regarding interpretation of

mean scores on health literacy for prevention and control of communicable diseases in children, high scores indicated high health literacy, while low scores indicated low health literacy; and, 3) The questionnaire on behaviors for the prevention and control of communicable diseases in child care centers was aimed at measuring behaviors for the prevention and control of communicable diseases in children among teachers in child care centers. The researchers created this questionnaire using the handbook on guidelines for the prevention and control of communicable diseases in small children's centers and preschools from the Department of Disease Control, Ministry of Public Health.[6] The questionnaire had 35 points within a scoring range of 35 – 140 points. Interpretations were used to consider behaviors for the prevention and control of communicable diseases in children among teachers in child care centers. High mean scores indicated good behaviors while low mean scores indicated poor behaviors for the prevention and control of communicable diseases.

Instrument quality testing was performed by three qualified experts who tested content validity and determined the following content validity indices (CVI): the questionnaire on health literacy for the prevention and control of communicable diseases among children obtained a CVI of 0.85 points, while the questionnaire on behaviors for the prevention and control of communicable diseases in child care centers obtained a CVI of 1 point. Instrument reliability was tested using Cronbach's Alpha Coefficient. The questionnaire on health literacy for the prevention and control of communicable diseases in children was found to have obtained Cronbach's Alpha Coefficient at 0.92 and the questionnaire on health literacy for prevention and control of communicable diseases in child care centers obtained Cronbach's Alpha Coefficient at 0.94 points.

Statistical analysis

The subjects' demographic data were analyzed with descriptive statistics. Data were expressed as mean standard deviation (SD). Relationships between the studied factors and preventive behaviors for communicable diseases in children were analyzed with Pearson's Rank Correlation Coefficient. Predictive relationships with preventive behaviors for communicable diseases were analyzed with multiple regression statistics. A P - value < 0.05 was considered statistically significant.

Results

Table 1. Demographic data of teachers (n = 112).

Demographic of teachers	Number	Percentage
Age (year) [min = 20, max = 59]		
Mean ± SD	40.37 ± 10.32	
Gender		
Male	3	2.7
Female	109	97.3
Status		
Single	33	29.5
Married	68	60.7
Widow	6	5.4
Divorce / separation	5	4.5
Education		
High school / vocational certificate	26	23.2
Diploma	29	25.9
Bachelor degree	54	48.2
Master degree	3	2.7
Experience from working (year) [min = 1, max = 32]		
Mean ± SD	10.58 ± 7.00	
Training experience on communicable diseases		
Never	28	25.0
Training within 5 years	84	75.0
Time for training 1 time	26	23.2
2 times	30	26.8
3 times	13	11.6
4 times	4	3.6
5 times	11	9.8

Table 2. Overall score of teachers (n = 112).

Variables	Mean ± SD	Level
Behaviors for the prevention and control of communicable diseases	125.79 ± 10.29	Good
Health literacy on preventive and control of communicable diseases	82.12 ± 10.15	Good

Table 3. Relationships between variables studied by using Pearson's Rank Correlation Statistics (n = 112).

Studied variables	1	2	3	4	5
1 Age	1.00				
2 Teachers ©work experience	0.544*	1.00			
3 Training experience	0.219**	0.402*	1.00		
4 Health literacy on prevention and control	-0.055	0.113	0.117	1.00	
5 Preventive and control behaviors	-0.010	-0.017	0.079	0.401*	1.00

* $P < 0.05$, ** $P < 0.01$

Table 4. Multiple regression analysis of factors predicting preventive behaviors for communicable diseases (n = 112).

Variable	B	SEB	β	*t*	*P*-value
Constant	2.497	0.255	-	9.779	<0.001
Age	0.003	0.003	0.119	0.974	0.332
Teachers ©work experience	-0.007	0.005	-0.171	-1.343	0.182
Training experience	0.044	0.065	0.065	0.671	0.504
Health literacy on communicable disease prevention	0.255	0.055	0.42	4.658	<0.001

$R = 0.42$, $R^2 = 0.176$, Over all $F = 5.720$, $P < 0.001$

Discussion

According to data analysis, the hypothesis was partially supported. Factors in four areas were found to be able to predict behaviors for the prevention and control of communicable in children among teachers in child care centers at 17.6% with statistical significance. The behavior for prevention and control of communicable diseases and health literacy on preventive and control communicable diseases were at good level. The findings can be discussed according to the hypothesis according to the following content:

