



Medical Laboratory Staff Awareness' Concerning Occupational Health Hazards in Public Hospitals

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ABSTRACT

Background: Medical Laboratory staff are exposed to a wide range of hazards associated with the materials they employ and the methods they use in their work. The occupational hazards include chemical, physical, biological, psychosocial, and ergonomics hazards.

Objectives: To assess the laboratory staff level of awareness of the anticipated occupational hazards.

Methodology: A descriptive- cross-sectional study was conducted using a self-administered questionnaire. The Study participants consist of Medical Laboratory staff who works in public hospitals. The current Study includes 350 staff who responded to the questionnaire, with a response rate of 100%. and the method used by the researcher was the probability sampling technique (Stratified Random sampling).

Results: The obtained findings show that (0.0%) of the staff have poor awareness Occupational hazards, (46.6 %) with moderate awareness, (53.4 %) of them have good levels according to the total assessment of awareness.

Conclusion: The medical laboratory staff is well-versed in the hazards associated with their jobs at the laboratory. There are a number of issues that make it difficult for upper management to increase workplace safety. Nonetheless, more might be done to guarantee hospital staff members have a safer place to work.

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INTRODUCTION

The clinical laboratory is a medical specialization that complements and works in conjunction with other specialties. For other specialties as it is very important and indispensable and deals with almost all medical conditions. The Laboratory Medicine is considered an essential specialty in the field of medicine and complementary to every other field, where most clinicians need laboratory reports to complete the examination of

patients; as clinicians depend on reports for proper diagnosis, therapeutic strategy, and subsequent medical care ⁽¹⁾.

Medical laboratories in hospitals Include a range of work hazards. To laboratories workers, given that they often work with dangerous biological agents and are seen as more vulnerable of Biological laboratory-associated infection refers to an infection that is acquired in a laboratory setting. Multiple

published reports provided evidences for the threat of the infections connected with laboratory work. Of emerging and re-emerging diseases on the medical laboratory staffs in general, and staffs in labs in specific, are potentially at a higher hazard of contracting wide range of infectious diseases including human immunodeficiency virus HIV, HBV and HCV (2).

Occupational health hazards are hazards to employees' health that are generally associated with work-related activities. Occupational hazards also refer to method or situation that causes accidents or disease at workplace. Occupational health hazards are brought caused by hazardous job conditions and hazardous work practices. Occupational dangers or injuries are preventable with the use of appropriate occupational safety and health services (3, 25).

Occupational health hazards in the workplace exists in diverse manifestations, including chemical, physical, biological and psychological. Workplace accidents and illnesses remain major issues worldwide because of the plethora of hazards present in most jobs and the general disregard for health and safety displayed by many employers (4, 26).

Therefore, medical laboratory staffs are confronted with several workplace hazards at work and there might be a serious hazard to their health and safety if proper preventative measures for protection are not taken. These hazards may be biological, chemical, or physical (5).

Basically, these exposures to occupational health hazards arise in the manner the laboratory staffs handle and use substances during their routine work schedules (6).

Community Health Nursing (CHN) plays a significant role in managing and preventing workplace dangers. The main responsibility of aspect of community health nursing is identifying and avoiding workplace hazards, educating laboratory employees on personal protective equipment and strategies for prevention and management of occupational health hazards. It also involves assessing the workplace,

educating staff members about prevalent illnesses and injuries at work, keep documenting of illnesses and injuries, and adhering to post-exposure policy. Community Health Nurses may have a major influence on safeguarding, preventing, and enhancing the workers' health in laboratories. Nurses help in prioritizing the steps of protecting laboratory workers from environmental and occupational dangers, as well as promoting health and preventing sickness and injuries. Community health nurses work to prevent, identify, and treat illnesses and injuries related to the workplace and environment that arise in laboratory departments. Community health nurses also provide rehabilitation of laboratory employees who have already been affected by a disease or injury to soften the impact of an ongoing illness or injury that has lasting effects (7).

Awareness is a state of understanding and being aware of something, and it is also described as a state of being aware of one's surroundings and responding to them. From this standpoint, medical laboratory staff must be aware of occupational hazards and how to take safety measures. The lack of awareness of safety precautions linked to careless handling and hazardous procedures during sample collection, processing, and disposal, which may increase exposure to microbes (16).

