Bridging the Knowledge–Behavior Gap: A Health Communication Study of Liver Fluke Prevention in Thailand[1]

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Abstract

Liver fluke infection (*Opisthorchis viverrini*) and cholangiocarcinoma continue to represent serious public health concerns in Thailand, particularly in the Northeastern region where the consumption of raw and undercooked freshwater fish remains deeply embedded in local food culture. Despite decades of public health interventions and awareness campaigns, risky consumption behaviors persist across generations. This study examines the effectiveness of the ISAN ZERO OV health communication campaign and explores the persistent gap between health awareness and actual preventive behavior among young people in Thailand.

Using a mixed-methods approach, the study combines quantitative survey data from 616 participants with qualitative insights obtained through participatory workshops and group discussions. Quantitative findings reveal moderate levels of knowledge regarding liver fluke infection and cholangiocarcinoma (M = 7.43/10), alongside moderate attitudes toward safer food practices (M = 3.03/5). However, risky food consumption behaviors remain common, with nearly half of respondents continuing to consume raw or partially cooked food occasionally. The findings demonstrate that awareness of health risks does not necessarily translate into sustained behavioral change.

Qualitative findings further indicate that risky food practices are shaped by cultural familiarity, emotional attachment to traditional food, family environments, and socially normalized routines. Although the ISAN ZERO OV campaign was perceived positively, particularly in generating emotional engagement and concern for family health, emotional awareness alone was insufficient to disrupt culturally embedded behavior.

This study contributes to health communication scholarship by demonstrating the limitations of awareness-based interventions in culturally normalized behavioral contexts. The findings suggest that effective liver fluke prevention requires culturally grounded and norm-shifting communication strategies that address the symbolic, social, and emotional dimensions of food practices rather than relying solely on biomedical information transmission.

Keywords: Health Communication; Liver Fluke Infection; Cholangiocarcinoma; Social Norms; Behavioral Change

Liver fluke infection caused by *Opisthorchis viverrini* remains one of the most persistent public health problems in Thailand, particularly in the Northeastern region where the consumption of raw and undercooked freshwater fish is culturally normalized (Sripa et al., 2007). Chronic infection has long been associated with cholangiocarcinoma (CCA), a highly fatal bile duct cancer that continues to affect communities throughout the Mekong subregion. Despite decades of public health campaigns, educational interventions, screening programs, and community-based control initiatives implemented through the Ministry of Public Health, risky food consumption behaviors remain difficult to reduce in endemic areas (Jongsuksuntigul, 2003). This persistence suggests that liver fluke prevention is not solely a medical challenge but also a communication and behavioral issue shaped by social and cultural factors.

Traditional dishes such as *koi pla*, *pla som*, and fermented freshwater fish products are not merely dietary choices but are deeply connected to local identity, social interaction, family

gatherings, and everyday cultural practice (Kaewpitoon et al., 2007). As a result, liver fluke prevention represents not only a biomedical challenge but also a socio-cultural communication issue. Individuals may recognize the dangers associated with raw fish consumption while continuing the practice due to habit, emotional attachment, peer familiarity, and cultural belonging.

Previous control efforts in Thailand have demonstrated that providing information and treatment alone is insufficient to eliminate infection when risky food practices remain socially normalized within communities (Jongsuksuntigul, 2003; Sripa et al., 2015). Consequently, understanding how health communication interacts with local culture has become increasingly important for sustainable disease prevention.

Health communication scholars have increasingly argued that awareness alone rarely guarantees behavioral transformation (Glanz et al., 2015; Schiavo, 2014). Research across multiple health contexts— including smoking, alcohol consumption, dietary behavior, and vaccine hesitancy— demonstrates that health decisions are influenced by social norms, emotional attachment, and collective identity in addition to cognitive awareness (Fishbein & Ajzen, 2010). In culturally embedded contexts, risky practices may persist even when individuals possess adequate knowledge regarding health consequences.

In Thailand, several communication campaigns have attempted to address liver fluke infection through schools, hospitals, public service media, and community-based health activities. More recently, the ISAN ZERO OV campaign emerged as a large-scale communication initiative designed to reduce liver fluke infection and cholangiocarcinoma among younger generations. Unlike earlier campaigns that focused primarily on medical information dissemination, ISAN

ZERO OV combines emotional storytelling, online communication, educational engagement, and family-centered messaging to encourage safer food practices.

