Occupational Safety and Health Hazards among Smoked Fish Workers in Demak

by Yuliani Setyaningsih

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RESEARCH ARTICLE

Occupational Safety and Health Hazards among Smoked Fish Workers in Demak

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Abstract

Smoked fish is an essential commodity in Central Java. Smoked fish workers must always ensure the availability of smoked fish products for the community. To work continuously, workers need to maintain their safety and health. Workers are constantly exposed to potential hazards from their work. This study aimed to describe the potential occupational hazards of smoked fish workers and identify efforts to control these hazards. This descriptive research involved smoked fish workers cleaning, cutting, washing, and smoking fishing in Demak city, Central Java, in March 2021. The job safety analysis (JSA) method was used to describe potential hazards in every work process. The results showed that the potential risks found in the working process of smoking fish were a wet and humid work environment, sharp work equipment, non-ergonomic work postures, and a hot work climate. It can be concluded that workers are exposed to various hazards in their work and work environment. Therefore, it is necessary to increase occupational safety and health (OSH) awareness and working environment conditions in the smoked fish industry so that workers will always be safe and healthy at work.

Keywords: Job safety analysis, occupational safety and health (OSH), OSH hazards, smoked fish worker, work environment

Introduction

Indonesia is famous for its diverse specialties. The food is the result of agriculture/plantation and marine products. One of the marine products is fish. Various kinds of food are processed from fish, one of which is smoked fish, an essential commodity in Central Java. The smoked fish center is one of the informal sector industries that is multiplying and supports the economy of fishing communities. Still, this sector has a reasonably high health risk because workers pay less attention to work safety rules.[1]

A study on fishermen in West Java showed that 7 out of 17 had health problems, with the highest number suffering from hypertension. All respondents had experienced work-related hazards and accidents. The most significant health hazard that fishermen complain about is the sting of a green jellyfish. Handling marine products can also increase the health and safety risks of fishermen. Increased knowledge about safety and health at work, as well as training on accident handling, needs to be carried out so that workers can prevent exposure to potential hazards at work.[2]

Smoking fish in Indonesia was initially done traditionally by using simple equipment and not paying attention to hygiene and sanitation aspects so that it can impact health and the environment. Short chimneys affect air pollution and health. In addition, non-ergonomic work postures cause many health problems for workers.[3]

The working process of smoking fish begins with cleaning the fish. Fish that have been cleaned are then cut into pieces according to the specified size. The pieces of fish are then washed and stabbed with bamboo. The fish then go into the smoking process. Health complaints found in previous studies were as follows: 87% of workers had MSDs complaints, 40% of workers complained of dermatitis, and 76% of workers had respiratory complaints.[4]

This study aims to analyze the potential occupational hazards of fish-smoking workers and identify efforts to control these hazards.

Methods

This research is a descriptive study conducted at a smoked fish center in Demak city, Central Java, in March 2021. The subjects of this study were smoked fish workers in cleaning, cutting, washing, stabbing, and smoking fish.

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Each work process was analyzed based on the job safety analysis (JSA) form. The JSA method was used to describe potential hazards in every work process.[5] Workers were observed from the start of work to completion to fill out the JSA form. In addition, researchers took pictures when workers were doing work with the workers' permission.

The research protocol has been approved and received an ethical clearance certificate number 200/EA/KEPK-FKM/2020.

Results

Based on the study's results, it was found that each work process was carried out successively in one day. Each fish that has been processed must be completed until the smoking process. The fish may be damaged or rot if smoking is done the next day.

The process of cleaning the fish can be seen in Figure 1. In this picture, it can be seen that workers are splitting and cleaning the entrails of the fish and cutting the fins of the fish. Workers sit in tiny chairs (*dingklik*) and use flip-flops for footwear.

Figure 1 shows that workers use pieces of wood as a work table as well as a cutting board. Around the workers, there are several buckets and fish to be cleaned. Fish droppings are also placed on the floor.

Figure 2 shows the process of cutting fish into smaller pieces with a predetermined size. Several buckets of fish containers were seen in front of the workers to separate the pieces of fish.

Figure 2 Fish Slaughter

The fish washing process shown in Figure 3 is carried out with water stored in a bucket. This process is repeated several times until the fish are clean. Figure 3 also shows that the worker was still sitting on a small/short chair and the body looked slightly bent to reach the bucket. In this washing process, workers were seen wearing cloth gloves.

The process of skewering pieces of fish with bamboo was carried out by workers who sat on

Figure 1 Fish Cleaning

Figure 3 Fish Wash

Figure 4 Fish Stabbing

Figure 5 Fish Smoking Process

short chairs and saw their bent backs. Workers wear flip-flops. Bamboo slats can be seen piled up on the floor.

