



## Research Article

# Occupational health hazards among Irular tribal fisherwomen fishing in Pichavaram Mangrove Water

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## ABSTRACT

A study was conducted in view to assess the factors contributing to the occupational health hazards among Irular tribal fisherwomen fishing in Pichavaram mangrove forest areas. Two hundred and fifty Irular fisherwomen from 8 Irular settlements were randomly selected through convenient sampling. Direct interview methods were adopted to collect information on the various occupational health hazards faced by the respondents. The results indicated that out of 250 respondents, 182 fisherwomen had skin softening, 155 suffered catfish bites, 135 reported lesions caused by oysters and 134 had finger nail cavity problems. 120 fisherwomen suffered mouth ulcer and blistering, 33 reported lightning and storming risks, 73 were affected by itching and skin rashes, 43 suffered from stomach ulcers, and 39 suffered menstruation-related problems. About 22 fisherwomen reported shivering and 32 were affected by leg and knee pain due to the fishing practices in which they were involved in the mangrove backwaters. Around 19 fisherwomen also reported other health hazards such as crab bite, snake bite, hair bleaching and skin darkening, which are some of the common occupational hazards faced by Irular fisherwomen while engaged in the various fishing practices in the Pichavaram mangrove waters. The study concluded that Irular fisherwomen fishing in Pichavaram mangrove waters are prone to various occupational health problems and strategies need to be developed to limit the problem and to promote their health.

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## INTRODUCTION

The International Labour Organization estimated that worldwide 24,000 fatal and 24 million nonfatal injuries annually occur on fish processing workers in the fishing industry (ILO, 1999). The available statistics for countries with significant economic dependence on the commercial fisheries sector indicate that occupational fatalities and injuries in the fishing industry occur at rates much higher than the national averages for other occupational fatalities and injuries regardless of the level of industrialization (FAO, 2001). These high rates of fatalities and injuries can be partially attributed to the inherently dangerous working conditions involved in the industry. The profession of the fisher community is considered to be one of the most dangerous and life-threatening professions all over the world. Some of the common life-threatening factors to which fishers are exposed include exposure to cold, wind and rough seas; increased frequency of injuries during work; unpredictability and dubious nature of threats and

equipment failure; continuous psychological stress; and constant economic pressure. At the same time, the specificity and variety of hazards, depending significantly on geographical climate and cultural factors, make the dissimilarity of problems and solutions substantial in the different sectors of fishing. The occupational hazards, safety concerns, pathogenic infections and risks to health in the fishing and aquaculture industry may vary from region to region. Virtually, every fishing job poses some hazard to personal health and safety.

In today's era, women play diverse roles in society, and this is especially evident in the fisheries sector. Often, they handle many tasks simultaneously. As a result, they are prone to suffer from work-related diseases and hazards, which are further complicated by social, psychological and physiological issues. Roughly, one out of every 300 women is suffering from some occupation-related disease (Srivastava and Bihari, 2000). In addition, recognizing and

understanding women's occupational health hazards has been impeded by the notion that women's jobs are 'safe'. In the past, women were excluded from studies of occupational health hazards in the fisheries sector. Greenberg and Dement (1994) found a large number of studies on occupational disease involving only men in various sectors. Only a few studies (Saha *et al.*, 2006) are available on the occupational health hazards of women working in fish-processing plants. Relatively little information is available on the occupational health hazards faced by women involved in the fisheries sector, and especially in capture fishery, there is a dearth of information on the occupational health hazards faced by fisherwomen.

Irulars are a non-traditional tribal fishing community living in the Pichavaram region and depending on the mangroves for their sustenance. Groping for shrimps, fishing by using craft and gears, mussel and clam collection and polychaete fishing are some of the methods adopted for fishing by the Irulars. In this backdrop, the health-risks involved in fishing practices adopted by Irular tribal fisherwomen warrants serious research. An attempt has therefore been made to study the occupational health hazards faced by Irular tribal fisherwomen involved in fishing in the Pichavaram mangrove backwaters. This paper discusses the occupational health hazards of Irular tribal fisherwomen related to groping for shrimps and fishing by using craft and gears by husband and wife pairs of Irular fishers in Pichavaram Mangrove Forests.