The knowledge is information that laboratory workers possess regarding blood and bodily fluid exposure at work, including infections brought on by exposure, modes of transmission, prevalence, preventive measures, spill management, post-exposure prophylaxis, and infection follow-up assessed through structured self-administered questionnaires (17).

The hospital environment has to be secure and free from any unfavorable incidents that can endanger patients or employees. However, a healthy workplace is full with hazards, so it's important to take all the precautions needed to lower the chance of becoming hurt at work. Stated differently, healthcare professionals need to be well-informed about these

hazards and mindful of them on a daily basis in order to protect themselves. In addition, the hospital bears the responsibility of furnishing suitable and secure surroundings for the performance of healthcare duties (18).

The way laboratory staff perform their job and the safety procedures used in their workplace lead to exposure to occupational dangers (19).

It was found that almost 66% of medical laboratory employees had been exposed to at least one kind of biologic hazard, which was frequently parasites and bacteria (20).

Inadequate and subpar safety measures in the laboratory, as well as the lack of biosafety cabinets, safety kits, and safety instructions, also raise the danger of exposure. Awareness of occupational dangers in the laboratory and how to handle accidents is another important component (21).

PROBLEM STATEMENT

An accurate diagnosis of the disease is necessary for selecting right medicines and appropriate surgical procedures. An accurate investigation of body fluids and other tissues support doctors as well as surgeons in a major way, helping in diagnosing diseases and finding a prognosis. Thus, the medical laboratory staff working in both hospitals and diagnostic centers play a major role in diagnosis and prognosis part of the medical and surgical treatment.

Medical laboratory staff working in hospitals as well as in medical facilities for conducting diagnostic tests and examinations are exposed to a many of occupational hazards in their profession. However, the extent to which staff are exposed to these degrees varies according on the characteristics of the organization. in which they are working. Numbers of factors are associated with occupational hazards of medical laboratory staff. Among them, Extended periods of standing, occupations involving bending, intense concentration requiring a high degree of focus, and handling patients with contagious

diseases, dealing with emotionally unstable, pressing nature and violent patients, long working hours, two work shift, prolonged night shift, inadequate safety, heavy workload, multiple work and so on are some of the common factors.

These elements will result in several health-related problems, examples of potential health issues include eye strain, neck and back pain, shoulder discomfort, headaches, and stomach ulcers. Medical laboratory staff working in hospitals undergo patient-related hazards. But the degree to which medical laboratory staff working in diagnostic centers undergo patient-related hazards is comparatively less than those working in hospitals, Moreover, an organization's structure and policy, ergonomics, fear and safety, resources, workload and work shift, environment and hygiene, interruption, patient, and communication- and training-related factors are some of the important factors involved in occupational hazards. When a medical laboratory staff performs his or her duty with these effects for a long period of time, it will not only influence their health seriously but also the accuracy of results of investigation which will then threaten the safety of the patients. Therefore, it is necessary to educate them about on potential dangers involved in their occupation and the way of preventing them in order to promote their health and safety of patients. Moreover, It is crucial to draw the administration of hospitals' attention as well, diagnostic centers and other health care sector towards these hazards so as to take necessary preventive steps towards these.

Therefore, the present study is conducted in these study areas with the objective to identifying the staff awareness' about sources of occupational hazards and providing suitable suggestions to prevent them.

AIMS OF THE STUDY

1. To assess the laboratory staff level of awareness of the anticipated occupational hazards.

2. To find-out the relationship between staff awareness level and socio-demographic characteristics.

Research Question:

Is there relationship between staff awareness level and socio-demographic characteristics?

METHODOLOGY

Study design:

A cross-sectional design have been performed in the present study, which is conducted to assess the laboratory staff level of awareness of the anticipated occupational hazards.

Setting of the Study:

The study conducted in the governmental hospitals in Al-Najaf Al-Ashraf City/Al-Najaf Health Directorate. Public hospitals that have laboratory department were included in the study (6 hospitals). Al-Sadr Teaching Hospital, Al-Hakim General Hospital, Al-Sajjad Hospital, Al-Zahraa Teaching Hospital, Al-Furat Al-Awsat Teaching Hospital, Hassan Halous Specialized Hospital. This study was conducted from December 26th, 2023, to January 24th, 2024.

