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Occupational safety and health among fishing boat workers in Thailand

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ABSTRACT

The Thai fishing industry has been under close scrutiny for conditions faced by fishing boat workers, yet data are scarce with regards to occupational safety and health (OSH) among its workers. The objectives of this study are to describe: i) water, sanitation, and hygiene (WASH) conditions, and; ii) OSH conditions faced by migrant fishing boat workers in Thailand. We conducted a mixed-methods study with a quantitative survey in 200 migrant fishing boat workers and focus group discussions with 11 workers and 6 stakeholders in southern Thailand. We analyzed quantitative and qualitative data using descriptive statistics and content analysis, respectively. Nearly all participants (95.0%) reported that drinking water on board was stored in a sealed container, but only 5.5% of participants reported that there was latrine on board for defecation. Nearly all participants reported proper storage of objects on board, although findings on maintenance varied. Use of personal protective equipment was scarce as equipments obstruct the workers' movement. The findings highlighted areas where improvements in WASH and OSH are needed. However, caveats regarding potential information bias and lack of generalizability should be considered in the interpretation of the study findings.

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1. INTRODUCTION

Marine fishing, an industry in which 18.4 million people are involved worldwide, is among one of the most hazardous occupations in the world [1]–[3]. Most fishing vessels are small to medium-sized, where crew members commonly experience severe injuries from sprains, strains, contusions, cuts, lacerations, fractures, burns, and amputations [2], [4]–[6]. Other physical issues included sprains, sleep deprivation, and hearing loss [7].

Thailand is a middle-income country with more than 4 million migrant workers [8], [9], many of whom work in the informal sector [10] and may not enjoy the same level of protection according to Thai labor laws as those formally employed [11], including the fishing industry. The fishing industry in Thailand has been under close scrutiny from concerns regarding human trafficking and exploitation of labor [12], [13]. In addition to work-related injuries, crew members in Thai fishing boats, particularly those trafficked, also face problems from frequent physical illnesses [14], lack of personal protective equipment [15] and onboard violence [14], [16].

The burden of physical health among fishing boat crew members may be attributable to lack of proper access to water, sanitation, and hygiene (WASH) [17], [18]. Residents of inland fishing communities face

severe lack of access to water, sanitation, and hygiene facilities [19], and it is likely that these challenges are also present onboard small and medium-sized fishing vessels. Furthermore, despite concerns regarding injuries to fishing boat workers, data are scarce with regard to assessment of occupational safety and health (OSH) conditions faced by these workers. The literature on migrant health in Thailand are generally broad with maternal and child health as the only notable area of focus [10], [20]. A previous study on Myanmar migrants who worked in seafood processing showed that nearly half of the participants reported musculoskeletal disorder, especially lower back pain [21], which may also be found among fishing boat crew members. Data from an assessment of occupational safety and health of migrant fishing boat workers could be of interest to stakeholders in communicable disease control, environmental health, occupational health, and migrant health. Therefore, the objectives of our study are to describe: i) water, sanitation, and hygiene (WASH) conditions, and; ii) occupational safety and health (OSH) conditions faced by migrant fishing boat workers in Thailand.

2. METHOD

2.1. Study design and setting

We conducted a mixed-methods study. We collected the study data using questionnaires and focus-group discussions from March to June 2022. We conducted study interviews and focus group discussions at designated meeting venues in Songkhla and Pattani Provinces, southern Thailand.

2.2. Study population and sample size calculation

The participants in this study included migrant fishing boat workers who were ashore in Songkhla and Pattani. For the quantitative survey, we collected data from 100 workers in each province. The sample size was based on the presumed vaccination prevalence of 50% (p=0.50) with margin of error of 10% (d=0.10) at 95% level of confidence, using (1):

$$n = \frac{Z^2_{1-\alpha/2} * p * (1-p)}{\delta^2} \quad (1)$$

where:
Z = The standard score for the level of confidence (at 95% confidence, Z=1.96)
p = estimated proportion (prevalence) of vaccination (p=50% =0.50)
d = precision (d=10% =0.10)

The (1) yielded a sample size of 96. Assuming that the response rate was very low (i.e., 5%), the sample size adjusted for non-responses was 96*1.05=100 participants per province, thus 200 participants in total (n=200 quantitative study participants). The inclusion criteria were: i) Aged 18 years or older; ii) Hold citizenships other than Thai; iii) Working in the fishing industry in Thailand. We excluded workers who were unable to communicate verbally from our study.