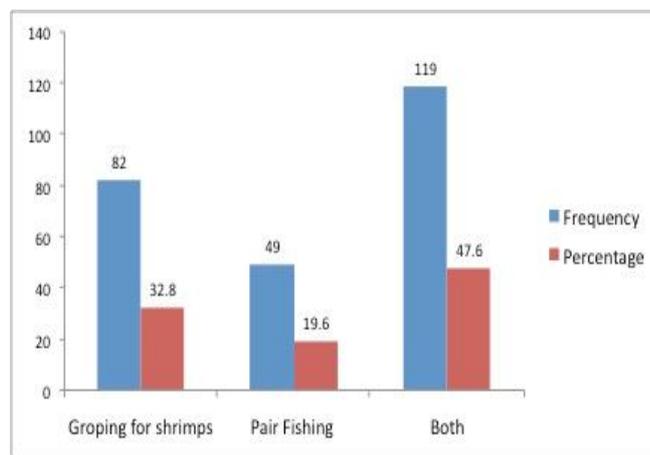
## MATERIALS AND METHODS

Interview methods, focus group discussions and direct observation methods were used to collect data from the Irular tribal fisherwomen involved in fishing activities in the Pichavaram mangrove waters during the period from June, 2011 to May, 2012. Around 250 Irular fisherwomen from 8 Irular settlements were randomly selected through convenient sampling. The respondents ranged in age between 15 and 55 years, and informed consent was obtained from the participants of the study.

Direct interview methods were adopted to collect information on the various occupational health hazards faced by the respondents. In order to substantiate and evaluate the information collected from the interviews, a questionnaire was formed on the basis of a focus group discussion, which was held with a selected group of fisherwomen from 3 villages. The developed questionnaire was first piloted with 2 fisherwomen from each village and then used among the study participants to collect data for the study.

## RESULTS

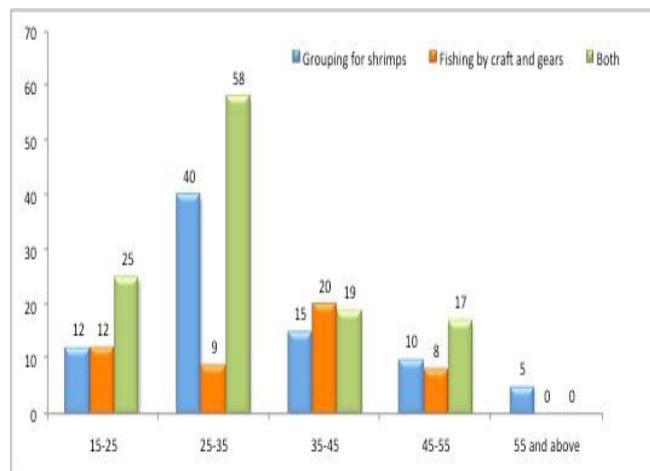
Irular tribal fisherwomen in the Pichavaram region involved in fishing adopt methods such as groping for shrimps, fishing by using craft and gears and mussel collection in mangroves. From the selected groups, 33% of the fisherwomen were involved in groping for shrimps, 19.5% into pair fishing and 48% of them were engaged both in groping and pair fishing methods (Fig. 1). Out of the 250 samples studied, almost all the fisherwomen were reported to have one or two health hazards, and few reported more than 3 health hazards that they faced during their fishing operations in the mangrove waters



**Fig. 1:** Occupational categorization of the Irular tribal fisherwomen affected by health hazards related to fishing practices

### (i) Age-wise classification of the Irular fisherwomen affected by occupational health hazards

The Fig. 2 explains the age-wise classification of the respondent fisherwomen affected by occupational health hazards while fishing in the Pichavaram mangrove backwaters. The study indicated that fisherwomen in the age group between 15 and 55 years were involved in fishing practices of which the majority are from the age group of 25–35 years followed by 35–45 years, and only very few of them above 55 years were involved in fishing.