The last process carried out in this work was smoking the fish (Figure 5). This process begins with preparing fuel for smoking fish. The fuel for this process was dried corn cobs. The method of smoking fish was carried out in a relatively narrow room so that workers would be exposed to heat and fumes from the smoking process.

Discussion

The process carried out in the work of smoking fish has potential hazards that can endanger the safety and health of workers. For example, potential hazards in the fish cleaning process include fish/fish droppings that can trigger allergies and dirty and slippery floors because they are always wet, which can cause falls, scratched hands, or fish thorns. In addition, sitting for too long, especially with a low enough chair, can trigger complaints of aches and back pain.[6–8]

The smoked fish production process uses many repetitive activities with a continuous sitting position and grabbing, retrieving, and bending movements. Work activities like this will certainly cause injury to the muscles, joints, ligaments, and tendons. These disorders are usually referred to as musculoskeletal disorders (MSDs) complaints or complaints of the musculoskeletal system, which are conditions of discomfort or even pain.[9–11]

Cutting fish has various potential hazards, including dirty and slippery floors that can cause falling or slip and knives/sharp objects that can cause hands to be cut. In addition, an unergonomic and uncomfortable sitting position and sitting for too long can cause backache or pain.

Workers are exposed to several potential hazards during the fish-washing process. Floors that are always wet can cause slips and falls. Sitting positions that are not ergonomic and too long can cause backache or pain. Hands that are always in contact with water can cause workers' skin to become irritated. If not addressed immediately, these complaints can develop into skin diseases in workers.

Occupational skin diseases contribute to the majority of occupational diseases, especially in Asia, where most of the workforce is in the unorganized sector. A study was conducted on the number of reported disease incidences with patterns of occupational skin diseases reported in Asian countries and different types of occupational allergens. Some of the skin diseases seen in workers in Asian countries are similar to those in Western countries, including skin diseases caused by chromate in construction and electroplating workers, epoxy resins and chromate in painters, wood dust in workers in the furniture industry, dyes in textile workers, formaldehyde and chromate in those working in the leather and dyeing industry, skin diseases in

domestic workers, cooks and health care workers. Skin diseases in workers engaged in agriculture, carpet weaving, sanitation, coffee plantations, coal mines, and also fish processing workers.[12]

A study was conducted on hundred and eleven of 135 (82.2%) seafood workers at two food markets in Ningbo, East China. The prevalence of hand dermatitis was 50.5% (56/111) in seafood workers, which was significantly higher than the control group (7.43%, p<0.001). It was found that the incidence of superficial hand fungal infections in seafood workers was much higher than in the community (26.1% vs. 2.7%, p<0.001). Without waterproof gloves, longer working hours per day and a long history of work in the seafood sector increase the risk of hand dermatitis. Hand skin disease is prevalent in workers who handle seafood. And these public health problems must be addressed, especially in this working population.[13]

In the process of skewering fish, workers are exposed to the potential danger of sharp sticks that can cause sticks to prick their hands. In addition, slippery floor surfaces can cause slips and falls. Sitting positions that are not ergonomic and too long can cause backache or pain. Workers' hands in this process are also always wet because the pieces of fish to be pierced are submerged in a water-filled bucket. So that when it is about to be skewered, the fish must be taken piece by piece by the worker by dipping his hand in the bucket.

A study stated that jobs where there are activities of workers who have to immerse their hands in liquid for >2 hours per shift or wear waterproof (occlusive) gloves for a suitable time, or wash their hands >20 times per shift are common known as wet work. This study investigated wet work as a significant risk factor for developing irritant contact dermatitis on the hands. The study also provides a detailed description of exposure to wet work among certain occupational groups who deal extensively with water and other liquids in their work. In addition, the study also highlights the extent and importance of the health effects caused by exposure to wet work.[14]

The process of smoking fish exposes workers to smoke and hot steam, which can cause eye, skin, and respiratory irritation. Exposure to hot temperatures can cause workers to experience heat stress. The sitting position is not comfortable/not ergonomic, and sitting for too long can cause backache or pain.

