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Industrial Hygiene and Occupational Safety Assessment in Khartoum North: A Case Study of Food and Beverages Industries

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Abstract: An assessment was conducted to delineate the level of industrial hygiene and occupational safety in Khartoum North to identify critical tasks, responsible parties and required resources for an industrial hygiene and occupational safety. Assessment instruments used in this research study included an on-line survey, review of periodic environmental survey reports and documents, walk through survey and personal interviews. A cross-sectional study was designed to assess industrial hygiene and occupational safety practices in Khartoum north. The study was conducted on 32 food industries in Khartoum North industrial area. Assessment of some physical hazards mainly, noise, lighting and heat stress in those plants revealed that 74% of the inspected work places are exposed to high noise level, and 72.2% do not fulfill the industrial lighting requirements. Chemical hazards were attributed to Chemical detergents used in cleaning operations and disinfection of process areas. Back injuries represent the most reported occupational health related problems mainly caused by Slips and strips. The study revealed that only31.25% of the plants have a Safety supervisor, and 3.2% of those plants conduct a pre-employment medical examination. Absence of safety education and non-availability of personal protective equipment were the most reported reasons for not using PPE. It was also found that workers do not have background about their jobs related hazards. Other findings show that monitoring is not implemented regularly and properly by the concerned authorities. Standardized safety records were not kept or maintained. The study concluded that emergency procedures, personal protective equipment, first aid and safety, facilities in addition to indoor environment could be classified as unsatisfactory

Keywords: Hygiene; Occupational; Hazards; Safety; PPE.

1. INTRODUCTION

The level of industrial hygiene and occupational safety in Africa is low compared with the rest of the world, (for example the buildings are very old and do not fulfill acceptable safety and health standards). These buildings, have poor lighting and ventilation, there are no emergency exit doors, the welfare and sanitary facilities, if any, are old or no longer in use and the machineries are outdated or improperly installed, unguarded and producing high noise levels [1]. Unfortunately, technology was transferred from industrialized countries to developing ones without any consideration for occupational safety, health and working conditions. Investors brought in technology based on economic or technical criteria only. Sudan is not in isolation from what happens in Africa. The importance of occupational hygiene has not been clearly enough demonstrated to make it a structural discipline [2-4]. The industrial bodies in Sudan face challenges in implementing the occupational health and safety management systems towards productivity and to comply with regulations.

The purpose of this study was to delineate the level of industrial hygiene and occupational safety in Sudan to identify the critical tasks, responsible parties, and required resources for an industrial hygiene and occupational safety. The specific Objectives are to identify the critical tasks, responsible parties, and required resources for an industrial hygiene and occupational safety programs, to assess the knowledge of workers on safety practices. Identifying the required trainings and knowledge which, will help improving the quality of the occupational environment and to have a baseline research for future studies.

Data acquired by this study were analyzed to answer the following questions:

- To which degree does industrial hygiene and occupational safety have a concerning industrial community?
- Are industrial hygiene and occupational safety actual practices or they are just a documented data to show compliance with the law?

- What are the required measures to improve the industrial hygiene and occupational safety practices in Sudan?

2. MATERIALS AND METHODS

For this study qualitative method is adopted.

2.1 Target population:

Food and beverages plants covered in this study can be classified as:

1. Dairy products.
2. Soft drinks and minerals water.
3. Oils manufacture.
4. Bakery products.
5. Grain and flour milling.
6. Meat and poultry products.

Twenty two plants, which represent all the above categories in Khartoum north, were selected to represent the study population.

2.2 Data collection:

- Review of the last three years (2011-2010-2009) periodic environmental survey reports conducted by administration of occupational health and safety at Khartoum North

- Semi-structured interviews were conducted with informants involved in occupational health and safety, including governmental authorities, researchers, health and safety professionals, industry representatives, and labours.

- A walk-through of each plant was done to observe safety practices and conditions. Observations were recorded and reported as Results

3. RESULTS AND DISCUSSION

Analysis and findings obtained from periodic environmental survey reports:

- 830 (75.2%) locations within the inspected plants do not fulfill the industrial lighting requirements.(Table 1)

- 816 (74%) of the inspected work places are exposed to high noise level - above the permissible limits- according to OSHA standards (Table 2).

- injuries represent the most reported occupational health related problem (see Fig. 1).