For the qualitative study, we conducted two focus group discussion sessions with Cambodian migrant workers. One session included 10 men, and the other session included 10 women. Only the men worked on fishing boats, thus we excluded the women's focus group discussion data from this analysis. We also conducted a separate focus group discussion with 11 stakeholders in migrant issues, including 6 men and 5 women (total n=21 qualitative study participants).

2.3. Study instruments

The instrument for the quantitative study was a structured questionnaire which included 3 sections: i) General characteristics of the study participants; ii) Living conditions onboard, including water, sanitation and hygiene (WASH) and occupational safety and health (OSH), with illustrations to help clarify each question item, and; iii) Access to COVID-19 vaccination. The study questions and illustrations were programmed into KoboToolbox electronic data collection platform. The electronic version of the questionnaire only contained the participant's unique ID number and no personally-identifiable information.

The instrument for the qualitative study included a paper-based semi-structured questionnaire for focus-group discussions. The instrument included 3 sections: i) Participants' experiences pertaining to health and wellness; ii) Participants' experiences pertaining to safety; iii) Participants' access to COVID-19 vaccine. With regard to access to COVID-19 vaccines, questions included: i) Whether the participants had received two doses of COVID-19 vaccine; ii) If not, the reason(s) for which vaccination was incomplete; iii) Course of actions taken to receive the COVID-19 vaccines, and organizations that helped to arrange vaccination for the participants; iv) Procedures for COVID-19 vaccination, i.e., documents and paperwork to prepare and present.

We contacted 3 experts to assess the validity of the study instruments (1 expert on migration, 1 expert on labor policy, and 1 expert on epidemiology) and made changes to the study instrument wording and illustration as per the experts' feedback. As it was difficult for us to access the migrant fishing boat workers, we did not test the validity and reliability of this questionnaire in a population similar to our study participants.

2.4. Sampling methods

We used convenient sampling for both parts. For the quantitative part, we contacted a local non-government organization (NGO) (name withheld) that worked closely with seafaring migrants in Songkhla and Pattani Provinces. The NGO maintained a roster of migrants with whom they were in contact to provide services when ashore. The NGO notified the migrants about the study, and invited migrants who met the study criteria to meet with us or our data collectors at a designated time and place. Similar procedures were followed for the qualitative part.

2.5. Data collection

For both parts, when the potential participant arrived at the designated location, the NGO representative would introduce us or our team members. We then introduced ourselves and provided information to the participants according to the Participant Information Sheet. We then asked the participant to provide verbal or written informed consent.

For the quantitative study, members of the research team would conduct structured interview using the KoboCollect application for Android or accessing the online questionnaire linked to the KoboToolbox platform. We showed the illustrations to the study participants where applicable. The mean length of one quantitative interview was approximately 20 minutes.

For the qualitative study, members of the research team would ask for participant's permission to record the interview for future transcription. We probed for additional information when deemed necessary, while going through the list of issues in the semi-structured questionnaire. The mean length of a focus group discussion was approximately 60 minutes.

2.6. Data management and analysis

We uploaded the quantitative study data from KoboCollect to a password-protected server. Only the authors of this manuscript had access to the study data on the server. We downloaded the data and undertook routine data cleaning and performed descriptive statistical analyses.

For the qualitative study, we transcribed focus group discussion recordings in the Thai language. We subsequently analyzed the transcribed data using content analysis. We aggregated and slightly edited the quotations in order to improve legibility.

2.7. Ethical considerations

Investigators asked the participant to provide either verbal or written informed consent before data collection. For the qualitative part, we also asked for permission to record the focus group discussion session separately from the permission for data collection. This study received ethical approval from the Human Research Ethics Committee, Sirindhorn College of Public Health Yala (Approval Number: SCPHYLIRB-040/2565).

3. RESULTS AND DISCUSSION

3.1. Results

Of the 200 potential participants recruited for the study, everyone agreed to participate in our study (participation =100%). All participants were male, and the vast majority were Cambodian and Buddhists as shown in Table 1. Approximately three-fourths of the participants finished primary school or less, and earned between 10,001 to 20,000 Thai Bahts per month. Nearly all participants reported being insured under the universal health coverage scheme. The median size of the fishing boat was 21 crew members, and one-fifth of all participants reported that there was one or more minor on board.