A study investigating musculoskeletal symptoms in workers at a fish processing plant in Ghana found that workers' necks were stooped and experienced neck flexion. Workers also stand for long periods, elevate the shoulders, abduct the arms, repeatedly reach forward and deviate the wrists. It follows the questionnaire results where musculoskeletal symptoms most occur in the neck, shoulders, lower back, wrists/hands, and knee areas. There was no significant relationship (p<0.05) between musculoskeletal symptoms with age, working hours, and length of work. Even so, if this condition occurs continuously, the musculoskeletal complaints in workers will get worse. Therefore, in this study, it is suggested to redesign the task, change the workplace, and train workers to improve their quality of work and health.[15]

Results from one study showed that nearly 71% of women (aged 23.0±6.4 years) reported MSDs, especially in the upper back (54%), lower back (33%), knees (35%), and shoulders (27%). Pain severity was high among workers with high comorbidity (pain in two or more areas). One-third of workers consider the work environment to be the cause of their MSDs. Almost all psychosocial factors and job stress are associated with low back MSD. In addition, cold and humid environments, awkward standing work postures for long hours, high physical activity, poor task clarity, and high mental load are important risk factors for MSDs.[16]

A descriptive study conducted on 368 workers in the seafood industry in Myanmar showed a prevalence of MSDs of 45.1% occurring in the last seven days. Marital status, the number of dependents, other health problems, working hours, repetitive hand movements, awkward wrist posture, prolonged standing, and manual handling of heavy loads were found to be associated with MSDs. The research findings also indicate the need for adequate knowledge about ergonomics and awareness campaign programs focusing on preventing MSD, especially low back pain. Business owners are advised to detect MSD symptoms early in seafood processing workers.[17]

Research conducted in the salmon industry found that from a Nordic questionnaire, 80% of workers showed musculoskeletal symptoms in the right hand/wrist, followed by the shoulder in 60% of workers and arm/elbow in more than 50%. There was a statistically significant relationship between productivity and MSD risk (p<0.05).[18] A

study of the average annual claim rates in health-related workers found that claims on workers in the seafood processing industry were significantly higher than all industries in Alaska. The most common injuries/diseases were sprains/strains/tearing (n=993, 36%); by body part, upper limb (1212, 43%); and by event, contact with objects/equipment (1020, 37%) and overreaction/body (933, 34%). Frequent incidents include repetitive movements; fatigue when handling tools, fish, and buckets; and contact with fish, cookware, and machinery. Ergonomic and safety solutions should be implemented to prevent musculoskeletal injuries/diseases in seafood processing.[19]

New sources of exposure to this type of allergen continue to be reported. Through clinical databases and surveillance systems, the effects of the presence of a new allergen can be monitored. In the fish processing process, certain ingredients may be allergens for some workers. Maybe workers have not recognized it because early detection and screening have yet to be implemented. Primary prevention in the workplace Must be done. This process of identifying and assessing potential hazards must be carried out to reduce the impact of disease occurrence. Further research and efforts to improve the prevention of occupational skin diseases should continue.[20]

Hygienic and sanitary working conditions in fish processing facilities are most challenging to control and sometimes even very dangerous for workers. Various data literature on fish processing work still raises many questions regarding assessing working conditions concerning worker knowledge, evaluation of work risks, risk of occupational diseases, and working conditions in the working group.[21]

Hazard controls that can be carried out in this work per the hazard control hierarchy are as follows. The substitution step can replace the water to wash the fish from the reservoir with running water. Engineering can be done by replacing the appropriate work table and chairs (there were seat backs, cushions, and height according to the length of the legs), engineering/adding the installation of exhaust fans/making air ventilation. Administrative steps are used by stretching every 2 hours of work, doing work with the 5R concept (*ringkas*/concise, *rapi*/neat, *resik*/clean, *rawat*/treat, *rajin*/diligent), and cleaning the work area after. Additionally, arrange regular changes in washing water, conduct regular health checks on workers (at least once a month) by checking blood pressure, and diagnose the complaints felt by workers. This health check can be done by utilizing the available clinics at the fish smoking center.

The last control hierarchy was using personal protective equipment (PPE). Workers can use appropriate PPE such as gloves, masks, and boots/anti-slip shoes. PPE is adjusted to the potential hazards faced in each work process.

Conclusion

It can be concluded that potential hazards from the smoked fish process were fish droppings that can trigger allergies, accidents caused by knives or pricked by fish bones, non-ergonomic work conditions, and fumes.

Conflict of Interest

All authors convey that there is no conflict of interest between all parties.

