



RESEARCH ARTICLE

Suleimanya Gas Power Station Hazards Upon their Workers' Health Status: A Cross-Sectional Study

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ABSTRACT

The workplace should be a clean and safe place to support the health status of workers. However, there are many potential risks and dangers associated with working in the workplace. The purpose of this study is to determine the type of risks to which workers are exposed in gas power plants.

A cross-sectional study was conducted among workers at a gas power plant station in Sulaymaniyah Governorate. Of the 160 workers, 49 participants took part in this study. A questionnaire with structured interview methods was used to obtain data. Workers were selected intentionally according to study criteria. A pilot study was conducted to determine the internal consistency of occupational hazard questions, and reliability was measured using Cronbach's alpha method.

The study indicated that workers are exposed to different types of hazards that are classified into physical, radiological, biological, chemical, psychosocial, and ergonomic hazards at the workplace with low and medium levels of risk. Awareness arising from the application of safety rules is essential to reduce the risks of occupational hazards in the workplace.

Keywords: Workplace hazards, gas power plant station, workers



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Introduction

Most of a person's lifetime working are expended in a job. The workplace should be a wonderful place to foster both workers pleasure and health (Edmund, 2015). Working in the factories comes with a number of potential dangers and hazards (Amabye, 2016). Hazards are defined as the presence of a component or circumstance that has the chance of resulting in an incident or harm, or as a combination of the severity of the outcomes and the possibility that unfavorable effects will be arise. Many specific people or groups will suffer harm or injury as a result of workplace hazard (Mert & Ercan, 2015). Laborers are exposed to a wide range of physical, chemical, and biological risks which increasing the risk of being sick with respiratory conditions, dermatitis, musculoskeletal problems, and gastro-intestinal conditions, as well as getting hurt (Jasani et al., 2016).

Despite advancements in occupational safety in many industrialized nations, many developing nations do not place a high priority on safeguarding their workforce from occupational diseases as a result of a variety of other health issues that vie for attention. Due to a number of socioeconomic, cultural, and political challenges that frequently result in occupational health being neglected, this condition has persisted for a very long period. In developing nations, occupational health and safety has been disregarded despite being a fundamental entitlement to protect workers' welfare. The shortcomings of our health system, near-neglect of our health infrastructures, and the low wages of our overworked health workers all exacerbate the issue.(Ogundare, 2020).

Predicting, assessing, analyzing, and managing workplace hazards is essential because they may have an impact on the health and wellbeing of employees. To protect workers from harm, personal protective equipment (PPE) should be worn at all times (Budhathoki et al., 2014). Employee wellness and workplace promotion and safety are complimentary components of industrial growth since higher production and productivity require a safe work environment. (Beyene et al., 2019).

The well-being of the people and the economic and social performance of the workforce both depend on worker health. The purpose of this study is to figure out the extent to which Slemani gas power plant station employees are at danger from workplace hazards.

Methods

A cross-sectional study was done among workers at gas power plant station (GPPS) in Slemani city from July 2020 to December 2020. GPPS had over 160 workers. 49 of participated workers were chosen purposively based on the study criteria. Administrative staffs were excluded from the study.

A created questionnaire and interviewing methods were used to gather the data. The questionnaire was built from literature review and previous studies and it consisted of two sections. Sociodemographic information about the respondents is provided in section one, and section two is related to occupational hazards which divided into (6) sub sections as the following: physical hazards (23 items), radiation hazards (3), biological hazards (7), chemical hazards (9) items, psychological hazards (9) items, and ergonomic hazards (9).

The questionnaire was translated to participant's language. Informed consent from the workers was taken before including them in the study.

Participant self-report utilizing 5 Likert scales and rating as the primary metrics was used to measure workplace hazards: Strongly agree, agree, neither agree nor disagree, disagree and strongly disagree. Rating such as 5, 4, 3, 2 and 1. Workers are given a score of 5 if they are highly exposed to physical hazards at work or are at high risk of being exposed to them, a score of 4 for moderate hazards. if they are neither agreeing with it nor disagreeing a score 3 is given, a score of 2 if there are only minor hazards, and a score of 1 if there are no physical hazards at work (Faith, 2014) (James, 2017). The average score between 5 and 3.67 was regarded as high risk, 3.66 to 2.34 as moderate risk, and less than 2.34 as low risk.

