

Assessment of 4th Grade School Students' Rabies Protection Motivation and Preventive Behavior in Chonburi Province, Thailand

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Rabies is one of Thailand's most deadly endemic diseases. Young people under 15 are at risk. The Protection Motivation Theory (PMT) has amassed considerable acceptance. This study compared Rabies Protection Motivation (RPM) and Rabies Preventive Behavior (RPB) in fourth-graders in Chonburi province who attend the Office of the Basic Education Commission (OBEC) (290 students) and the Office of the Private Education Commission (OPEC) (268 students) schools. The result of the study indicated that students who enrolled in school under the OPEC demonstrated significantly higher levels of RPM (39.22 SD=4.487, $P < 0.001$) and RPB (16.60 SD=3.889, $P < 0.05$) compared to students under OBEC. On the other hand, the students in OBEC schools presented lower scores in RPM (37.35 SD=4.923, $P < 0.001$) and RPB (15.81 SD=3.398, $P < 0.05$). When examining the components of RPM, it was discovered that students in OPEC schools presented remarkably higher levels of Rabies Perceived Vulnerability (RPV) (9.94 SD=1.560, $P < 0.001$) and Rabies Self Efficacy (RSE) (10.85 SD=1.426, $P < 0.001$) compared to students under OBEC (RPV; = 9.38 SD=1.577, $P < 0.001$, and RSE; = 9.98 SD=1.850, $P < 0.001$). OBEC and OPEC students need instructional programs to improve Rabies Perceived Severity (RPS). These programs will educate students about rabies and promote students' rabies defenses.

Keywords: Rabies, Protection Motivation, Preventive Behavior, 4th grade school Students, Thailand

Introduction

Due to its high annual death rate of over 59,000 and lack of a reliable treatment, rabies is a zoonotic disease that is widely recognized as a significant global public health concern (Centers for Disease Control and Prevention 2020, WHO 2005). Notably, the research identifies children under the age of 15 as the most vulnerable demographic (Deray et al. 2018, Meslin & Briggs 2013, WHO 2018, Wilde et al. 2017). In Thailand, Rabies is a prevalent endemic disease

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(WHO 2023). According to the statistics on Rabies-related deaths in Thailand from 2011 to 2022, Chonburi province in Thailand has recorded the highest mortality rate in relation to Rabies-related deaths (Epidemiology 2022). Research conducted in Thailand revealed that the majority of deaths were among those under the age of 15 (Bureau of Epidemiology 2016, Kasempimolporn et al. 2008), particularly in rural regions (Goel et al. 2007). The primary determinant of death is the absence of consciousness about the dangers of rabies and the essential precautions to be followed after being bitten by an animal (Bureau of General Communicable Diseases 2017). Furthermore, Savadogo and Boushab (2015) further elucidation that individuals under the age of 15 exhibit an inadequate understanding of the risks involved in contracting Rabies, resulting in less-than-ideal management of the disease. Additionally, some children fail to show up for additional wound care following initial treatment. In contrast, older individuals recognize the risks associated with rabies and actively seek medical treatment (Deressa et al. 2010). An analysis of many research (Amparo et al. 2019, Dzikwi et al. 2012 Lungten et al. 2021, Sancheti & Mangulikar 2016) revealed that a small number of children knew that rabies is a potentially lethal disease, and it could identify their susceptibility to it. Hence, awareness and education are essential. Furthermore, the cognitive process is likely to have a significant impact on the decision-making process, resulting in alterations in behavior (Xiao et al. 2014). These characteristics align with the protection motivation theory (PMT) factors.

