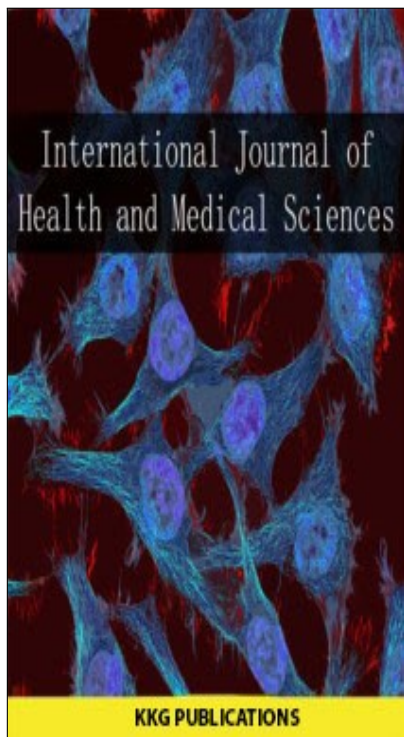


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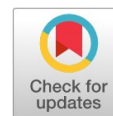


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The Concordance of Perception about Dog Bite Impacts and Practices after Dog Bite in Victims, Chiang Mai, Thailand: The Participatory One-Health Disease Detection (PODD) Project Setting Area



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THE CONCORDANCE OF PERCEPTION ABOUT DOG BITE IMPACTS AND PRACTICES AFTER DOG BITE IN VICTIMS, CHIANG MAI, THAILAND: THE PARTICIPATORY ONE-HEALTH DISEASE DETECTION (PODD) PROJECT SETTING AREA

PHIRABHAT SAENGSAWANG ^{1*}, KANNIKA NA LAMPANG ², WARANGKHANA CHAISOWWONG ³^{1, 2, 3} Faculty of Veterinary Medicine, Chiang Mai University, Thailand**Keywords:**

Dog Bite
Rabies
Perception
Participatory
One-Health Disease Detection (PODD)
Kendall Coefficient of Concordance

Abstract. Dog bite injury is one important public health concern, especially in endemic rabies areas such as Asia. The negative impacts of a dog bite include rabies virus inoculation, wound infection, psychological problems, or other somatic disabilities. Thailand is one of the endemic rabies countries, and the canine population, which is rabid mammals, still circulates in the community. The perception of the rabies prevention program is necessary and reflects the success of the prevention campaign in communities. The objective of this study was to access the perception of victim practices after the dog bite and their perception of negative impacts to victims. The cross-sectional study was conducted from January 2015 to December 2016. Twenty-one participants whom Participatory One Health Disease Detection (PODD) volunteers were invited into the study. We created the perception's ranking table and keyword cards for participation. The victims ordered the keyword card and discussed their ordering. The ranking and discussing data were collected and analyzed by the Kendall coefficient of concordance. Only nine participants (42.86%) knew or were accustomed to the details of the dog bite prevention campaign. We significantly found concordance in both topics; the effect of the bite that victims mostly concerned about was rabies virus infection (mean rank = 1.64, Kendall's $W = 0.63$, $p < 0.05$), and the foremost priority that they practice after the bite was wound washing with clean water (mean rank = 1.45, Kendall's $W = 0.51$, $p < 0.05$). We suggested that knowledge of the rabies prevention program and the practical knowledge of victims after the bite was approximated trends and novel implements for the dog bite prevention campaign advertising to the community should re-establishing.

