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Health risks and hazards of pedestal oil-lamp workers in Nachiyar Kovil Village, Tamil Nadu, India

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ABSTRACT

Work plays a vital role in people's lives, since most workers spend at least eight hours a day, whether it is on a farm, an office, a factory. Hence, working environments should be safe and healthy. But this is not the case for many workers. Every day workers all over the world face with a multitude of health risks hazards, such as dusts, gases, and noise, vibration and the extreme temperatures. Occupational health should aim at 'the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations'. International Labour Organization (ILO) estimates that the world's 2.7 billion workers, at least 2 million deaths per year are attributable to occupational disease and injuries. In India, according to 2001 censuses around 18 million workers were affected by occupational diseases. Recently, occupational health, risk and hazards are empirically studied by many scientists. The health of the industrial workers is influenced by conditions prevailing in their work place. One of the aims of occupational health is to provide a safe occupational environment in order to safeguard the health of the workers and industrial production.

Key Words: Occupational Health, Health Hazards, Social Health, Workers.

INTRODUCTION

Accidents or illness are likely to be incurred during the work of a particular occupation. An industrial worker may be exposed to five types of hazards, depending upon their occupation. *Physical hazards:* Heat, cold, light, noise, vibration, ultraviolet radiation and ionizing radiation, if the workers are exposed to beyond the acceptable limits without protective measures. *Chemical hazards:* Toxic, corrosive, allergenic and carcinogenic chemicals act by local action; inhalation and ingestion on exposure to concentrations beyond the threshold limit of value. *Biological hazards:* Workers are exposed to infectious and parasitic agents at the workplace. Persons working with animal products and agricultural workers are likely to be exposed to biological hazards. *Mechanical hazards:* The mechanical hazards in industry by the machine, protruding and moving parts. Industrial accidents are due to mechanical causes. *Psychosocial hazards:* occur from the workers' failure to adapt to psychosocial environment. Frustration, lack of job satisfaction, insecurity, deprived human relationships and emotional tension are some of the psychosocial factors that may undermine both the physical and mental health of industrial workers.

Chatterjee D.S et al (1978) Prevalence of vibration-induced white finger in fluorspar mines in Weardale. Br J Ind Med; 35:208–218. A combined epidemiological and clinical study of vibration-induced white finger (VWF) was carried out involving 115 men in four fluorspar mines. The overall prevalence of VWF was found to be 50% among 42 vibration-exposed subjects, while that of constitutional white finger (CWF) was 5-6% in all men studied. The VWF latent interval was 1-19 years with a mean of 5-6 years. An association was observed between the exposure time and VWF stages which included 18 men in Stage 0, three in the intermediate Stage of OT/ON, five in Stage 2 and 16 in Stage 3; no men were seen at Stage 1. Among those with VWF in Stage 3, the index, middle and ring fingers were affected in both hands and the little fingers and thumbs were last to be involved. Clinically, on general

examination, apart from vibration-induced white finger, the men in the 'vibration' group were not as healthy as those in the 'control' group. The circumference of the index fingers was not significantly different for the different groups. Neurological tests showed that the ridge test and, to a lesser extent, the two-point discrimination and the light touch tests, could be regarded as useful for the diagnosis of VWF. Donoghue AM.(2004) Heat illness in the US mining industry. *Am J Ind Med*; 45:351–356. This review article outlines the physical, chemical, biological, ergonomic and psychosocial occupational health hazards of mining and associated metallurgical processes. Mining remains an important industrial sector in many parts of the world and although substantial progress has been made in the control of occupational health hazards, there remains room for further risk reduction. This applies particularly to traumatic injury hazards, ergonomic hazards and noise. Vigilance is also required to ensure exposures to coal dust and crystalline silica remain effectively controlled. Ranjnarayan R. Tiwari (2009) Child labours in footwear industry: Possible occupational Health Hazards The constitution of India, as a part of the fundamental rights, has laid down that the State shall direct its policy towards protection of childhood and youth against exploitation and shall not be employed to work in any factory or mine or engaged in any hazardous employment.