Sample Size and Sampling Technique:

The selected sample reaches to 350 staff working in 6 governmental hospitals in medical laboratories, and the method used by the researcher was the probability sampling technique (Stratified Random sampling), The questionnaire was distributed to the employees, and the questionnaire was fully explained so that they could answer accurately.

The Study Instrument:

For the purpose of achieving the aims of the study and to investigate the study phenomena, the questionnaire developed as a tool for data collection. Such development was employed through an extensive review of studies and books related to the study phenomenon

- **The First Part: Socio -Demographic Characteristics:** This part consists of (8) items, which included age, sex, marital status, work location, education level, job position, training course.

- **The Second Part :Awareness Level of Medical Laboratory Staff on Occupational Hazards:**

The second part: consists (9 items).

Rating and Scoring

Each item rated according to the following manner: five-points likert scale was used for measuring awareness level of medical laboratory staff: (1) To a very little extent, (2) To a little extent, (3) Neutral, (4) To a large extent, (5) To a very large extent.

The Validity of the Study Instrument:

The face validity of the study instruments is determined by a panel of (12) experts in the Nursing and Medicine fields.

Reliability of the Study Instrument:

The researcher used Internal consistency reliability (Cronbach's alpha test) to assess the stability of the developed questionnaire and find each domain's stability. Reliability for domain staff awareness about occupational hazards was 0.789.

Statistical Analysis:

The data of the present study are analyzed through the application of Statistical Package of social Sciences (SPSS) version 25, and Microsoft Excel 2016 using both descriptive and inferential data analysis approaches as follow:

- **Descriptive Data Analysis:** Presented as tables, frequencies, and percentage.
- **Inferential Data Analysis:** Statistical tests were applied according to the distribution and type of variables, which include Chi-square.

Ethical considerations:

Before conducting the study, a legal, governmental agreement is obtained from the Medical Research Ethics Committee (MREC) for ethical study approval in accordance with the standards for conducting human research.

Before beginning data collection, it is necessary to protect the subjects' rights through informed consent for participation rights. The researcher introduces himself and his identity to the subject; explains the study's objectives and benefits; ensures the confidentiality of the participant identity and information; voluntary participation in the study; and the subject's right to withdraw from the study at any time.

RESULTS

Table (1): shows statistical distribution of study participants by their socio-demographic data, it explains that the highest percentage of the medical laboratory workers' subgroup are: those with ages between (22-28) years old (51.4%), female members (54%), married members (64%), those are college graduated (57.4%), those who work in Al-Sadr Medical City (20%), those with (1-8) years of experience (74%), those who work as practitioners (89.1%); those who have no training courses about occupational hazards (51.1%) (See Table 1).

Table (2): shows the assessment and mean of scores for the awareness about occupational hazards, it reveals that the assessment of the items (3,4,7,9) was (moderate), while for the rest items the assessment was (good) awareness. The overall awareness assessment was (good) (See Table 2).

Table (3): shows the descriptive statistics of workers' subgroups according to their total assessment of awareness about occupational hazards, it shows that about (0.0%) of the workers have poor awareness about hazards, (46.6%) with moderate awareness; while (53.4%) of them have good levels according to the total assessment of awareness (See Table 3).

Table (4): show the relationship between awareness about occupational hazards and demographic characteristics. It shows that there is no significant relationship ($P > 0.05$) between awareness about occupational hazards and demographic data

except for primary work place in which there was a high significant relationship ($P < 0.01$) (See Table 4).

DISCUSSION:

Concerning the discussion of the socio-demographic characteristics table researcher note about 92 % of samples were below 42 years old, which indicates that most of the samples are young, as shown in table (1). One possible explanation is the increasing number of hospitals and laboratory department in the past few years, which requires increasing in the number of staff. The sample consisted of both males and females; males made up 46% and females 54%. It may be because of the nature of the work in the laboratory department. The results of this study are agree with the study ⁽⁷⁾ which found that more than half were female

The samples were dispersed based on the workers' places in the various hospitals. The most notable presence of the staff was in Al-Sadr and Al-Hakeem (20%, 18.6%), the disparity in the staffing allocation could be attributed to the size of the hospitals and the number of laboratory department that they got, this could affect the number of the medical laboratory staff available ⁽⁸⁾.