As a framework for the prediction and intervention of health-related behavior, The Protection Motivation Theory (PMT) has been extensively embraced since its development (Rogers 1975). PMT has accumulated (garnered) significant acceptance as a conceptual framework for predicting and manipulating health-related behaviors. The construction of PMT includes four key components: Perceived Severity (PS), Perceived Vulnerability (PV), Response Efficacy (RE), and Self Efficacy (SE). These components are crucial in avoiding possible damage and significantly promoting advantageous behavioral change. These parameters are influenced by the utilization of fear-inducing media as opposed to the typical utilization of stimulation, environmental organization, persuasion, observational learning, personality, and experience (Clubb & Hinkle 2015). As an investigation and comprehension of health-related and preventive/protective behaviors, researchers have utilized PMT (Ezati Rad et al. 2021, Puttapa 2016, Roozbahani et al. 2020). Further studies on children have applied PMT to examine a range of risk behaviors, such as drug or nicotine use (Macdonell et al. 2013, Sabzmakan et al. 2018, Sadeghi et al. 2019), perceptions of sexual health programs (Chambers et al. 2018, Gong et al. 2009, Pham et al. 2012), and cybersecurity behavior (Florence & Jhee Hee 2021). In addition, it appears that children should be educated about self-care behaviors from 9 to 10 years old (WHO 1997) because of the stage of development. These advancements collectively contribute to the enhancement of healthcare awareness through the application of information and analytical ability (Surapong Sotanasathien 1990). To resolve a gap in the literature, the current investigation utilized the PMT as a predictive instrument to forecast Rabies Preventive Behavior (RPB) among fourth-grade students in Chonburi province attending schools administered by the Office of the Basic Education Commission

(OBEC) (268 students) and the Office of the Private Education Commission (OPEC) (290 students). Upon concluding the Rabies Protection Motivation (RPM) analysis, the data will be converted to execute targeted Rabies preventive programs for elementary school students in the future.

Materials and Methods

Samples and Populations

This study was conducted as a cross-sectional survey from July 2022 to February 2023. The population of fourth-grade students in Chonburi province was 11,199, of which 5,929 were boys and 5,270 girls (Office of the Basic Education Commission Ministry of Education, 2022). The study randomized 558 students, both boys and girls, who were enrolled in fourth-grade students under the Office of the Basic Education Commission (OBEC) and schools under the Office of the Private Education Commission (OPEC) in Chonburi province. The sample size was estimated using G*Power 3.1 software developed by Faul et al. (2007). Using a multistage selection procedure, the sample was randomly selected from OBEC and OPEC in six districts. The study commenced by implementing stratified sampling, which divided the sample based on geographical divides. The population was split into two distinct groups: the first group was made up of the Chonburi province areas (Bang Lamung, Si Racha, and Ban Bueng) that had dogs with rabies cases reported in 2021, and the second group was made up of the areas without dogs with rabies cases reported. Three sub-districts, Mueang Chonburi, Phanat Nikhom, and Bo Thong, were selected from the second group using a straightforward random selection technique. The final approach employed was cluster sampling, wherein two schools (one from OBEC and another from OPEC) were randomly selected from each of the chosen sub-districts. A total of 558 samples were collected.

Research Instruments

One of the instruments used in this investigation was a questionnaire produced by the researcher. The questionnaire consists of three sections: The study aims to examine the socio-demographic characteristics of the students, which include factors such as gender, district, school affiliation, academic achievement, father's employment, mother's occupation, pet ownership, and history of animal attacks. The assessment of Rabies Protection Motivation (RPM) involves using a Likert scale to quantify degrees of agreement, uncertainty, and disagreement. The four crucial elements consist of Rabies Perceived Severity (RPS), Rabies Perceived Vulnerability (RPV), Rabies Response Efficacy (RRE), and Rabies Self Efficacy (RSE). There are a total of sixteen questions, and each question carries a maximum of forty-eight points. The Rabies Preventive Behaviour (RPB) is evaluated using a Likert scale that gauges the frequency of engagement, ranging from regular, frequent, occasional, to never. There are a total of six questions, and

each question has a maximum score of twenty-four points. The final version of the questionnaire was assessed for content validity by calculating the Item-Objective Congruence (IOC), which was greater than 0.8, indicating satisfactory content validity. The reliability was evaluated by calculating the Cronbach's alpha coefficient. The Cronbach's Alpha reliability study yielded a value of 0.712 for the Rabies PMT and 0.740 for the RPB. Their quality was considered suitable, as it exceeded the criterion of 0.7, as established by Polit and Beck (2017).