Twenty experts validated the questionnaire in terms of the questions' content and applicability to the study's goals. The suggestions from the experts contributed to a few modifications in the wording and phrases. From May 7 to June 7 of 2020, 5 of study sample were purposefully chosen for pilot study to determine the internal consistency for 60 occupational risks items. The Cronbach's alpha approach was used to measure reliability. For all 60 items related to occupational hazards, the alpha value was 0.84. Physical dangers were rated at 0.69, radiation hazards at 0.64, biological hazards at 0.83, chemical hazards at 0.81,

psychological hazards at 0.90, and ergonomic hazards at 0.85. Which indicating that the survey was internally consistent.

Results

Table 1. Shows more than half of workers 55.1% were between age group (31–40) years old. all workers were men, and 89.8% of them were married. majority of workers had college degrees. Most of workers 77.6%, worked in morning and evening shifts. and 91.8% of them worked for 48 hours weekly. Additionally, the study found that 51.0% of workers spent between five and ten years at their jobs

Table 1. Sociodemographic characteristics of the workers (N=49)

Sociodemographic		Frequency	Percent
Age	21 - 30	21	42.9
	31 - 40	27	55.1
	41 - 50	1	2.0
	Total	49	100
Sex	Male	49	49
	Total	49	100
Level of Education	Primary school graduated	1	2.0
	Institute graduated	2	4.1
	College graduated	46	93.9
	Total	49	100
Sex	Male	49	100.0
	Total	49	100
Marital status	Single	5	10.2
	Married	44	89.8
	Total	49	100
Running shifts	Morning shift	11	22.4
	Morning and Night shift	38	77.6
	Total	49	100
Number of working hours/week	48	45	91.8
	>48	4	8.2
	Total	53	100
Duration of work /years	1-5 years	19	38.8
	6-10 years	25	51.0
	> 11	5	10.2
	Total	53	100

F=Frequency %=Percentage

It was observed from table 2. That workers were exposed to different type of occupational hazards. Most of workers exposed the low level of physical and biological hazards 25 workers (51%) and 22 (44.9) % respectively. Among 49 workers only 6 of them were deals with radiation at factory and 3 of them exposed to high levels of radiational hazards. Furthermore, among

participating workers only 20 workers deal with chemicals substances and half of them were exposed to low level of chemical hazards. The result also shows that 42.9 were at risk of moderate level of psychosocial hazard. In addition, more than half of workers (57.1%) were exposed to some degree of ergonomic risk.

Table 2. Exposed worker to occupational hazards in term of (physical, radiation, biological, chemical, psychosocial and ergonomics) at (GPPS)

Occupational hazards	Low Hazard	Moderate Hazard	High Hazard	Total
	No. (%)	No. (%)	No. (%)	No. (%)
Physical hazards	25. (51)	23. (46.9)	1. (2)	49. (100)
Radiational hazards	1. (2)	2. (4.1)	3. (6.1)	6. (100)
Biological hazards	22. (44.9)	14. (28.6)	13. (26.5)	49. (100)
Chemical hazards	10. (20.4)	9. (18.4)	1. (2)	20. (100)
Psychosocial hazards	19. (38.8)	21. (42.9)	9. (18.4)	49. (100)
Ergonomic hazards	13. (26.5)	28. (57.1)	8. (16.3)	49. (100)

No=Number of participated workers %=Percentage

Discussion

Hazards are basically an indication of the risk of injury. Workplace risks, accidents, and injuries are all commonplace issues that must be understood. The study showed workers were exposed to occupational hazards at GPPS, ranging from low to moderate and high. Most of workers exposed to low and moderate of physical hazards, Undesirable machinery noise, excessive heat, lights, and electrical conditions, as well as the hazard of vibration during work, are all factors to consider physical hazards. Noise-induced hearing loss might go unreported until it becomes a severe safety threat because it interferes with communication. (Kumar et al., 2008) (Vlaming et al.,2014). Yoon in his study demonstrates a link between workplace noise and the incidence of work-related injuries (Yoon et al., 2016).