With regard to water, sanitation, and hygiene (WASH) conditions on board, nearly all participants reported that drinking water on board was stored in a sealed container with clear separation from water used for other purposes, depicted in Table 2. However, only 11 participants (5.5%) reported that there was latrine on board for defecation, and only 4 participants (2.0%) reported that there was a location for showering on board. With regard to solid waste management, four-fifths of the participants reported that the fishing vessel had a designated site for waste disposal, albeit without a lid.

Table 1. Characteristics of the study participants (n=200 migrant fishing boat workers)

Characteristic	Number (percent), unless otherwise specified
Sex: Male	200 (100%)
Age in years [median (Q1, Q3)] *	32 (26, 40)
Citizenship	
Cambodian	191 (95.5%)
Myanmar	9 (4.7%)
Religion	
Islam	4 (2.0%)
Buddhist	196 (98.0%)
Highest level of education completed	
None	18 (9.0%)
Primary education (year 6)	130 (65.0%)
Lower secondary (year 9)	40 (20.0%)
Upper secondary (year 12)	12 (6.0%)
Mean personal monthly income	
Less than 5,000 THB	0 (0%)
5,001-10,000 THB	43 (21.5%)
10,001-20,000 THB	156 (78.0%)
20,001-30,000 THB	0 (0%)
30,001-40,000 THB	1 (0.5%)
More than 40,000 THB	0 (0%)
Health coverage	
Universal health coverage card	192 (96.0%)
Social security card	6 (3.0%)
No card	1 (0.5%)
Don't know/Not sure/Uncertain	1 (0.5%)
No answer	0 (0%)
Number of persons in household/boat, including both adults and children, including the participant [median (Q1, Q3)] *	21 (6.5, 25)
Number of persons in household/boat under 18 years of age	
None	164 (82.0%)
1 person	18 (9.0%)
2 persons	11 (5.5%)
3 persons	1 (0.5%)
4 persons	1 (0.5%)
Don't know/Unsure/Uncertain	4 (2.0%)
Refuse to answer	1 (0.5%)

*Excluding those who were unsure or refused to answer

Table 2. Water, sanitation, and hygiene (WASH) conditions aboard fishing boats as reported by migrant workers in Thailand (n=200 workers, unless noted otherwise)

Characteristic	Number (percent)*
Water on board	
Clear separation of drinking water and water used for other purposes	190 (95.0%)
Clean water, boiled water, distilled water, with storage in a sealed container	195 (97.5%)
Sanitation on board (n=199 workers)	
No latrine available	186 (93.5%)
Latrine available for defecation	11 (5.5%)
Latrine available for urination only	2 (1.0%)
Hygiene on board	
Clear designated spot for showering	4 (2.0%)
Solid waste management on board	
No designated site for solid waste disposal or removal	12 (6.0%)
Designated waste disposal site without lid	151 (81.6%)
Designated waste disposal site with lid	34 (18.4%)
Designated waste disposal site, participant did not provide details	2 (1.0%)

*Number of those who answered "Yes", excluding those who refused to answer

Qualitative data from key informant provided further details on the issue of sanitation facility on board. One key informant reported that there were generally three types of sanitation facility on board fishing vessels, two of which resembled hanging latrines and were considered as unimproved sanitation.

> *"Latrines on board are risky and require expertise. The crew member needs to have skills in lowering his buttocks. Some boats have an extension with a closure, so there is a certain level of safety. However, some boats only have planks and we have to grab onto the rails and do our business. That's what I've found...*

> *There are generally 3 types of latrines on board. The first type is a proper bathroom. That's very rare in [the study province]. I only found one boat with a bathroom in the Deep South... The second type is a metal frame at the back of the boat. The frame is divided into 2 parts. There is a fixed iron frame that cannot be folded. It's permanent and is generally a luxury. In some boats, this frame has to be folded...They would hang the frame here before doing business, and then remove it afterward... There is a rail to grab on the side. A crew member goes inside the metal frame with a piece of cloth to cover up...The discharge would be dropped directly below, into the water.... That's actually the better type.*
> *The more dangerous type hardly includes anything. It's a rubber tire, held with a rope and suspended on the side of the boat. One grabs the tire and the rope...and use skills...There have been no cases of someone falling overboard when going... I'm not sure how crew members clean themselves afterward. Maybe they take a shower and clean themselves them. The most dangerous latrine is the one with the rope. The crew members would tie the rope to themselves and sit at the back of the boat. That's now uncommon in [the study province]. It used to be common, but that's been gone for .... around 7-9 years now."* Key informant (local NGO), Session 1 of 2

A crew member provided a similar account, but also mentioned that the captain had access to an exclusive latrine, but the facility was not available to crew members due to lack of space on board.

