

Occupational Health Hazards among Workers in Welding Factories at Qalyubia Governorate

Aya Abd Elhameid Ramadan¹, Mahbouba Sobhy Abdelaziz², and Amina Abd –Elrazek Mahmoud³

(1) B.Sc. Nursing (2014), Fayoum University, Nursing Specialist Member of Infectious Diseases Surveillance Team Fayoum General Hospital, (2) Professor of Community Health Nursing, and (3) Assistant Professor of Community Health Nursing, Faculty of Nursing, Benha University.

Abstract

Background: Welding manufacturing poses a variety of chemical, physical, biological, psychological and ergonomic risks to the health of workers. **The aim** of the study was to assess the occupational health hazards among workers of welding factories. **Research design:** A descriptive research design was utilized. **Setting:** This study was carried out at Elegeet Factory, and Electromica Factory in Mostorod. **Sampling:** Convenience sample of workers who worked in the previously mentioned settings: That included 200 workers. **Tool:** One tool was used for data collection that consisted of the following parts; **A)** socio- demographic characteristics, **B)** Occupational hazards and health problems facing welding workers in the last six months, and **C)** welding workers' knowledge, and reported practice regarding dealing with emergency situations as first aid. **Results:** 40.5% of studied workers was in between 20<30 years and 48, 5 % had basic education, 51.5% of them live in Urban area. 49% of the studied workers had 5<10 years of experience. 44%, 23.5%, 26.5%, 46%, 37% and 18.5 % of the studied workers had nasal irritation due to rising gases, nausea, excessive tearing, and ear ache, skin burns, and numbness in the limbs respectively regarding their occupational health problems in the first six months of work. **Conclusion:** More than half of the studied workers had poor total knowledge level about occupational hazards related welding exposure, and less than ten percent of them had good total knowledge level about occupational hazards related welding exposure. Less than three quarters of the studied workers had satisfactory total practices regarding precaution in welding factories, there was positive correlation between total knowledge level and their total practices level of the studied workers regarding occupational health hazards in welding factories. **Recommendation:** Develop training program for workers at welding factories to improve their knowledge and practices regarding occupational health hazards and regular periodic checkup for all workers for early detection of any health problems and health needs.

Keywords: Occupational Health Hazards, workers, and welding Factories

Introduction:

Occupational health refers to the identification and control of the risks arising from physical, chemical, and other work place hazards or placing and maintenance of the workers in an occupational environment adapted to physiological and psychological capabilities in order to establish and maintain safe and healthy working environment. Workplace hazards are numerous and can arise on a daily basis. It is important to

identify and take steps to mitigate the risks that workers may face. Hazards in the workplace occur when the working environment can cause injury, illness or death. The hazards can result from many of the different aspects of the working world, including equipment, dangerous materials, unsafe working practices and the behavior of people for lone workers, hazards often present increased risk because they are less likely to have immediate support from

colleagues (Fried & Kohn, 2018; Grant, 2019).

Occupational health hazards are the risks to the health of workers which refer to the process or situation that cause accidents or disease at work place, occupational health hazards are brought by unsafe work behaviors. workplace hazards or injuries are preventable with the use of appropriate occupational safety and health services According to global estimation about 2.9 billion workers across the global are exposed to hazardous risks at the work place. Workers exposed to the occupational risk factors lost about 22 million years of health life. By far the main cause of years of healthy life loss measured in Disability-Adjusted Life Years (DALYS), with in occupational diseases, was international injuries with 48% of the burden. This was followed by hearing loss due to occupational noise (19%) and chronic obstructive pulmonary disease due to occupational agent (17%) (World Health Organization (WHO), 2018; Degavi et al., 2021).

Welding is a very important process used for joining metals, it is used in more production fields, and the quantity of welders is increasing. Occupational exposure to welding fumes is a serious occupational health problem all over the world. Welders are exposed to many occupational hazards such as dust, heavy metals, fluoride, ozone, nitrogen oxides, carbon monoxide, and noise, ultraviolet rays during welding. These hazards might cause some occupational diseases such as pneumoconiosis, poisoning, electric ophthalmic, hearing impairment, and so on. Welding fumes are a complex mixture of different metals. Most welding fumes contain a small percentage of manganese. There are many studies concerning about the potential neurological effects associated with exposure to manganese in welding fumes and

some studies explored the association between parkinsonism and exposure to welding fume, However, welders' quality of life has not gotten enough attention(Qin et al., 2018).

Employment of safety measures and practices among welders are important ways of preventing or reducing the levels of health hazards associated with the occupation. It is, therefore, pertinent to assess the level of awareness of these hazards among welders and the safety measures and practices they adopt to safeguard their health, with a view to making recommendations on ways of ameliorating the effect of the hazards (Joshi et al., 2020).