This study investigates the effectiveness of the ISAN ZERO OV campaign among young people in Thailand. Specifically, the study examines levels of knowledge, attitudes, and risk behaviors related to raw food consumption while exploring the socio-cultural factors shaping the persistent gap between awareness and behavioral practice.

The study contributes to health communication scholarships in three important ways. First, it provides empirical evidence regarding the limitations of awareness-based health communication in culturally embedded behavioral contexts. Second, it highlights the role of social norms, emotional attachment, and cultural identity in shaping food-related health behavior among younger generations. Third, the study proposes the importance of culturally grounded and norm-shifting communication strategies capable of negotiating cultural meaning rather than relying solely on biomedical risk messaging.

Conceptual Framework

This study integrates concepts from the Knowledge–Attitude–Practice (KAP) model, the Health Belief Model (HBM), and broader health behavior theories to explain the relationship between media exposure, health beliefs, social norms, and preventive behavior regarding liver fluke infection.

The framework proposes that exposure to health communication media contributes to increased knowledge regarding liver fluke infection and cholangiocarcinoma. Knowledge

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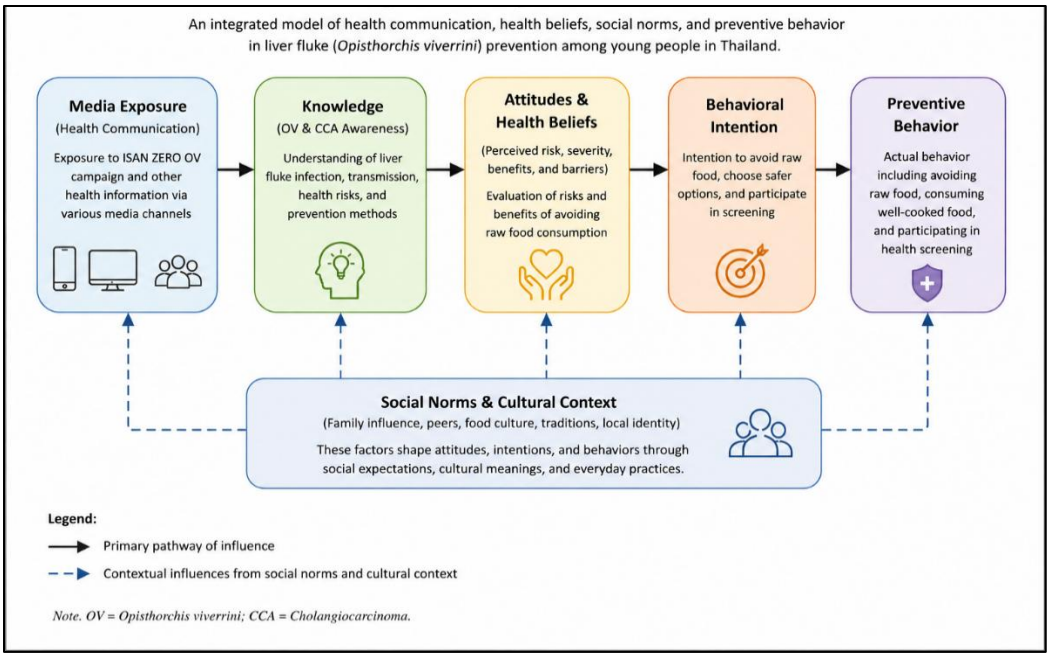
subsequently influences attitudes and health beliefs, including perceived susceptibility, severity, benefits, and barriers associated with preventive behavior.

However, the study argues that behavioral intention is shaped not only by individual cognition but also by broader socio-cultural influences. In endemic communities, food practices are embedded within family relationships, peer interaction, cultural familiarity, and collective identity. Consequently, social norms and cultural context may either support or constrain behavioral transformation even when individuals possess adequate awareness.

The framework further suggests that behavioral intention influences actual preventive behavior, including the avoidance of raw fish consumption and participation in health screening practices. The conceptual relationship can be summarized as shown in Figure 1.