> "*The bathroom is the back of the boat (laughter). Is it clean? Well, we have to maintain [cleanliness] ... because no one does it for us. But the captain has another [location] ... with a separate bathroom. Someone helps to clean it ... We can't use his latrine, because that's his and not ours.... Sure, we'd like a latrine like that. [But would the captain build you a latrine?] That's unlikely, because it's cramped on the boat.*" Crew member

With regard to occupational safety and health (OSH) on board, nearly all participants reported that proper storage of objects on board and use of personal protective equipment as shown in Table 3 Approximately three-fourths reported use of safety clothes and existing measures to prevent and control hazards, while less than half of the participants reported availability of annual training sessions for the crew on work safety. However, nearly none of the crew members reported availability of multilingual written instructions for operation of machineries near the working space.

Qualitative data from crew members contextualized the findings on hours of rest within a given day and a given fishing cycle, as well as the schedule of work on board, as follows:

> *"The longest that we have left shore was 13 days. Most fishing boats leave around 2 am. [Participants argued among themselves]. Some people leave for work from 7 am, 8am, or 10 am. Work starts around 3pm. If there was fish, the work would start from 10 pm until morning. Then there is rest, and work then starts again in the afternoon. We eat whenever we finish work, and then we sleep and rest. We wake up again around 1pm and work until 4 pm, then we rest until 10 pm. Sometimes we cook for ourselves, sometimes we have a housekeeper who cooks, we call this person Chong Pao (laughter).*
> *[The rest period] started around 10 pm, then we would wake up at 1am or after 7-8 am. They let us sleep ... [interrupting one another]. It depends on the amount of fish. If there was a lot of fish, there would be little time to rest. If there wasn't much fish, there would be more time to rest. We get to rest eventually during the waning period because the fishes would be gone by then. But most of the time, there's not much time to rest... [If the net was broken] or something breaks on board, we have to help each other fix things before we can rest ... [The longest repair time] was approximately one day ... the net was stuck on corals or something in the sea…"* Multiple crew members

Crew members in the study did not directly experience severe work-related injuries, but gave account of one incident with broken arm. Key informants, on the other hand, provided a more concerning account of crew safety with additional details on work-related hazards on board fishing boats.

> *"When we bumped into things, they would give us mediation and symptoms would go away in 2-3 days... For example, when my nail fell off, with a small wound, they would let us rest and take medication. There were creams, too... I've been working for 10 years and I've never had a severe injury. The most was that my nail broke...*

...There was [a case of broken limb] ... It's not frequent...It used to happen, but not much these days...The guy was old and not careful. He was drowsy, and there was an accident. Ropes on the boat tangled on his legs and broke his legs." Crew members

"Some crew members lose their thumbs from work-related accidents. The employers took good care of them...
...Actually, every spot is risky. All fishing equipments [are dangerous]. Even the fish storage room is dangerous. We found a case of accident from the capstan with ropes pulling on the net. There was a risk of severing the finger..." Key informant (local NGO), Session 2 of 2

"There was a case of severed limb, but the crew member could still work... [Regarding use of boots] The fishing boat workers said that they couldn't move well with boots, but they would wear boots if they had to go to the cold storage room belowdeck. Some spots on the boat can be very slippery from the fish slime.
In case of severe accidents, the captain would call the Center, and the Navy would send a pick-up. If there were boats nearby that were ready to go ashore, they would pick up...Most cases of severed limbs are from entanglement by large ropes." Key informants (local NGO), Session 2 of 2

"There was a case in Pattani. Someone turned on the gas and walked around, looking for a lighter. An explosion happened once the fire was lit… That person jumped into the water...in the middle of the sea...Not all workers know how to swim. Only around 80% of them do." Key informant (local NGO), Session 2 of 2

With regard to use of safety gear, crew members reported that they did not like wearing life vests because the vests made it more difficult to move and work. Key informants also gave additional account regarding the non-use of other equipment due to similar reasons, as well as gaps in inspection of equipment on board.