Occupational Health Nurses should be make major contribution to the sustainable development, improved competitiveness, job security and increased profitability in entries and communities by addressing those factors which are related to the health of workers, helping to reduce ill. Occupational health nurses can contribute to the increased profitability and performance of organizations and reduce health car, help to reduce the externalization of costs onto the taxpayer by preventing disability, social exclusion and by improving rehabilitation services at work (Sadhr et al., 2022).

Significant of the study:-

All over the world the injury among welder worker is an important public health problems; frequent self-reported effects after injuries included skin conditions (74.3%), and arc-related issues (61.3%), asthma complications (46.7%), while the least frequent condition was hearing difficulties (35.7%). Skin, eye, and respiratory morbidity are among the common health hazards that have been associated with several studies (Wanjari and Wankhede, 2020). According to previous studies data about occupational hazards among welders no

studies have been conducted thus far in Egypt regarding exposure & health effects among welder, according to information available.

Aim of the study:

The aim of this study was to assess occupational health hazards among workers in welding factories.

Research questions:

- 1.What are occupational hazards facing welding workers at the work place in the last six months?
- 2.What is the studied workers' knowledge regarding occupational health hazards related exposure to welding?
- 3.What are the studied workers' practices regarding to using safety measure related to exposure to welding?
- 4.Is there a correlation between the studied welding workers' knowledge and their practices regarding occupational hazards related to exposure to welding?

Subjects and method:

Research design:

A descriptive research design was used to conduct this study.

Setting:

The study was carried out at two Welding Factories at Qaliubia Government which included (Eleget Factory and Electromica factory in Mostorod) Electromica Factory works in welding, manufacture of electricity towers and light poles. The Eleget Factory one of the factories of the Government that manufactures welding structures, the selected sector was used as a sample . Because there are no other welding factory in Benha City and Qaliubia Governorate.

Sampling:

Convenience sample was used in this study, workers who work at the prevised settings were 200 welder workers selected according to the following criteria:

-Accepted to participate at the study.

- Workers who have been working for more than 6 months

Tools of data collection:

Two tools were used for data collection to carry out this study:

First tool : An interviewing questionnaire: It was developed by the researchers, based on reviewing relates literatures and it was written in simple clear Arabic language: It comprised of two parts:

The first part: Was concerned with socio-demographic characteristics of the studied workers, this part included two sections:

(A)- Socio-demographic characteristics of the studied workers involved in the study. It included six items.

(B)-Occupational hazards and health problems facing welding workers in the last six months.

The second part: (A)- Concerned with welding workers' knowledge regarding occupational health hazards which included five items.

Scoring system:

knowledge score for each answer was giving as follows (2)score for correct and complete answer, (1)score for correct and incomplete answer, (0) score for don't know or incorrect answer.

Total score of knowledge =10

The total knowledge score was considered good if the score was >75% (8 score), while considered average if it was 50-75% (5-8 score), and considered poor if it was <50% (< 5 score)

(B)- Concerned with reported practices of studied workers regarding their dealing with emergency situations as: first aid to respiration which include 9 items, first aid to Burn include 8 items, first aid to bleeding 8 items, and first aid to fracture include 6 items.

Scoring system:

The scoring system for the worker's practices was scored as follows: (1) Score for done and (0) score for not done. Total practice scores =31. The total practices score were considered satisfactory if the score >60 %(> 18 score) and considered unsatisfactory if the score< 60 % (< 18score).

The second tool: Was concerned with an observational checklist which includes two sections as: **(A)-** An observational checklist to assess: studied workers practices related wear of PPE and maintain body mechanics, Adapted from **(Tarawneh, 2018)** Adapted by the researchers to assess uses of personal protective equipment and use the correct body mechanics. It included 11 items divided into seven measures for PPE, and four measures for body mechanics.

Scoring system:

Scoring system for workers practices: Each items scored (1) if done and scored (zero) if not done. Total practice score =11. The score for the total observations

- > 80% (> 9 point) was considered satisfactory.

- < 80% (< 9 point) was considered unsatisfactory.

(B)- An observational checklist was used: to assess and observe the workers factory environmental safety condition adapted from **(Ali, 2019)**, which was modified by the researchers, it included nine items The scoring system for the work environment condition was scored as follows:

(1) Score for acceptable and (0) score for not acceptable environment. The total score =9. The total environment score was considered sanitary if the score of the total >80% (>7points), and considered unsanitary if it was <80% (<7points).

Content Validity:

Refers to the extent that the test measures what is supposed to measure. The tools

validity was done by five of Faculty's Staff Nursing experts from the Community Health Nursing Benha University specialties who reviewed the tools for clarity, relevance, comprehensiveness, and applicability.