**Fig. 2:** Age-wise classification of Irular tribal fisherwomen engaged in various fishing practices affected by occupational health hazards

### (ii) Types of occupational health hazards

While groping for shrimps and fishing by craft and gears, the Irular tribal fisherwomen in the Pichavaram region are affected by multiple health-related hazards. Almost all the fisherwomen surveyed were of the opinion that groping for shrimps in the mangrove's muddy bottom is a very difficult task, but due to the non-availability of other regular income-generating support they are compelled to perform this unconventional fishing practice. The various health hazards faced by Irular fisherwomen are given below.

- a. *Catfish sting*: Almost all of the 250 respondents have been affected by one or more of the health-related hazards. Out of these, 155 fisherwomen reported that they have been stung by catfish (*Plotosuscanius*), which is a common phenomenon while fishing in the

mangrove waters. Catfish stings prohibit fisherwomen from fishing for 2–3 days. It is a common hazard for the fisherwomen involved in groping for shrimps and pair fishing (Fig. 3).



**Fig. 3:** Catfish sting on leg experienced by one of the Irular fisherwomen

**b. Oyster lesions:** Oyster lesion is another common occupational hazard faced by the Irular fisherwomen during groping. When groping for shrimps, the palms of the fisherwomen are severely cut by oyster shells. Unfortunately, the fisherwomen who suffer lesions caused by oyster shells do not realize it until they come out of the water, from a minimum of 4 hours to a maximum of 8 hours, by that time they lose a lot of blood. Moreover, oyster beds are not visible as the fisherwomen move into deeper waters while they scour the bottom of the river beds for shrimps. About 135 fisherwomen reported that they periodically suffered from lesions caused by oysters while groping.

**c. Mouth ulcer (sores on lip and tongue):** This is the third most common problem faced by Irular tribal fisherwomen who grope for shrimps in the mangrove waters. About 120 fisherwomen reported that they suffered from mouth ulcers caused by continuous rubbing of the rope attached to the collecting pouch, which is held between their teeth for as long as they grope, for nearly 4–8 hours. The ulcers caused by the abrasion of the rope severely inhibit their regular intake of meals (Figure 4).



**Fig. 4:** Mouth ulcers caused by abrasion of the rope of the collecting pouch

**d. Finger nail cavities and black or infected nails:** The finger nails of the Irular tribal fisherwomen are critically damaged and the areas under their finger and toe nails are badly infected. Out of the 250

fisherwomen studied, almost 134 of them were affected by this nail degeneration, which is caused due to injuries when shrimp spines and debris get caught inside the nails while the fisherwomen scour the sandy bottom of the mangroves for shrimps. The thumb nails were mostly affected in all the cases studied (Figure 5).



**Fig. 5:** Nail degeneration caused by the unhealthy practice of groping for shrimps

**e. Skin softening:** The Irular tribal fisherwomen's hands and feet are submerged in water for about 6–7 hours while groping for shrimps. Due to long period of exposure in the water, the skin of the Irular fisherwomen is saturated with water, which results in skin softening, which makes the skin more vulnerable to abrasions caused by sharp objects. Fisherwomen who are engaged in groping for shrimps are affected by this health hazard. Unfortunately, they do not realize that this is a serious health hazard that needs medical attention (Figure 6).