"None of us wears life vests...We only wear them when we get in the water...The vests get stuck on our belly. It's also hard to work in them. When we pull on nets, the vest sometimes gets tangled with the nets...Yes, it's hard to work in large life vests, so no one wants to wear them. But we are scared ... of falling overboard when we walk, but it's hard to work in life vests." Crew members

"All boats have life vests, but some people are heavy and others are skinny, while the vests are of standard size that may not fit everyone. Those who are heavy cannot wear standard-sized life vests. When I went to Songkhla Province, they were purchasing life vests for the boats. The vests were all the same size. Those who were larger wouldn't fit.
The crew don't wear gloves either. They said that they couldn't work well while wearing gloves. Employers have gloves available, but they don't use them.
All boats have life vests, but not everyone wears gloves and shoes. During inspection, they only look at life vests. They don't look for shoes and gloves. Life vests are available for everyone. The vests do not have light or whistle. They only float, although they have side straps." Key informants (local NGO), session 2 of 2

Contrary to quantitative results, crew members mentioned during in-depth interview that there was no first aid equipment on board, but the captain had medication for the crew, available upon request.

"There was none [first aid equipment on board]. There are only medicines...They buy medicine for us, and we can take those meds when we are sick. They keep a stock. [Requests are] Easy. We ask for medicine when we get sick. They give it to us because they prepare a stock for all crew members." Crew members

In case of death, the employer would pay the spouse of the crew member in cash, but there would be no coverage from insurance.

"Most of the time, if a spouse fell overboard and died, the boss would ask whether a person is the crew member's partner, and would provide 40,000-50,000 Bahts in cash. But there would be no payout from accidents insurance." Interpreter for crew member

Table 3. Occupational safety and health (OSH) conditions on board fishing boats as reported by migrant workers in Thailand (n=200 workers)

Characteristic	Number (percent)*
On board, tools, equipment, containers, and sharp objects were stored in an orderly manner which did not pose danger or risk accidents, injuries, or deaths	193 (96.5%)
Fishing equipment and tools were strong, safe to operate, with handles of appropriate lengths (n=199 workers)	199 (100%)
Objects which required human physical force to move were of appropriate size and weight, and in shapes that were easy to handle at the right weight for transport	199 (99.5%)
There were clear labels to distinguish control buttons or light switches on electronic equipment, machines, tools, and appliances, enabling safe use	160 (80.0%)
Participant used personal protective equipment such as swimming goggles, gloves, and boots while on board	196 (98.0%)
There were lifting equipment or other tools that were safe and reduced danger when lifting objects	199 (99.5%)
Participant donned headgear, boots, and safety clothes to reduce danger during work	146 (73.0%)
There was a practice of cleaning hands, feet, body, and clothes immediately after work with soap or shampoo	198 (99.0%)
Employers allowed for rest hours while fishing, with a minimum of ten hours in any 24-hour period and 77 hours in any 7-day period	195 (97.5%)
There were regular inspections of machineries and equipment but no maintenance	77 (38.5%)
There were regular checks and inspections prior to use of machineries and equipment and repairs of damaged parts according to standards for maintenance of machineries on board fishing vessels	200 (100%)
There were inspections of the lighting system on board according to the standards for maintenance of machineries on board fishing vessels	199 (99.5%)
There was a system to maintain and control cooking gas to be in order and safe	200 (100%)
There were written instructions on correct operation of machineries near the working space (in Thai, Myanmar, and Khmer languages)	16 (8.0%)
There were written instructions and procedures for proper machinery operation near the working space (in Thai, Myanmar, and Khmer languages)	8 (4.0%)
There was adequate life-saving equipment for all crew members including floats, life vests, or life rafts on board	200 (100%)
There were annual training sessions for the crew on work safety	99 (49.5%)
There were measures to prevent and control hazards, with recommendations on working with moving machinery, e.g., capstans, to protect workers' safety	148 (74.0%)
There were measures to prevent falling overboard, including equipment for assisting those who fell overboard, i.e., ropes or life vests	191 (96.0%)
The boat practiced safe refueling, e.g., prohibiting smokers from being in the vicinity	185 (92.5%)
There were inspections of the boat's conditions and equipment prior to all voyages	199 (99.5%)
Fire extinguishing equipment were stored on board with regular inspections of fire-fighting equipment.	200 (100%)
There were first-aid kits on board, and crew members had received first-aid training	196 (98.0%)

*Number of those who answered "Yes", excluding those who refused to answer

3.2. Discussion

In this mixed-methods study, we described WASH and OSH conditions faced by migrant fishing boat workers in southern Thailand. We found concerns with regards to onboard sanitation facilities, as well as the lack of use of safety equipment, albeit with acceptable level of access to drinking water and storage of onboard equipment. The findings of this study should be of interest to stakeholders in migrant health, occupational health, and environmental health.