Data Analysis

The data obtained from the surveys underwent a process of cleaning and verification for completeness before being inputted into EpiData Analysis version 2.1. Descriptive statistics were computed for three categories: 1) socio-demographic data, 2) the RPM, and 3) RPB. The RPM constructions were classified based on Bloom's threshold (<60% as poor, 60 - 80% as fair, and >80% as good) (Bloom BS, 1968) independent t tests will be conducted to compare the average scores of each variable between students studying in schools under the OBEC and OPEC.

Ethical Considerations

The study was conducted under the regulations of the Human Research Ethics Committee of the Department of Health Sciences, Sukhothai Thammathirat Open University in Thailand, with approval number 0602.20/972. The confidentiality of all participants' information was ensured.

Results

The Socio-Demographic Character of the Students

Table 1 shows that in this study, 52% of the participating students are enrolled in schools under the OBEC, while 48% study in schools under the OPEC. These schools are situated near all six districts, namely Mueang Chonburi (17%), Phanat Nikhom (17.4%), Ban Bueng (14.9%), Sri Racha (18.1%), Bo Thong (15.2%), and Bang Lamung (17.4%). Both schools affiliated with OBEC and OPEC frequently demonstrate comparable demographic features. The survey revealed that the predominant gender among the respondents is girls, accounting for 60.2% of the total. Furthermore, a significant proportion of respondents, 50.7%, demonstrated good academic achievement, while 29.4% achieved fair results. Additionally, it was observed that 62.4% of students possess pets, with dogs being the most prevalent choice, accounting for 26.3% of the total. Regarding pet-inflicted bites, scratches, or lick wounds, it was discovered that most students from both affiliations have mostly not experienced any injuries caused by pets in the past year (54.8%). The experiences of individuals who have encountered this phenomenon are as follows: being bitten (12.4%), being scratched (17.9%), and being both bitten and scratched (9.1%). The two associations exhibit distinct

population features, including variations in parental employment. Employed fathers and mothers comprise the majority of students attending OBEC schools (24 percent and 19.7 percent, respectively). In contrast, company employees comprise the majority of fathers and mothers attending OPEC schools (18.5 percent and 18.6 percent, respectively).

Table 1. *The Socio-Demographic Characteristics of 4th-grade Students Studying in Schools under the Office of the Basic Education Commission (OBEC) (n=290 People) and Schools under the Office of the Private Education Commission (OPEC) (n=268 people)*

Variable	Frequency (%)		
	OBEC (n=290)	OPEC (n=268)	Total (n=558)
Gender			
Boy	123 (22.1)	99 (17.7)	222 (39.8)
Girl	167 (29.9)	169 (30.3)	336 (60.2)
District			
Mueang Chonburi	50 (9.0)	45 (8.0)	95 (17.0)
Phanat Nikhom	51 (9.1)	46 (8.2)	97 (17.4)
Ban Bueng	36 (6.5)	47 (8.4)	83 (14.9)
Sri Racha	53 (9.5)	48 (8.6)	101 (18.1)
Bo Thong	51 (9.1)	34 (6.1)	85 (15.2)
Bang Lamung	49 (8.8)	48 (8.6)	97 (17.4)
Academic achievement			
Very Good	47 (8.4)	51 (9.2)	98 (17.6)
Good	129 (23.1)	154 (27.6)	283 (50.7)
fair	105 (18.8)	59 (10.6)	164 (29.4)
poor	9 (1.6)	4 (0.7)	13 (2.3)
Father's occupation			
Not working / house husband / Died	27 (4.8)	19 (3.4)	46 (8.2)
Company employee	72 (12.9)	103 (18.5)	175 (31.4)
Employee	134 (24.0)	35 (6.3)	169 (30.3)
Self-employed/ Merchant	43 (7.7)	67 (12.0)	110 (19.7)
Others	14 (2.5)	44 (7.9)	168 (10.4)
Mother's occupation			
Not working / housewife / Died	30 (5.4)	43 (7.7)	73 (13.1)
Company employee	77 (13.8)	104 (18.6)	181 (32.4)
Employee	110 (19.7)	21 (3.8)	131 (23.5)
Self-employed/ Merchant	57 (10.3)	72 (12.9)	129 (23.2)
Others	16 (2.8)	28 (5.0)	44 (7.8)
kinds of domesticated mammals			
Do not take care of any animals.	95 (17.0)	115 (20.6)	210 (37.6)
Only dog	84 (15.1)	63 (11.3)	147 (26.3)
Only cat	55 (17.2)	41 (17.2)	96 (17.2)
Other mammals besides cats and dogs	8 (1.4)	11 (2.0)	19 (3.4)
Dog and cat	37 (6.6)	30 (5.4)	67 (12.0)
Dogs and other mammals	6 (1.1)	4 (0.7)	10 (1.8)
Cat and other mammals	4 (0.7)	2 (0.4)	6 (1.1)
Dogs, cats, and other mammals	1 (0.2)	2 (0.4)	3 (0.5)
Experienced injury from domesticated mammals within the previous year.			
Not experienced any injuries	138 (24.7)	168 (30.1)	306 (54.8)
Last year, mammal bites	43 (7.7)	26 (4.7)	69 (12.4)
Past year mammal scratches	59 (10.6)	41 (7.3)	100 (17.9)
Past year mammal licks at a wound	7 (1.3)	4 (0.7)	11 (2.0)
Last year, mammal bites and scratches	28 (5.0)	23 (4.1)	51 (9.1)
Last year, a mammal bites and licked at a wound	2 (0.4)	0 (0.0)	2 (0.4)
Last year, a mammal scratched and licked at a wound	4 (0.7)	3 (0.5)	7 (1.3)
In past years, animal bites, scratches, or licks have occurred at a wound site.	9 (1.6)	3 (0.5)	12 (2.2)

