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A persona-based exploration of rabies post-exposure prophylaxis seeking behavior and its implication for communication strategic planning: Evidence from Thailand

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ABSTRACT

Rabies is a lethal zoonotic illness that claims over 59,000 lives annually. However, this fatality can be avoided by postexposure prophylaxis (PEP). This study aimed to identify and characterize different personas of individuals regarding their PEP-seeking behavior and develop tailored communication strategies to encourage PEP adoption among these distinct groups effectively. We categorized our subjects, residing in two districts of Chonburi province, Thailand, into three groups: (i) individuals with a history of dog bites who underwent PEP; (ii) individuals bitten by dogs who did not receive PEP; and (iii) individuals who had never been bitten. Subsequently, we employed an empathy map, a visual method, and a customer journey map to better understand the participants' experiences and perceptions. A total of 38 individuals were interviewed. We categorized the participants into three distinct personas: positive, neutral, and negative trends. Individuals classified within the positive trend strongly advocate for seeking rabies vaccines in the event of a dog bite. Meanwhile, individuals who have a neutral inclination are more likely to contemplate getting vaccinated following a dog bite, particularly if the injury is substantial. Those with a negative trend demonstrate a notable lack of attention or concern toward preventing rabies. A lack of attention to the potential severity of the issue characterizes their attitude. Notably, nearly half (44.74 %; 17/38) of the individuals involved in the study indicated utilizing interpersonal communication, followed by digital platforms (42.11 %; 16/38) and traditional communication channels (10.52 %; 5/38). Tailoring communication modalities to suit each specific group is crucial for effective outreach.

1. Introduction

Rabies, a life-threatening zoonotic disease caused by a single-stranded RNA virus from the *Lyssavirus* genus of the Rhabdoviridae family, poses a significant global health threat. This virus has a wide host range within the mammalian species, with the mammals from the Carnivora and Chiroptera orders serving as the primary reservoirs [1]. In particular, dogs are the most common reservoirs of rabies to humans, accounting for an estimated 99 % of human rabies deaths [2]. Rabies outbreaks have occurred in over 150 countries, primarily in Asia and Africa. The World Health Organization (WHO) estimates that rabies kills approximately 59,000 people each year, with a disproportionate impact in developing countries. Alarmingly, more than 40 % of these fatalities involve children under the age of 15 [3]. In 2015, the WHO, the World Organization for Animal Health, the Food and Agriculture Organization of the United Nations, and the Global Alliance for Rabies Control joined forces to set an ambitious goal of zero human rabies deaths by 2030 [4]. A multifaceted approach involving all relevant sectors, such as healthcare, animal welfare, agriculture, and public health, will be necessary to achieve this goal. Collaboration and coordination among all

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stakeholders, guided by the One Health approach, will be critical to achieving the ambitious goal of eliminating human rabies deaths [3]. In Thailand, the rabies situation has changed significantly since the disease's first documented outbreak in 1980, which resulted in nearly 400 human deaths. The number of human rabies deaths has since steadily decreased, reaching a record low of three in 2020 [5]. Similarly, animal rabies cases have decreased significantly, from approximately 3000 cases in 1995 to 249 in 2010. However, a concerning resurgence occurred in 2018, with over 1000 cases [6].

Despite a nearly 100 % fatality rate in cases of symptom onset, rabies remains a preventable disease through vaccination of rabies reservoir animals, primarily dogs and cats. Even in high-risk exposure cases, people bitten by dogs must clean their wounds promptly and receive postexposure prophylaxis (PEP) following WHO recommendations [3]. However, a concerning proportion of dog bite victims do not seek PEP following exposure. PEP consists of thorough wound cleaning, a series of vaccine injections at regular intervals, and infiltration of the wound with rabies immunoglobulin in severe wounds [7]. Understanding the underlying causes of this noncompliance is critical for developing effective policies to enhance PEP coverage for dog bite victims. Using a social science approach enables a thorough examination of this undesirable behavior. Despite the availability of vaccines, rabies deaths continue to occur in many countries worldwide. Multiple factors, such as healthcare provider practices, patient compliance, wound severity, and cold chain integrity, can impact PEP effectiveness [8,9]. Nevertheless, high PEP coverage among people bitten by dogs remains critical to preventing dog-mediated rabies deaths.

Beyond demographics, empathy maps were introduced to analyze target groups [10]. Empathy maps provide deeper insights into individuals' environment, behavior, interests, and motivations, allowing them to create more compelling value propositions, reach the right audience, and understand their preferences.

Visual methods were critical in facilitating meaningful interactions with research participants [11]. Visual ethnography was defined as a data collection method that enhances the narrative aspect of a research study [11]. Drawing the participants' pictures elicited a strong positive response. The participants were overjoyed to see their faces represented in drawings and excited about the novel approach to data collection. Following the fieldwork for data collection, researchers gathered to share and analyze the data. The visual method was beneficial at this stage, allowing for easier recall of individual responses, actions, expressions, thoughts, and feelings.