Age, according to the findings, age was not related to behaviors for the prevention and control of communicable diseases in children and age was unable to predict behaviors for the prevention and control of communicable diseases in children among teachers. The findings were different from a study conducted by Issarasongkram M, *et al*. [18] on participation to prevent and control communicable diseases among teachers in child care centers, differences in teachers' age were found to have caused participation in prevention and control of communicable diseases among teachers to be significantly different. In addition, the findings were different from a study conducted by Laemthaisong J, *et al*.[12] who found age to be able to predict preventive behaviors for respiratory infections. Moreover, Jaidee C, *et al*.[13] found teachers to have a mean age of 21 – 40 years, an age with emotional maturity and capacity to learn, think and use reason in hygienic practices, causing teachers to have good overall preventive behaviors for acute respiratory infections. Older age may have no influence on behaviors for the prevention and control of communicable diseases in children because of other factors such as access to information and knowledge on communicable diseases in children via online media. If communicable diseases occur, teachers were able to find information on diseases, which the research finding for teachers with good health literacy on prevention and control of communicable diseases and teachers of all age groups have access to information. Thus, age was unable to predict behaviors for the prevention and control of communicable diseases.

Work experience in child care centers was not related to behaviors for the prevention and control of communicable diseases in child care centers and teachers' work experience was unable to predict behaviors for the prevention and control of communicable diseases in children among teachers. This finding differed from Siriphap V, *et al*. [19] who found teachers with different work experience to have significantly different attitudes toward problems in promoting children's development. This was because experience influenced consideration and decision-making to solve problems by using previous events as learning guidelines for solving problems. This was consistent with Michail K, *et al*. [20] who found teachers to be important in preventing and controlling the spreading of diseases in childcare centers and teachers with work experience were better able to answer questions on influenza and proper influenza prevention than teachers with less work experience. According to Chanakul U.[8] 98.6% of teachers had high control behaviors for hand-foot-and-mouth disease. 47.0% of subjects took care of young children for 1 - 10 years and 11 - 20 years with an average work period of 8.14 years. In addition, Laemthaisong J, *et al*. [12] found that teachers who cared for children to have a mean work period of 10.7 year. This period represents long experience and contributed to development of learning and skills to have expertise in preventing and controlling respiratory infections and advise parents. Kasetsunthorn S, *et al*.[9] found their subjects had high scores for attitude about hand-foot-mouth disease screening at 66.7% and most subjects had more than 5 years of work experience in child development centers. Thus, the subjects had skills in screening hand-foot-mouth disease. Experience resulted in good skills and may have caused the subjects to have a positive attitude toward hand-foot-mouth disease.

Teachers' work experience was unable to predict behaviors for the prevention and control of communicable diseases in children. This may be explained by the fact that teachers with high experience and perform preventive and control activities regularly may have a greater lack of awareness for the prevention and control of communicable diseases in centers than teachers with less work experience, causing poor behaviors for the prevention and control of communicable diseases in child care centers. This was consistent with a study conducted by Laemthaisong J, *et al*. [12] who found perceived self-efficacy to be unable to predict preventive behaviors for respiratory infections among caregivers in child care centers. In addition, scores from certain items showed caregivers to have perceived caregivers were performing behaviors. This may be because most of the caregivers had long work experience and performed behaviors with familiarity and may have caused lack of motivation to improve disease prevention and control behaviors. Moreover, Sangnimitchaikun W, *et al*. [10] found 40.0% of caregivers to have experience in the care of children with hand-foot-mouth disease, causing caregivers to have learning, skills and experience in caring for children to prevent hand-foot-mouth-disease. In addition, the factor with influence on preventive behaviors for hand-foot-mouth disease was found to be caregivers' experience in caring for children with hand-foot-mouth disease. In some areas with few epidemics, caregivers may lack skills and expertise in caring for sick children, resulting in poor behaviors for the prevention and control of diseases.