Figure 1

Conceptual Framework



Research Objectives

1. To examine levels of knowledge regarding liver fluke infection and cholangiocarcinoma among young people in Thailand.

2. To investigate attitudes toward raw food consumption and safer eating practices.

3. To analyze risk behaviors associated with liver fluke infection.

4. To evaluate perceptions regarding the effectiveness of the ISAN ZERO OV campaign.

5. To explore the knowledge– behavior gap in liver fluke prevention from a health communication perspective.

Based on the research objectives and conceptual framework, this study addresses the following research questions:

RQ1: What levels of knowledge regarding liver fluke infection and cholangiocarcinoma are demonstrated among young people in Thailand?

RQ2: How do young people perceive raw food consumption, safer eating practices, and liver fluke prevention?

RQ3: What risk behaviors associated with liver fluke infection remain among campaign participants?

RQ4: How do participants perceive the effectiveness of the ISAN ZERO OV campaign?

RQ5: How can the knowledge–behavior gap in liver fluke prevention be explained from a health communication perspective?

Literature Review

Liver Fluke Infection and Cholangiocarcinoma in Thailand

Liver fluke infection caused by *Opisthorchis viverrini* has long been recognized as a major public health concern in Northeast Thailand (Sripa et al., 2007). The parasite is commonly transmitted through the consumption of raw or undercooked freshwater fish, particularly traditional dishes such as *koi pla* and fermented fish products (Kaewpitoon et al., 2007). Persistent infection contributes to chronic inflammation of the bile ducts and significantly increases the risk of cholangiocarcinoma, one of the deadliest cancers in Thailand and the Mekong region (Brindley et al., 2021). The disease remains a major public health concern because of its high mortality rate and its close association with long-term liver fluke infection.

Although medical prevention knowledge has been disseminated widely through public health campaigns, risky food practices continue to persist in many endemic communities. Previous studies suggest that the persistence of liver fluke infection cannot be explained solely through lack of awareness but must also be understood through cultural practice, social routine, and local identity (Jongsuksuntigul, 2003; Sripa et al., 2015). Research from Thailand consistently demonstrates that risky food consumption often continues despite long-term health education efforts, highlighting the limitations of information-based interventions.

Health Communication and Behavioral Change

Health communication research has consistently demonstrated that awareness alone is insufficient to generate sustained behavioral change (Schiavo, 2014). Early public health campaigns frequently assumed that individuals would make rational decisions once informed

about health risks. However, later scholarship emphasized that health behavior is shaped by psychological, social, cultural, and environmental factors beyond individual cognition.

The Knowledge–Attitude–Practice (KAP) framework remains one of the most widely applied models in health communication research (Launiala, 2009). The framework proposes that knowledge contributes to attitude formation, which may subsequently influence behavioral practice. Nevertheless, researchers increasingly acknowledge that the relationship between awareness and behavior is neither linear nor guaranteed.

Similarly, the Health Belief Model (HBM) explains preventive behavior through perceived susceptibility, severity, benefits, and barriers (Rosenstock, 1974; Champion & Skinner, 2008). Individuals are more likely to adopt preventive practices when they believe they are personally vulnerable and perceive meaningful benefits from behavioral change. However, culturally normalized practices may persist even when individuals recognize health risks.

In endemic contexts such as Northeast Thailand, raw food consumption often functions as part of social routine and cultural familiarity rather than purely individual dietary preference. Consequently, rational awareness may coexist with continued risky behavior.

Social Norms, Cultural Identity, and Food Practices

Social norms play an important role in shaping food-related behavior (Rimal & Lapinski, 2015). Individuals frequently adjust their practices according to family expectations, peer interaction, and community traditions. In many Northeastern Thai communities, raw food consumption remains normalized within family meals, celebrations, and social gatherings.

Food practices also carry symbolic meaning connected to local identity and belonging (Tufte, 2017. Traditional dishes may represent familiarity, emotional comfort, and intergenerational continuity. Younger generations may therefore experience tension between modern health awareness and cultural expectations associated with local food practices.

Recent health communication scholarship increasingly emphasizes the importance of culturally sensitive communication strategies capable of negotiating cultural meaning rather than simply transmitting biomedical information (Kreps, 2003; Schiavo, 2014). Instead of positioning local culture as a problem to eliminate, effective campaigns may need to encourage safer adaptation of traditional practices while respecting cultural identity.