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INTRODUCTION

Rabies is one of neglected zoonotic [1] and vaccinated preventable disease. This zoonotic disease is a fatal encephalitis that most countries around the world aware and desire to eliminate from the country, but no one could not eliminate rabies except some island. Rabies could be infected via various route such as mammal bite, scratch on the skin, lick on broken skin, consume the infected nervous tissue, etc. The bite is the main route of transmission of rabies and mostly occurred by the dog bite. The dog bite is an important public health concern especially in rabies endemic countries including Thailand since the virus is mostly infected human via animal bite [2], especially dog bite. Dog bite problem related to others and one-health that complementing between human and other species in ecology and encouragement between animal control and public health policies [3]. The close interaction with companion pet, almost in children was one risk factor of bite [4], and numerous persons are still believed in the wrong information of the dog bite [5]. The other effects caused by dog bite are bacterial wound infection, psychological disorders, disability or disfigurements. Thailand public health authority established the dog bite prevention campaign for acknowledging the people

about the risk of the bite and the management or first aid after the bite (see the details of the campaign in appendix part). The campaign has launched to the community in various ways e.g. leaflet, poster or public notice by local public health workers, local government official staffs, volunteers or head of the villager for avoiding dog bite and rabies post-exposure prophylaxis. The campaign called "Five don't" including do not making the dog aggressive, angry, frighten or scared, do not step on dog body, do not separate dogs when fighting, do not pick the dogs food tray during their meal and do not play or touch unfamiliar or stray dogs. In addition, the step of wound management after the bite was publicized with the campaign or call post-exposure prophylaxis or PEP. Rabies post-exposure prophylaxis is included following steps i.e., biting wound washing and cleaning, apply disinfectants such as povidone iodine or 70 % alcohol solution, consult public health officer or physician, quarantine the biting animal, and receive the anti-rabies vaccine.

That knowledge of local people in the community on dog bite and rabies prevention such as biting wound management and protection, or anti-rabies vaccination is necessary for national rabies prevention and control [5] as well as the perception

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of people which leads to creating the practice of people after the dog bite. The perception of dog bite and rabies prevention are also important to reflect the success of the campaign which was intervened into communities. The knowledge of most victims in Thailand about biting wound management and anti-rabies vaccination were unclear and these might from the problem of communication between government authorities and communities. The knowledge about bite prevention campaign in people of the community was not formally studied in Thailand and the knowledge of practice about the wound management after the bite was not evidence. The evaluation of the bite prevention campaign in the dimension of perception in the community was frequently not proceeded in the in-depth content. The missing of the in-depth content of the campaign might reflect the fraudulent data. The in-depth data could be fulfilling and helped to reflect the real result of the campaign better than using only quantitative data.

This study aims to access the perception of victim's practices after the dog attack and dog bite negatively impact a dog bite victim in the quantitative and in-depth content. We

focused on the dog bite victims who were reported by the PODD system. PODD was a one-health related project that established the community-owned digital surveillance tools. The PODD has applied one-health concepts for collaboration in the community among animal health, human health, and environmental health. The PODD volunteers play a role as the key person who drives the surveillance system in community with their local government agencies: local public health organizations and local government organizations. PODD volunteers were trained to detect and report abnormal events related to health via their smartphone. The dog bite is one of the abnormal events which is monitored and reported via PODD system. The report and response systems as shown in Figure 1. The biting victims were reported via PODD smartphone application, details of them were collected in PODD database called "PODD dashboard". The dashboard is used for report follow up and management by local authorities and epicenter which refers to the central office for suggestion system working. This pilot project initiates in seventy-four sub-district areas.