The customer journey map depicts a customer's experience with a service or product over time. It emphasizes the customer's perspective, highlighting touchpoints (interactions), emotions, and challenges encountered along the way. The customer journey map consists of crucial elements: Customer segments identify user personas with distinct needs and experiences. Preexposure, postexposure, and vaccination are three phases that divide the journey into distinct stages. Touchpoints for mapping all interactions with the service include healthcare providers, community resources, and communication channels. Meanwhile, actions detail the customer's actions at each touchpoint. Thoughts and emotions are required to understand the customer's emotional state and cognitive processes throughout the journey. Lastly, pain points are used to identify obstacles and challenges, and opportunities identify potential areas of improvement and intervention [12].

The Business Model Canvas (BMC) is a popular tool for entrepreneurs, strategists, and innovators to create, visualize, and communicate their business models. The BMC, developed in their book "Business Model Generation," offers a concise visual and structured framework for understanding and outlining the nine critical components of a successful business [10]. The BMC framework helps develop and implement novel approaches to improve PEP rabies vaccination. By understanding diverse customer segments, crafting tailored value propositions, leveraging technology, and building strategic partnerships, BMC can guide the development of interventions that overcome existing barriers and contribute to a rabies-free future.

This study aimed to identify and characterize different personas of individuals based on their PEP-seeking behavior using the empathy map, visual method, customer journey map, and BMC to develop tailored communication strategies to promote PEP adoption among these various groups effectively.

2. Methods

2.1. Study location and participant interview

Two districts in Chonburi province, Bang Lamung, and Sattahip, were selected as study sites due to their history of recurrent rabies outbreaks in humans and dogs. Participants in this qualitative study were divided into three groups: (i) those with a history of dog bites who received PEP, (ii) those who were bitten by dogs but did not receive PEP, and (iii) those who had never been bitten. We aimed to recruit at least ten participants per group.

The interviews were conducted on a one-on-one basis to foster a more personal and in-depth exchange with each participant. While a guiding list of questions was prepared to ensure the discussion addressed the key areas of interest, our approach was intentionally conversational. This allowed us to build rapport with participants, encouraging open dialogue. Probing questions were employed throughout to delve deeper into topics as they naturally arose, ensuring comprehensive coverage of our question guide while allowing flexibility to explore emergent themes.

A pilot coding session was conducted to test the framework and refine the coding process before full-scale analysis. To enhance reliability, two coders were involved in the classification and coding process. Both coders independently reviewed and coded the interview transcripts using a pre-determined coding framework. Discrepancies in coding were discussed and resolved through consensus meetings.

2.2. Theme and content analysis

We used thematic and content analysis of qualitative data to understand participants' experiences and identify factors influencing the phenomenon under study. Both thematic analysis and content analysis are critical tools for qualitative researchers. Thematic analysis is particularly useful for revealing deep insights into participants' experiences and perspectives, whereas content analysis focuses on identifying data patterns and trends.

2.3. Empathy map and visual method

We employed an empathy map to better understand how people decide about PEP after dog bites. This tool enabled us to delve into participants' thoughts, feelings, and experiences (heard, seen, and done) regarding dog bites and PEP vaccination. We identified barriers (pain points) and facilitators (gain points) that influenced their decisions. We primarily conducted in-depth interviews to investigate the cognitive and emotional aspects of each group's reactions to dog bite incidents.

The visual method was used during interviews to gather participants' narratives on their thoughts, actions, and views concerning the rabies vaccine after dog bites. These visual representations enhanced our understanding of their experiences, revealing subtle details like emotional stress and decision-making processes. We analyzed the visual data in conjunction with interview transcripts, facilitating the triangulation of findings and the identification of patterns. This thorough analysis guided the classification of participants into various personas, as the visuals often illuminated the emotional or behavioral tensions influencing their response categorizations.

2.4. Customer journey map

We used the customer journey map to better understand and suggest ways to improve the rabies vaccination process. Customer journey maps, which identify customer segments, map their journeys, and pinpoint pain points and opportunities, can guide interventions to overcome barriers and improve service delivery. This study used an exhibition and categorization approach to summarize the synergistic use of an empathy map, visual method, and customer journey map (Table 1).

2.5. Business model canvas

BMC provided a structured approach for developing strategic interventions. Segmenting the target audience into distinct groups enabled BMC to develop tailored communication strategies that addressed each group's specific motivations and concerns. This approach ensured that the interventions were not generalized or uniform but were customized to align with each target segment's unique characteristics and needs. We used BMC to suggest ways to implement effective strategic plans to persuade people to get PEP after dog bites by identifying the following nine elements:

1) **Customer segments**: Who are the target beneficiaries of the vaccination solution?
2) **Value propositions**: What unique value does the solution offer to overcome existing barriers (e.g., cost, accessibility, fear)?
3) **Channels**: Through which channels does the solution reach and engage the target groups?
4) **Customer relationships**: How does the solution cultivate trust and adherence to vaccination schedules?
5) **Revenue streams**: How will the solution be financially sustained?
6) **Key resources**: What resources are necessary to deliver the value proposition (e.g., technology, partnerships)?
7) **Key activities**: What core activities are needed to operate the solution effectively?
8) **Key partnerships**: Who are the critical partners for implementing and scaling the solution?
9) **Cost structure**: What are the associated costs of providing the solution and maintaining PEP?