The Knowledge–Behavior Gap

The knowledge–behavior gap refers to situations in which individuals possess awareness regarding health risks but continue engaging in risky behavior (Launiala, 2009). Previous studies involving smoking, alcohol consumption, dietary behavior, and sexual health consistently demonstrate that awareness alone rarely guarantees behavioral transformation (Fishbein & Ajzen, 2010; Glanz et al., 2015).

In the context of liver fluke prevention, the knowledge–behavior gap may emerge because raw food consumption is embedded within emotional attachment, taste preference, family tradition, and collective identity. As a result, communication campaigns relying solely on fear appeals or biomedical information may increase temporary awareness without necessarily transforming long-term practice (Gallagher & Updegraff, 2012).

Taken together, previous scholarship suggests that liver fluke prevention cannot be understood solely through biomedical knowledge transmission. Preventive behavior emerges through the interaction between health beliefs, social norms, emotional attachment, and culturally normalized food practices. This study therefore positions liver fluke prevention as both a public health issue and a socio-cultural communication challenge.

Research Gap

Although previous studies have examined liver fluke infection in Thailand from biomedical, epidemiological, and public health perspectives, fewer studies have examined how younger generations negotiate health awareness within culturally embedded food practices. Existing research has also tended to emphasize knowledge dissemination and disease control rather than the communicative and socio-cultural processes that shape everyday behavioral decisions. This study addresses this gap by integrating health communication theories with social norms and cultural context to explain why risky food consumption may persist despite increasing awareness among young people.

Methodology

Research Design

This study employed a mixed-methods approach combining quantitative and qualitative data collection. The quantitative component consisted of a cross-sectional survey examining knowledge, attitudes, risk behaviors, and perceptions regarding the ISAN ZERO OV campaign. The qualitative component included participatory workshops and group discussions designed to explore emotional responses, cultural perceptions, and social influences associated with raw food consumption.

The mixed-methods design was selected to provide both statistical understanding and contextual interpretation of health behavior. While survey findings identified broader behavioral patterns among respondents, qualitative data provided deeper insight into the socio-cultural meanings underlying risky food practices.

Participants

The quantitative survey involved 616 participants consisting primarily of secondary school students, vocational students, and university students. Most participants resided in Northeast Thailand, particularly Maha Sarakham Province.

Among respondents, 41.4% were secondary school and vocational students, while 36.4% were university students. More than half of participants lived with their parents, indicating that family environments may significantly influence food practices and health behavior.

The focus on younger generations aligned with the campaign's objective of promoting long-term behavioral change before risky consumption practices become deeply habitual.

Participants were recruited through campaign-related activities, educational events, and online communication channels associated with the ISAN ZERO OV project. A voluntary convenience sampling strategy was employed due to the exploratory and campaign-based nature of the study. This approach enabled the research team to access young participants who had varying levels of exposure to campaign activities. However, because participation was voluntary and data collection was conducted under operational field conditions, the sample should not be interpreted as fully representative of all target groups across provinces or age categories.

Research Instruments

The questionnaire consisted of five sections:

1. Demographic information

2. Knowledge regarding liver fluke infection and cholangiocarcinoma

3. Attitudes toward raw and cooked food consumption

4. Risk behaviors associated with raw food practices

5. Perceived effectiveness of the ISAN ZERO OV campaign

Knowledge was measured using ten multiple-choice items. Attitude items employed a five-point Likert scale examining perceptions related to health awareness, social influence, cultural beliefs, and family responsibility.

Risk behavior was assessed through frequency of raw or undercooked food consumption and related practices. Campaign effectiveness was evaluated among participants exposed to campaign media.

Data Collection

Data were collected through both online and onsite survey distribution during campaign-related educational activities. Participatory workshops and group discussions were conducted to gather qualitative reflections concerning food culture, emotional responses, and barriers to behavioral change.

The data reported in this study represents a subset of participants who were reached through campaign activities and data collection processes during the first phase of the ISAN ZERO OV project. Because data collection was conducted under operational conditions and participation was

voluntary, the sample does not fully represent all target groups across provinces and age categories. Therefore, the findings should be interpreted as an exploratory assessment of campaign outcomes and behavioral patterns rather than a comprehensive evaluation of the entire project population.

The questionnaire was reviewed by experts in health communication and public health to ensure content validity before data collection.

