OCCUPATIONAL RISK ASSESSMENT IN VEGETABLE OIL PRODUCTION PLANTS

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Annotation. Reportedly, 50 - 70% of current global labor force is exposed to poor working conditions. This study examined exposure and hazards of workers in a vegetable oil industry and the perceived health effects. The study findings reveal that occupational health and safety in the workplace is inadequate with a wide range of hazards, physical, chemical, and ergonomic, which suggests implementation of stringent safety measures.

Keywords: Noise level; Occupational; Safety; Working conditions.

ОЦЕНКА ПРОФЕССИОНАЛЬНОГО РИСКА НА ЗАВОДАХ ПО ПРОИЗВОДСТВУ РАСТИТЕЛЬНЫХ МАСЕЛ

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Аннотация.По имеющимся данным, 50–70 % нынешней мировой рабочей силы подвергается воздействию плохих условий труда. В этом исследовании изучались воздействие и опасности для работников в отрасли по производству растительного масла, а также предполагаемые последствия для здоровья. Результаты исследования показывают, что охрана труда и техника безопасности на рабочем месте неадекватны из-за широкого спектра опасностей: физических, химических и эргономических, что предполагает внедрение строгих мер безопасности.

Ключевые слова: Уровень шума; Охрана труда; Безопасность; Условия труда.

Introduction. According to available literature, risk factors leading to injuries are present in every occupation with industrial and agricultural workers having the highest risks [5].Work is essential for life, development and personal fulfillment. Unfortunately,

work activities such as food production, extraction of raw materials, manufacturing of goods, energy production etc. involve processes, operations and materials which affect the health of workers.

Workplace hazards may be biological, chemical, physical, and psychosocial in nature. These hazards have resulted in a host of health impacts, ranging from catastrophic direct effects to chronic effects. While the identification of workplace hazards has often come from observations of adverse health outcomes among workers, unquestionably it is in the workplace that the impact of industrial exposures is best understood. In the past, the assessment of hazards in the workplace had been concentrated on agricultural workers, health-care workers and laboratory personnel, who are at considerable risk of adverse health effects [2].can cause hazards which affect the health of workers [1].

Generation of noise by heavy machines in the companies has become a major menace to the workers. It is estimated that 15.8 to 23.6 percent proportion of workers world-wide is exposed to noise at moderately high (86-90 dB) and high (>90 dB) levels [13], and the relative risks of hearing loss at those exposure levels. The choice of these levels was based on the recommended exposure limits for occupational noise exposure around the world: 86 dB in most developed countries, and 90 dB in the U.S. and in many developing countries [14]. There is a seeming increase in advocacy on the right to health and safety at work as part of basic human rights. To further strengthen this, it is important to bring research into various production sectors to the fore as the findings will further enlighten the employers and employees on how to create a safe and conducive work environment.

Governments in developing countries display apathy to occupational health and safety issues; different stakeholders (management, workers and government) do not appreciate the problems that can be solved or mitigated through occupational safety and health [1]. The available literature further identified risk factors leading to injuries which are present in every occupation with industrial and agricultural workers having the highest risks [4,5]. The job demands of most industries have been reported to be hazardous to the health and safety of workers. Although, some industries have evolved high-tech approaches to minimize workers' exposure to heavy physical workloads, empirical evidence shows that workers in the developing countries still seem to be at high risk of occupational hazards [1,6]. The number of hours spent at workplace by either

white or blue professionals, has resulted in several health issues such as cardiovascular disease, diabetes, hypertension, metabolic syndrome, obesity, subsequently high mortality rate thus, leading to a major health challenge in public [7-12].

Materials and Methods

Data collection method

Data was drawn from primary sources using a questionnaire and environmental assessment/monitoring device to measure noise level and temperature. Noise level is measured because the workers use machine that generates a loud noise that could affect them. Temperature is measured to assess the amount of heat being generated in the company and its impact on workers. The questionnaire was carefully designed with closed-ended items having available options for respondent to choose from.

The questionnaire sought information on the following sections:

Section A: Socio-demographic information of the participants;

Section B: Identification of inadequacies in health and safety measures;

Section C: Safety and health effects of worker's exposure to workplace hazards; and

Section D: Identification of unsafe acts among workers.

Both interviewer and self-administered formats were used to obtain the data which covered all the sections per shift. The questionnaire was used to assess worker's exposure to health and safety hazards in their workplace as well as compliance to safety standards.

Environmental Monitoring

A Peak Tech 5035 (Figure 2) series environmental monitor was used to measure the following parameters: noise level and ambient temperature of the work areas. Data collection was carried out daily for workers working in the daytime shift in each department at time intervals (9:00 AM, 2:00 PM).

Noise/sound level meter

The environmental noise levels from the machines in the selected departments were measured using a factory-calibrated environmental monitor meter (Peak Tech 5035 series). The meter was taken to locations in the study sites and powered on. The Sound Level Mode (SLM) of the monitor was set at the slow response mode with a-weighting decibels (dB (A)) of the noise level displaying on the screen. The reading was taken for both day and night shift at two-time intervals (Day: 9 am, 2 pm and Night: 9 pm, 2 am) in each of the sections.

Figure 2: Environmental Monitor Meter.

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Data management and statistical analysis

Data collected were analyzed using descriptive statistics of mean, standard deviation, frequency and percentages. The most appropriate exposure measurement for occupational noise is the A-weighted decibel, dB (A), usually averaged over an 8-hour working day.

Identification of unsafe acts among workers

Various safety and health hazards were identified. Eighteen (18.3%) respondents claimed to experience back pain always, six (6.4%) respondents claimed to always experience eye irritation while seven (6.9%) respondents claimed to experience breathing difficulty. Thirty-two (31.2%) respondents reported heat exhaustion, two (1.8%) respondents claimed to always suffer cuts while at work, four (3.7%) respondents claimed to experience ear pain/hearing difficulty, while eight (8.4%) respondents claimed to always experience skin irritation.

Noise: The power plant area where the electricity generators are installed had the highest noise level of 103.7 dB; this exceeds the recommended exposure limit (85 dB). A lower noise level of 86.2 dB was recorded at the office section of the power plant. However this is still relatively hazardous as long term exposure to this level of noise

impairs hearing [8]. The work area of the crushing section recorded a noise level of 91.8 dB during the day and a slightly lower value of 90.8 dB at night, while the office section recorded a noise level of 79.9 dB and a slightly higher value of 80.3 dB at night.

Temperature: Daytime at the crushing site (34.7°C); This was due to the heat generated by the palm kernel crushers, as well as poor ventilation in the work area. Other areas with high temperatures were the power plant site, which recorded 33.7°C during the day and 33.5°C at night, and the margarine site, which recorded 32.8°C during the day and 32.7°C at night. The solvent extraction plant temperature was 29.8°C during the day and 29.5°C at night. The lowest temperature in the laboratory was 27.3°C during the day.

Conclusion. Thus, occupational health and safety in the work place is inadequate since safety measures were not fully implemented.The workers in the company were observed to have different ailments such as heat exhaustion, back pains, respiratory irritation, eye irritation, skin irritation, cuts and bruises on the workers. The most predominant unsafe act identified among the respondents was working while ill.

It is therefore recommended that there should be more awareness on behavioral based safety to promote the safety culture among the workers. The safety health and environment messages can be displayed widely at conspicuous locations (mounted on the walls of the factory).

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