2.6. Persona classification

This approach aimed to distinguish between each individual's gain and pain points. We systematically delineated each trend, detailing their perceptions of hearing, seeing, saying, doing, thinking, and feeling and examining their gains and pain points. The sequence starts with a positive trend, then a neutral trend, and finally, a negative trend, all based on persona elements from empathizing design thinking [13]. Our justification was based on participants' responses during the interviews. Key criteria included their expressed attitudes toward PEP, their actions following dog bites, and their perspectives on the accessibility and necessity of PEP. For instance, a positive trend persona was identified when participants demonstrated proactive attitudes, promptly seeking PEP and advocating its importance to others. A neutral trend persona was pointed out when participants showed ambivalence, acknowledging the importance of PEP but not always acting promptly or consistently, and a negative trend persona was selected when participants expressed hesitation or skepticism about seeking PEP, citing factors such as mistrust, perceived low risk, or logistical barriers. These classifications emerged through iterative analysis of interview transcripts, allowing us to identify patterns of behavior and attitudes.

Table 1
Integrative approach of the methods used in this study.

Methods	Approach in the study
Empathy map	- Delve into the perspectives of the participants, capturing their thoughts, feelings, actions, and aspirations on receiving postexposure prophylaxis (PEP). - Empathize with the participants, fostering a deeper understanding of their motivations and challenges on this issue based on their context.
Customer journey map	- Map out the participants' experiences over time, from their initial encounter with the dog bite incidence to their resolution or conclusion. - Identify key touchpoints, emotions, and interactions, providing a holistic view of the participants' engagement with PEP.
Visual method	- Complement the empathy map and customer journey by adding a visual layer to participants' narratives relevant to the PEP acceptance. - Enrich an understanding of emotions and reactions.
Exhibition and categorization	- Combine insights from the empathy map, customer journey, and visual method in a cohesive data exhibition. - Group participants based on shared experiences to identify patterns, outliers, and key themes that emerge in data sets.

2.7. Data source triangulation and respondent feedback

Data source triangulation entails gathering information from multiple sources to improve the quality and dependability of the results. This technique increases the study's credibility and provides more accurate information [14]. We use respondent feedback on data source triangulation as an additional validation mechanism to confirm the accuracy of our interpretations. To accomplish this, we organized an online meeting with 50 people on September 5, 2023, and solicited feedback to assess the plausibility of our interpretations. Subsequently, on November 28, 2023, we presented our research findings to the public at an academic conference titled "Enhancing, creating, and expanding rabies-free area operation," organized by the Department of Disease Control, Ministry of Public Health. This conference was attended by local government organizations, both onsite and online, who actively implemented the research results to benefit the public. This dissemination bridges the gap between research and practical application, encouraging collaboration with stakeholders who are dedicated to applying research results in real-world contexts.

The Mahidol University Central Institutional Review Board (MU-CIRB 2023/075.2402) approved this study for human research ethics.

3. Results

3.1. Demographic distribution

A total of 38 participants were interviewed: 22 from Bang Lamung and 16 from Sattahip. The participants included 18 men and 20 women. The participants' ages ranged from 20 to 78 years, with a median of 55 years (interquartile range: 39.25 to 63.75 years). Eleven participants had a history of dog bites but did not receive PEP; 12 were bitten and received PEP; and 15 had never been bitten by dogs. Based on the persona classification, 15 were classified as positive, 11 as neutral, and 12 as negative (Fig. 1).

3.2. Persona identification

After collecting data from three groups of participants—those who were bitten and went to see a doctor, those who were bitten but did not see a doctor, and those who were never bitten by dogs, we classified the participants into three distinct trends: positive, neutral, and negative.