According to the findings from the present study, teachers had good mean scores for health literacy on prevention of communicable diseases in children and teachers' health literacy on controlling communicable diseases among children in child care centers was related to behaviors for the prevention and control of communicable diseases in children. This variable was able to predict preventive behaviors to control communicable diseases in children if teachers who cares for children had good health literacy in preventing communicable diseases. The findings were supportive and consistent with the concept of Nutbeam D. [16] who found people with high health literacy to have access to health information sources and understand health information or news to care for their health and others. However, teachers' working experience was unable to predict behaviors for the prevention and control of communicable diseases in child care centers. Although teachers had different work experience, information and training related to communicable diseases in children was important. High health literacy on preventing communicable diseases in children among teachers affected control behaviors to prevent communicable diseases in child care centers. Moreover, in this study, health literacy on disease prevention was found to be important when receiving support from health personnel such as doctors, nurses or public health officials, checking accuracy of information or receiving

advice from health personnel and support from various media to ensure confidence among teachers when managing communicable diseases in children and good behaviors for the prevention and control of communicable diseases in children among teachers.

According to the findings in this study, training experience on communicable diseases in children among teachers was unrelated to behaviors for the prevention and control of communicable diseases in preschool children and training experience regarding communicable diseases in children was unable to predict behaviors for the prevention and control of communicable diseases among teachers. This was different from a study conducted by Temawong P, *et al*. [14] who found work knowledge from accumulated work and training experience to be different according to each person's condition. For example, persons who worked for a long time had more knowledge and experience and persons who were trained frequently had more experience and knowledge. The findings were different from a study conducted by Issarasongkram M, *et al*. [18] who found teachers who has graduated at the level of a bachelor's degree to have a medium level of knowledge on the prevention and control of communicable diseases. Education alone may be insufficient for controlling and preventing communicable diseases. Therefore, teachers should be trained on principles for the control of communicable diseases. In addition to helping teachers have more knowledge, training supported teachers to have good attitude and perform better behaviors for the prevention and control of communicable diseases. This was different from the findings of Jaidee C, *et al*. [13] who found teachers to have received training to review knowledge on communicable diseases in children, causing teachers to have good overall behaviors for the prevention and control of hand-foot-mouth disease. The Department of Disease Control, Ministry of Public Health, specified standard criteria for teachers to have annual meetings or trainings on common diseases in child care centers and disease prevention and control methods from public health officials. [21] In addition, the teachers must be healthy, be a role model for health behavior and knowledge able in carrying out surveillance, prevention and control of communicable diseases [22] clearly required every teacher to be trained or receive knowledge on prevention and control of communicable diseases in education facilities such as measles, diarrhea, hand-foot-mouth disease and rabies, etc., on an annual basis. Thus, most teachers at child care centers received training on prevention and control of communicable diseases in child care centers, causing effects on teachers' behaviors for the prevention and control of communicable diseases in children.

Health literacy on prevention of communicable diseases in child care centers, according to the findings, health literacy on prevention and control of communicable diseases in children among teachers in child care centers was related to behaviors for the prevention and control of communicable diseases in children at a medium level. Moreover, health literacy was able to significantly predict behaviors for the prevention and control of communicable diseases in children among teachers. This supported the hypothesis. The findings from this study showed the importance of health literacy on prevention and control of communicable diseases in children. Teachers with good health literacy on prevention and control of communicable diseases will have good prevention and control behaviors. The findings concurred with Rosenthal C, *et al* [23] who studied 157 caregivers aged 1 – 4 years and found 34.0% of caregivers to have low health literacy and low health literacy was related to quality of care for children and low self-esteem. Furthermore, Lam W, *et al*. [24] found health literacy to have influenced family life and activities in addition to directly influencing care for children. Therefore, health literacy was a key to health behavior adjustment and disease prevention and control behaviors for good public health and safety from communicable diseases. Health literacy at poor levels also had effects on quality of life. Health literacy is a person's ability to access, understand, assess, use information and communicate health needs as well as promote health and maintain good health throughout life.

Conclusion

In this study, the factors with the highest predictive power and predictability were health literacy on preventive and control of communicable diseases in children among teachers. In caring for young children to grow up with quality and good physical and mental health, teachers are important. In this study, teachers had good knowledge. Most of the teachers had high scores for health literacy on prevention and control of communicable diseases. Teachers should be provided with guidelines for the development of

health literacy in child care centers for preventive and control of communicable diseases in children which could lead to healthy children child care centers and support training on communicable diseases in children for teachers as a policy, competency of teachers in child care centers and create awareness for teachers and caregivers to receive comprehensive training on children's diseases.

Acknowledgements

The researchers would like to thank all the participants as well as the Department of Health, Bangkok Metropolitan Administration for providing scholarships and would like to express the gratitude to all the participants who were involved in this study.

Conflict of interest

The researchers, hereby, declare no conflict of interest.

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