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RESEARCH ARTICLE

Role of T2-weighted and Diffusion-weighted Imaging in Cervical Malignancy in Developing Countries

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Abstract

Cervical cancer is the second most common gynecologic malignancy in Asia and is the leading cause of death in women in developing countries. The cervical cancer stage will significantly affect the prognosis and management. Based on the International Federation of Gynecology and Obstetrics (FIGO) 2018 classification of cervical cancer, magnetic resonance imaging (MRI) has a crucial role in determining cervical cancer staging. This study aimed to evaluate the role of T2-weighted imaging (T2WI) and diffusion-weighted imaging (DWI) sequences in assessing cervical carcinoma, with the pathological diagnosis being taken as the standard for cervical cancer diagnosis. This study was conducted on seven patients diagnosed with cervical cancer from pathological examination in January 2020 to March 2021 in the Department of Radiology Dr. Hasan Sadikin General Hospital Bandung. We detect the presence of locoregional lesions and extensions of cervical carcinoma using MRI with T2WI and DWI sequences in patients who have previously been diagnosed histopathologically. This study involved seven cervical cancer patients. Pelvic MRI with T2WI and DWI sequences was performed. The imaging results in these patients show that one patient has stage IB1 cervical cancer, four patients have stage IIB, one patient has stage IIIA, and one has stage IIIC1 cervical cancer. This study concluded that T2WI and DWI sequences in MRI are essential and sufficient for diagnosing cervical cancer.

Keywords: Cervical malignancy, diffusion-weighted imaging, magnetic resonance imaging, T2-weighted imaging

Introduction

Cervical cancer is Asia's second most common gynecologic malignancy after uterine and ovarian malignancies. According to 2020 Globocan data, in developing countries such as Indonesia, cervical cancer is the second most common cancer after breast cancer and is the leading cause of death in women.[1]

Radiology plays a vital role in the diagnosis of cervical cancer and determining the staging of cervical cancer.[2] Cervical cancer staging will significantly affect the prognosis and management.[3,4] Based on the revised classification from the International Federation of Gynecology and Obstetrics (FIGO) in 2018, cross-sectional imaging, especially magnetic resonance imaging (MRI), has a vital role in determining the staging.[4] MRI can determine the origin of the mass, the size of the masses more accurately, invasion of the parametrium, pelvic wall, vagina, bladder, ureter, and rectum, and see the presence of lymph node involvement.[5–7] The necessary MRI sequences in cervical cancer are T2-weighted imaging (T2WI) and diffusion-weighted imaging (DWI). In T2WI, we can determine if there is tissue edema or necrosis due to cervical cancer. DWI can be used to see the presence of cervical cancer lesions and to evaluate quantitatively the diffusion properties based on the value of the apparent diffusion coefficient (ADC).[8–10]

This study aimed to evaluate the role of T2WI and DWI in assessing cervical carcinoma, with the pathological diagnosis being taken as the standard for cervical cancer diagnosis.

Methods

This study was conducted on seven patients diagnosed with cervical cancer from pathological examination in January 2020 to March 2021 in the Department of Radiology Dr. Hasan Sadikin General Hospital Bandung. They underwent pelvic MRI with T2WI and DWI sequences and had not yet undergone therapy. The processed data is secondary data from patient medical records and picture archiving and communication

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RESEARCH ARTICLE

Determinants of Detectable Anti-hepatitis B in Fertile Age Women from Indonesia

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Abstract

Hepatitis B (HBV) is still a major health problem worldwide, as evidenced by the large number of people infected with hepatitis. There are around two billion people infected with HBV, and an estimated 350 million are in chronic conditions. Hepatitis B is a ninth-order disease that causes death in mothers and their babies. The HBV infection in pregnant women is critical because of vertical or perinatal transmission. This study's purpose was to analyze data of the HBsAg and anti-HBs rertile age women, pregnant women, and postpartum mothers from National Basic Health Research Data 2007. The method is a retrospective study using secondary data from the Basic Health Research in 2007. The number of samples in the form of data on respondents of fertile age women are women aged 15 to 49 years. Data screened and matched with that examined pregnancy/have had a postpartum examination/never checked neonates/had examined their toddlers. One thousand three hundred two (1,302) respondents were eligible to be sampled in this analysis. The variables analyzed were age and anti-HB titers in women of childbearing age 15 to 49 years who were not protected against hepatitis B, as much as 74.65% of the total 1,302 people. Three hundred thirty (330) respondents had anti-HBs titers. This study concludes respondents who are not married age 15–20 years showed relationship with negative anti-Hbs antibodies.