Rabies Protection Motivation (RPM)

Upon analyzing the scores for RPM and RPB, which have a range of scores, maximum, minimum, mean, and standard deviation (SD) as shown in Table 2, it was discovered that students studying at OPEC schools had significantly higher RPM scores (mean = 39.22, SD = 4.487, P < 0.001) and RPB scores (mean = 16.60, SD = 3.889, P < 0.05) compared to students studying at OBEC schools (RPM scores; mean = 37.35, SD = 4.923, P < 0.001 and RPB scores; mean = 15.81, SD = 3.398, P < 0.05). When examining the components of RPM, it was discovered that students in OPEC schools presented remarkably higher levels of RPV (mean = 9.94 SD=1.560, P < 0.001) and RSE (mean = 10.85 SD=1.426, P < 0.001) compared to students in OBEC schools (RPV; mean = 9.38 SD=1.577, P < 0.001, and RSE; mean = 9.98 SD=1.850, P < 0.001). These differences were statistically significant at the 0.05 level. Furthermore, when the scores were categorized into three groups based on Bloom's criteria (Bloom 1968). As shown in Table 3, students in both OBEC and OPEC schools had scores within the same level for each variable. Specifically, RPM scores were at the good level (51.7% and 66.8%, respectively), and RPB scores were at the fair level (46.2% and 42.5%, respectively). When examining the components of RPM, only RPS scores were at a fair level, while RPV, RRE, and RSE scores were at a good level.

Table 2. Examine the Average RPM, RPS, RPV, RRE, RSE, and RPB Scores of Students Enrolled in OPEC (n = 290) and OBEC (n=268) Schools, Using the Independent t-Test

Variable	School affiliation	Score range	Minimum	Maximum	Mean	SD	t	p-value
RPM	OBEC	16-48	22	47	37.35	4.923	-	0.000
	OPEC		28	48	39.22	4.487		
	Total		22	48	38.25	4.806		
RPS	OBEC	4-12	5	12	8.37	1.371	-0.205	0.838
	OPEC		4	12	8.39	1.637		
	Total		4	12	8.38	1.504		
RPV	OBEC	4-12	5	12	9.38	1.577	-	0.000
	OPEC		5	12	9.94	1.560		
	Total		5	12	9.65	1.592		
RRE	OBEC	4-12	5	12	9.62	1.769	-2.845	0.006
	OPEC		5	12	10.04	1.716		
	Total		5	12	9.82	1.755		
RSE	OBEC	4-12	4	12	9.98	1.850	-	0.000
	OPEC		6	12	10.85	1.426		
	Total		4	12	10.40	1.714		
RPB	OBEC	6-24	9	24	15.81	3.398	-	0.011
	OPEC		8	24	16.60	3.889		
	Total		8	24	16.19	3.660		