Reliability of tools:

Refers to the extent that the measurement is stable, dependable, and sound was done by Cronbach Alpha test, coefficient test which revealed that each of the two tool consisted of relatively homogeneous items as indicated by the moderate to high reliability of each tool, for knowledge was 0.753, practices was 0.761.

Ethical consideration:

An interview with welder workers to collect data, the was informed about the purpose and benefits of the study, and their participation in the study is voluntary. Subjects were informed with complete full information about the study and their role before signing the informed consent. The ethical considerations they were also include explaining the purpose and nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it were not be accessed by any other party without taking permission of the participants; the data was used for research only, and approval was obtained from the Scientific Research Ethics Committee.

Pilot study:

The pilot study was carried out on 20 workers which represented 10% of the sample size 200 workers. The pilot study was made to assess the tool clarity, applicability and time needed to fill each tool, completing the tools consumed about 30-45 minutes. No modification was done, so the pilot study sample was included to the total sample.

Field work:

The actual field work was carried out over period of five months from the beginning of April 2022 to the end August 2022. The

Occupational Health Hazards among Workers in Welding Factories at Qalyubia Governorate

researcher visited Factory from 8 am to 3 pm, three day per weeks (Sunday, Tuesday, and Thursday) to collect data from worker. The average time needed for the tools were around 30-35 minutes, the average number interviewed workers were 6-7 workers /day depending on their responses to the interviewers.

Statistical analysis:

All data collected were organized, tabulated, and analyzed by using the Statistical Package for Social Science (SPSS version 21), which was used frequencies and percentages for qualitative descriptive data and χ^2 was used for relation tests, mean and standard deviation was used for quantitative data, spearman correlation test (r) was used for correlation analysis and degree of significance was identified.

-Highly significant result when p-value (HS)
 $P < 0.001$

-Significant result when p-value (S)
 $P < 0.05$

-No significant result when p-value (NS)
 $P > 0.05$

Results:

Table (1): Shows that; 40.5% of workers aged from 20 to less than 30 with mean age 42.72 ± 9.35 years, 48.5% of them had basic education. 65.5 % of them are married, 51.5% of them were from urban areas, as well as 43.5% of them had enough monthly income and 67.5% had 3 to 5 member of the family.

Table (2): Shows that; 44.0%, 23.5%, 26.5%, 46.0%, 37.0% and 18.5% of the studied workers had nasal irritation due to rising gases, nausea, excessive tearing, and ear ache, skin burns, and numbness in the limbs respectively.

Figure (1): Illustrates that; 53.0% of the studied workers had poor total knowledge level; while 38.5 % of them had average total knowledge level and 8.5% of them had good

total knowledge level about occupational hazards related welding exposure.

Figure (2): Illustrates that; 70.5% of the studied workers had satisfactory total practices regarding prevention of occupational health hazards related welding exposure, while 29, 5% of them had unsatisfactory total practices score.

Table (3): Shows that; there was positive correlation between total knowledge level and total practices level of the studied workers regarding occupational health hazards in welding factories ($p < 0.05$).

Table (1): Frequency distribution of the studied workers regarding their socio demographic characteristics (n=200).

Socio demographic characteristics	No.	%
Age\ years		
< 20 years	24	12.0
20 >30 years	81	40.5
30>40 years	54	27.0
40 years and above	41	20.5
Min –Max	21-59	
Mean ±SD	42.72±9.35	
Educational level		
Basic education	97	48.5
Diploma(secondary education)	21	10.5
University Education	82	41.0
Marital status		
Single	20	10.0
Married	131	65.5
Divorced	25	12.5
Widow	24	12.0
Residence Place		
Rural	97	48.5
Urban	103	51.5
Monthly income		
Enough	87	43.5
Enough and save up	84	42.0
Not enough	29	14.5
Number of family members		
<3 member	44	22.0
3:5 member	135	67.5
> 5member	21	10.5

Occupational Health Hazards among Workers in Welding Factories at Qalyubia Governorate

Table (2): Percentage distribution of the studied workers regarding their occupational health problems in the first six months of work (n=200)

Health problems & diseases	No.	%
Respiratory		
Nasal irritation due to rising gases	88	44.0
Dry cough	68	34.0
Difficult breathing	65	32.5
Sore throat	49	24.5
Pneumonia	9	4.5
GIT		
Anorexia	5	2.5
Colitis	34	17.0
Stomachache	32	16.0
Nausea	47	23.5
Eye		
Excessive tearing	53	26.5
Excessive twitching of the eyelid	30	15.0
Eye inflammation	40	20.0
Double vision	49	24.5
Ear		
Ear ache	92	46.0
Hearing impairment	26	13.0
Ear burns	27	13.5
Skin		
Dermatitis	56	28.0
Burns	74	37.0
Skin disease	47	23.5
Musculoskeletal		
Neck pain	4	2.0
Shoulder pain	22	11.0
knee pain	16	8.0
Muscle strain	21	10.5
Numbness in the limbs	37	18.5