In addition, most of workers worked in a hot environment. Inappropriate temperature conditions can have an effect on workers' health and productivity (Krishnamurthy et al., 2017), Enhancing the heated environment in the workplace and ensure appropriate cooling system, especially in summer, helps to prevent workers from work-

related health problems. The lighting and electrical conditions in these workplaces were good condition. The illumination levels in the workplace were acceptable for the personnel.

The study also shows among 49 participated workers only 6 works deal with radiation and half of them exposed to high levels of radiation hazards. There was no radiometer available to continuous monitoring the levels of radiation at workplace or any alarm to detect the levels of over radiation in addition to adequate ventilation were not provided according to participated responds. Workers may be exposed to either man-made or naturally occurring radioactive substances. Some real precautions can be taken to safeguard them from such an exposure. Regular monitoring, protective equipment, and countermeasures such as shielding are examples of these (International Atomic Energy Agency, 2021).

Concerning to biological hazards the study shows 14 workers (28.6%) at risk to moderate level of biological hazards and 13 workers (26.5%) at risk to high levels of biological hazards. Work - related biohazards are pathogens or harmful biological substance that

endanger the health of employees, either straight through contamination or indirect through environmental impairment. (Rim & Lim, 2014). About chemical hazard among 49 participated workers 20 workers deals with different types of chemical hazards. The chemical hazards at workplace come in the form of liquid, solid, solvent, gas or vapor. Half percentage of the workers exposed to low levels of chemical hazards and 9 workers (45%) exposed to moderate rate of chemical hazards and one of them at risk to high levels of chemical hazards. Chronic effects can result from long-term exposure to a particular chemical at relatively low concentrations. The effects can be severe at higher concentrations. Some chemicals cause local harm when they come into contact with or enter the body, while others have systemic effects. Chemicals in manufacturing enter the body by three primary routes: inhalation, ingestion, and skin absorption (Phillip, 2002).

About the psychosocial hazards, the finding shows 21 workers (42.9%) at risk to moderate level of psychosocial hazards and 9 workers (18.4.5%) exposure to high level of psychosocial at workplace. work overload and assigned more responsibilities than their duties and difficulty to adapt to the were identified among workers. Half of workers assumed their salary is inadequate. Furthermore, not let the workers participating in decision-related to their works by workplace administration another issue were workers struggled with it. There is an agreement with (Okefor and Alamina, 2018) study regarding a “qualitative study on psychosocial hazards among health care workers in a tertiary health facility in South-South Nigeria” it concluded psychosocial risks faced by health care workers include high work overload, weak interpersonal relationships, harassment by patients' families, and job dissatisfaction.

Furthermore, the present study shows more than half 28 workers (57.1) were exposure to moderate level of ergonomics hazards. workers had to repetitive movement for long time with no sufficient rest or regular break to decrease the workload. The risk of low back discomfort and disc herniation increases with

frequent lifting of heavy weights and lifting while twisting the trunk, on the other hand, the long periods of sitting increases the risk of low back pain (Waldron and Edling, 2004).

Conclusions

Workers were exposed to a variety of occupational dangers, according to the finding, which can be divided into: physical, radiation, biological, chemical, and psychosocial and ergonomics. The majority of the workers had been exposed to low and moderate level of occupational hazards according to the respondent's rating of five different types of current hazards. Following safety practice standards and implementation of safety rules and guidelines are critical to decrease the risk of occupational hazards at workplace, in addition to educational health programs regarding occupational health and safety issues.

Ethical considerations

Ethical approval for this study was obtained by the ethical committee of the College of Nursing/University of Raparin and from the Gas Power Plant Station ID number (7/29/150) on March 9, 2022. in addition to the verbal consent was taken from participants.

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Conflict of Interest

The author reports no conflict of interest.