3.2.1. Positive trend

Individuals with the positive trend strongly advocate for receiving rabies vaccines in the event of a dog bite. This group typically acquires information through personal experience, communication with others, or formal education, emphasizing the importance of seeking medical

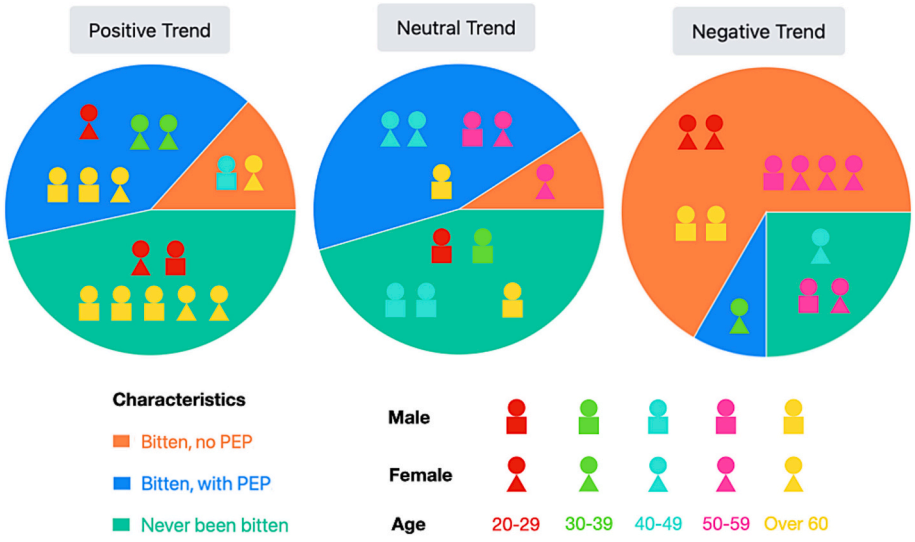

Fig. 1. Personas and characteristics of the participants involved in this study.

attention immediately following a dog bite. They show a greater awareness of the symptoms of rabies after witnessing the distressing effect on people bitten by rabid dogs.

Members of this trend actively disseminate information, encouraging others to seek medical attention immediately if bitten by a dog. When personally bitten, they follow this advice and seek vaccination immediately. In addition, they take a proactive approach to pet health by ensuring that their animals receive the rabies vaccine annually. The predominant emotion in this group is fear, which stems from genuine concern about the potential consequences of rabies.

Their cognitive perspective is based on the assumption that visiting a hospital for rabies prevention is not difficult. They emphasize the importance of seeking medical attention even when their pets bite them (Fig. 2). The prevailing attitude is one of responsibility for both personal prevention and the protection of others from rabies exposure.

Individuals in the positive trend see an advantage in this matter as having an in-home vaccination service, where healthcare staff give rabies vaccinations at home. This convenience allows them to easily access and administer the rabies vaccine, thereby contributing to the timely and efficient prevention of rabies transmission.

On the contrary, this group's pain point occurs when they seek medical attention in a hospital. The main issue is prolonged queueing times, which result in a significant time investment. The inconvenience of prolonged waiting periods becomes a notable drawback in their efforts to address potential rabies exposure promptly.

The participants' statements provide evidence to support this positive trend:

One participant said, "*Even in the case of my own dog attacking me, I would promptly consult a doctor and seek the necessary rabies vaccine.*"

Another participant said: "*Since childhood, I have been aware that if bitten by dogs, it is imperative to pursue a rabies vaccine.*"

Yet another participant highlighted that "*The crux of the issue lies with those who feed stray dogs, believing that they are contributing generously to the world, unaware of the innocence that underlies the root of the problem.*"

3.2.2. Neutral trend

Individuals who fall into the neutral trend are more likely to consider vaccination after a dog bite, especially if the injury is perceived to be substantial (Fig. 3). Their awareness of rabies prevention varies according to the perceived severity of the wound, with a tendency to be indifferent when the injuries are minor.

Fig. 2. A participant with a positive trend and his quote. Illustrated by Patoo Cusripituck using a visual method.

Fig. 3. A participant with a neutral trend and his quotes. Illustrated by Patoo Cusripituck using a visual method.

Their knowledge stems from hearing advice to seek medical attention and vaccinations following a dog bite. They have observed instances of people being bitten by rabid dogs, but they have not witnessed fatalities as a result of rabies complications. Members of this trend frequently justify not seeking medical attention by claiming that their own dogs are immunized, or they dismiss minor scratches as inconsequential.

Their approach is distinguished by a selective decision to consult a doctor only for more serious wounds, indicating a sense of safety in less severe cases. Financial constraints are not a significant barrier for this group, but they may choose not to get vaccinated despite having the means. Misconceptions, a degree of carelessness, and a false belief in the perceived safety of certain situations can all describe this behavior.

This trend emphasizes the neutral stance of people who do not seek vaccination unless their injury is serious. The following quote captures this sentiment:

"I suffered a severe bite, and the pain was overwhelming,
prompting me to seek immediate medical attention at the hospital."

3.2.3. *Negative trend*

Individuals who follow the negative trend exhibit a high level of carelessness regarding rabies prevention. Their attitude reflects a lack of concern for the potential severity of the problem. Their perception of rabies as a life-threatening disease leads them to believe that herbal remedies, cutting a dog's ear, or striking the wound with shoes are effective alternatives. This group tends to dismiss minor dog bites as insignificant, particularly if there is no blood, deeming them inconsequential and overlooking the potential risks.