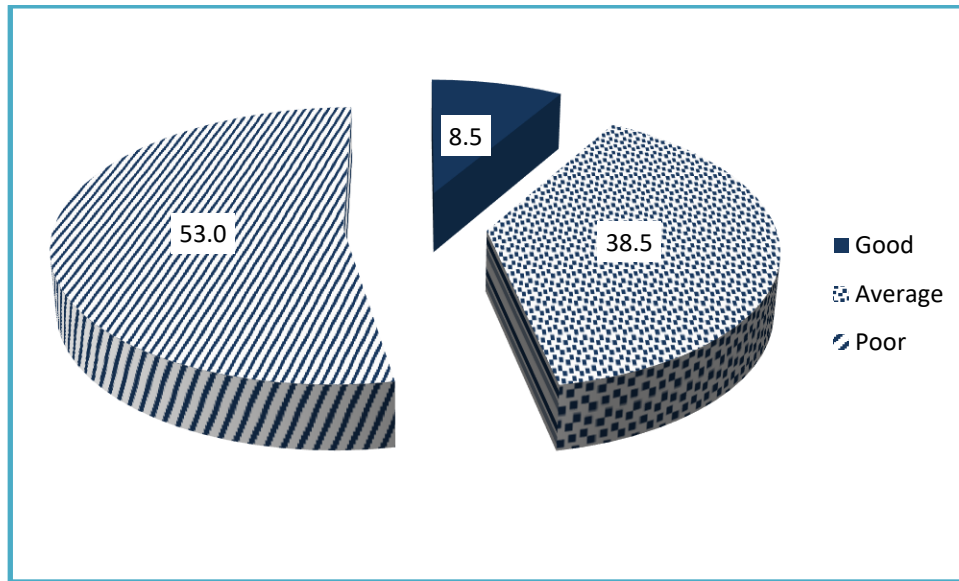


Figure (1): Percentage distribution of the studied workers' total knowledge about occupational health hazards of welding exposure (n=200).

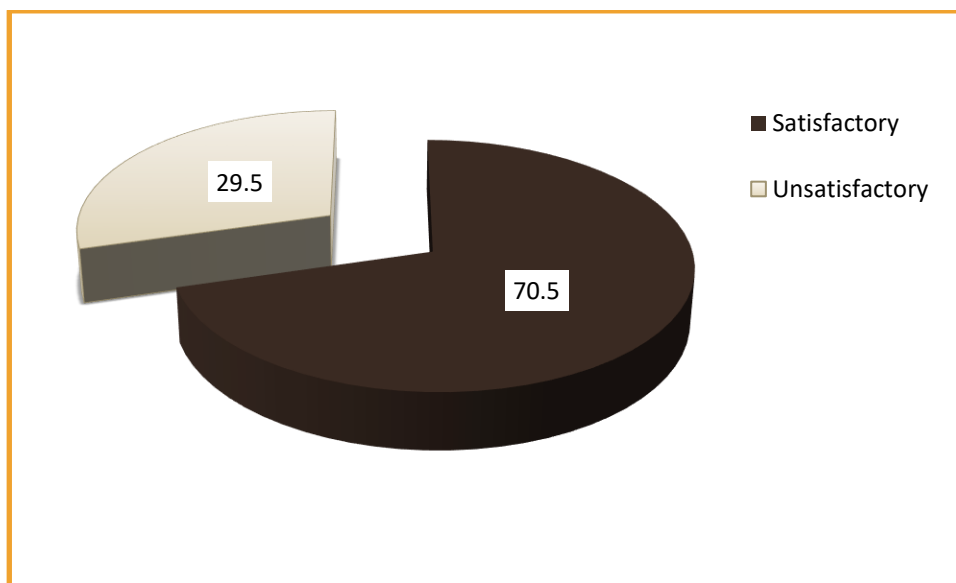


Figure (2): Percentage distribution of the studied workers, regarding their total practices related prevention of occupational health hazards related welding exposure. (n=200).

Table (3): Correlation between the studied workers total knowledge and their practices regarding occupational health hazards in welding factories (n=200)

Total practices level	Total knowledge level	
	r	P-value
	.162	.022*

Discussion:

The International Standard Classification of Occupations (ISCO) defined welders as workers who join and cut metal parts using flame or electric arc and other sources of heat. There are varieties of these processes, but the commonest types are the gas welding using oxyacetylene flame and the electric arc welding involving the use of electricity. Welders are often exposed to potential workplace hazards that can be injuries to their health especially when exposure is on a regular and cumulative basis. The excessive high temperature generated by the hot oxyacetylene flame, or the electric current may lead to burns and electric shocks. Injuries such as lacerations and cuts by sharp or pointed metal panes, from high velocity particles and occasional explosions of the oxyacetylene gas tanks may also occur (**Joshi et al., 2020**).