Table 3. RPM, RPS, RPV, RRE, RSE, and RPB Score Levels of Students Enrolled in OBEC (n = 268) and OPEC (n = 290) Schools

Variable	School affiliation	Good	Fair	Poor
RPM	OBEC	150 (51.7%)	125 (43.1%)	15 (5.2%)
	OPEC	179 (66.8%)	87 (32.5%)	2 (7.0%)
RPS	OBEC	54 (18.6%)	170 (58.6%)	66 (22.8%)
	OPEC	60 (22.4%)	132 (49.3%)	76 (28.4%)
RPV	OBEC	156 (53.8%)	98 (33.8%)	36 (12.4%)
	OPEC	165 (61.6%)	89 (33.2%)	14 (5.2%)
RRE	OBEC	168 (57.9%)	88 (30.3%)	34 (11.7%)
	OPEC	173 (64.6%)	75 (28.0%)	20 (7.5%)
RSE	OBEC	188 (64.8%)	75 (25.9%)	27 (9.3%)
	OPEC	223 (83.2%)	40 (14.9%)	5 (1.9%)
RPB	OBEC	46 (15.9%)	134 (46.2%)	110 (37.9%)
	OPEC	69 (25.7%)	114 (42.5%)	85 (31.7%)

Discussion

This study forecasted Rabies Preventive Behavior (RPB) among fourth-grade students in Chonburi province attending schools administered by the Office of the Basic Education Commission (OBEC) and the Office of the Private Education Commission (OPEC). Our research shows that the children enrolled in OPEC schools had significantly higher RPM and RPB scores than those attending OBEC schools. This conclusion is consistent with similar results in other studies (Adeyemi 2014, Kumar & Choudhury 2021, Roy & Majumder 2020). Additionally, it was documented that the average GPA and academic outcomes of pupils in the private primary schools performed better than their counterparts in the public schools.

RPM consists of a combination of the four constructs: Rabies Perceived Severity (RPS), Rabies Perceived Vulnerability (RPV), Rabies Response Efficacy (RRE), and Rabies Self-Efficacy (RSE). It was found that students had good RPV, RRE, and RSE levels (OBEC; 53.8%, 57.9%, and 64.8% OPEC; 61.6%, 64.6%, and 83.2%, respectively). Only on the RPS construct at 58.6% and 49.3% (OBEC and OPEC) did students score at a "fair" level. This finding is consistent with the result reported by Sirinan Kumsri (2018) but inconsistent with previous studies (Lanthip Hearabut & Natthisa Booncharoen 2016, Puttapa 2016). Possible factors contributing to the moderate RPS level attainment among the majority of fourth-grade students could be the age-dependent nature of the RPS construct, as individuals, both children and adults, undergo distinct stages of cognitive development. The study participants achieved the lowest RPS scores on the RPM in OBEC schools (mean = 10.85, SD = 1.371) and OPEC schools (mean = 8.39, SD = 1.637). The majority of pupils were uncertain about the extent of the severity of rabies. However, the role of RPS in RPM constructs is significant as awareness of the repercussions and damages of rabies can enhance protective motivation among students (Sadeghi et al. 2019). Hence, it is crucial to prioritize the consideration of RPS while developing educational programs. This can be

achieved by integrating real-life stories of children who have encountered mammal attacks, as Okuhara et al. (2020) suggested.

In the RPM framework, the RSE construct had the highest scores in both OBEC schools (mean = 10.85, SD = 1.426, $P < 0.01$) and OPEC schools (mean = 9.98, SD = 1.850, $P < 0.01$). The investigation aligned with the results of prior investigations (Ezati Rad et al. 2021, Florence & Jhee Hee 2021, Laorujisawat et al. 2021, Macdonell et al. 2013, Sadeghi et al. 2019). It was disclosed that Self-Efficacy (SE) obtained the highest score among the RPM constructs. Furthermore, it supported the findings of Anam and Susanto (2018), which found that students attending private elementary schools scored higher on SE than students attending public schools. According to a study, possessing RSE indicators had a statistically significant relationship to RPM constructs (Laorujisawat et al. 2021), meaning a high degree of RSE is believed to contribute to promoting RPB. This is because individuals with higher RSE scores are more inclined to consistently take measures to minimize the risks associated with rabies, protect their well-being, and minimize the adverse consequences of improper RPB. Therefore, while designing educational interventions, it is vital to give priority to the RSE construct since it plays a critical role in mitigating dangers (Sadeghi et al. 2019).