Present Study and its Importance

The study area is Nachiyar Kovil village, Kumbakonam Taluk, Thanjavur District, Tamil Nadu, India. It is a leading famous centre for the manufacturing of pedestal oil-lamp using Brass Metal and it is largely consumed by local also exported to Hindu occupied countries. The pedestal lamp is culturally valued and used by devotees of Hindu God, festivals, marriage ceremony and inaugurating functions.

Present research is deals with the occupational health risks and hazards perceived amongst pedestal oil-lamp industrial workers towards the type of work engaged in industry and existing health conditions. Health risks, explained the underlying factors responsible for the health hazards of workers. In this direction the present study is deals more emphasis on health hazards towards the type of work engaged in the industry, duration of work and existing health and psychological problems of respondents. In addition to above perception of the respondents towards their health care information are also collected to bring out for planning frame work and better industrial management.

Aim and Objectives

- ❖ To analyze the physical, socio-economic, cultural, demographic and psychological characteristics of the respondents working in pedestal oil-lamp manufacturing industry and existing health (conditions) hazards reported by them.
- ❖ To probe into the relationships and find out the association among the selected health hazard variables.
- ❖ To discuss the existing health care system and preventive measures for the control of health hazards.

Datasets and Methodology

Primary Data and Sample

The present study is based on a questionnaire survey by direct observation method based on random sampling procedure. As much as 400 respondents have been selected from a universe of 2000 workers. The random number table was used to pick out the sample. The questions are mostly closed one except in some places the questions are designed in an open-ended manner. The questions are related to type of work engaged, physical position at working place, duration of work, risks, socio-economic, demographic and psychological characteristics and utilization of health care facilities available at pedestal oil-lamp manufacturing industry.

Statistical Techniques

The information collected through the questionnaire has been transformed into selected variables and entered into SPSS 15.0 Statistical Software for the application of statistical technique to find out the association. The χ^2 test and Pearson correlation (p. c, sig. 2-tailed) techniques are performed to bring out the association and interrelationships between the types of work engaged in Pedestal oil-lamp industry and selected variables related health hazards.

Findings and Discussion

Socio-Economic and Living Conditions of Workers

For this study 400 respondents are observed aged between 18 and 71 years. They engaged different types of work. 28 percent of workers aged between 18 and 28. 30, 29, 10 and 3.1 percent are between the age group of 29 and 38, 39 and 48, 49 and 58 and above 59 respectively (Figure.1). Their monthly income varies from Rs. 4500 and Rs. 6000 according to their experience in years. This is also justified that there is a positive correlation (0.553) between age and experience; this shows that their monthly income increases with experience increases. 73.5 percent of workers were married and 26.5 percent were unmarried. Their family size is small to medium (2-6 members). The workers educational background is not satisfactory; 11.5 percent of them uneducated, 55.5 percent were having primary education, 31.8 percent were having secondary education and the remaining 1.2 percent were degree and

diploma level. This is a traditional, cottage and unorganized industry, so that technical education is not played a vital role to work in this industry even though it is technical oriented. The young or newly appointed workers are gaining knowledge, techniques and skills from the elder or experienced persons by keen observation. This is also verified that the educational background and monthly income and year of experiences are negatively (-0.188 and -0.214) correlated.