Regarding socio demographic characteristics of the studied workers, the current study showed that; less than half of workers aged from 20≤30 years old with mean age 42.72±9.35years. This finding was consistent with **Adeniyi & Isah (2023)** who conducted a study in Benin City, Nigeria, a bout “Assessment of workplace hazard awareness, work-related health complaints and safety measures among welders” and showed that less than half (47.4%) of workers aged from 20 <30 years old. Also, this finding was similar with **Tagurum et al., (2018)** who conducted a study in Jos metropolis, Nigeria, about “Awareness of occupational hazards and utilization of PPE amongst welders and reported that; less than half (43.7) of workers aged from twenty to less than thirty.

On the other hand, this finding disagreed with **Nalugya et al., (2022)** who assessed in study in small-scale metal workshops in

Nansana municipality, Wakiso district, Uganda, about “Knowledge, attitude and practices related to the use of personal protective equipment among welders” and revealed that more than half (55.5%) of workers aged from than twenty to less than twenty six. In addition to, this finding was not harmony with **Esu & Ekanem, (2021)** who conducted a study in Cross River state, Nigeria, about “Awareness and utilization of personal protective equipment among small-scale welders in Cross River state, Nigeria” and showed that, less than one third (29.5%) of workers aged from thirty four to forty one.

As regards educational level, slightly less than half of workers had basic education. This finding was strongly agreed with **Asmita et al., (2023)** who conducted study in Sumedang, West Java, Indonesia, about “Knowledge on occupational health and safety hazards among welders” and revealed that slightly half of workers had basic education.

Conversely, this finding was not harmony with **Esu & Ekanem, (2021)** showed that, slightly half of workers had secondary education. Also, this finding was disagreement with **Nalugya et al., (2022)** who revealed that less than three quarters (71%) of workers had secondary education. Moreover, **Tagurum et al., (2018)** who revealed that, less than half (43.7%) of workers had secondary education. From the investigator point of view, these results may be explained that, this group of age tend to be involved in more physically demanding jobs.

Regarding marital status; the current study elaborated that less two thirds of them are married. This finding agreed with study conducted by **Chukwu et al., (2019)**, in Nigeria, about “Occupational Hazards and use of Personal Protective Equipment among Small Scale welders” who reported that (56.1%) of welders were married.

Moreover, this finding was consistent with study by **Onguto et al., (2020)**, in Kenya, about “Physical Hazards and Reported Health Effects among Welders in the Small and Medium Enterprise Sector in Embakasi, Nairobi City County, Kenya” and found that (67.8%) of welders were married. On the other hand; this finding was disagreement with **Salah et al., (2023)**. who conducted a study in Sharkia Governorate, Egypt, about “Workplace Environment and Utilization of Personal Protective Equipment Among Welders” and revealed that most (91%) of welders were married. From the investigator point of view, this might be due to the responsibility of the married male due he is a family host.

Concerning residence place and income, the current study revealed that about half (51.5%) of welders’ workers were from urban areas. This finding was in disagreement with **Salah et al., (2023)**. who revealed that (63%) of welders’ workers were from rural areas, and (32%) have sufficient monthly income, From the researcher point of view, these results may be explained that the highest proportion of welding industries builds in districts area of urban regions. As well as less than half of them have enough monthly income.

Regarding studied workers welding health problems. The current study showed that; less than three quarters of the studied workers had health problems, less than half of these problems were respiratory diseases, while about one quarter were skin diseases, and were eye diseases respectively.

These findings were similar with **Joshi et al., (2020)** who conducted a study in Nepal about “Occupational health problems, workplace environment and utilization of personal protective equipment among welders of Banepa municipality” and revealed that all

respondents have experienced different types of occupational health problems. While about one third (37.69%) have respiratory problems. meanwhile, less than third (28.5%, 25.7%) were skin diseases, and were eye diseases respectively.

In addition to, these findings were consistent with **Sadiq et al., (2018)** who conducted a study in Nigeria, about “Health hazards of excessive light and utilization of safety measures among small scale welders” and reported that; Traumatic ocular injury and irritation are the most visible and perpetual occupational health and safety infirmities associated with welders. Welders also suffer from Actinic Skin Disease (ASD) due to thermal burns on their skin in the workplace.

Moreover; according to **Wanjari & Wankhede, (2020)** who conducted a study about “Occupational hazards associated with welding work that influence health status of welders” and stated that several studies reported that respiratory illness is more common in welders and morbidity rate also in large numbers. Pneumonia- Metal fume fever- recent studies show the morbidity of metal fume fever is 43.7% of welding workers get an infection. In welders show symptoms like malaise, chills, dry cough, shortness of breath showed after when exposure is more than 3-10 hours and its resolve in 24 to 48 hours. Also, skin problems among welders are more prone to skin related problems, as reported symptoms of skin irritation and erythema.