Data Analysis

Qualitative data from participatory workshops, group discussions, open-ended responses, and field observations were analyzed thematically. The analysis involved repeated reading of qualitative materials, initial coding of recurring ideas, grouping codes into broader categories, and identifying themes related to social norms, emotional attachment, cultural familiarity, and barriers to behavioral transformation. To strengthen analytical trustworthiness, qualitative insights were compared with survey findings and field observations to identify convergent patterns across data sources.

Findings

Demographic Characteristics

The majority of respondents were secondary school and vocational students (41.4%), followed by university students (36.4%). More than half of participants lived with their parents, suggesting that family environments may continue to shape food-related practices among younger generations. Most respondents resided in Northeast Thailand, particularly Maha Sarakham Province, where liver fluke infection remains a continuing public health concern.

Table 1

Demographic Characteristics of Participants (n=616)

Variable		n	%
	1. Education		
	Secondary / Vocational Students	255	41.4
	University Students	224	36.4
	Other	137	22.2
	2. Living Arrangement		
	Living with parents	348	56.6
	Living with relatives / others	216	35.1
	Living alone / dormitory	52	8.3
	3. Region of Residence		
	Northeast	512	83.2
	Central	64	10.4
	Other regions	40	6.4
Total		**616**	**100.0**

Note. Percentages may not total 100 due to rounding.

Knowledge Regarding Liver Fluke Infection and Cholangiocarcinoma

Overall knowledge regarding liver fluke infection and cholangiocarcinoma was moderate, with an average score of 7.43 out of 10 (SD = 1.88). Nearly half of respondents demonstrated moderate levels of knowledge.

Participants showed relatively strong awareness regarding the relationship between raw freshwater fish consumption and liver fluke infection. Many respondents also recognized that cholangiocarcinoma may not display symptoms during its early stages.

However, lower levels of understanding were observed regarding health screening procedures, particularly urine testing for early detection. The findings suggest that while general awareness of disease transmission has become widespread among younger generations, more specialized medical understanding remains limited.

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Table 2

Knowledge about Liver Fluke Infection and Cholangiocarcinoma (n=616)

No.	Knowledge Item	Response, n (%)		
		Correct	Incorrect	Don't know
1	Raw freshwater fish can cause liver fluke infection (OV).	559 (90.7)	39 (6.3)	18 (2.9)
2	Liver fluke infection is a risk factor for cholangiocarcinoma.	540 (87.7)	45 (7.3)	31 (5.0)
3	Cholangiocarcinoma often has no symptoms in the early stages.	572 (92.9)	26 (4.2)	18 (2.9)
4	Regular screening can help detect risk or early disease.	401 (65.1)	129 (20.9)	86 (14.0)
5	Urine test (OV-ATK) can be used for liver fluke screening.	276 (44.8)	212 (34.4)	128 (20.8)
6	Eating raw or undercooked freshwater fish is the main way to get liver fluke.	588 (95.5)	15 (2.4)	13 (2.1)
Summary (Total of 10 Knowledge Questions)		Average Score 7.43 / 10	Average Score —	Average Score —

Note. Items are examples from a total of 10 knowledge questions.

Attitudes Toward Raw Food Consumption

Overall attitudes toward raw food consumption remained moderate (M = 3.03, SD = 0.77), indicating partial awareness without complete attitudinal transformation.

Respondents generally agreed that consuming cooked food helps prevent disease and expressed preference for safer food choices when possible. Nevertheless, many participants continued to perceive cooked food as less enjoyable or less convenient compared to traditional raw dishes.

Participants reported relatively low levels of explicit social pressure to consume raw food. However, risky food practices remained socially familiar within family environments and peer interaction. Although respondents did not necessarily feel directly forced to consume raw food, the practice continued to function as a culturally normalized routine.

Importantly, many younger respondents rejected the idea that consuming raw food represents authentic Northeastern identity or social status. At the same time, participants increasingly associated safer eating practices with self- care and responsibility. This finding suggests gradual generational shifts in attitudes toward food and health.

Respondents also rejected traditional beliefs suggesting that lime juice, seasoning, or long-term experience consuming raw fish can guarantee safety. Additionally, many participants emphasized the importance of preventing infection to protect family members and long-term well-being.