References

- Amabye, T. G. (2016). Occupational Risks and Hazards Exposure, Knowledge of Occupational Health and Safety Practice and Safety Measures among Workers of Sheba Leather Plc, Wukro, Tigray Ethiopia. *MOJ Public Health*, 4(2), 39–45.
<https://doi.org/10.15406/mojph.2016.04.00074>
- Beyene Gebrezgiabher, B., Tetemke, D. and Yetum, T. (2019). Awareness of Occupational Hazards and Utilization of Safety Measures among Welders in

- Aksum and Adwa Towns , Tigray Region , Ethiopia , 2013. *Journal of Environmental and Public Health*, 2019.
- Budhathoki, S. S., Singh, S. B., Sagtani, R. A., Niraula, S. R., & Pokharel, P. K. (2014). Awareness of occupational hazards and use of safety measures among welders: A cross-sectional study from eastern Nepal. *BMJ Open*, 4(6), 1–6. <https://doi.org/10.1136/bmjopen-2013-004646>
- Edmund, E. (2015). Analysis of Occupational Hazards and Safety of Workers in Selected Working Environments within Enugu Metropolis. *Journal of Environmental & Analytical Toxicology*, 05(06). <https://doi.org/10.4172/2161-0525.1000337>
- Faith Eyayo. (2014). Evaluation of occupational health hazards among oil industry workers: A case study of refinery workers. *Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT)*, 8(12), 22–53.
- International Atomic Energy Agency. (2021). *Radiational Protection*. Vienna International Centre, PO Box 100. <https://www.iaea.org/topics/workers>
- James A. Fain. (2017). *Reading, Understanding, and Applying Nursing Research* (5th Editio).
- Jasani, P. K., Joshi, J. B., Kartha, G. P., Mehta, H., & Shah, I. (2016). *A study of knowledge and utilization of safety measures against occupational hazards among constructional workers in Surendranagar city , Gujarat , India*. 3(11), 3055–3058.
- Krishnamurthy M, Ramalingam P, Perumal K, Kamalakannan LP, Chinnadurai J, Shanmugam R, Srinivasan K, Venugopal V. (2017). Occupational heat stress impacts on health and productivity in a steel industry in Southern India. *Safety and Health at Work*, 1(8(1)), 104. <https://doi.org/10.1016/j.shaw.2016.08.005>
- Kumar, G.P., Dewangan, K.N. and Sarkar, A. (2008). Noise exposure in oil mills. *Indian Journal of Occupational and Environmental Medicine*, 12(1), 23.
- Mert, B., & Ercan, P. (2015). *Occupational health and safety in aquaculture industry*. 3277–3280.
- Ogundare, O. S. (2020). ASSESSMENT OF THE IMPACT OF OCCUPATIONAL HAZARDS ON EMPLOYEE PERFORMANCE IN SLUG CEMENT NIGERIA LIMITED. *FOUNTAIN UNIVERSITY OSOGBO JOURNAL OF MANAGEMENT*, 5(1).
- Okeafor, C.U. and Alamina, F.E. (2018). A qualitative Study on Psychological Hazards among Health Care Workers in Tertiary Health Facility in South Nigeria. *Annals of Ibadan Postgraduate Medicine*, 16(1), 23–29. <https://doi.org/10.4314/aipm.v16i1>
- Phillip Carson., C. M. (2002). Hazardous chemicals handbook. In *Elsevier* (Second edi). [https://doi.org/10.1016/0304-3894\(94\)80071-5](https://doi.org/10.1016/0304-3894(94)80071-5)
- Rim, K., & Lim, C. (2014). Biologically Hazardous Agents at Work and Efforts to Protect Workers ' Health: A Review of Recent Reports Biologically Hazardous Agents at Work and Efforts to Protect Workers ' Health: A Review of Recent Reports. *Safety and Health at Work*, 5(2), 43–52. <https://doi.org/10.1016/j.shaw.2014.03.006>
- Vlaming, M.S., MacKinnon, R.C., Jansen, M. and Moore, D.R. (2014). Automated Screening for High-Frequency Hearing Loss. *Ear and Hearing*, 35(6), 667–679.
- Waldron, H.A. and Edling C. (2004). Occupational Health Practice. In *Hodder Arnold Publication* (4th Editio). <https://doi.org/10.1016/j.patrec.2005.01.006>
- Yoon, J.H., Roh, J., Kim, C.N. and Won, J.U. (2016). The risk of occupational injury increased according to severity of noise exposure after controlling for occupational environment status in Korea. *Noise & Health*, 18(85), 355.