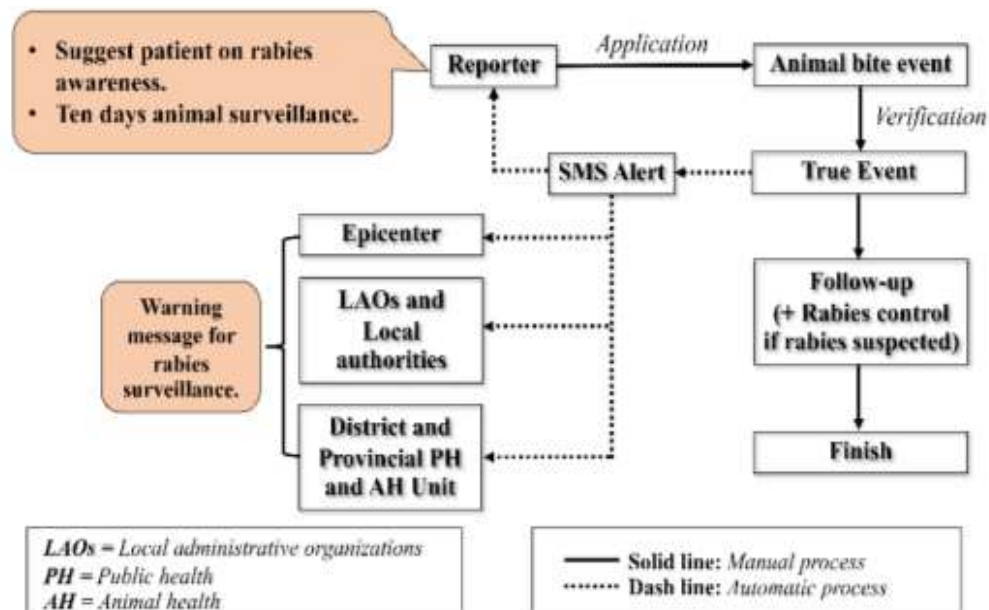


Fig. 1. The Dog bite event process flow of PODD surveillance system

METHODOLOGY

Study Area, Target Sample, Sampling Method and Sample Size

The cross-sectional study was conducted during January 2015 to December 2016. The study area was in eleven sub-districts in nine districts of Chiang Mai province those reported dog bite events to the PODD project. The victims who were reported to PODD surveillance database were recruited to be our

subject and the name list of the victim was provided by PODD project, faculty of veterinary medicine, Chaing Mai University. Total seventy-six dog bite cases were reported to the system and twenty-one dog bite victims were consented for data collection and subjected to be our informants.

Data Collection

Twenty-one informants were interviewed on their perception of practice after the dog bite and the consequent negative impacts on their life after the dog bite. We created the perception’s ranking table and the items of dog bite prevention and rabies prevention were written down on the cards so called as ”keyword cards”.

Two sets of keyword card were used for ranking including dog bite effect set and practice after bite card set. The victims participated in keyword card ranking. After ranking was complete, we discussed with the participant with their ordering one by one.

The ranking and discussing data were collected on paper and recorded the interview using digital voice recorder. The recorded interviews were fully translated into Microsoft Excel

version 2016 and all the data were conceal kept in confidentiality.

Data Analysis

The raw data were recorded into the spreadsheet of Microsoft Excel 2016 and recorded data were analyzed using Kendall coefficient of concordance (W) by IBM SPSS Statistics 23. Kendall coefficient of concordance use to find the relationship between informants perception and items from the national campaign. Kendall coefficient of concordance range from zero to one. If the variable is related or completely compatible, the value is closed to one and if not, the value would be closed to zero. The statistical significance was considered as $p < 0.05$. Interpretation of Kendall coefficient of concordance as in Table 1.

TABLE 1
INTERPRETATION OF W VALUE AND LEVEL OF AGREEMENT [6]

Kendall coefficient of concordance (W) value	Interpretation
0	No agreement
0.1	Weak agreement
0.3	Moderate agreement
0.5	Strong agreement
1.0	Complete agreement

RESULTS

The general information of participants (eight males and thirteen females) i.e., age, gender, occupation, and living area location of twenty-one informants were represented in Table 2. Informants were five children (23.8%) who were aged less than ten years old, six persons (28.5%) were middle-age d victims (twenty-seven to fifty-five years old) and nine people (42.8%) were the elderly participants. The most occupations were the farmer (28.6%), unemployed (23.8%) and student (19.0%) and other small portion included the canine seller, public health volunteer, livestock volunteer, and driver. Five (23.8%) victims have lived in the urban area and sixteen (76.2%) have lived in rural area.