Finally, this finding was agreed with **Adeniyi & Isah, (2023)** who conducted a study in Benin City, Nigeria, about “Assessment of workplace hazard awareness, work-related health complaints and safety measures among welders” and showed the work-related health complaints among welders in the last six months. The

proportions of those who reported lower respiratory symptoms, upper respiratory symptoms were more than half (55.3%). Finally, these findings were strongly agreed with **Joshi et al., (2020)** who revealed that a significant number of health impacts experienced by those who do not use PPE experienced different types of health problems.

On the other hand, these findings were disagreed with **Sepahi et al., (2022)** who conducted a study in an urban desert City in the Middle East, and indicated that; Musculoskeletal problems: Symptoms revealed welder's lower back pain, muscle pain that they suffer from various serious problems. Musculoskeletal problems are notified 46.7% in research studies. Skin diseases are seen in welders 74.3% is many scores of skin problems and most of the welders is suffering from a burn due to the inability of handling welding equipment. From the researcher point of view, these results may be explained that welders are continuously exposed to welding fumes and gases, electric current, flying sparks, sharp edges of metals, fire and heat while at work.

Concerning the studied workers total knowledge regarding occupational hazards, more than half of the studied workers had poor total knowledge level; while less than ten percentages of them had good total knowledge level about occupational hazards related welding exposure. The current study showed that; around half of the studied workers hadn't knowledge about meaning of occupational health hazards, causes of occupational hazards, types of occupational hazards, physical, chemical, biological, mechanical, psychological and neurological hazards respectively.

This finding was similar with **Asmita et al., (2023)** who conducted a study in Sumedang, West Java, Indonesia, about

“Knowledge on occupational health and safety hazards among welders” and revealed that; less than half of the studied workers hadn't knowledge about occupational health hazards, causes, types of occupational hazards, physical, chemical, biological, mechanical, hazards respectively. Also, this finding was matched with **Beyene et al., (2019)** who reported in a study in Aksum and Adwa towns, Tigray region, Ethiopia, about “Awareness of occupational hazards and utilization of safety measures among welders” and reported that; the overall knowledge of respondents to occupational hazards was less than half (44.2%) which is lower.

Regarding total practices of the studied workers about their prevention of occupational health hazards related welding exposure figure (2), showed that less than three quarters (70.5%) of the studied workers had satisfactory total practices regarding prevention of occupational health hazards related welding exposure, while less than one third (29, 5%) of them had unsatisfactory total practices score.

These findings were discordant with **Ilo et al., (2021)** who conducted a study in Anambra state, about “Knowledge of occupational health hazards and preventive practices among abattoir workers in Anambra state” and revealed that, the workers have low level of practice of preventive measures. Also, **Adeniyi & Isah, (2023)** who showed that more than three quarters (79.1%) of the studied workers had satisfactory total practices regarding prevention of occupational health hazards.

From the researchers' point of view, these results may be explained that lack of training and awareness of welding workers about usage of personal protective equipment. Also, from researcher point of view, these results might be due to the poor utilization of

personal protective equipment might be as a result of these welders' poor awareness about PPE and the major reasons for nonuse might be related to leave it to fate, uncomfortable feeling during use used PPE, not available of PPE and decrease supervision on using PPE.

The current study showed that, there was positive correlation between total knowledge level and their total practices level of the studied workers regarding occupational health hazards in welding factories ($p < 0.05$). This finding agreed with **Al-Kady et al., (2022)** WHO conducted a study in Benha , about “Safety Measures and First Aid Practices among Oil and Soap Workers” and revealed that; there was a positive statistically significant correlation between the studied workers' total practices and total knowledge pre and post program. Also, this result was strongly supported by **Silva et al., (2017)**, who studied "Health Education Intervention on First Aid Measures for Lay People in Brazil: Integrative Review", reported that there was an association between knowledge and practices.

Conclusion:

Less than half of the studied workers had nasal irritation due to rising gases, nausea, excessive tearing, and earache, skin burns, and numbness in the limbs, Less than half of the studied workers had poor total knowledge level; while less than one third of them had average total knowledge level and minority of them had good total knowledge level about occupational hazards related welding exposure, also, less than three quarters of the studied workers had satisfactory total practices regarding prevention of occupational health hazards related welding exposure, while less than one third of the had unsatisfactory total practices score. Furthermore, there was positive correlation between total knowledge level and their total practices level of the studied workers

regarding occupational health hazards in welding factories ($p < 0.05$).

Recommendations:

- Develop training program for workers at welding factories to improve their knowledge and practices regarding occupational health hazards, the importance of use of personal protective equipment, right way for using it and first aid.
- The importance and usefulness of personal protective equipment, right way for using it and first aid.
- Periodic checkup of health status for workers for early detection of occupational hazards to monitor their health status and early case finding.
- Replication of the study on a larger probability sample is highly recommended to achieve generalizable results.