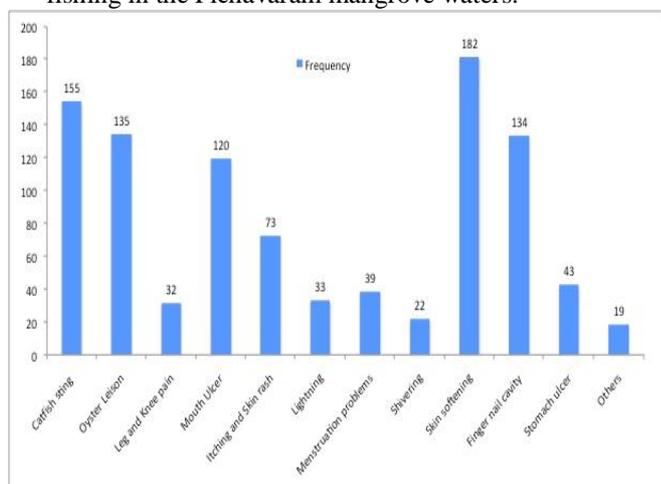
**Fig. 6:** Irular fisherwomen subjected skin softening while grope fishing

**f. Itching and skin rash:** Irular tribal fisherwomen spend almost 6–7 hours in the brackishwater and subsequently suffer from skin irritation and rashes. Constant exposure to a variety of irritants that are found in the brackishwater of the mangroves, such as salt water, jellyfish, sun light, algal blooms, etc., results in increased skin sensitivity. Over exposure to the allergens causes infections on the skin that induces itching and rash. Continuous itching hampers their day-to-day activities.

**g. Leg, knee and back pain:** Normally, Irular tribal fisherwomen involved in groping for shrimps walk for about 1–5 km from their villages to reach the groping sites in the mangrove waters. Once the fisherwomen enter the water, they walk through mud, which can be up

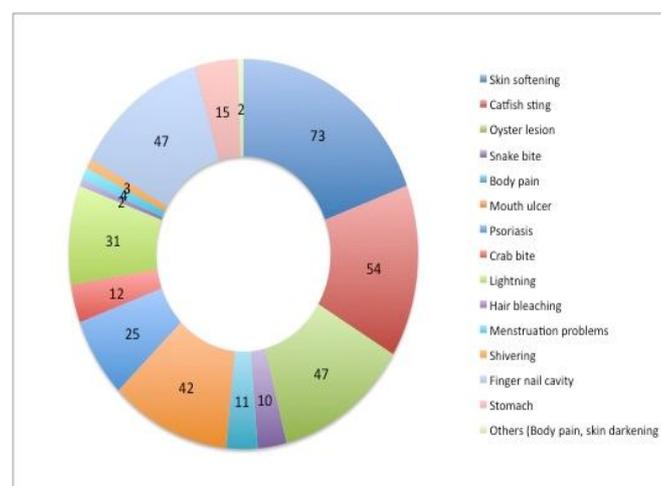
to half a meter deep. Straining to walk in the loose, wet mud causes severe leg and knee aches. Bending on their knees to grope for shrimps for almost 4–8 hours put undue strain on their back muscles, which causes severe back ache. Likewise, the fisherwomen who practice pair fishing are involved in harder tasks such as casting the net, collecting the net and segregation of fishes.