The results of the keyword card ranking were used to test the statistical hypothesis under 95% confidence interval and $p < 0.05$ was considered as the significant level. Kendall coefficient of concordance (Kendall’s W) is the agreement degree of rank which the value represented in the range from zero to one (0 represented disagree level and 1 represented strongly agree on level). Before the in-depth interview started, we would ask all participants “Did you know the bite prevention (five dont) campaign that intervened in your community” and “Did you

know the step of biting wound management”. We found nine participants (42.86%) ever heard or accustomed the campaign but only one of them (4.76%) knew the details of the bite prevention campaign. About the step of practice after the dog bite, we found that fourteen of twenty victims (70.00%) would like to wash the biting wound with water with soap but only one of the participant (5.00%) knew the details about the practice after the bite. The participants mentioned that they knew the details from their subconscious mind and the minor portion of them knew from the local authority publicization.

For the perception of negative impacts to livelihood after the dog bite, rabies virus inoculation, microbial wound infection, absence from work or school, losing income and disfigurement were listed. We significantly found of concordance in both topics; the effect of the bite that victims most concern was rabies virus infection (mean rank = 1.64, Kendall’s W = 0.63, $p < 0.05$) and Figure 2 show the details of each object about negative impacts of the dog bite. Rabies virus inoculation was the first negative impact although the studied period did not find the report of the rabid case both in human and animal. The microbial wound contamination was the second concern and this subject was almost mentioned by participants who had a

chronic disease such as Diabetes Mellitus (D.M.) because of they afraid of organ remove. We found that the working or school absence and outcome losing was the mutually related object, the informants remarked that if they absent from work, they would lose their earning and most of the participants got

the daily income, not a salary. The disfigurement was the least impacts that affected them, most of them mentioned that they got the biting wound far from the important anatomic site such as the face.

TABLE 2
GENERAL INFORMATION ABOUT ALL INFORMANTS

Participant code ^Δ	Age (years)	Gender	Occupation	Location
7EDNDG3K	< 10	F	Student	R
NGK35SZU	< 10	F	Student	R
U7E4KPPV	< 10	M	Student	U
MM95JGNW	< 10	M	None	U
LCDQ43TV	< 10	F	Student	U
735PYU68	27	F	Canine seller	R
LDP9CB6Q	43	F	Farmer	R
V6PWBS7D	48	F	Volunteer	U
4L82HGRV	49	M	Volunteer	U
WZBZVUGR	51	F	Farmer	R
PQS4PVZA	55	M	Farmer	R
H4YVJTJW	65	M	Driver	R
UB7N5UVE	69	F	Unemployed	R
TUNCHQXW	70	M	Farmer	R
BVBZX52L	72	F	Unemployed	R
G6H2F3PF	72	F	Unemployed	R
P6QF69WT	75	F	Employee	R
PWZJ88N3	82	M	Farmer	R
VDEPXRGP	86	F	Unemployed	R
7FQN8A4P	88	F	Unemployed	R
8XA9F3DU	NA	M	Farmer	R

^Δ code was generated using online randomize website

M, male; f, female; U, urban setting; R, rural setting; NA, not available

About the practices after bite, wound washing, consult the health practitioner, topical drug application, anti-rabies vaccination, and quarantine dogs were listed. We found that the first priority that victims would like to practice was wound washing with clean water (mean rank = 1.45, Kendall's W = 0.51, $p < 0.05$).

Figure 3 showed the details of each object in practices after bite. The wound washing was the first priority to do, they mentioned that they rinsed water and some of them applied with soap or detergent. One of them gave the reason that the dog mouth was dirty and had numerous pathogen especially bacteria, it could be contaminated into the wound and made the wound infection. The health worker or physician consulting was the

second step that they would like to do, they mentioned that they could not manage to wound if it was big or had blood and if they got paid, they also wished to receive some medicine for pain relief. These might be the reason to consult the doctor. In addition, the topical drug usage, they frequently applied when doctors instructed to use, few of them might use some topical detergent such as povidone iodine or 70% alcohol solution after they wash the biting wound. The fourth step, they would receive the anti-rabies vaccine. Biting dog quarantine was the last priority, they gave the reason that the biting dog was owned the dog and the owner was their neighbor. The dogs were easy to find, and the owners should know if their dog dies.