Keywords: Anti-hepatitis B titer, fertile age women, hepatitis B virus, postpartum mothers, pregnant women

Introduction

Hepatitis B is still a significant health problem in the world. It is proven by the large number of people infected with hepatitis.[1] The prevalence of chronic hepatitis B infection varies worldwide, ranging from <1% in low-endemism regions to 30% in highly endemic areas. There are around two billion people infected with HBV, and an estimated 350 million are in chronic conditions.[1] HBV is a ninth-order disease that causes death to mothers and their babies.[2] In Nigeria, despite effective vaccine administration, it is still declared an HBV hyperendemic area with an estimated prevalence of 12%.[2]

Regions declared endemic intermediate if the prevalence of HBsAg is around 1–17% and the risk of infection is approximately 20–60%, covering Southern Europe, Southern America, and Russia. Fertile age women (FAW) are women in a state of reproductive organs functioning properly between the ages of 20–45 years. The peak of fertility in women is in the age range of 20–29 years. At this age, women have a 95% chance of getting pregnant. At the age of 30–39 years, the percentage decreases to 90%, and after entering the age of 40 years, the chance of pregnancy becomes 40%, then it will reduce to 10% if women are over 40 years old.[3,4]

In countries with high HBV endemicity, where the prevalence of HBsAg is ≥8%, the transmission pattern is usually vertical at birth from a chronically infected mother or horizontally during early childhood from being caused by bites, skin lesions, or unhealthy habits. About 45% of the world's population, those living in African and Asian countries, the Amazon Basin, and parts of the Middle East, live in high endemicity areas with a lifetime risk of infection of more than 60%. Only about 12% of the world's population lives in low-endemicity regions, such as the United States, Western Europe, and Australia, where the prevalence of HBsAg is <1% and the lifetime risk of infection is <20%.[2,5]

Transmission in low-endemicity areas is generally horizontal in adulthood, usually through sexual transmission and contaminated needles in medical procedures or injection drug use. The results of the Basic Health Research in 2007 showed a prevalence of hepatitis of 9.4%.

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KOMISI ETIK PENELITIAN KESEHATAN
HEALTH RESEARCH ETHICS COMMITTEE
FAKULTAS KESEHATAN MASYARAKAT UNIVERSITAS DIPONEGORO
FACULTY OF PUBLIC HEALTH DIPONEGORO UNIVERSITY

KETERANGAN LOLOS KAJI ETIK
DESCRIPTION OF ETHICAL APPROVAL
"ETHICAL APPROVAL"

No : 200/EA/KEPK-FKM/2020

Protokol penelitian yang diusulkan oleh :
The research protocol proposed by

Peneliti utama : Dr. Yuliani Setyaningsih, SKM, M. Kes
Principle Investigator

Nama Institusi : Universitas Diponegoro
Name of the Institution

Anggota Peneliti : 1. Ida Wahyuni, SKM, M. Kes
Member 2. Ekawati, SKM, M. Sc

Dengan judul :

Tittle

"UPAYA PENURUNAN KELUHAN MUSCOLOSKELETAL DAN KEJADIAN DERMATITIS MELALUI PERBAIKAN PERILAKU, HIGIENE SANIITASI DAN STASIUN KERJA PADA PEKERJA SENTRA PENGASAPAN IKAN"

" EFFORTS TO DECREASE THE COMPLAINTS OF MUSCOLOSKELETAL AND INCIDENCE OF DERMATITIS THROUGH BEHAVIORAL IMPROVEMENT, HYGIENE SANITATION AND WORK STATIONS ON FISH-TASTING CENTER WORKERS"

Dinyatakan layak etik sesuai 7 (tujuh) Standart WHO 2011, yaitu 1) Nilai Sosial, 2) Nilai Ilmiah, 3) Pemerataan Beban dan Manfaat, 4) Risiko, 5) Bujukan/Eksploitasi, 6) Kerahasiaan dan Privacy, dan 7) Persetujuan Setelah Penjelasan, yang merujuk pada Pedoman CIOMS 2016. Hal ini seperti yang ditunjukkan oleh terpenuhinya indikator setiap standar.

Declared to be ethically appropriate in accordance to 7 (seven) WHO 2011 Standards, 1) Social Values, 2) Scientific Values, 3) Equitable Assessment And Benefits, 4) Risks, 5) Persuasion/Exploitation, 6) Confidentiality and Privacy, and 7) Informed Concent, referring to the 2016 CIOMS Guidelines. This is as indicated by the fulfillment of the indicators of each standard.

Pernyataan Laik Etik ini berlaku selama kurun waktu tanggal 28 August 2020 sampai dengan tanggal 28 August 2021

This declaration of ethics applies during the period August, 28th 2020 until August, 28th 2021

Semarang, 28 August 2020
Professor and Chairperson,

KOMISI ETIK PENELITIAN KESEHATAN FKM-UNDIP SEMARANG

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