Common musculoskeletal problem experienced by fishing industry workers

Abstract

Introduction: Work-related musculoskeletal disorders (WMSDs) are a common health problem throughout the world and a major cause of disability in the workplace. Awkward working posture is a main risk factor for developing WMSDs. Assessment of exposure level to WMSDs risks can be an appropriate base for planning and implementing interventional ergonomics program in the workplace. Fishing in India is a major industry in the coastal states employing over 14 million people. The job demand of fishermen make them vulnerable for various musculoskeletal problems. This study was conducted among workers of fishing industry in Mumbai, India with the objective to determine WMSDs prevalence in fishing industry. Materials and Methods: In this cross-sectional study, 110 randomly selected workers from fishing industry, India, Mumbai, Anonymous questionnaire was used to study prevalence of WMSDs. Visual analogue scale used to assess intensity of pain. Results: The results of NMQ revealed that WMSDs occurrence was high. The highest rates of WMSDs prevalence were reported in Low back (92.4%), Shoulder (64.8%) and Knee (31%) and Hand (25%). Conclusion: This study showed that maximum of the fishermen have musculoskeletal problem with the most common joint involved is low back and then followed by shoulder, knee, and hand. Ergonomic risk factor involved were found to be repeated pulling and throwing of the net as well as repeated bending forward action to lift heavy load and transfer that heavy load.

Key words: Fish industry, workers, musculoskeletal problems

INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) are a common health problem throughout the world and a major cause of disability in the workplace. Awkward working posture is a main risk factor for developing WMSDs. Fishing in India is a major industry in the coastal states employing over 14 million people. Although fishing equipment and technology have improved, life in the commercial fishing industry still can be difficult with the strenuous physical labor of netting and processing fish, irregular work hours, and much time spent away from home.

Their job involves catching and processing of fish manually. Their work days start very early, long before dawn or last late into night. Living conditions inside large commercial vessels can be cramped, offering little privacy and long fishing expedition can mean weeks or months spent away from family members. One must be healthy and strong to be able to perform the manual labor of fishing as well as the boat maintenance and repair.

The job of these fishermen involves catching fish, storing them, and bringing them back to shore to sell. Their job mainly includes steering a vessel, operating navigational equipment, putting fishing equipments including nets and traps in water, pulling the net through water, bending forward to pick up the fish, and preserving them. Their job also involves transferring of heavy loads of fish, which involves a lot of forward bending from standing position. They also need repeated shoulder, elbow, wrist, and hand activities to throw and pull the net and to lift heavy fishes.

The job demand of fishermen leads to various musculoskeletal problems mainly involving shoulder, back, knee, and hand. Constant bending action and lifting heavy weights puts excessive strain on the back leading to development of back pain. Shoulder pain may also occur due to heavy weight lifting and repeated throwing and pulling of net from water. Hence, the objective of this article is to analyze the musculoskeletal problem in fishing industry in relation to their heavy load carrying and catching fish.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Fishing Industry, Navapada, Uran. Surkichapada, Uran, Colaba, these are the areas in Mumbai, which takes
care of the total demand of fish supply in Mumbai and nearby areas. More than 1000 male workers were employed in this industry. In this study, 110 workers with at least a 5-year of job tenure were randomly selected and included in the study. Workers with background diseases or accidents affecting musculoskeletal system were excluded from the study. Data were collected via anonymous questionnaires. The questionnaire consisted of two parts and covered the following items: (1) Personal details (including gender, age, job tenure, health, and medical background), and (2) musculoskeletal problems in different body regions. Visual analogue scale is used in the study to quantify the intensity of pain. Reported MSD symptoms were limited to the past 12 months. The subjects were contacted at their workplace and the questionnaires were completed by interviewing the workers.

RESULTS AND OBSERVATIONS

Table 1 shows the mean and standard deviation of age of the workers participated in the study. Table 2 job tenure of the workers participated in the study. Table 3 shows, the various activities in which workers are involved at workplace. Table 4 shows, quantification of amount of pain level in workers. Table 5 shows, the most commonly affected regions among the workers are, lower back (92.4%), shoulders (64.8%), knees (31.4%), elbow (24.8%), wrists/hands (25.8%) leg (5.7%), feet (0.9%).

