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*RESEARCH ARTICLE - MEDICAL TECHNIQUES*

# Occupational Hazards Knowledge among a Sample of Medical and Paramedical Staff in Baghdad City

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**Abstract**

Occupational hazards include any behaviors which possess the potential to cause or raise risks at the workplace, as well as the compounding effects of accidents and occupational diseases within workers in the health and medical field. As a result, such hazards have a deleterious impact on staff, their families and friends, and the country. To identify the levels of knowledge of medical and paramedical staff regarding occupational hazards in their workplaces.
An observational snapshot cross sectional study, started at Jan 5th and up to April 10th, 2022 at 3 hospitals and 3 health centers at Baghdad governorate, on 485 participants from medical and paramedical staff, information about knowledge collected through a structured questionnaire developed by the researcher.
Results observed more than half responses regarding of sub domain "General Knowledge's items" had a “Good” evaluating and assigned for 6 (54.55%), while the leftover item are assigned an “Accepted” evaluation, then followed by the second sub domain of "Specific Knowledge's items" an “Accepted” evaluating for 4(57.14%) items, while leftover items assigned a “Good” evaluation.
The introduction of modern educational programs among medical and paramedical personnel is essential in order to expand their understanding of occupational hazards in their respective fields of practice.



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**Keywords:** Occupational health and safety; Occupational hazards; Knowledge; Healthcare facilities; Medical and paramedical staff.

## 1. Introduction

Occupational hazards discuss and indicate to activities and procedures which occur in the work environment that have the probable ability to make or raise the probable risk of causing health impairment condition [1, 2]. Across the world , health centers, hospitals and other health facilities have over fifty nine million employee [3] which are considered as workers with the higher category of workplace hazards and accidents [4]. besides to the prevailing work environment related hazards exposures, workers in health sector having dangerous hazards because of their work pattern [5]. At the hospital environment, the occupational hazards occurrence are more uncontrolled in some departments, compared to others [6], knowledge regarding work environment hazards differs between departments and health organizations [7]. previous research indicate that occupational health related impacts more abundant in procedure rooms as compared with and consultation places [3]. Diseases such as tuberculosis [8], transmission routes of diseases as HIV and hepatitis are usually via direct exposure with contaminated fluids ,droplets and aerosols from infected persons [9]. Several studies noted increase in the prevalence of highly infectious pathogens as Severe Acute Respiratory Syndrome [10] and swine-origin influenza A (H1N1) [11], which have the predisposition to increase the probability of getting infections among health care workers and professionals [6]. Alongside with the potential hazards, there are factors could contribute the occurrence of occupational health related problems and impacts or injuries of workers in health sectors like workers carelessness, unavailability of appropriate protection equipment, lack of appropriate numbers of workers, over load of work, fail to follow the safety and hygiene guidelines by the workers or the administration, and inappropriate modern equipment knowledge [12]. occupational hazards could be decreased through applying number of initiatives such as; education along with training of workers in the health organizations [13]. With recent study medical and paramedical staff mentioned that the practical training and education could provide appropriate knowledge in dealing with workplace hazards. In contrast, the deficiency of workplace related knowledge will put workers in a risky situation [14].

### *1.1. Aim of the study*

Identify the knowledge levels of medical and paramedical staff regarding occupational hazards in their workplaces.

| Nomenclature | | | |
|---|---|---|---|
| A | accepted | HCW | health care worker |
| Ev | evaluation | MCQ | multiple-choice question |
| F | Frequency | OHS | Occupational health and safety |
| G | good | P | poor |
| OSHA | Occupational safety and health administration | NS | not significant |
| SDCv. | socio-demographical characteristics variables | RS | relative sufficiency |
| s | significant | % | Percentage |
| HCF | health care facilities | | |

## 2. Research Methods

An observational snapshot cross sectional study, started at Jan 5th to April 10th, 2022 at a one hospital and one health center from each of the health directorates of (AL-Karkh, AL-Rusafa and Medical City) which all located at Baghdad governorate by multi stage sampling technique, information about knowledge of medical and paramedical staff collected through a structured questionnaire developed by the researcher depends on the previous studies [15], All observations of the supervisors and the experts to evaluate the questionnaire contents, clarity, and adequacy were taken into consideration to achieve the present goals of the study.

### *2.1. Ethical approval & administrative arrangement*

One of the most important measures taken by the researcher before collecting the information from the sample is ethical considerations.
Ethical approval and all administrative agreements were obtained from the College of Health and Medical Technology/ Baghdad/ Community Health Department and the research committee at Middle Technical University. This is one of most basic principles before gathering the data, to protect the participant values and dignity.
Followed by a formal agreement from AL-Karkh, AL-Rusafa and Medical City Health Directorates, and then, from the hospitals and health centers that belong to these directorates in which the data collection will occur in them.