- h. *Menstruation problems:* Over-bleeding and white discharge is a common problem faced by Irular fisherwomen engaged in groping for shrimps and pair fishing. Irular tribal fisherwomen continue to grope for shrimps even during their menstruation cycle, which causes increased body stress. This coupled with their method of shrimp picking leads to over-bleeding during menstruation for many of the Irular fisherwomen studied. Heavy work for long hours in the mangrove waters is stressful to the body.
- i. *Shivering and fever during the rainy season:* Long periods of submergence in the cold water of the mangroves during rainy season leads to common cold and flu-like symptoms for the Irular tribal fisherwomen, especially for the fisherwomen in the age group over 40 years.
- j. *Stomach ulcers:* Stomach ulcer is a common problem among the Irular tribal fisherwomen who are involved in fishing by groping as well as pair fishing. After their breakfast, the fisherwomen begin to fish starting at 8 a.m. During fishing, these women do not break for lunch and only consume food once they return in the evening, which ultimately causes stomach ulcers in many of the women in the Irular tribal fishing communities.
- k. *Lightning and thunder strikes:* During the rainy season, fisherwomen continue to grope for shrimps and are exposed to increased lightning and thunder storms. Sometimes lightning strike causes loss of life.
- l. *Other health hazards:* Around 19 fisherwomen reported that they were also affected by other hazards such as biting of crab, rabbit fishes, skin darkening due to overexposure to the sunlight during the day time and hair bleaching. Crab bite and rabbit fish bite are also common hazards for fisherwomen involved in pair fishing and groping for shrimps. Figure 7 details the various health hazards faced by Irular tribal fisherwomen and the frequency the respondents are subjected to these occupational health hazards while they are engaged in groping for shrimps and during pair fishing in the Pichavaram mangrove waters.



**Fig. 7:** Occupational health hazards faced by Irular tribal fisherwomen while fishing in the mangrove waters

Of the 250 respondents, 182 fisherwomen reported skin softening, 155 suffered catfish bites, 135 reported lesions caused by oysters and 134 had finger nail cavity problems, 120 fisherwomen suffered mouth ulcer and blistering, 33 reported lightening and storming risks, 73 were affected by itching and skin rashes, 43 suffered from stomach ulcers and 39 suffered menstruation-related problems. About 22 fisherwomen reported shivering and 32 were affected by leg and knee pain due to the fishing practices in which they were involved in the mangrove backwaters. Around 19 fisherwomen also reported other health hazards such as crab bite, snake bite, hair bleaching and skin darkening, which are some of the common occupational hazards faced by Irular fisherwomen engaged in various fishing practices in the Pichavaram mangrove waters.



**Fig. 8:** Percentage-wise fishing related health hazards that Irular tribal fisherwomen faced

Totally, a maximum of 73% of fisherwomen suffered skin softening, around 62% suffered catfish stings, 54% reported oyster lesions and finger nail cavity problems, 48% suffered mouth ulcer and blistering, 42% of fisherwomen affected by shivering, 29% were affected by itching and skin rashes, 17% suffered stomach ulcers, 16% reported facing menstruation-related problems and 13% reported lightning and storming risks, (Figure 8) during fishing in the mangrove backwaters. About 8% of the fisherwomen were also affected by hazards such as crab bite, rabbit fish bite, hair bleaching and skin darkening due to the fishing practices.

### (iii). Seasonal variation of occupational health hazards

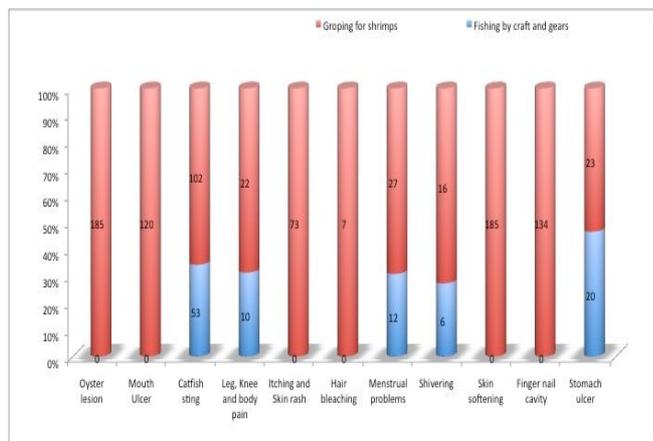
The seasonal variation in the prevalence of hazards related to fishing was also studied. The seasons play a role in the occupational hazards among the Irular fisherwomen of the Pichavaram mangroves. Oyster lesions, cat fish sting, leg and knee pain, mouth ulcer, skin softening, menstruation problems and finger nail cavities occurred almost throughout the year among the Irular fisherwomen who are involved in fishing in the mangrove waters. During the monsoon season, shivering, lightning strikes and thunderstorms were the major occupational hazards that the Irular fisherwomen experienced. Similarly, skin darkening and hair bleaching are the common hazards that occur in the summer season. (Table 1).