DISCUSSION

Through the survey of total 110 fishermen who have been catching fish for more than 10 years. The data collected showed that 92% of the fishermen experienced intermittent pain whereas the remaining had continuous pain. The most common site of pain was found to be low back followed by shoulder and then knee and hand.

Job description

The fishermen have to work for more than 12 h a day. They have to throw the net in the water for 3-5 times in a day and pull the net thrown in the water, which is heavy. They also have to bend forward from standing position to pick up the fish and preserve it. The person who has to preserve the fish have to be in continuous contact with ice. The person who sits in one place at a height to observe fish and also helps in catching fish has to sit in one place for a long period of time and also help in catching fish. They have to work in both summer and winter seasons.

Job demand analysis

Physical: Long hours of standing. They have to throw the net into the water, which involves repeated shoulder, elbow, wrist, and hand activities. They also have to pull the net from the water, which appears to be heavy, which also involves repeated shoulder, elbow, wrist, and hand activities, and which also appears to put strain on the back. They also have to load heavy fish, which involve a lot of bending forward from standing position.

Mobility: Their job involves more mobility. Long hours of standing.

Environmental: The person who does the job of preserving fish in ice is in constant contact with ice. They have to work in both summer and winter seasons. Working in summer make them vulnerable to abnormal fluid loss.

Task analysis

Fishermen transfer weight of more than 75 kg every day from catching site to the place where the fish is preserved. Also throughout the day they have to pull the heavy net, which is thrown in the water for 3–5 times in a day. Every day they have to pull and throw the net 3–5 times a day and they also have to do repeated shoulder, elbow, and wrist and hand activities to pull the net. Every day they have to bend forward from standing position to pick up the heavy loads of fish and transfer them to the place where the fish are to be preserved.

Low back pain is one of the most common musculoskeletal problems seen in fishermen (92.4%). This is due to heavy load transfer with forward bending from standing position, which puts excessive strain on the back. Repeated lifting of load > 75 kg is a major predisposing factor to back pain seen in our study population. They also have to pull the heavy net through the water, which also puts strain on the back. Poor physical condition in association to job demands increases risk of developing back pain. Improper lifting can cause muscle injury as well as if you change your position while lifting it may place a lot of strain on your low back muscle. An article on “Employment and Physical work activities as predictor of future low back pain” stated that there is an increased risk of a new episode of a low back pain found in those whose job involves lifting/pulling/pushing objects of at least 25 lbs. or whose job involves prolonged standing and walking.[1] An article on “A study of lower back pain of Spanish fishermen on board of small commercial fishing vessels by Ergonomic digital human modelling systems and surface electromyography technique” by Zhang and Mondelo stated that the workplace on board of small fishing vessels with elements of manual materials handling or lifting are among those with the highest risk for injury in lower back, shoulders, and upper extremities.[3]

Shoulder pain is also one of the musculoskeletal problem seen in fishermen (64.8%). Due to heavy load carrying and transfer the shoulders are strained, also due to repeated throwing and pulling of the net causes microtrauma to the structure around
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shoulder joint, which may later lead to injury or tear. Mainly there are chances of having rotator cuff injuries because of repeated pulling and throwing activities. Excessive throwing or other overhead activities during work can lead to acute tendinitis. The rotator cuff becomes inflamed or irritated due to rotator cuff tears, which are much slower to develop. These tears are often the result of repeated actions with the arms working above shoulder level while throwing the net, which is having weight more than 3 kg.

Knee pain is also one of the problems seen in fishermen (31.4%). Injury to the knee may be caused by a fall or a slip while working. While the fishermen are performing throwing and pulling activities, a lot of force is exerted on the knee joint. There appears to be co-contraction of the muscle around the knee joint and there is increased joint reaction force as well as ground reaction force acting on the knee joint. This could lead to stress on the muscle around the knee joint, which could lead to knee pain. Working in standing position can be linked to versatility because the mobility of legs position and having large degree of freedom. This working position promotes workers to be more efficient and productive. Such advantages contribute high value for company profits; however, standing in a long period of time can lead to discomfort, muscle fatigue, and occupational injuries to workers.[3]

The fishermen have to work in summer season for more than 12 h because of which dehydration may occur and muscle may also get fatigued fast, which may lead to pain. The fishermen also have to work in winter and because they are in continuous contact with water and ice, there are chances of having cramps and pain in the muscle as well as reflex spasm of vasculature.