The level of experience of the employees shown that the years of experience of the medical laboratory workers vary, as there is a distribution in the number of staff in terms of years of experience, and this indicates that there are a need and continuous employment staff over the past years.

Regarding credentials and levels of education, the data showed that most of the medical laboratory staff were B.Sc (57.4%), In comparison the percentage of M.Sc and Diploma was low (35.4%, 7.1%), this indicates that this may be due to the lack of available specialist, as well as the need for medical Analytics technicians.

Additionally, 64% of the respondents were married, while 35.7% were single. On other hand, ages over 23 years old constitute around 94% percent of the respondents, this finding is compatible

with the Iraq Central Bureau of Statistics indicators which indicates that the average age of marriage in Iraq is 23 years for men and 19 years for women ⁽⁹⁾.

The findings indicated that most medical laboratory employees lack training courses in occupational health over (51.1%). Also, most of those who had training courses little percent (48.9%) took it before at least two years ago. This could be the result of inadequate training and growing competencies for staff in the laboratory departments within occupational health.

Concerning to table Overall degree of the domain of staff awareness, which has a percentage of (77%) indicates that there is a high degree of awareness of the staff on occupational safety issues. The positive responses of the samples also indicate that they have a high level of awareness. The results of the current study match the results of ⁽²²⁾ study, which found that awareness and knowledge of occupational hazards among HCW have scored very high, and safety climate scored high. Also, the result compatible with ⁽²³⁾ study, which showed a high degree of participant knowledge about occupational hazards in laboratory workers in the hospitals. On the other hand, the study results differ from ⁽²⁴⁾ study, which found a lack of knowledge (poor knowledge) on preventing occupational accidents to a high degree.

Concerning to study relationship between staff awareness and socio-demographic characteristics There were no significant relationship founded in the mean of staff awareness and age variable.

The study findings were aligned with the study conducted by ⁽¹⁰⁾, who concluded that there is no significant relationship in safety measures and occupational hazards perception and knowledge with age domain among the medical laboratory workers. Simultaneously, the present study doesn't agree with the study ⁽¹¹⁾ who found significant relationship in the mean of occupational hazards and age domain on staff.

There was no significant relationship founded in the mean of score for staff awareness and sex

variable. Concurrently, the current research differs with ⁽¹⁰⁾ a study, who concluded that there is no significant relationship in safety measures and occupational hazards perception and knowledge with sex domain among laboratory workers in governmental hospitals.

Researcher recognizes that there is no significant relationship founded in the mean of staff awareness and marital status variable. This result was agreed with ⁽¹⁰⁾ a study, which found no significant relationship in perception and knowledge, and safety measures. In contrast ⁽¹¹⁾ doesn't agree with result, which found significant relationship in the domain of occupational hazards and marital status.

The primary work location variable and the mean staff awareness did exhibit meaningful correlation the presence of varying equipment and capability conditions in each of the hospitals in Najaf may be the reason for the statistically significant link the researcher discovered based on the work locations.

On the other hand, there were no significant relationship founded in staff awareness and years of experience variable. The researcher frequently relied on the cause of the absence of statistically significant relationship in the level of experience in adopting practical experience to learn how to deal with occupational hazards and these results were consistent with ⁽¹²⁾. A study revealed that there was no discernible correlation between the number of years of experience and the occupational dangers for health staff. And these results were incoherent with ⁽¹³⁾, who found significant relationship in the level of likelihood of chemical, biological, ergonomic, and physical hazards between years of experience of health care providers. Also ⁽¹⁴⁾ studies found the same result of significant relationship.

There was no significant relationship in the mean of staff awareness and education level variable. The new study supports the findings of ⁽¹³⁾ study who conclude that there is no significant relationship in the likelihood and severity of occupational hazards

between education levels of health care providers. Also, the outcomes matched ⁽¹⁵⁾ research who observe that there no significant relationship between occupational hazards and educational level.