Their behavior is consistent: they do not seek medical attention for minor wounds without bleeding, assuming their vaccinated dog will keep them safe (Fig. 4). One notable aspect of this trend is the preservation of relationships, in which people may choose not to see a doctor after being bitten by a friend's dog to avoid straining their friendship.

Despite having the financial resources to address the issue, people with negative trends take a careless approach to vaccination and have a limited understanding of rabies prevention. This behavior is marked by misconceptions, carelessness, and misplaced trust in various alternative methods. Table 2 summarizes the personas associated with the three trends described earlier.

The depictions (Figs. 2–4) show a sense of joy as they observe their own faces within the drawings. These visual representations are critical in capturing key quotes spoken by participants. Combining words and facial expressions in these drawings enhances our ability to recognize and understand information gathered during fieldwork.

Fig. 4. A participant with a negative trend and her quotes. Illustrated by Patoo Cusripituck using a visual method.

Table 2
Personas and trends from participants' experience.

Persona/ trend	Positive trend	Neutral trend	Negative trend
Hear	- A deadly disease. - Need medical attention. - After being bitten, first aid is needed before seeing a doctor.	- After being bitten, we should see a doctor or get vaccinated.	- A deadly disease. - Using herbs. - Believe that cutting the dog's ear is helpful. - The belief is that using shoes to hit the wound is helpful.
See	- Rabid dogs. - People who got bitten by rabid dogs. - The symptoms are terrifying.	- Never seen an individual die from complications from rabies. - People who got bitten by rabid dogs.	- Little scratches, no blood. - Ignorance.
Say	- When we are bitten by dogs, we have to rush to see a doctor no matter what!	- My dog was vaccinated! - Just a scratch! - I will not get vaccinated if my dog bites me.	- My dog was vaccinated! - Just a scratch! - I will get vaccinated only if I am bitten by a stray dog.
Do	- Get a vaccination after being bitten (even by our dog and if the wound is not severe) - Go to the hospital after first aid - Get a rabies vaccination for pets every year	- First aid if the wound is severe, then go to see a doctor. - Forget about getting complete doses of vaccines.	- Not going to be vaccinated. - Forget about getting complete doses of vaccines. - Not going to see the doctor immediately, but after having severe symptoms.
Think	- Going to the hospital is not difficult. - The rabid dog is frightening. - I have to get a vaccination, even if I got bitten by our own dog.	- Incorrect first aid methods.	- No problem / it's ok - "My dog" - Friendship comes first - If a vaccinated dog bites me, I may not need to receive vaccination
	Responsibility for prevention and protection	*Misconception Careless misplaced trust*	*Misconception Careless misplaced trust*
Feel	Fear!	Safe!	Safe!
Pain	- Long queue to see the doctor. - Lack of knowledge about rabies.	- Do not get vaccinated. - Problems with stray dogs and community dogs. - Financial difficulty.	- Ignorance of vaccination. - Lack of knowledge on rabies prevention. - It is not convenient to get vaccinated. - Financial difficulty.
Gain	- It is better to have an in-home vaccination service. - The village health volunteer is the best communication mediator.	- Good knowledge of rabies. - The village health volunteer informs people who have been bitten by a rabid dog to get vaccinated.	- If a village health volunteer comes to notify me that I need to be vaccinated, I will go.

3.3. Communication channel preference

Nearly half (44.74 %; 17/38) of the study participants used interpersonal communication channels, followed by digital platforms (42.11 %; 16/38) and traditional communication (10.52 %; 5/38). Surprisingly, more than half (56.25 %; 9/16) of those who preferred digital communication platforms were under 40, indicating a generational divide in communication preferences. In contrast, most older participants (over 60) communicated exclusively through interpersonal channels (61.54 %; 8/13). Regarding gender-based communication preferences, male participants showed a slight preference for interpersonal communication channels (44.44 %; 8/18) over digital communication channels (38.89 %; 7/18), whereas female participants showed an equal preference for both interpersonal and digital communication channels (45 %; 9/20) (Fig. 5).

However, the effect of outreach depends on how well each segment's communication modalities are tailored (Table 3). A detailed analysis of the Business Model Canvas that guided our suggestions on the communication strategies is attached in Appendix A.

Our results were validated and deliberated in several meetings with various stakeholders to confirm the reliability of our findings as part of our triangulation process.

Table 3
Suggested communication modalities for each persona.

Persona	Characteristics	Communication Modalities
Positive trend	- Already open to vaccination. - Potential advocates for vaccination.	- *Social Media Campaigns*: Encourage sharing positive experiences. - *Online Forums and Groups*: Participate in health-related discussions. - *Community Events*: Organize events to share experiences.
Neutral trend	- Probably to be vaccinated in response to specific incidents, such as high-magnitude wounds. - Need reminders and education on the proactive benefits of vaccination.	- *SMS and Mobile Alerts*: Send timely reminders about proactive vaccination. - *Local Clinic Partnerships*: Collaborate on in-clinic information. - *Emergency Response Training*: Provide training in preventive measures. - *Community Workshops*: Conduct sessions to dispel myths and provide information.
Negative trend	- Currently, overlook the importance of vaccination. - Need awareness, myth-busting, and addressing concerns.	- *Local Influencer Partnerships*: Collaborate with influencers for targeted content. - *Door-to-Door Campaigns*: Engage directly to provide information and address concerns.