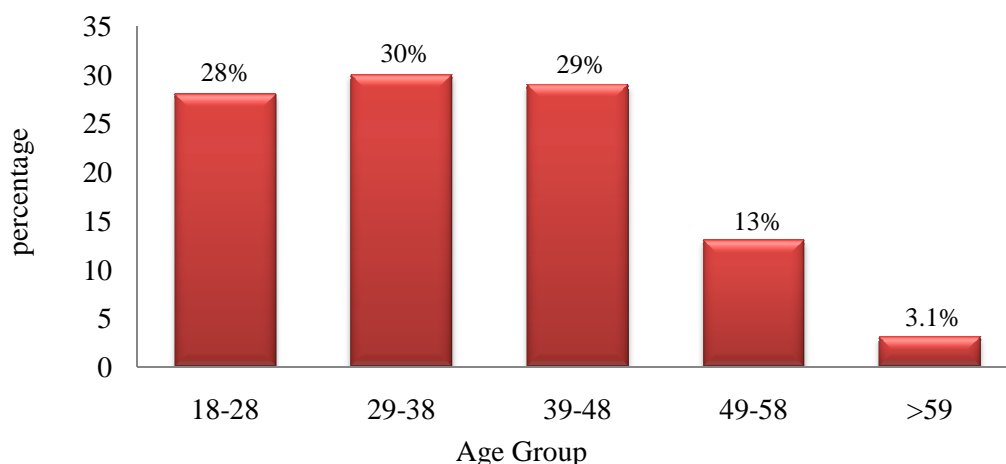


Figure 1 Respondents Age Group

Types of Work Engaged in the Pedestal Oil-Lamp Manufacturing Industry

In the Pedestal Oil-Lamp Manufacturing Industry, the workers are doing different activities (Figure.2) according to their field of specialization. Among the 400 respondents the hammering workers are 17.8 percent, melters are 13.3 percent, molders specialists are 18.5 percent and welders are 9.8 percent. The workers those are engaging in polishing and drilling are 13.3 and 27.5 percent respectively.

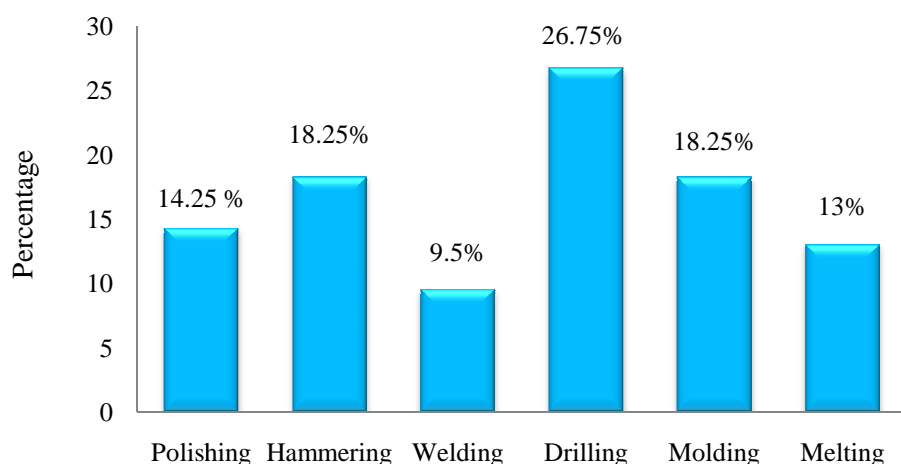


Figure 2 Type of work

The respondents are exposed to health risk according to their respective work after long run it will create some problems in workers' health. It may leads to permanent or temporary cause on their physic. Occupational health hazard is getting or acquiring illness due to their work. In this way, the workers health risks and hazards are analyzed.

Physical Hazards

Almost all the workers are exposed to physical hazards likely to be heat, light, noise, vibration and radiation. The respondents of hammering (17.8%) people are uttered that they are suffering from musculoskeletal discomfort as like palm, wrist, neck and shoulder, back and hip pain. There is a strong association between the variable musculoskeletal discomfort and type of work engaged in the industry ($\chi^2=240.022$, $df=15$, $p=0.000$). These are also positively correlated with those variables (p. c value 0.111, sig. 0.027). There is also another variables associated

between heat and musculoskeletal discomfort ($\chi^2=17.010$, $df=9$, $p=0.049$); among them about 40 percent are informed that they are having stomach pain often due to physiological working conditions as such as sitting and bending for long duration. They also revealed that their palm and finger become white because of their continuous hammering.

About 13.3 percent of melting related respondents is disclosed that they are exposed to 1200°C temperature at kiln, so heat spot has been created in and around the melting room; the workers have got pimples, burns, wounds, heat cramps, heat exhaustion (fatigue) due to radiation. There is a strong interrelationships between the variables the type of work and heat ($\chi^2=44.72$, $df=15$, $p=0.000$). This is also justified by strong positive correlation between the variable part affected by heat and type of work (p. c value 0.144, sig. 0.004). They are also affected by smoke inevitably during melting of metals that's why the respondents (13.3%) relate their respiratory problems (breathing trouble and chest congestion), eye problems (tearing, glare, blurry, sore, dry, inflammation, and pain), accidents (poor vision) due to smoke. In Sometimes they are also getting head ache and body pain due to physical strain. Here is a strong connection between the variables, type of work and smoke ($\chi^2=55.075$, $df=15$, $p=0.000$).