There were no significant relationship founded in the mean of staff awareness hazards and job position variables. The researcher ascribes the established outcome to the reality that the quantity of practitioners in the laboratory departments is good and sufficient.

Finally, The researcher observed also there were no significant relationship founded in the mean of Staff awareness and receiving training courses on occupational hazards variable. The observed outcome, according to the researcher, can be explained by the fact that occupational hazard training courses raise trainers' awareness, reduce their exposure to occupational dangers, and improve their readiness to manage those hazards.

CONCLUSIONS:

The medical laboratory staff is well-versed on the hazards associated with their jobs at the laboratory. There are a number of issues that make it difficult for upper management to increase workplace safety.

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TABLES:

Table (1): The Socio-demographic characteristics of medical laboratory staff sample will be clarified as the following figures (N=350)

Items	Sub-groups	Study group (Total = 350)	
		Frequency	Percentage
Age / Years	22 – 28	180	51.4
	29 – 35	99	28.3
	36-42	43	12.3
	43-49	17	4.9
	50 – 56	11	3.1
Gender	Male	161	46.0
	Female	189	54.0
Primary Work Place	Al Sadr Teaching Hospital	70	20.0
	Al Zahraa Teaching Hospital	60	17.1
	Al-Hakim General Hospital	65	18.6
	Al-Furat Al-Awsat Teaching Hospital	44	12.6
	Al-Sajjad Hospital	60	17.1
	Hassan Halous Specialized Hospital	51	14.6
Years of Experience	1-8	259	74.0
	9-16	52	14.9
	17-23	28	8.0
	24-31	11	3.1
Levels of Education	Diploma	124	35.4
	B.Sc.	201	57.4
	M.Sc.	25	7.1
Marital Status	Married	224	64.0
	Unmarried	125	35.7
	Other	1	0.3
Job Position	Head of Department	6	1.7
	Head of Division	32	9.1
	Practitioners	312	89.1
Training courses on occupational Hazards?	Yes	171	48.9
	No	179	51.1

Table (2): Assessment and mean of scores for staff awareness about occupational hazards

No.	Items	MS	SD	RF	Assessment
1	I am aware of the occupational hazards at work.	4.27	0.54	0.85	Good
2	I know how to avoid occupational hazards.	4.03	0.70	0.81	Good
3	I know about preventive measures to be taken at work hazards.	3.59	0.82	0.72	Moderate
4	There is a transparent process for reporting accidents that occur during work.	3.40	0.82	0.68	Moderate
5	I can provide information to those around me about occupational hazards in my workplace.	4.04	0.67	0.81	Good
6	I'm committed to wearing the gloves while dealing with the patient	4.24	0.63	0.85	Good
7	I sterilize my hands using sterilizers or wash my hands after dealing with each patient	3.34	1.49	0.67	Moderate
8	I am aware of the symptoms that appear on patients carrying the communicable diseases while they were in the lab department	4.19	0.55	0.84	Good
9	I know what to do with a suspected communicable diseases patient	3.61	0.85	0.72	Moderate
Overall Awareness		3.86	0.79	0.77	Good

MS: Mean of Scores; SD: Standard Deviation; Low: MS = 1-2.33; Moderate: MS =2.34-3.66; High: MS≥3.67.

Table (3): Descriptive Statistics of staff subgroups according to their total assessment of awareness about occupational hazards

Awareness about occupational hazards				
		Poor	Moderate	Good
	Frequency	0	163	187
Percentage	0.0	46.6	53.4	

MS: Mean of Scores; SD: Standard Deviation; Low: MS= 1-2.33; Moderate: MS=2.34-3.66; High: MS≥3.67 RF: Ratio fraction.

Table (4): Relationship between staff awareness about occupational hazards and demographic characteristics

Items	Chi Square	df	P value	Sig.
Age / Years	0.51	1	0.54	NS
Gender	1.22	2	0.54	NS
Primary Work Place	101.85	5	0.000	HS
Years of Experience	4.18	3	0.24	NS
Levels of Education	0.07	2	0.96	NS
Marital Status	3.78	2	0.15	NS
Job Position	5.37	2	0.06	NS
Training courses on occupational Hazards?	0.01	1	1.04	NS

NS: Non-significant at $p>0.5$; HS: High Significant at $p<0.01$.