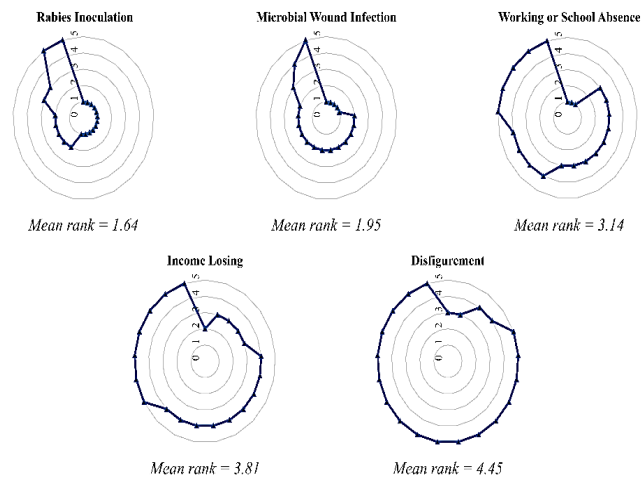


Fig. 2. Show the ranking distribution of dog bite effects; the number in the circle represents the degree of rank (1 represented strongly effect and 5 represented weakly effect) and δ represent for each participated ranking

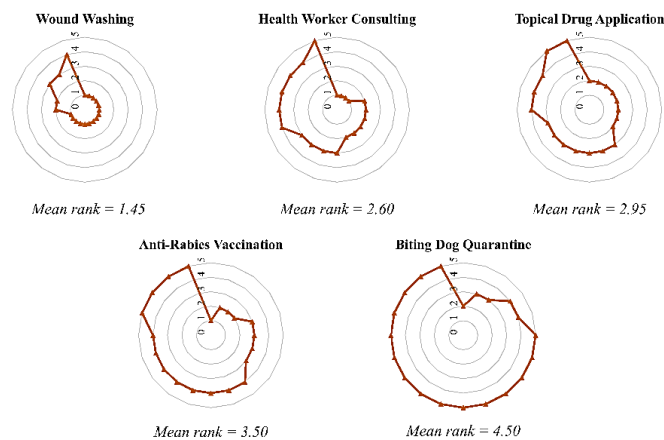


Fig. 3. Show the ranking distribution of practices after bite; the number in the circle represents the degree of rank (1 represented prime priority to do and 5 represented last priority to do) and δ represent for each participated ranking

DISCUSSION AND CONCLUSION

The most negative impact of the dog bite was infection particularly rabies but the most of participants were not clearly know about the rabies detail, they knew only the name of the disease. Herbert's study discovered around 70% of the sample ever heard rabies and half of them know as a fatal disease [7]. Rabies in Thai means mad dog, all participants afraid that they might be mad like a psychological problem person. This is a reason that they almost concern rabies infection more than other negative effects. Most of the participants were misunderstand about the details of rabies, some of them believed that rabies could be cured, only the dog could transmit the virus to human or the young dog could not be infected the virus, these reflected that the knowledge of rabies in the community still had some

gap. There are gaps of knowledge especially perception about dog behavior or corrected PEP protocol [8]. The next plan of the study about the success of rabies knowledge in the community should be researched. Bacterial wound infection was a negative effect that wakeful, some of the participants had some chronic disease such as systemic hypertension or D.M.. The D.M. participants were extremely anxious about their wound because these victims were fostered when the wound occurred, it might be infected some pathogens and deeply invaded to vital tissues or organs. This subject might be the cause of organ remove and disability in the D.M. patient who got the infected wound. The income losing and working, or school absence were related together but only a few participants concerned, except in victims who were the employee or non-government

officers. The reason is that if the biting effect to their movement and work, they might absent for rest. The absence effects of getting income because some of them receive the income in daily. The disfigurement was the topic that participants did not think about that can be affected for their daily livelihood, they mentioned that their biting wound occurred far from the vital site such as the face, eye or head. They suggest that this effect was important in the victims who was bitten on the face or severe attack.