The respondents of welders (9.8%) have reported that they are acquired wounds; hair falls in hand and forehead due to radiation. Apart from that their eyes are severely affected due to intensity of light in welding process. There is a strong association between the variables duration of work and intensity of light ($\chi^2=7.937$, $df=3$, $p=0.047$). This has also verified that there is a positive correlation between the variables causes of light and duration of work (p. c value 0.119, sig. 0.017). They also informed that they have leg, neck, shoulder and hand pain due to their working circumstances. Polishing (13.3%) and drilling (27.5%) respondents were informed that they are affected by vibration syndrome (joint pain, impairment, sensitiveness and shivering) leads to musculoskeletal discomfort.

So, almost all the respondent are affected by physical hazards like musculoskeletal, eye and body pain due to their nature of work engaged in the industry.

Organic and Inorganic Dust Hazards

While molding and pattern making the respondents (18.5%) are handling alluvial soil, clay soil and cow dung. At this juncture small and fine dusts are enter into lungs, the respondent are noticed through cough and spitting. There is a strong association between the variables dust and smoke ($\chi^2=19.100$, $df=9$, $p=0.024$). The respondents have revealed that they are getting temporary throat problem like inflammation, sore, nasal itching due to dusts. But those who have engaged in polishing, grinding, engraving and drilling respondent (40.8%) revealed that they are exposed in inorganic insoluble dust.

Biological Hazards

During pattern and molding process they are using cow dung, alluvial and clay soil. The respondents 18.5 percent are revealed that those particles are left in hands (nails) and foot (nails and cracks). Forming pus around finger tip and foot cracks; becoming wound. They also informed that whenever they are engaging in this type of work, the following day they are affected with diarrhea. Thriving of parasitic eggs and worms in stomach due to oral feeding with impure hands after handling cow dung; there is a chance of tetanus with bleeding cracks in hands.

Mechanical Hazards

Drilling, polishing, engraving and grinding are done with machines. These activities are the final processes in oil-lamp production. During this work the products are machined with cutting tools and scribes; so the workers hand as well as the whole body will be vibrated. The respondents (40.8%) are revealed that they are getting physical discomfort due to long hours of working (due to tiredness). There is a strong association between the variables with working position and type of work ($\chi^2=239.646$, $df=10$, $p=0.000$). They have also revealed that the major accidents are happening due to of noise, the sounds and noise by diverting their attention. There is strong association between the variables accidents and noise ($\chi^2=9.639$, $df=4$, $p=0.047$).

Psychological Hazards

The oil-lamp manufacturing respondents are engaging in different works in the industry. Their monthly income and economic background is moderate. This is the main source of income to meet out their needs. Majority of the respondents (86.8%) are revealed that they are in psychologically depressed due family income (20.4%), children education (34 %), over burden of work (21 %) and physical problems (11.4%). They also revealed that about 33 percent of them are smoking and consuming alcohol to get rid of stress. This variables are strongly associated with marital status ($\chi^2=7.698$, $df=2$, $p=0.021$), duration of work ($\chi^2=16.505$, $df=6$, $p=0.011$), age of the respondent ($\chi^2=12.946$, $df=6$, $p=0.044$), monthly income ($\chi^2=7.072$, $df=2$, $p=0.029$), working position ($\chi^2=12.932$, $df=4$, $p=0.012$) and over timing ($\chi^2=9.476$, $df=2$, $p=0.009$). This clearly shows that the psychological stress strongly associated with family status, long hours of work in a day, age of the workers (aged person), economic conditions,

physical position during work and over time. These variables are playing a vital role for workers stress and other psychological problems.

Socio-Economic Conditions and Health Hazards

Among the respondents aged, married and over time workers are highly exposed to health hazards. As we noticed and justified as age (18 and 72) increases the problems perceived by respondents are also increased. Married respondents (73.5%) are revealed that they are doing over time work because of their family commitment. As a traditional, unorganized and cottage industry educational background is not necessary for this job and through observation and guidance from experienced person they are doing this job. That's why semi-skilled workers are considerably working in this oil-lamp manufacturing industry. The respondents revealed and are observed that about 5 percent of them are working 6 hours per day, 18.5 percent of workers 7 hours per day, 36.8 percent of laborers 8 hours, and 19.5 percent of workers 9 hours per day and the remaining 20.2 percent are doing more than 10 hours per day. Those are engaged in over time the respondents (33.5%) told that they are doing because of economical demand.