Conclusion

The PMT, or Protection Motivation Theory, is a valuable framework for accurately forecasting behavior, particularly in relation to intention and motivation surrounding RPB (Laorujisawat et al. 2021). While the students in OPEC schools demonstrated higher levels of all four constructs of RPM (RPS, RPV, RRE, and RSE), particularly PRV and PSE, compared to the students in OBEC schools, it is necessary to enhance RPM in both OBEC and OPEC. This is because when the scores were classified into three groups according to Bloom's criteria, students in both OBEC and OPEC schools obtained scores within the same level. Furthermore, it is imperative to implement educational initiatives aimed at enhancing RPS among students in both OBEC and OPEC, as they have exhibited limited scores. These programs will heighten students' understanding of the gravity of rabies, hence fostering a proactive approach towards self-protection against Rabies. Additionally, educational institutions should incorporate activities that promote the growth of cognitive flexibility and encourage the adoption of positive problem-solving behaviors among students (Alhraiwil et al. 2019, Alkhatri & Shamssain 2023). In order to reduce the occurrence of rabies, it is crucial to promote and strengthen relevant behaviors about rabies prevention among students. This intervention is anticipated to improve students' capacity to protect themselves from rabies in the future.

Study Limitations

There are certain constraints in this study. Due to the fact that the subjects of this study were fourth-grade pupils, specific PMT components (i.e., Perceived Rewards, Perceived Response cost) were not examined. In future studies involving family members, it would be beneficial to include these constructions. The Perceived Rewards construct has an impact on Threat Appraisal, whereas the Perceived Response cost construct influences Coping Appraisal (Rogers & Prentice-Dunn 1997).

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References

- Adeyemi S (2014) Comparative Study of Pupils' Academic Performance between Private and Public Primary Schools. *World Journal of Education* 4(4): 55–60.
- Alhraiwil NJ, AlYoussef RA, AlShlash NK, Amer SA, Radwan NM, Al Hazmi AM, et al. (2019) The Impact of an Educational Program on Enhancing Knowledge towards Drug Addiction among Health Care Providers in Saudi Arabia. *Athens Journal of Health & Medical Sciences* 6(3): 157–166.
- Alkhatri, SA, Shamssain M (2023) Knowledge and Awareness of Childhood Asthma in a Population in the United Arab Emirates. *Athens Journal of Health & Medical Sciences* 10(1): 59–82.
- Amparo ACB, Mendoza ECB, Licuan DA, Valenzuela LM, Madalipay JD, Jayme SI, et al. (2019). Impact of integrating rabies education into the curriculum of public elementary schools in Ilocos Norte, Philippines on rabies knowledge, and animal bite incidence [Original Research]. *Frontiers in Public Health* 7(119): 1–11.
- Anam S, Susanto M (2018) *A Closer Look into Primary School Students' Self Efficacy in L2 Learning across Gender and School Location*. Available at: <https://doi.org/10.2991/soshec-17.2018.26>.
- Bloom BS (1968) Learning for mastery. instruction and curriculum. *REL for the Carolinas and Virginia* 1(2): 1–12.
- Bureau of Epidemiology (2016) *Summary of guidelines for analyzing the surveillance system for 5 groups of diseases in 5 dimensions, 2016*. Edited by S Hinjoy, K Tipprat, P Techakamolsook. 1st Edition. TS Interprint Co., Ltd.
- Bureau of General Communicable Diseases (2017) *Guidelines for the prevention and control of rabies*. 1st Edition. Aksorn Graphic And Design Publishing House LP.
- Centers for Disease Control and Prevention (2020) *Rabies around the World*. Centers for Disease Control and Prevention.
- Chambers RS, Rosenstock S, Lee A, Goklish N, Larzelere F, Tingey L (2018) Exploring the Role of sex and sexual experience in predicting American Indian adolescent