Hand pain is also one of the common problems seen in fishermen (25.8%). During the study, most of the fishermen complained of numbness, tingling, and pain in their hands, which are similar to carpal tunnel syndrome. It is observed that there is repeated movement at wrist and hand, which mainly puts stress on the small muscles around the wrist and hand. This also appears as a predisposing factor for carpal tunnel syndrome. Carpal tunnel syndrome (CTS) is one of the most common hand problems among adults. The complexity of symptoms results from compression of the median nerve at the carpal tunnel and includes pain, numbness, or tingling anywhere along the median nerve distribution. Some patients experience a weakened grip or nocturnal exacerbation of the symptoms.[3] According to the study which have done 96% have discomfort due to contact with ice. Due to continuous contact of hand with ice, there is a chance of vasospasm of the vasculature supplying hand, because there are chances of easy fatigue and decrease in functional capacity of structures surrounding the wrist and hand. Easy fatigue can be a reason for repetitive trauma as it affects hand muscle coordination,[4] followed by swelling, which is a major cause of compression effect on the median nerve and produces carpal tunnel syndrome-like pathology. An article written by Jianmongkol stated that there are chances of carpal tunnel syndrome in workers from a fishnet factory. The article stated that fishnet-making factory is one of the largest manufacturers in the area in which workers use their hands for prolonged, repetitive grasping or extreme hyperextending positions of the wrist.[5]

**CONCLUSION**

This study showed that maximum of the fishermen have musculoskeletal problem with the most common joint involved

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**Table 1: Age distribution of the workers**

| Age (years) | % |
|-------------|---|
| 21-30       | 31|
| 31-40       | 38|
| 41-50       | 14|
| 51-60       | 14|
| 61-70       | 4 |

Mean = 37.89, Standard deviation = 15.54027

**Table 2: Job tenure of the workers participated in the study**

| Duration (years) | Percentage |
|------------------|------------|
| 10               | 19         |
| More than 10     | 81         |

**Table 3: Activities in which workers are involved at work place**

| Title            | Percentage |
|------------------|------------|
| Catch fish       | 99.09      |
| Pagi             | 0.9        |
| Preserve fish    | 0          |

**Table 4: Quantification of pain level in workers**

| Percentage |
|------------|
| 0          | 5          |
| 1          | 29         |
| 2          | 49         |
| 3          | 10         |
| 4          | 4          |
| 5          | 3          |

**Table 5: frequency of reported symptoms in different body regions during the 12 months prior to the study (n=110)**

| Site                                               | Percentage |
|----------------------------------------------------|------------|
| Low back                                           | 92.4       |
| Shoulder                                           | 64.8       |
| Elbow                                              | 24.8       |
| Hand (it is combined distribution of wrist and hand) | 25.8       |
| Knee                                               | 31.4       |
| Leg                                                | 5.7        |
| Feet                                               | 0.9        |
is low back and then followed by shoulder, knee, and hand. Ergonomic risk factors involved were found to be repeated pulling and throwing of the net as well as repeated bending forward action to lift heavy load and transfer that heavy load.

REFERENCES

1. Macfarlane GJ, Thomas E, Papageorgiou AC, Croft PR, Jayson MI, Silman AJ. Employment and Physical work activities as predictor of future low back pain. Spine (Phila Pa 1976). 1997;22:1143-9.

2. Zhang B, Mondelo P. Study of lower back pain of Spanish fishermen onboard of small commercial fishing vessels by ergonomic digital human modeling systems and surface electromyography technique. media.univ-lyon1.fr/iea-dhm2011/abstracts/2169.pdf [Last accessed on 2014 Nov].

3. Isa Halim, Abdul Rahman Omar, Alias Mohd Saman, Ibrahim Othman. A review on health effects associated with prolonged standing in the industrial workplaces. IJRRAS 2011;8:14-21.

4. Danna-Dos Santos A, Poston B, Jesunathadas M, Bobich LR, Hamm TM, Santello M. Influence of fatigue on hand muscle coordination and EMG-EMG coherence during three-digit grasping. J Neurophysiol 2010;104:3576-87.

5. Jianmongkol S, Kosuwon W, Thumroj E, Sumanont S. Prevalence of carpal tunnel syndrome in workers from a fishnet factory in Thailand. Hand Surg 2005;10:67-70.

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