Table 3

Attitudes Toward Raw Food Consumption (n 616)

Dimension	Description	Example Items (Statements)	Mean (1–5)	SD	Interpretation
1. Health Awareness	Perception of health risks and benefits of avoiding raw food.	• Eating cooked food helps prevent liver fluke infection. • I am concerned about the health risks of eating raw fish. • Avoiding raw food can reduce the risk of cancer.	3.55	0.78	Moderately High Participants generally recognize health risks and benefits of safer eating.
2. Social Pressure	Perceived pressure from family, friends, or community to eat raw food.	• People around me expect me to eat raw traditional food. • I would feel left out if I do not eat raw food with others. • My family encourages me to eat raw traditional food.	2.38	0.86	Low Participants report low explicit social pressure to consume raw food.
3. Cultural Identity	Beliefs about raw food as part of local culture and identity.	• Eating raw food is an important part of being Northeastern. • Raw food represents our local identity. • Traditional raw dishes should be preserved.	2.21	0.84	Low Participants tend to reject the idea that raw food defines local identity.
4. Family Responsibility	Sense of responsibility to protect family health through safer eating.	• I avoid raw food to protect my family's health. • My health behavior affects the well-being of my family. • I want to be a good role model in terms of healthy eating.	4.10	0.67	High Strong sense of responsibility toward family health.
Overall Attitude Score (Average of all items)			3.03	0.77	Moderate

Note. Attitude items were measured on a 5-point Likert scale (1 = Strongly Disagree, 5 = Strongly Agree). Higher scores indicate more positive attitudes.

Risk Behaviors

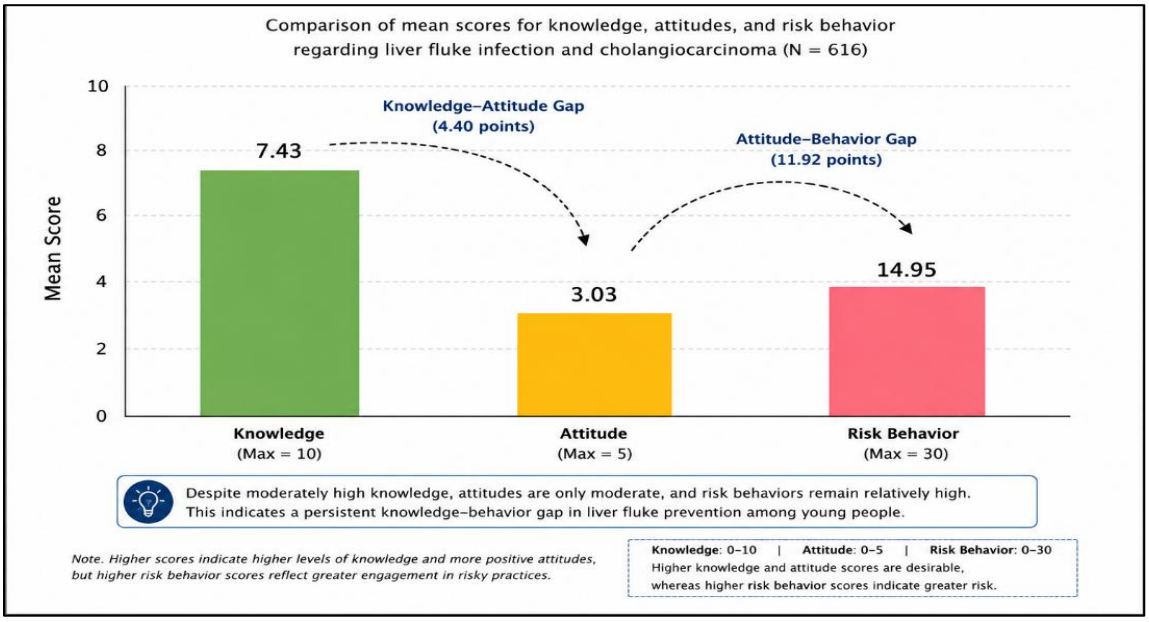
Despite moderate levels of knowledge and awareness, risky food consumption behaviors remained common. Nearly half of respondents (47.73%) demonstrated moderate levels of risk behavior, with an average score of 14.95 out of 30 (SD = 4.13).

Many participants reported occasional consumption of raw or partially cooked food. Although consumption frequency may not have been regular, even occasional exposure may increase vulnerability to liver fluke infection and related health risks.

The findings reveal a persistent gap between health awareness and behavioral practice. Respondents appeared positioned between cognitive understanding and full behavioral transformation, negotiating health concerns against cultural familiarity, emotional attachment, taste preference, and social convenience.