**Table 1:** Seasonal variation of occupational health hazards among Irular tribal fisherwomen

No	Monsoon	Summer	Common for two seasons
1	Shivering, lightning and thunder storming	Skin darkening, hair bleaching	Oyster lesion, cat fish sting, body pain, mouth ulcer, crab bite, menstruation problems, lip and tongue sores, softening of skin and finger nail cavity

(iv). Prevalence of health hazards faced by Irular fisherwomen due to various fishing practices

Catfish sting, body pain, lightning strikes and thunderstorms were the common health hazards that affected fisherwomen involved in groping for shrimps and those fishing as pairs using craft and gears. Hazards like oyster lesion, snake bite, mouth ulcer, itching and skin rash, hair bleaching, menstruation-related problems, shivering, finger nail cavity and stomach ulcer were observed only in fisherwomen engaged in groping in the mangrove waters. When the data available on fishing practices were compared, it was found that fisherwomen involved in groping for shrimps were affected by a large number of health hazards than fisherwomen engaged in pair fishing (Figure 9).



**Fig. 9:** Prevalence of fishing related health hazards among Irular fisherwomen

## DISCUSSION

The present study on the occupational health hazards faced by Irular tribal fisherwomen revealed that the women involved in capture fishing activities are exposed to multiple health hazards, and the prevalence of health hazards varies from season to season. So far as workplace injuries are concerned, reports show that injuries are higher in fish processing workers than non-exposed workers, and women workers are more vulnerable than male workers. Studies on fish processing workers have highlighted skin rashes, asthma and allergies as common work-related symptoms (Jeebhay *et al.*, 2000). In the present study on the hazards faced by the Irular fisherwomen in the Pichavaram mangrove waters, it is clearly evident that fisherwomen are the most vulnerable group who are exposed to multiple hazards. For instance, cat fish sting prohibits the

fisherwomen from fishing for 2–3 days. After the bite, the skin swells and bulges out for a week and there is severe pain for 24 hours. If the spine is also inserted during the bite, the fisherwomen may require medical treatment. During this time, the fisherwomen may not be able to do fishing. Most fisherwomen who are stung by catfish do not seek proper medical treatment but resort to traditional medicines for healing the wound. International Collective in Support of Fish workers (ICSF 1997) reported that clam pickers and other fisherwomen, who are exposed in the waters for long hours, in the *kolim* (a type of shrimp) fishery sector in Maharashtra are exposed to various occupational health hazards such as rheumatoid arthritis and backache. Koshy and Sharma (2001) reported that the issues of occupational health and safety are clearly important and need to be addressed to improve the working conditions in shore-based fishing activities.

The sharp oyster shells cut through the skin of the feet, legs and hands as the fisherwomen scour the bottom for shrimps on their hands and knees. These cuts are generally very deep and bleed profusely. In areas heavily populated by oysters, shrimps are in greater abundance, and the fisherwomen are naturally drawn to these areas due to the large quantities of shrimps, but they face the hazards of increased oyster cuts. Oyster cuts are generally very deep and to prevent sand and other debris from entering the wound, the fisherwomen stitch it with sewing needles. Due to the un-sanitized nature of the stitching, wounds become infected frequently.

While groping, fisherwomen submerge their whole body in the water, and only the head is out of the water as they carry the collection pouch (*pari*) between their teeth. Continuous rubbing of the *pari* rope on the lips leads to bulging, irritation and blistering of the lips. Exposure to sunlight during the day time causes ulcers and mouth pimples. Sometimes the mouth ulcers are so severe that the affected fisherwomen can't eat for 3–4 days.