References:

- Adeniyi, T., & Isah, E. (2023).** Assessment of workplace hazard awareness, work-related health complaints and safety measures among welders in Benin City, Nigeria. *Journal of Community Medicine and Primary Health Care*, 35(1), 136-150. <https://doi.org/10.4314/jcmphc.v35i1.12>
- Ali, M. (2019).** The elements governing the safety and security of workers in industrial establishments in the Arab Republic of Egypt. *Finance and Commerce magazine*, 19(219), 21-36. <http://search.mandumah.com/Record/96347>. accessed on 7 february 2022.
- Al-Kady, A., Sadek AbdEl-Hameed, H., Mohamed Abd El-All, E., & Said Sabry, S. (2022).** Safety Measures and First Aid Practices among Oil and Soap Workers. *Journal of Nursing Science Benha University*, 3(1), 791-803. *Toxicology*, 16(1), 865-871.
- Asmita, K., Panduragan, S., Agustina, E., Nambiar, N., & Yahya, F. (2023).**

Knowledge on occupational health and safety hazards among welders in Sumedang, West Java, Indonesia. In AIP Conference Proceedings (Vol. 2854, No. 1). AIP Publishing.

Beyene Gebrezgabher, B., Tetemke, D., & 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(1), 4174085.

Chukwu, R., Okereke, o., Chike C., Iwuoha, Gregory, Anochie, Christopher C., Chikwe, Chidinma M., Nwoke Eunice. A. (2019). Occupational Hazards and use of Personal Protective Equipment among Small Scale welders in Owerri North LGA, Imo State, Nigeria. *IOSR Journal of Nursing and Health Science* ;8(6): 22-30

Degavi, G., Dereso, C. W., Shinde, S., Adola, S. G., & Kasimayan, P. (2021). Prevention of occupational hazards among sanitary workers: knowledge, attitude, and practice survey in Bulehora, West Guji zone, Oromia, Ethiopia. *Risk Management and Healthcare Policy*, 2245-2252.

Esu, E., & Ekanem, U. (2021). Awareness and utilization of personal protective equipment among small-scale welders in Cross River state, Nigeria: A descriptive cross-sectional study. *Babcock University Medical Journal (BUMJ)*, 4(1), 1-7. <https://doi.org/10.38029/bumj.v4i1.56>

Friend, M., & Kohn, J. (2018). Fundamentals of occupational safety and health. Rowman & Littlefield, 52-60

Grant, L. (2019). Workplace hazards | Types of hazard | StaySafe app. StaySafe <https://staysafeapp.com/blog/6-types-of-workplace-hazard>.

Ilo, C., Ede, A., Aronu, C., Abonyi, I., Okeke, M., Nwazunku., Nwankwo, C., &

Mbaegbu, N., (2021). Knowledge of occupational health hazards and preventive practices among abattoir workers in Anambra state. *GSC Advanced Research and Reviews*, 7(3), 115-121. <https://doi.org/10.30574/gscarr.2021.7.3.0129>

Joshi, M., Dhakal, G., & Shrestha, S. (2020). Occupational health problems, workplace environment and utilization of personal protective equipment among welders of Banepa municipality. *International Journal of Occupational Safety and Health*, 10(2), 100-7. <https://doi.org/10.3126/ijosh.v10i2.30175>.

Nalugya, A., Kiguli, J., Wafula, S., Nuwemat siko, R., Mugambe, R., Oputan, P., Tigaiza, A., Isunju, J., & Ssekamatte, T. (2022). Knowledge, attitude and practices related to the use of personal protective equipment among welders in small-scale metal workshops in Nansana municipality, Wakiso district, Uganda. *Health Psychology and Behavioral Medicine*, 10(1), 731-747. <https://doi.org/10.1080/21642850.2022.2106987>

Odhiambo, O., Peterson, W., & Isaac, M. (2020). Knowledge about physical hazards and use of personal protective equipment based on demographic characteristics and among small scale welders in Nairobi city, Kenya. *Journal of Scientific Research and Reports*, 120-130. <https://doi.org/10.9734/jsrr/2020/v26i630277>

Onguto, N., Mwanzo, I., & Warutere, P. (2020). Physical Hazards and Reported Health Effects among Welders in the Small and Medium Enterprise Sector in Embakasi, Nairobi City County, Kenya (Doctoral dissertation, Master Thesis Of Public Health (Epidemiology and Disease Control) in The School of Public Health and Applied Human Sciences of Kenyatta University: 1-95.

Qin, Q. Yan, S., Xing, B., Zhou, H., Xiao, Y., & Chen, H. (2018). Effect of filling materials on the microstructure and properties of hybrid laser welded Al-Mg-Si alloys joints. *Materials Characterization*, 144, 205-218.