4. Discussion

This study employed a qualitative approach to investigate complex behaviors and perceptions, generating rich, context-specific data for effective public health communication and rabies prevention strategies. Qualitative healthcare research provides profound insights from detailed narratives, often surpassing extensive quantitative studies [15–17]. In-depth interviews with 38 participants uncovered intricate narratives, revealing factors influencing rabies-related behaviors. A persona-based framework analyzed the data, categorizing participants into distinct groups, highlighting diverse perspectives, and guiding the development of tailored communication strategies for each group's unique needs [10]. This approach is essential in rabies-endemic regions, ensuring that public health messaging is culturally and socially relevant. Additionally, the qualitative approach yielded significant epidemiological insights, enhancing the understanding of rabies prevention behaviors in specific communities. These findings support evidence-based public health policies and interventions, improving rabies control programs [18].

In our persona classification, nearly half of the participants had a positive persona, with the rest split evenly between neutral and negative personas. Interestingly, the distribution of personas and characteristics associated with dog bites and PEP receipt varied slightly across age and sex groups. In contrast, a recent Thai study found that men, younger people, and those with higher education had less supportive attitudes toward canine rabies control measures [19]. The relationship between personas and attitudes toward rabies prevention and control in humans and animals must be addressed in future studies. It is critical to investigate how intersectionality influences individual perceptions and behaviors toward rabies control. This framework recognizes how race, gender, and socioeconomic status intersect, shaping attitudes and actions [20]. The problem of intersecting identities, marginalization, and disparities has been addressed in other health issues [21], for example, COVID-19 [22], HIV [23], and Alzheimer's Disease [24]. For rabies, limited access to healthcare and education in marginalized communities may lead to distrust toward medical interventions, impeding rabies control efforts.

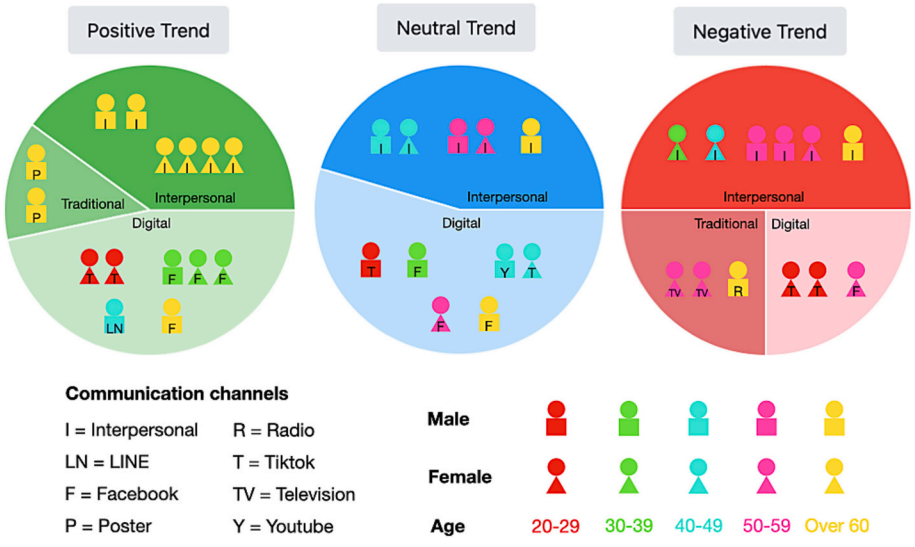

Fig. 5. Communication channels preferred by participants in different personas, ages, and sex groups.

It should be noted that approximately half of the participants who had never been bitten presented a positive attitude. This finding is consistent with a previous Ugandan study [25], in which 70 % of non-bitten respondents indicated they would seek medical attention if bitten. Interestingly, their study also found that nonbitten people with more rabies knowledge were likelier to visit hospitals. These findings suggest public education campaigns could significantly improve behaviors and prevent deaths. Relevant authorities should consistently target such educational efforts to enhance rabies awareness among the public.