Finger nail cavity formation is a common hazard in almost all the fisherwomen who are involved in groping for shrimps. While fishing, the women are groping the bottom with their hands and dragging their feet along the muddy bottom. During this time, foreign bodies (i.e., sand particles, fish spines, shrimp rostrums, etc.) enter under their nails, creating irritation, blackening and infection. The fisherwomen's hands and feet are submerged in water for 6–7 hours. Water saturation and skin softening make fisherwomen more vulnerable to sharp objects. Therefore, their hands and feet are easily punctured by spines, oysters and other sharp objects encountered in the water. Some fisherwomen are unable to carry out household activities like cooking due to this condition.

Irular fisherwomen spend 4–7 hours in the brackish water and subsequently suffer from skin irritation, rashes and psoriasis due to overexposure and experience a variety of irritants such as salt water, jellyfish, algal blooms, etc. This continuous exposure leads to skin itching, which results in psoriasis. Normally, Irular fisherwomen walk around 1–5 km from their villages to reach the groping site in the mangrove waters. Once the fisherwomen enter the water, they wade through knee deep muddy water. The long distances of walking coupled with the strain of working in

deep mud for 4–7 hours leads to undue stress on the leg, knee and back, which causes pain.

Women continue to grope of shrimps during their menstruation cycle causing increased body stress. This coupled with their method of shrimp picking leads to over-bleeding during menstruation, which is a common phenomenon in many of the Irular fisherwomen studied. During menstruation, fisherwomen continue to fish by groping, without using sanitary pads, and as a result many of them experience vaginal itching and/or yeast infections. If the fisherwomen choose to stay at home during menstruation, they lose a day's wage and are therefore inclined to fish daily. Over-bleeding leads to anaemia, which was also observed in many of the fisherwomen who participated in the study. Long periods of being submerged in the chilled water during the rainy season often leads to cold and flu-like symptoms for the fisherwomen especially women in the age group above 40.

Stomach ulcer is a common problem for fisherwomen who are involved in groping and pair fishing. Lack of food is the cause of stomach ulcers for many of the fisherwomen in Irular fishing communities. During the rainy season, the fisherwomen continue to catch shrimp by groping and are exposed to increased lightning strikes and thunder storms. Sometimes loss of life also occurs in the event of direct lightning strikes. Heavy work for long hours in mangrove waters is stressful on the body.

The groping method of fishing is more vulnerable than using craft and gears due to its inherent multiple health hazards. The seasons also play a role in the occupational hazards among the Irular fisherwomen of the Pichavaram mangroves. Fisherwomen are also exposed to multiple hazards due to natural disasters such as heavy rain, cyclone and thunderstorms. Moreover the monsoon period is generally the most productive fishing time of the year, and the fisherwomen spend more time in the water for collecting so they will get a good amount of catch. This is also one of the reasons for the severe health hazards during monsoon periods.

It may be concluded that looking at the nature of the occupation of Irular fisherwomen engaged and the kind of hazards they face resulting in work related physical injuries and other health issues it is important to stress here the need for prevention of such occupational hazards that may help in protecting and improving their lives. In the wake of the adoption of ILO's Work in Fishing Convention, which can go a long way in improving the working conditions of the fishing sector worldwide, it is to be hoped that the Central and State government will enact appropriate legislation, ensuring coverage of all significant categories of fishers. Extending the provisions of occupational health and safety, and social security to those engaged in shore-based fishing operations will do justice to women in fishing, in particular. The linked issue of social security for the Irular tribal fishers also needs to be examined. While no reliable data is available, it appears that Irular tribal fishers in Pichavaram region unlike the fishers who are involved in fishing in backwaters, are, by and large, not covered by government schemes for fishers in States where such schemes exist. It would be in order for the government to ensure that this marginalized segment also derives social-security benefits

through any legislation that might be adopted towards implementing the Work in Fishing Convention, 2007.

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