- Slip/Strips, machinery, and hand tools combine to cause over 50% of all food and drink manufacture injuries. Although other categories such as falls from height and Hit by fallen objects from height have smaller percentages, injuries from such causes are often more severe (see Fig. 2)

- Workers were highly exposed to high level of heat, humidity, noise, air born contaminants unguarded machines, defective electric wires and other chemical hazards such as caustic soda.

Table 1. Inspected work places for lighting intensity

Food and Beverages Industries	No. of Inspected work places	No. of work places do not fulfill the industrial lighting requirements
Dairy products	110	66
Soft drinks and minerals water	132	95
Oils manufacture	232	162
Bakery products	121	89
Meat and poultry products	232	197
Grain and flour milling	276	221
Total	1103	830

Table 2. Inspected work places for Noise level

Food and Beverages Industries	No. of Inspected work places	No. of work places with noise level above permissible level
Dairy products	110	66
Soft drinks and minerals water	132	93
Oils manufacture	232	165
Bakery products	121	89
Meat and poultry products	232	192
Grain and flour milling	276	211
Total	1103	816

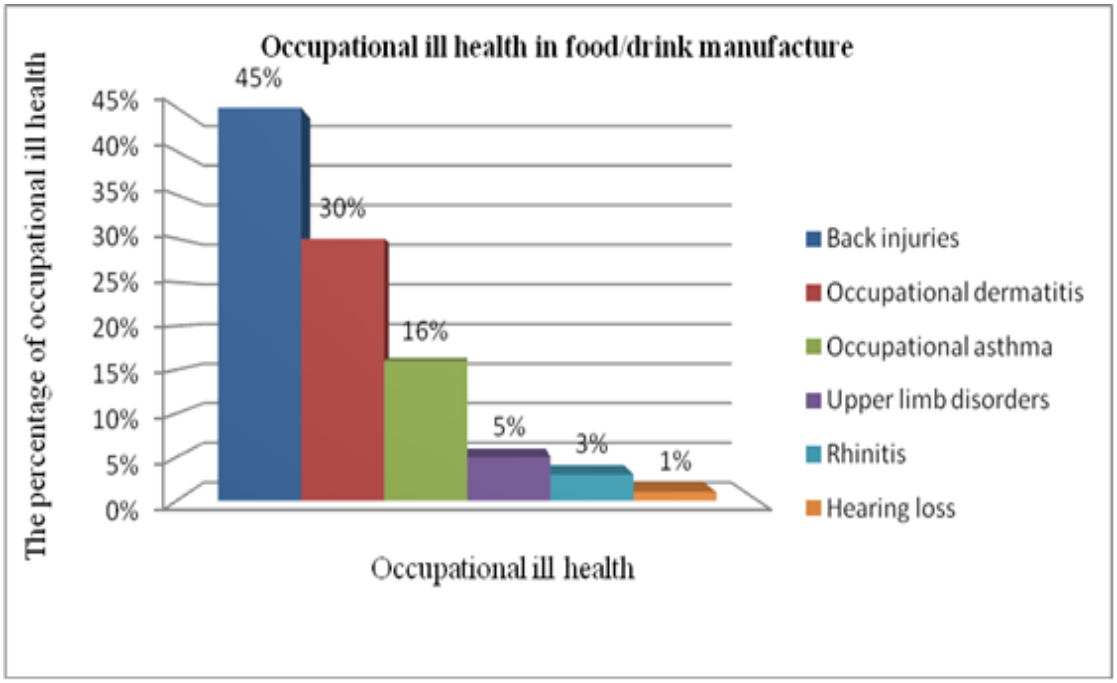

Fig. 1. Occupational ill health in food industries

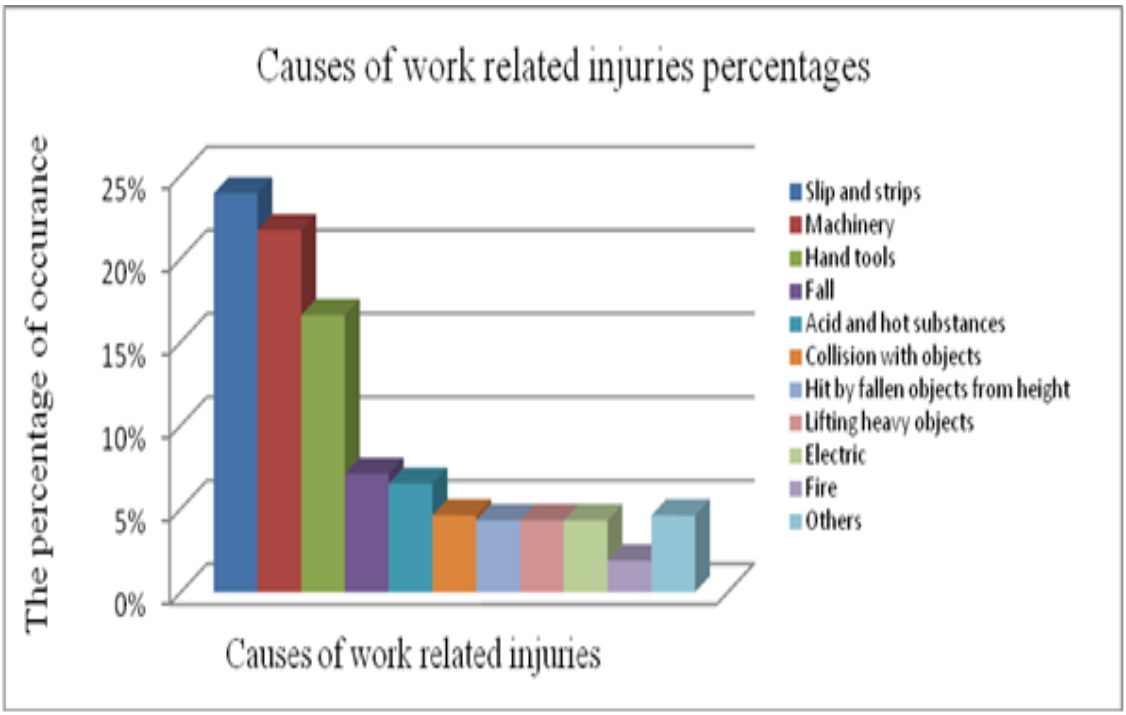

Fig.1. Causes of work related injuries

- Out of the 32 plants surveyed, 4 (12.5 %) had medical or First Aid facilities in their workplace.
- 26 (81.3%) of inspected plants have no safety signs in workplace.
- 20 (62.5%) plants have fire extinguishers, only 25% of them have well tested fire extinguishers ready to use in case of fire outbreaks.

Analysis and Findings from Interview/Personal Observation:

The researcher engaged the Safety supervisors, and heads of departments/units in an interview on one basis and the following came out.

- Buildings do not fulfill acceptable safety and health standards, poor lighting and ventilation, there are no emergency exit doors, the welfare and sanitary facilities, if any, are old or no longer in use.
- 10 (31.3%) plants have a safety supervisor.