Highly experienced and aged persons are also working in the industry; 28.8 percent of respondents are having below 9 years of experience. 46 percent are 10 and 20 years, 18.7 percent are 21 and 30 years and 6.5 percent are above 31 years. The maximum experience registered at 42 years. Almost all the respondents (99%) reported they have musculoskeletal discomfort or pain in palm, wrist and neck (9%), palm, wrist and shoulder (7%), palm wrist and back (32.3%), palm, wrist and arm (5.8%), arm and neck (5.8%), arm and shoulder (4%), arm and back (11%), back and neck (18.5%), back and shoulder (6.3%) and the remaining are shoulder and neck.

Accidents take place due to many reasons; the respondents are revealed that more often on their hand (39.5%) and legs (12%) are affected. The respondents are revealed about heat affected parts on their hand/finger (23.5%), face (3.8%), leg (11.3%), and whole body (16.5%). Due to dust 69.8 percent of respondents are revealed that they have respiratory problems, 11 percent of them are affected by chest pain and the remaining 19.2 percent are affected by head-ache.

Health Care of the Workers

Most (90%) workers in this industry are not following any safety measures like protective clothes, gloves, shoes, goggles, ear muffs, mask and even fire extinguishers. The respondents (58%) are revealed that they are not accustomed to use it, the remaining (62%) are informed that they may irritate their body and discomfort during work. The respondents (78.4%) are also revealed that whenever they have minor health problems and complications like cough, eye pain, head ache, body pain, chest pain, leg and hand pain they will just ignore or they will take pills by themselves. But if it is major injuries or diseases then only they are (40%) visiting hospital for treatment. If burns or accidental injuries they will get medicine from medical shops in own interest. So the respondent's view for their medical treatment is depends upon their level of satisfaction.

CONCLUSION

Almost all the respondents are affected by one or more hazards. More number of respondents revealed that they are affected by physical hazard. So their body is under illness due to musculoskeletal discomfort amongst the workers. Secondly smoke and dusts is the common and it leads to respiratory problem. Thirdly stress (psychological problem) playing a role among the respondent because of economical and family commitments.

Pattern and mold making respondents are having low to medium biological risks. Pattern and mold making respondents have get hazards of temporary throat inflammation and sore, nasal itching, pus formation around finger tip, foot cracks cum wound and diarrhea are due to organic dusts. High heat, smoke risks and medium risks of dusts are noticed in melting. Pimples, burns, heat cramps, breathing trouble, chest congestion, tearing, glare, blurry, sore, dryness, inflammation, body pain, poor vision, dehydration, head ache, hair fall and front head are found as hazards in melting. Medium to high musculoskeletal risks found in polishing, drilling and grinding. Vibration syndrome includes joint pain, impairment, sensitiveness, shivering and whole body vibration; is the hazard in machining process.

Medium radiation risks are found in welding. Intensity of light plays a major role of hazard in welding. Very high musculoskeletal risks are identified amongst worker due to physical position at work place for a long period of time. Musculoskeletal discomfort includes palm, wrist, neck shoulder; back and hip pain are the main hazards of hammering. Socio-economic problems lead the very high to high psychological hazard. Heat, higher intensity of light, noise and vibration are present as physical hazards. The psychological stress strongly associated with family

status, long duration of work per day, aging, economic conditions, physical position during work and over time. In cause of poor attention due to noise and sounds, accidents may be happened.

The above mentioned risks and hazards are found in the industry. They may severely affect the public health. So the following suggestions are made as prevention and control.

- ❖ First aid box have to be ready for use.
- ❖ Helmet, mask, goggles, ear muffs, proper dressing and safety shoes, should be provided to workers.
- ❖ Regular records on health checkup will be maintained.
- ❖ Fire extinguisher should be provided and instructed.
- ❖ Working environment should be modified with best handling of tools and ventilation.
- ❖ Health awareness programs and protective measures of industrial safety must be conducted.

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