- condom use intention using protection motivation theory. *Frontiers in Public Health* 6(318): 1–9.
- Clubb A, Hinkle J (2015) Protection motivation theory as a theoretical framework for understanding the use of protective measures. *Criminal Justice Studies* 28(3): 1–20.
- Deray R, Rivera C, Gripon S, Ulanday C, Roces MC, Amparo AC, et al. (2018) Protecting children from rabies with education and pre-exposure prophylaxis: A school-based campaign in El Nido, Palawan, Philippines. *PLoS One* 13(1): e0189596.
- Deressa A, Ali A, Beyene M, Newayesilassie B, Yimer E, Hussen K (2010) The status of rabies in Ethiopia: a retrospective record review. *Ethiopian Journal of Health Development* 24(2): 127–132.
- Dzikwi AA, Ibrahim AS, Umoh JU (2012) Knowledge and practice about rabies among children receiving formal and informal education in Samaru, Zaria, Nigeria. *Global Journal of Health Science* 4(5): 132–139.
- Epidemiology BO (2022) *Report 506 (R506): Rabies in 2011-2021 [Internet]*. Available at: <http://doe.moph.go.th/surdata/disease.php?dcontent=old&ds=42>.
- Ezati Rad R, Mohseni S, Kamalzadeh Takhti H, Hassani Azad M, Shahabi N, Aghamolaei T, et al. (2021) Application of the protection motivation theory for predicting COVID-19 preventive behaviors in Hormozgan, Iran: a cross-sectional study. *BMC Public Health* 21(1): 466.
- Faul F, Erdfelder E, Lang A-G, Buchner A (2007) G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods* 39(2): 175–191.
- Florence M, Jhee Hee J (2021) Compliance with security guidelines in teenagers: The conflicting role of peer influence and personal norms. *ACIS* 25: 1–25.
- Goel S, Gupta H, Mazta S (2007) Epidemiological profile of Bite cases admitted at a 50 bedded community health centre of Himachal Pradesh, India. *The Internet Journal of Health* 7(1): 1–5.
- Gong J, Stanton B, Lunn S, Deveaux L, Chen X (2009) Effects through 24 months of an HIV/AIDS prevention intervention program based on protection motivation theory among preadolescents in the Bahamas. *Pediatrics* 123(5): e917–928.
- Hearabut L, Booncharoen N (2016) The perception of information and health behaviors of rabies in Rayong. *ODPC6 Chonburi Journal* 7(2): 38–50.
- Kasempimolporn S, Jitapunkul S, Sitprija V (2008) Moving towards the elimination of rabies in Thailand. *Journal of the Medical Association of Thailand* 91(3): 433–437.
- Kumar D, Choudhury PK (2021) Do private schools really produce more learning than public schools in India? Accounting for student's school absenteeism and the time spent on homework. *International Journal of Educational Development* 83: 102395.
- Kumsri S (2018) Health beliefs affecting rabies disease prevention behavior in the local outbreaks at Hua Sai sub-district Bang Khla district. *Journal of the Department of Medical Services* 43(2): 137–140.
- Laorujisawat M, Wattanaburanon A, Abdullakasim P, Maharachpong N (2021) Protection Motivation Theory and Rabies Protective Behaviors Among School Students in Chonburi Province, Thailand. *Journal of Preventive Medicine and Public Health* 54(6): 431–440.
- Lungten L, Rinchen S, Tenzin T, Phimpraphai W, De Garine-Wichatitsky M (2021). Knowledge and perception of rabies among school children in rabies endemic areas of South Bhutan. *Tropical Medicine and Infectious Disease* 6(28): 1–15.
- Macdonell K, Chen X, Yan Y, Li F, Stanton B (2013). A protection motivation theory-based scale for tobacco research among Chinese youth. *Journal of Addiction Research & Therapy* 4: 154.