Conversely, over 70 % of participants who were bitten but did not receive PEP had a negative persona. These findings suggest that previous experiences may impact individual personas and subsequent behavior. Individuals who have been bitten without receiving PEP and have subsequently survived rabies infection may consider PEP unnecessary and less likely to require it if bitten again. Meanwhile, people who have never had a dog bite may be more aware of their own safety. They may have developed a protective mindset that prompts them to seek PEP following a dog bite. A study in India suggests that dog bite victims' preexisting beliefs and experiences, rather than objective bite circumstances, significantly influence their perceived risk, preventive behavior, and post-bite reactions [26], which supports our finding. Misconceptions can lead to the underestimation of disease risks, a lack of awareness, and hesitancy toward preventive or treatment interventions, as observed in infectious diseases like COVID-19 [27–29], tuberculosis [30], and malaria [31]. Numerous misconceptions about rabies have been documented in other cultures and beliefs worldwide. A study in Bali, for example, showed that some villages incorrectly believed that chickens, mosquitoes, or flies could transmit rabies [32]. Moreover, local beliefs influence people's attitudes and behaviors toward rabies control; for example, low-caste communities in western India worship a Hindu goddess, which results in less use of appropriate healthcare services [33]. Some residents in a Peruvian peri-urban community reported using charred dog fur and herbs as a traditional remedy for dog bite wounds [34]. The use of holy water, symbolic cleansing with blooms, and the ceremonial removal of a portion of the biting dog's ear were just a few of the traditional beliefs and practices covered by our study. Although these practices have cultural significance for some, they may impede the search for optimal medical care, which is critical for preventing rabies and other infections. To address this, we propose promoting critical thinking and informed decision-making throughout the community. This may entail collaborating with traditional healers to incorporate evidence-based medical advice into existing practices and to foster trust in contemporary healthcare systems. By working together, we can ensure that dog bite victims receive culturally appropriate support and medical care.

Our findings revealed that interpersonal and digital communication channels effectively reached participants with neutral and positive personas. Traditional forms of communication, such as posters, television, and radio, were less effective. Notably, interpersonal communication is the most effective channel for engaging people with negative personas. Health workers like village health volunteers are critical in educating community members about rabies [35,36]. In addition, age-related preferences for communication channels emerged. Participants under 40 preferred digital platforms, whereas older participants used a broader range of channels, including interpersonal and traditional media. We observed that TikTok was primarily used by younger participants (under 30). In comparison, older participants used a wider range of social media platforms, such as Facebook, Line, TikTok, and YouTube. However, a previous study suggested that senior citizens preferred direct communication. In contrast, younger adults relied heavily on smartphone technology [37], emphasizing the importance of tailoring communication strategies to different age groups' preferences and needs. People with negative personas should prioritize interpersonal communication, whereas younger generations should continue to use digital platforms. A multifaceted approach that uses both traditional and modern communication methods may be more effective in reaching a diverse audience. Appropriate communication channels tailored to the audience improve effective health promotion and comprehension across diverse populations [38]. Additionally, a previous study in a Latino community in the United States suggested that age and level of health literacy were important predictors of communication preference [39]. Intersectional influence on an individual's communication preference should be considered to tailor the message-conveying methods effectively.

The policy recommendation for rabies vaccination is based on fieldwork data analysis and seeks to educate, persuade, and emotionally engage people in getting rabies vaccines. A comprehensive communication campaign involving social and visual networks and community participation is required to promote vaccination. The goal is to reduce vaccine reluctance and promote informed health decisions through appealing messaging, educational tools, and emotional storytelling.

The concept of One Health emphasizes the interdependence of human, animal, and environmental health. Rabies, a zoonotic disease spread from animals to humans, emphasizes the importance of a collaborative One Health strategy involving human health professionals, veterinarians, environmental scientists, and other stakeholders [40]. The One Health approach is essential for effectively reducing rabies transmission and enhancing overall public health outcomes. It necessitates integrating surveillance systems that monitor human and animal rabies cases alongside robust data-sharing mechanisms among healthcare providers, veterinarians, and environmental health experts. Cross-sector collaboration is critical; it ensures that veterinary services, public health authorities, and community members work synergistically to tackle rabies at its source. For instance, elevating vaccination rates for animals and humans is crucial, as is cultivating community trust and engagement.

Additionally, incorporating socio-behavioral research, like our study, allows for identifying specific individual personas, which is instrumental in optimizing educational outreach and behavior modification efforts. Such strategies foster trust and active participation, aligning communication methods with the various values and beliefs of different community groups. By tailoring communication strategies based on identified personas, the One Health approach becomes more effective in promoting timely vaccinations and proactive health behaviors. Educating the public on the importance of rabies vaccinations following dog bites while confronting and correcting misinformation and addressing cultural misconceptions is vital. This strategy collectively works toward decreasing rabies transmission and improving public health.

Furthermore, community engagement is paramount, where local stakeholders, including leaders, educational institutions, and influencers, assist in disseminating accurate health information and advocating for preventive health practices. Ensuring access to vaccines and treatments and implementing mass canine vaccination programs hinder rabies transmission. Strengthening veterinary infrastructure, closely monitoring rabies in animal populations, and controlling stray dog communities are also integral components of this strategy. Moreover, fostering collaborative research on vaccine efficacy and exploring innovative therapeutic options will further enhance ongoing efforts against rabies.