- 50% of the managers believe that Occupational Health and Safety is employees' responsibilities.
- One plant conducts a pre-employment medical examination.
- The most frequently reported reasons for non-use of protective equipment were lack of personal protective equipment, and absence of health and safety education.
- Monitoring is not performed regularly by Authorities, and it is not conducted properly.
- 11(34.4%) plants have some shift duration go more than 8 hours.
- Chemical hazards mainly due to Chemical detergents are used in cleaning operations and disinfection of process areas.
- 30% of workers were temporary.

Safe and healthy working conditions do not happen by chance. Assessment conducted among 32 factories at Khartoum North, food and beverages Sector reflect poor practices of Industrial hygiene and occupational safety.

Appropriate legislation and regulations, together with adequate means of enforcement, are essential for the protection of workers' health and safety. The enforcement of legal provisions concerning occupational health and safety and the working environment should be secured by an adequate and appropriate system of inspection. Although occupational health and safety Act in Khartoum state was signed in February 2011, it is still state's law not federal. Moreover, there is no actual application of Act provisions. On the other hand, Environmental health survey form reflects poor practices of work place inspections improper measurements for physical chemical, biological and ergonomic hazards were conducted.

Lack of environmental measurements and lack of legislation at the federal level, represent the main obstacles for conducting proper workplace inspection. Any practice needs a valid and justifiable legal support for its effective enforcement and implementation.

Since the consequences of occupational hazards may not become apparent for many years, pre employment medical examination which represent imperative component of occupational health and safety system must be an integral component of recruitment procedures to preserve both employer and employee rights.