- Meslin FX, Briggs DJ (2013) Eliminating canine rabies, the principal source of human infection: what will it take? *Antiviral Research* 98(2): 291–296.
- Office of the Basic Education Commission Ministry of Education (2022) *Thai Early Childhood Education Program 2022*. 1st Edition. Printing House Agricultural Cooperatives of Thailand Limited.
- Okuhara T, Okada H, Kiuchi T (2020) Predictors of staying at home during the COVID-19 pandemic and social lockdown based on Protection motivation theory: A cross-sectional study in Japan. *Healthcare* 8(475): 1–11.
- Pham V, Nguyen H, Tho le H, Minh TT, Kaljee LM (2012) Evaluation of three adolescent sexual health programs in ha noi and khanh hoa province, Vietnam. *AIDS Research & Treatment* 986978.
- Polit DF, Beck CT (2017) *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*. 9th Edition. Wolters Kluwer Health/Lippincott Williams & Wilkins.
- Puttapa N (2016) *Motivation in the disease prevention by taking the dog to get rabies vaccination among people of Klongplu subdistrict, Nongyai district, Chonburi province*. Chonburi: Burapha University.
- Rogers RW (1975) A protection motivation theory of fear appeals and attitude change. *Journal of Psychology* 91: 93–114.
- Rogers RW, Prentice-Dunn S (1997) Protection motivation theory. In D Gochman (ed.), *Handbook of Health Behavior Research, Vol. I: Determinants of Health Behavior, Personal and Social*, 113–132. Volume 1. Plenum Press.
- Roosbahani N, Kaviani A-H, Khorsandi M (2020) Path analysis of skin cancer preventive behavior among the rural women based on protection motivation theory. *BMC Women's Health* 20(1): 121.
- Roy L, Paul D, Majumder U (2020) The Relative Performance of Different Types of Primary Schools in Bangladesh: A Multilevel Modeling Approach. *Creative Education* 11: 2354–2374.
- Sabzmakan L, Ghasemi M, Asghari Jafarabadi M, Kamalikhah T, Chaleshgar Kordasiabi M (2018) Factors associated with tobacco use among Iranian adolescents: An application of protection motivation theory. *Substance Use and Misuse* 53(9): 1511–1518.
- Sadeghi R, Mazloomi Mahmoodabad SS, Fallahzadeh H, Rezaeian M, Bidaki R, Khanjani N (2019) Predictive factors for preventing hookah smoking and health promotion among young people based on the protection motivation theory. *Journal of Educational Health Promotion* 8(Sep): 169.
- Sancheti PV, Mangulikar SK (2016) An interventional study to assess knowledge regarding rabies in secondary school students. *International Journal of Community Med Public Health* 3(1): 180–183.
- Savadogo M, Boushab MB (2015) La rage chez l'enfant: un risque encore meconnu des populations exposees. (Rabies in children: an often unknown risk among populations at risk). *Med Sante Trop* 25(2): 222–224.
- Sotanasathien S (1990) Concepts and Theories about Knowledge Attitude and Behavior. In *Communication and Social*. Chulalongkorn University Press.
- Wilde H, Ghai S, Hemachudha T (2017). Rabies: Still a silent killer targeting the poor. *Vaccine* 35(18): 2293–2294.
- World Health Organization – WHO (1997) *Life skills education for children and adolescents in schools*. Programme on Mental Health World Health Organization. Available at: https://apps.who.int/iris/bitstream/handle/10665/63552/WHO_MNH_PSF_93.7A_Rev.2.pdf?sequence=1&isAllowed=y.

- World Health Organization – WHO (2005) WHO Expert Consultation on Rabies. first report. *World Health Organ Tech Rep Ser*, 931, 1–88, back cover. Available at: <https://www.ncbi.nlm.nih.gov/pubmed/16485446>.
- World Health Organization – WHO (2018) *WHO Expert Consultation on Rabies*. 3rd Report. Geneva, Switzerland: WHO.
- World Health Organization – WHO (2023) *Rabies in the South-East Asia Region*. WHO. Available at: <https://www.who.int/thailand/health-topics/rabies>.
- Xiao H, Li S, Chen X, Yu B, Gao M, Yan H, et al. (2014) Protection motivation theory in predicting intention to engage in protective behaviors against schistosomiasis among middle school students in rural China. *PLoS Neglected Tropical Diseases* 8(10): 1–10.