Sadhr R. M., Moreno Pimentel, A., & Santos Posada, A. (2022). Occupational health nursing: Competence and experience to achieve the safety, health and well-being of the working population. *Enfermería Clínica* (English Edition), 29(6), 375379. <https://doi.org/10.1016/j.enfcl.2022.09.005>.

Sadiq, L., Sabo, A., Ibrahim, K., & Abdulsamad, A. (2018). Health hazards of excessive light and utilization of safety measures among small scale welders in Nigeria. *Journal of Environment pollution and Human Health*, 6(1), 26-40.

Salah, H., Ali, S., & Mahmoud, S. (2023). Workplace Environment And Utilization Of Personal Protective Equipment Among Welders In Sharkia Governorate. *Journal of Pharmaceutical Negative Results*, 1452-1467.

Sepahi Zoeram, F., Ebrahimi, A., Mehrparvar, A., Sarsangi Aliabad, A., Fallah Zadeh, H., Mehri, H., & Zare Sakhvidi, M. (2022). Health risk assessment of inhalational exposure to heavy metals in drivers working in an urban desert city in the Middle East. *Environmental monitoring and assessment*, 194(8), 533.

Silva, T., Galindo, N., Vasconcelos, E., Santos, A., & Mesquita, K. (2017). Health Education Interventions on First Aid Measures for Lay People in Brazil: Integrative Review. *Cienc Cuid Saude*, 16(4), 5.

Tagurum, Y., Gwomson, M., Yakubu, P., Igbita, J., Chingle, M., & Chirdan, O. (2018). Awareness of occupational hazards and utilization of PPE amongst welders in

Jos metropolis, Nigeria. *International Journal of Research in Medical Sciences*, 6(7), 2227.

Tarawneh, K.(2018) . The importance of security and safety to reduce work injuries in industrial facilities .V 2018,I 48 ,Pp(411-439)

Wanjari, M., & Wankhede, P. (2020). Occupational hazards associated with welding work that influence health status of welders. *International Journal of Current Research and Review*, 12(23), 51-55. <https://doi.org/10.31782/ijcrr.2020.122303>

World Health Organization. (2018). WHO/ILO joint estimates of the work-related burden of disease and injury, 2000-2016: technical report with data sources and methods.

المخاطر الصحية المهنية بين العاملين بمصانع اللحام بمحافظة القليوبية

آية عبد الحميد رمضان- ومحبوبة صبحي عبد العزيز- وأمينة عبد الرازق

يشكل تصنيع اللحام مجموعة متنوعة من المخاطر الكيميائية والفيزيائية والبيولوجية والنفسية على صحة العمال. لذا هدفت الدراسة إلى تقييم مخاطر الصحة المهنية بين العاملين في مصانع اللحام. تم استخدام تصميم البحث الوصفي. وقد أجريت هذه الدراسة في مصنع إlijيكيت ومصنع إلكتروميكيا بمسطرد على عينة ملائمة من العاملين الذين عملوا في المواقع المذكورة سابقاً وبلغ عددهم ٢٠٠ عامل. وقد أظهرت الدراسة أن ٤٤٪، ٢٣،٥٪، ٢٦،٥٪، ٤٦٪، ٣٧٪، و ١٨،٥٪ من العمال الذين شملتهم الدراسة أصيبوا بتهيج الأنف بسبب ارتفاع الغازات، والغثيان، وألم الأذن، وحروق الجلد، وتتميل في الأطراف على التوالي بالنسبة لهم. مشاكل الصحة المهنية في الأشهر الستة الأولى من العمل. وقد لخصت الدراسة أن أكثر من نصف العمال الذين شملتهم الدراسة لديهم مستوى معرفي إجمالي ضعيف حول المخاطر المهنية المتعلقة بالتعرض للحام، وأقل من عشرة بالمائة منهم لديهم مستوى معرفة إجمالي جيد حول المخاطر المهنية المتعلقة بالتعرض للحام. أقل من ثلاثة أرباع العمال الذين شملتهم الدراسة لديهم إجمالي ممارسات مرضية فيما يتعلق بالاحتراز في مصانع اللحام، وكانت هناك علاقة إيجابية بين مستوى المعرفة الكلي ومستوى ممارساتهم الإجمالية للعمال المدروسة فيما يتعلق بمخاطر الصحة المهنية في مصانع اللحام. وقد أوصت الدراسة إلى تطوير برنامج تدريبي للعاملين في مصانع اللحام لتحسين معارفهم وممارساتهم فيما يتعلق بمخاطر الصحة المهنية وإجراء فحص دوري منتظم لجميع العمال للكشف المبكر عن أي مشاكل صحية واحتياجات صحية.