Reporting of industrial hygiene and occupational safety data is still non-standardized. In most of the cases, it results from poor and inaccurate data. There is a lack of national-level policy in encouraging the scope of environmental performance reporting and keeping occupational health diseases and injuries records. Such lack varies widely between companies, which results from absence of awareness in the post of decision makers regarding the importance of occupational health and industrial hygiene policy.

Although studies showed a significant relation between productivity and occupational health and safety, employers still have a wrong idea about safety measures considering it an extra cost. Effective management of worker safety and health protection is a decisive factor in reducing the extent and severity of work-related injuries and illnesses and the related costs. Moreover, by law, any company with a workforce less of than 50 is not obliged to have safety representative it was clear that 56.7% of food Industries Companies have a workforce less than 50, which represents the main obstacle in conducting safety measures.

Back injuries represent the most reported occupational health related problem, this reveal that the present status of OHS/ ergonomics is still at the rudimentary level, but employers usually consider these elements as a costly luxury. It came out to bear that employees wrong perception of hazards and their consequences poses a great danger to them. Unfortunately, a number of workers believe that hazards are part of their jobs. Workers should be given enough insight of the risk and dangers inherent in their work at the work places and the preventive measures through education.

Employers and government authorities may work together to provide employees with an environment in which occupational health hazards are identified, evaluated, and eliminated or controlled in such a manner that personnel do not suffer adverse health effects as a result of their employment.

4. CONCLUSIONS

The following conclusions are drawn from the obtained results:

- Effective occupational health and safety policies can't be achieved unless both employers and employees perform their respective responsibilities. The employer is supposed to file government accident reports, maintain records on health and safety issues, post safety notices and legislative information and provide education and trainings on health and safety. Occupational health and safety should be a holistic exercise encompassing office design, ergonomics, tiling and flooring, protective tools and equipment, ventilation, lighting and any other procedures that will make the staff feel comfortable to do his/her job.
- The employee, on the other hand, is required to comply with all health and safety rules, know that he is ultimately responsible for his/her health and safety The employee is required to wear personal protective equipment and report any contravention of law by management. Also he has the right to refuse unsafe work.
- Any practice needs a valid and justifiable legal support for its effective enforcement and implementation, so the government should also institute monitoring teams who will go around periodically checking whether employers align to the regulations as provided in the Labour Act. Measurements of physical, chemical, biological, and ergonomic hazards must be conducted properly.
- Accidents are costly both to the affected worker and organization. Therefore, every effort should be made in order to avoid them at the work place. Health and safety of the staff doing the job is equally important for the job to be done.

The following recommendation should be undertaken into considerations:

- Any company should have an Occupational Hygiene Program that clearly defines and stipulates responsibilities of all the workplace parties involved in its development, administration and implementation.
- Pre-employment medical examination must be performed as part of Recruitment Procedure.
- Standardized reporting procedures must be conducted, to obtain accurate data in industrial hygiene and occupational safety to build-on comprehensive database, which will help researchers and governmental authorities to improve IH and Occupational safety Practices.
- Management should conduct regular monitoring to check whether employees are really put on personal protective equipment given to them before doing their duties, they must also observe, in strict terms, that the safety measures are put in place in order to avoid any mishaps and accidents.
- As with any health and safety problem, the hierarchy of control measures should be followed and, where possible, removing the hazard is the best option. Reliance on individual protection through personal protective equipment (PPE) should normally be a last resort.
- Workers should have training and information on the nature of likely injuries and causative factors and safe lifting methods (especially posture and methods of carrying). They should also be informed about the need to report injuries and accidents to the appropriate authorities for redress and solutions to be found which help avoiding the same or similar accidents in the future. Through education, some of these accidents could be minimized if not eradicated entirely.
- Exposure to noise on some operations, such as the canning, bottling, and use of conveyors expose workers to excessive noise levels. Engineering control measures should be used to reduce the noise levels, and personal protection should be emphasized.
- Introduce measures to prevent injury, e.g. reduce weights of sacks/boxes, improve ergonomic design of work stations and work areas, job rotation, training, medical surveillance and job transfer.
- Maintain walkways and working surfaces to be clean and dry by preventing spillages during operation and also providing workers with anti-slip footwear.
- Provide workers with suitable personal protection equipment and ensure training on its proper use.

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