### *2.2. Study sample, study population, and sample size*

Convenient sample number of 485 participants, (184 Medical staff and 301 Paramedical staff) selected randomly from the selected places of study, The study population consists of all the medical and paramedical staff who works in Baghdad governorate health directorates which were 485 and the sample size was estimated using Raosoft sample size calculatorand according to the following equations:

$$x = Z(c/100)^2 r(100-r)$$
$$n = N x / ((N-1)E^2 + x)$$
$$E = \mathrm{Sqrt}[(N-n)x / n(N-1)]$$

By using this calculation, suggested sample were 382 participants. The researcher added 25% (95.5) to ensure compensation for the loss or refusal to participate by some respondents, so the total number becomes 382+95.5=477.5 ≈ 485 to more accurate.

### *2.3. Instrument of the Study*

The questionnaire is divided into four main parts: Part 1 Concerning demographic and socio-economic data, contain 13 items including age, gender, years of experience, educational level, health care specialty, residence, marital status, number of Family members, Property, Department (Working area), Years of experience. Part 2 Contains 19 questions to measure knowledge of medical and paramedical staff regarding occupational hazards, these questions are divided into two domains, the general knowledge domain (11 question) and the specific knowledge domain (8 questions), by setting binary nominal dichotomous scales (yes, or no) with integer numbers (1, 0) for the first sub domain, and MCQ scales for the second sub domain.
Evaluation intervals are symbolized due to relative sufficiency statistic for the knowledge items by: [(0.00 – 33.33) for Poor (P) evaluation; (33.34 – 66.66) for a Accepted (A) evaluation; and (66.67– 100) for the Good (G) evaluation]
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By using this calculation, suggested sample were 382 participants. The researcher added 25% (95.5) to ensure compensation for the loss or refusal to participate by some respondents, so the total number becomes 382+95.5=477.5 ≈ 485 to more accurate.

## 3. Statistical Data Analysis

Multiple statistical analysis of data methods used to analyse and make assessment of the results of this study using statistical package (SPSS) ver. (20) application and analysis of Descriptive data as the following points:
a) Tables (Percentages and Frequencies) with, standard deviation (SD) and Arithmetic mean.

b) Where relative sufficiency (RS%) are calculated.
c) Transformed domains of the study for estimators of screening by score of grand and global mean of an overall assessments by transformation of the responses in each period at quantitative measure scale using the technique of percentile transformation.

## 4. Results

Table 1 shows distribution of studied health care provider's socio-demographical characteristics variables (SDCv.) according to their observed frequencies and cumulative percent, as well as the significant comparison through the observed distribution with an expected outcome in each variable whether they are randomly distributed or not.

Table 1 Distribution of the studied health care provider's social and demographical variables characteristics

| (SDCv.) | Groups | No. | % |
|---|---|---|---|
| Gender | Male | 220 | 45.4 |
| | Female | 265 | 54.6 |
| Age Groups | 20 _ | 254 | 52.4 |
| Yrs. | 30 _ | 133 | 27.4 |
| | 40 _ 49 | 60 | 12.4 |
| | 50 _ 60 | 38 | 7.8 |
| | Mean ± SD | 32.29 ± 8.93 | |
| Health Care Provider | Physician | 69 | 14.2 |
| specialty | Dentist | 53 | 10.9 |
| | Pharmacist | 62 | 12.8 |
| | Nurse | 98 | 20.2 |
| | Medical Technician | 99 | 20.4 |
| | Doctor Assistant | 91 | 18.8 |
| | Other paramedical specialties | 13 | 2.7 |
| Residency | Urban | 429 | 88.5 |
| | Rural | 56 | 11.5 |
| Educational Levels | Secondary school | 32 | 6.6 |
| | Institute | 155 | 32 |
| | Bachelors' degree | 274 | 56.5 |
| | Masters' Degree | 16 | 3.3 |
| | Ph.D. | 8 | 1.6 |
| Marital Status | Single | 190 | 39.2 |
| | Married | 275 | 56.7 |
| | Divorced | 11 | 2.3 |
| | Widowed | 9 | 1.8 |
| Years of Experience | 1 - 5 | 265 | 54.6 |
| | 6 - 10 | 83 | 17.1 |
| | 11 - 15 | 53 | 10.9 |
| | > 15 | 84 | 17.2 |
| Working Overtime | Yes | 219 | 45.2 |
| No | | 266 | 54.8 |