Nearly all fishing boat workers in our study were enrolled in the universal health coverage (UHC) scheme, suggesting that our participants were non-trafficked, registered foreign migrant workers [13]. Although WASH and OSH conditions and occupational hazards on board fishing vessels are nonetheless concerning according to the study findings, the conditions and access to medical care and referrals are markedly better than those reported by trafficked fishermen [13]–[16]. Furthermore, our participants reported noticeably higher wages and cash payout to spouses in case of death. Thus, the findings of our study may be more generalizable to fishing boat workers in similar contexts who face high level of occupational hazards [2] than to human trafficking victims on board fishing boats in this region.

Access to water, sanitation, and hygiene among our participants (or lack thereof) appeared to be relatively homogenous. As per existing criteria [18], our participants seemed to have either basic or limited level of access to drinking water (depending on the waiting time, which was not measured), had only unimproved sanitation facility (i.e., hanging latrines onboard), and uncertain level of hygiene facility (as we did not measure presence of wash basins with water and soap). Although the lack of improved latrines onboard was concerning, in circumstances where the volume of water under the hanging latrine was adequately large (i.e., the open sea), health concerns should be relatively small [22]. However, the authors speculate that the risks may increase if the excreted fecal matter was aerosolized and spread to other crew members, the boat remains stationary or in port with repeated excreta disposal in the same spot, or if the water receiving excreta was used as a drinking water source [23]. Furthermore, the crowded condition on board also predisposes the crew to outbreaks of diseases and makes fishing boat workers vulnerable to infectious diseases nonetheless [24]–[27].

With regard to occupational health and safety, two questions on maintenance of equipment with slight differences in wording yielded vastly different answers (i.e., "*There were regular inspections of machineries*

and equipment but no maintenance" had distinctly lower prevalence than "*There were ... repairs of damaged parts according to standards...*"), suggesting the influences of either lack of full comprehension of the questions, or potential response acquiescence among the participants [28]. The discrepancy between quantitative and qualitative data on availability of first-aid equipment also suggests potential response acquiescence in the quantitative findings. Similarly, questions regarding use of "*personal protective equipment such as swimming goggles, gloves, and boots*" vs. donning "*headgear, boots, and safety clothes*" also had distinctly different responses. On the other hand, questions on availability of written instructions for machinery operation in multiple languages yielded similar responses, suggesting that these potential biases were question or issue-specific. Future studies should consider more objective methods to measure occupational safety and health conditions on board fishing vessels, such as by rapid observation or structured observation on board by trusted parties such as NGOs who work closely with the fishing industry, in a similar manner to that done by study on WASH conditions ashore [29], [30].

The strength of our study was the 100% response rate in quantitative study section, which minimized potential selection bias due to non-response. However, a number of limitations were also present in our study. Firstly, there were discrepancies within quantitative data, and between quantitative and qualitative data, which suggest that information bias was present in the study and could not be removed. Secondly, this study was conducted among conveniently sampled fishing boat workers who were ashore and could be contacted by a local non-profit organization the deep south of Thailand, which limited the generalizability of the study findings. Lastly, the quantitative data collection interviews were conducted using an illustrated questionnaire in Thai language, and the language barriers could further introduce systematic errors to the study findings. These limitations should be considered as caveats in the interpretation of the study findings.

4. CONCLUSION

We assessed self-reported water, sanitation, hygiene and occupational safety and health conditions among migrant fishing boat workers in Thailand and found adequate access to water, but near-universal lack of latrine facility onboard, and questionable access to hygiene facilities. Occupational safety practices were commonly reported, although ambiguity existed on certain issues. Discrepancies also existed between quantitative and qualitative data. Caveats on potential information bias and lack of generalizability should be considered in the interpretation of the study findings.

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