The first step of practice after the bite that most of the participants would like to do was wound washing. The most of participants washed the wound with clear water but only some of them applied this important step with any detergents such as soap. The elder participants frequently trust of the wound management in the physician care more than their procedure, they did not immediately wash the biting wound because they wished to manage by medical workers such as physician or nurse. The anti-rabies vaccination is still being needed when the bite occurred and most of them still aware to receive the vaccine when they were bitten, but some victims aware to receive only in the first injection and ignored to completely received in the full course of the protocol. These might be from the biting dog lived when the biting event passed for ten days or they intentionally ignored to receive from various reasons such as itinerary, expenses or unawareness of rabies. Lunney study in Cambodia found 93% of participants knew rabies and 50% aware to inject anti-rabies vaccine in dogs [9]. The topic of dog quarantine was still ignored because some dogs were stray dogs and could not follow. The owned biting dog frequently stay in the house, this dog group easily to follow and the participants often mentioned that the quarantine was not needed in an owned dog. If it died, the owner would know and declared to the victim. The study of a slum area in India found that first aid that victims frequently practice was wound washing, physician consulting and rest respectively but about half of them aware to receive post-exposure vaccination [10]. The contributor opinions in another Lunney research found 78% of dog bite problem affect physical risk and 88% of the sample mention as a risk of infection. However, the owned biters were still neglected, it might form the trustworthiness with the familiar dogs or they

believed that the dogs were vaccinated, rabies virus might not be inoculated. Some owners still had the wrong belief about the anti-rabies vaccination in the dog, they understood that one shot of injection could protect their dog from the virus for the life long duration. This situation was suspense that the bite from closed or owned dogs might be the vaccination ignorance of the victim. Some part of this study reflected about lack of important rabies knowledge in participants. Lack of zoonotic disease that transmitted via dog might affect to victim health, the measure for public relation should concern [11], particularly rabies from the bite.

From the result reflected that the knowledge of rabies and bite management still poor particularly in the rural victims. We suggest that knowledge of the rabies prevention program and the practical knowledge of victim after the bite were the similarities in the negation trend and novel implements for the dog bite prevention campaign advertising to the community should re-establishing. The gap analysis might help to correct this problem, the in-depth intervention should establish and applied in the community. The measure of public relation of disease knowledge and prevention campaign should be chosen to proper context and culture of each area and working process of local authorities, coordinate on the one-health concept. The cooperation between relative authorities helped to motivate the campaign was successful because rabies is the zoonotic disease. The management of this disease relied on the co-working operation of these authorities such as livestock or veterinary section, medical or public health section and environmental health section. The applied interweaving between community cultures such as routine tradition or annual festival with academic measure might motivate villager to easily learn the academic content and increase the interest.

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APPENDIX

THE DETAILS IN THE LEAFLET OF BITE PREVENTION (FIVE DONT) CAMPAIGN

This campaign is advertised via many routes: leaflet, poster or public notice by local public health workers, local government official staffs, volunteers or head of villagers. The official dog bite prevention campaign by the government called “5 don’t”, There are short five words for community perception, easy to remember and help to prevent the dog bite. “Five don’t” include:

- “Don’t urge” means to avoid making the dog aggressive or angry.
- “Don’t tread” means to avoid treading some parts of the dogs body such as tail, legs or head and avoid making the dog frightened or scared.
- “Don’t separate” means to avoid separating the dogs when they are fighting.
- “Don’t pick” means to avoid picking the plate during their meal.
- “Don’t play” means to avoid playing or touching the unknown or strayed dogs.

The official rabies prevention campaign by the government is the practice after the dog bite that victims should perform. The steps of practice include:

- Biting wound washing: gently wash various times with soap.
- Topical drug medication: use the povidone-iodine solution on the washing wound.
- Medical worker consulting: meet the medical worker for consulting.
- Biter quarantine: quarantine the biting dog for ten days. If it dies, the body should be detected for the rabies virus. If found the suspected rabid dog, must immediately inform the livestock government officer.
- Post-exposure vaccination: receive the full course of anti-rabies vaccination protocol.