Figure 2

The Knowledge-Behavior Gap



Perceived Effectiveness of the ISAN ZERO OV Campaign

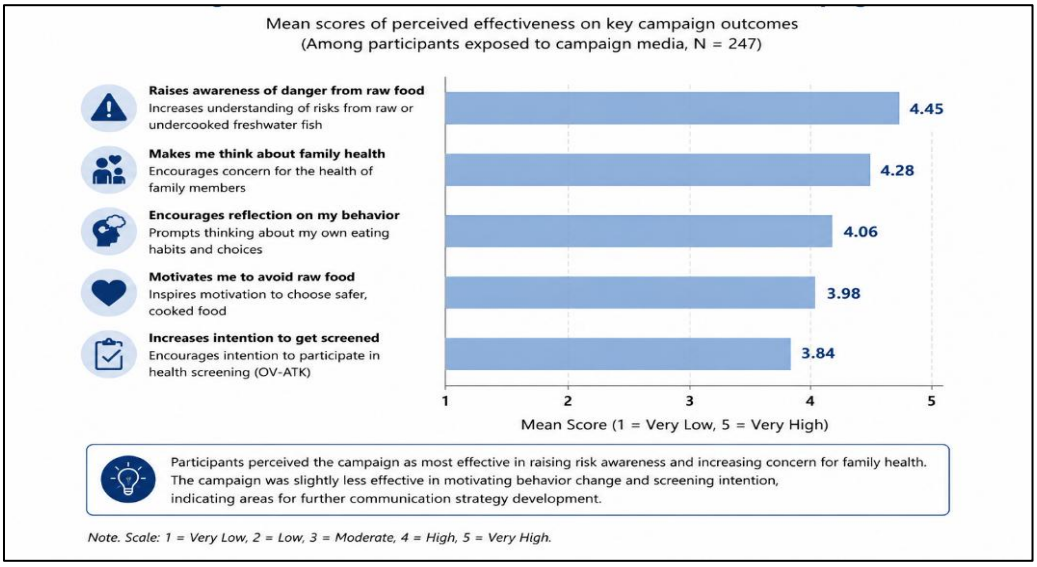
Among participants exposed to campaign media, overall perceived effectiveness was high ($M = 4.14$, $SD = 0.67$).

The campaign was particularly effective in raising awareness regarding the dangers of raw food consumption, increasing emotional concern regarding family health, and encouraging reflection on long-term health consequences.

Participants responded positively to emotionally framed communication emphasizing family responsibility and future well-being. However, qualitative findings suggest that emotional engagement alone was insufficient to produce long-term behavioral transformation when risky food practices remained culturally normalized within everyday life.

Figure 3

Perceived Effectiveness of ISAN ZERO OV Campaign



Discussion

The findings reinforce previous health communication research suggesting that awareness alone is insufficient to generate sustained behavioral change, particularly when risky practices are embedded within cultural routine and social familiarity (Launiala, 2009; Glanz et al., 2015).

Although respondents demonstrated moderate to relatively strong knowledge regarding liver fluke infection and cholangiocarcinoma, risky food practices remained widespread. This finding is consistent with previous studies in endemic areas, which reported that improvements in awareness do not necessarily result in sustained behavioral change when risky food consumption remains embedded in community traditions and everyday practice (Jongsuksuntigul, 2003; Sripa et al., 2015).

The present study extends this observation by demonstrating that the same challenge continues to exist among younger generations despite exposure to contemporary digital and campaign-based communication.

One important explanation involves the social normalization of raw food consumption. Participants did not necessarily experience direct coercion or explicit social pressure; however, risky food practices remained embedded within family interaction, peer environments, and everyday routine. In this context, behavior was shaped less through conscious decision-making and more through habitual social familiarity.

The findings also highlight the symbolic and emotional dimensions of food culture. Traditional dishes function not only as dietary choices but also as expressions of identity, taste, belonging, and shared social experience. Consequently, communication campaigns framing raw food consumption solely as dangerous may struggle to compete with the emotional and cultural value attached to local food practices.