The proposed communication strategy for the three segments is specific to the three personas addressed earlier. Positive reinforcement is essential for willing participants (rabies champions) whose dedication to community health sets an inspiring example. Community advocacy is critical, as their vaccination experience has great narrative potential. Incentives are essential, as acknowledging their proactive approach to immunization deserves recognition. Social media campaigns, online forums and groups, community events, SMS and mobile alerts, local clinic partnerships, emergency response training, and community workshops are all effective ways to engage them.

Individuals with positive and neutral trends (reactive participants; incident-influenced) should be targeted through public awareness

campaigns, timely reminders, local stories, and tailored communication. They should be reminded to prioritize their welfare and administer vaccines on time. Local stories can have a tangible impact, such as introducing a local hero who faced the dangers of rabies, allowing people to make informed decisions. In contrast, those who exhibit a negative trend (misconception) should be addressed through myth-busting campaigns, personalized communication, and community involvement. These segments should participate in community forums or Q&A sessions to discuss the importance of rabies vaccines and engage with local health advocates and influencers. Targeted efforts should be made to dispel myths, address concerns, and raise public awareness about the importance of vaccination. Community centers can host workshops to dispel myths, answer questions, and provide accurate information about rabies vaccination. Local influencer partnerships can be formed to generate content that addresses common concerns and emphasizes the importance of immunization.

Trained personnel can conduct door-to-door campaigns to interact with people, provide information, and personally address their concerns. A recent study on rabies communication strategies in Thailand also emphasized that interpersonal communication with credible personnel like village health volunteers can effectively convey rabies prevention and control messages [41]. Regular monitoring, feedback, and adaptability are required for the success of these communication modes. Furthermore, using a variety of modalities within each segment can improve the overall impact of the communication strategy.

We acknowledge that our study has several limitations. First, our study provides local information on a province that has experienced multiple rabies outbreaks. Future research should explore various belief systems, traditions, and practices and expand geographically. This increased epidemiological understanding will guide targeted interventions and promote disease prevention across cultures. Second, our persona analysis revealed distinct personas among the study population. Nonetheless, time constraints limited our ability to explore the underlying causes of these differences. Further research with comprehensive data collection is required to better understand the epidemiology underlying these personas, including their lived experiences and associated health burdens. Finally, the researcher's personal experiences and theoretical frameworks can influence data interpretation in qualitative research. However, this study facilitated a multidisciplinary working group discussion during data validation, using reviews and open debate, which could potentially reduce confirmation bias in data interpretation.

5. Conclusion

Lastly, we suggest implementing a communication campaign to increase awareness of the importance of vaccines and provide detailed information on where to obtain them.

"*Bite or scratch? Don't delay, vaccinate!*"

"*Save Life, Act Fast! Get Your Rabies Vaccine Now*".

"*Every Dose for Everyone*".

This study identified three personas—negative trend, neutral trend, and positive trend—based on participants' experiences with dog bites and their perspectives on PEP. These findings underscore the need for a tailored communication campaign to encourage timely action in obtaining PEP, addressing the distinct motivations and barriers associated with each persona.

The proposed campaign messages are designed to resonate with these personas:

"*Bite or scratch? Don't delay, vaccinate!*" appeals to individuals in the negative trend persona by stressing the urgency of immediate action despite hesitations.

"*Save Life, Act Fast! Get Your Rabies Vaccine Now*" aligns with the neutral trend persona, emphasizing the life-saving importance of PEP to encourage proactive behavior.

"*Every Dose for Everyone*" supports the positive trend persona by reinforcing accessibility and the importance of equitable vaccine distribution for all at risk.

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Declaration of generative AI in scientific writing

During the preparation of this work, the authors used Gemini and ChatGPT to enhance the readability and clarity of this manuscript. The AI assistance was limited to language editing and did not contribute to the research design, data analysis, interpretation, or authorship of the content. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the content of the publication.

CRediT authorship contribution statement

Jitjayang Yamabhai: Writing – review & editing, Writing – original draft, Validation, Supervision, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Patoo Cusripituck:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Teerawan Mingbualuang:** Writing – review & editing, Writing – original draft, Validation, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization, Visualization. **Nareerat Sangkachai:** Writing – review & editing, Writing – original draft, Validation, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Wimwiga Sakchainanon:** Writing – review & editing, Supervision, Project administration, Investigation, Funding acquisition, Data curation. **Chanatda Tungwongjulaniam:** Writing – review & editing, Validation, Supervision, Project administration, Investigation, Funding acquisition, Conceptualization. **Onphirul Yurachai:** Writing – review & editing, Validation, Supervision, Project administration, Investigation, Funding acquisition. **Ratana Theerawat:** Validation, Supervision, Project administration, Investigation, Funding acquisition, Writing – review & editing. **Anuwat Wiratsudakul:** Writing – review & editing, Writing – original draft, Validation, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.onehlt.2025.100980.

Data availability

The data supporting this study's findings are available from the corresponding author upon reasonable request.

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