Importantly, the study challenges the assumption underlying many traditional public health campaigns that rational awareness automatically leads to behavioral transformation. In culturally

embedded health practices, individuals do not make decisions solely through biomedical reasoning. Instead, health behavior is negotiated through emotion, identity, social belonging, and culturally normalized routine. This suggests that the limitations of liver fluke prevention campaigns are not merely informational but also social and cultural in nature.

At the same time, the findings indicate emerging generational change among younger respondents. Participants increasingly associated cooked food with self-care, responsibility, and family protection rather than weakness or loss of identity. This suggests opportunities for communication strategies capable of repositioning safer food practices as socially desirable and culturally modern.

The ISAN ZERO OV campaign demonstrated strong perceived effectiveness, particularly in generating emotional awareness and family-oriented concern. This finding supports previous scholarship emphasizing the persuasive role of emotionally framed health communication (Gallagher & Updegraff, 2012). Emotional storytelling remains valuable for attracting attention and increasing perceived risk.

However, the study also demonstrates the limitations of emotional awareness when broader social norms remain unchanged. Campaigns may successfully encourage fear or concern regarding health consequences without necessarily transforming daily behavior.

The knowledge–behavior gap identified in this study also reflects broader challenges observed in global health communication research involving smoking, alcohol consumption, unhealthy dietary behavior, and vaccine hesitancy. Across these contexts, awareness alone rarely

guarantees behavioral transformation when practices are embedded within emotional attachment, collective identity, and normalized social routine.

Therefore, the contribution of this study extends beyond the Thai context. The findings illustrate a broader challenge frequently observed in health communication: awareness-based interventions may achieve cognitive outcomes but remain less successful in changing behaviors that are reinforced by social norms, cultural identity, and everyday practice. This pattern has also been documented in studies of smoking, alcohol consumption, obesity prevention, and vaccine uptake (Fishbein & Ajzen, 2010; Glanz et al., 2015).

The study therefore argues that future liver fluke prevention strategies should move beyond awareness-based communication models toward culturally grounded and norm-shifting approaches. Such strategies may include as follows:

- Community-based participatory communication
- Peer-led advocacy among younger generations
- Positive reframing of cooked food practices
- Family-centered communication narratives
- Cultural adaptation rather than cultural rejection

Rather than portraying local food culture as inherently problematic, communication efforts may be more effective when encouraging safer reinterpretations of traditional practices while preserving cultural meaning and social belonging.

From a practical perspective, the findings provide useful evidence for refining subsequent phases of the ISAN ZERO OV campaign. The persistence of moderate risk behavior despite

relatively high awareness suggests that future communication efforts should move beyond information provision and place greater emphasis on social norm transformation, peer influence, family engagement, and culturally relevant behavioral interventions.

Limitations

This study has several limitations. First, the sample was recruited through voluntary participation in campaign-related activities and online channels; therefore, the findings may be affected by selection bias and should not be generalized to all young people in Northeastern Thailand. Second, the study employed a cross-sectional design, which limits the ability to examine long-term behavioral change or causal relationships among knowledge, attitudes, social norms, and behavior. Third, risk behaviors were self-reported and may be influenced by social desirability bias. Finally, although qualitative data provided contextual insights, future studies could include more extensive participant quotations and longitudinal follow-up to better understand how behavioral change develops over time.

Conclusion

This study examined knowledge, attitudes, risk behaviors, and perceptions regarding the ISAN ZERO OV campaign among young people in Thailand. The findings demonstrate that although respondents generally possess moderate awareness regarding liver fluke infection and cholangiocarcinoma, risky food consumption behaviors remain common.

The persistence of occasional raw food consumption reflects a continuing knowledge–behavior gap shaped by social norms, emotional attachment, cultural familiarity, and everyday

routine. While younger generations increasingly recognize the importance of safer eating practices, behavioral transformation remains incomplete.

The ISAN ZERO OV campaign was perceived positively, particularly in terms of emotional engagement and family-oriented messaging. However, emotional awareness alone may not be sufficient to disrupt deeply normalized cultural practices.

This study contributes to health communication scholarship by emphasizing the limitations of awareness-based interventions in culturally embedded behavioral contexts. Effective liver fluke prevention requires not only the transmission of biomedical knowledge but also communication strategies capable of reshaping collective norms surrounding food, identity, and social responsibility.

Future research should further investigate longitudinal behavioral transformation, intergenerational communication patterns, peer influence, and the role of digital participatory media in shaping health norms among younger generations in endemic communities.

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