Results show differences with significant levels which estimated in at least at P value<0.05 amongst resulted distribution with expected outcome in each variable. With respect to "Gender" variable, female was formed 265(54.6%), and for "Age Groups", most of studied health care providers were found at the first and age group, since they accounted (52.4%). health providers with medical technician specialty from the sample size are formed 184(20.4%) then followed by nurse specialty with (20.2%), while leftover health providers formed 301(59.4%), and for "Residency" variable, urban residents formed 429(88.5%), as well as "Educational Levels" showed that most of studied health care providers are graduated institute, and bachelor's degrees, since they are accounted 429 (87.5%), and then for "Marital Status", married status are formed 275(45.7%), while single status are formed 190(39.2%), as for "Years of Experience", more than half of studied health care providers with short years of experience represented by the first group, and finally "Working overtime", results shows that about half of studied health care providers who had work overtime, and they are accounted 219(45.2%).

Table 2 shows a summary statistic for "Health care Provider's knowledge toward occupational hazards from a point of view's medical and paramedical staff" among sampling population hospitals and Health care Centres in Baghdad governorate. Results that observed the more than half responses regarding of sub domain "General Knowledge's items" had a “Good” evaluating and assigned for 6 (54.55%), while the leftover item are assigned an “Accepted” evaluation, then followed by the second sub domain of "Specific Knowledge's items" an “Accepted” evaluating for 4(57.14%) items, while leftover items assigned a “Good” evaluation. From these results, conclusion can be that the health care providers' knowledge towards occupational hazards were assigned at the established level in which that achieving the goal of this study.

Table 2 Summary Statistics of Medical and Paramedical staff Knowledge toward occupational hazards

| Part1: General Knowledge's items | | | | | | | |
|---|---|---|---|---|---|---|---|
| knowledge's items | Resp. | No. | % | MS | SD | RS% | EV |
| you have knowledge of matters relating to occupational health and safety. | Yes | 415 | 85.6 | 0.86 | 0.35 | 86 | G |
| | No | 70 | 14.4 | | | | |
| you are aware of the level of risk surrounding your workplace. | Yes | 414 | 85.4 | 0.85 | 0.35 | 85 | G |
| | No | 71 | 14.6 | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| there is a department of occupational safety and health in workplace. | Yes | 272 | 56.1 | 0.56 | 0.50 | 56 | A |
| | No | 213 | 43.9 | | | | |
| are you aware of the meaning of the signboards that explain the nature of the risks surrounding your workplace and how to avoid and reduce the impact on you | Yes | 352 | 72.6 | 0.73 | 0.45 | 73 | G |
| | No | 133 | 27.4 | | | | |
| did you receive adequate training from the department of occupational health and safety in how to deal with occupational risk that affect you during your work. | Yes | 254 | 52.4 | 0.52 | 0.50 | 52 | A |
| | No | 231 | 47.6 | | | | |
| you are aware of your rights if you are exposed to any risk during working. | Yes | 245 | 50.5 | 0.51 | 0.50 | 51 | A |
| | No | 240 | 49.5 | | | | |
| you have the full ability to identify risks surrounding your workplace. | Yes | 309 | 63.7 | 0.64 | 0.48 | 64 | A |
| | No | 176 | 36.3 | | | | |
| biological infections transmitted mostly through contact with the patient. | Yes | 344 | 70.9 | 0.71 | 0.45 | 71 | G |
| | No | 141 | 29.1 | | | | |
| do you have adequate information on how to use the fire extinguisher in your workplace? | Yes | 251 | 51.8 | 0.52 | 0.50 | 52 | A |
| | No | 234 | 48.2 | | | | |
| you know the big risks resulted from exposing to radiation during your work. | Yes | 328 | 67.6 | 0.68 | 0.47 | 68 | G |
| | No | 157 | 32.4 | | | | |
| you have information on the types of injuries related to the nature of your work. | Yes | 402 | 82.9 | 0.83 | 0.38 | 83 | G |
| | No | 83 | 17.1 | | | | |
| part2: specific knowledge's items | | | | | | | |
| knowledge's items | Resp. | No. | % | MS | SD | RS% | EV. |
| which one is not a hospital workplace environment hazard?<br>Noise [ ] Needle stick injuries[ ] Early arrival at work[ ]<br>Body contamination with patients' body fluids [ ] | True | 449 | 92.6 | 0.93 | 0.26 | 93 | G |
| | False | 36 | 7.4 | | | | |
| which one of the following is not a workplace infection in hospital environemnt?<br>l. hospital? HBV [ ] HIV [ ] Chicken pox [ ] Malaria [ ] | True | 173 | 35.7 | 0.36 | 0.48 | 36 | A |
| | False | 312 | 64.3 | | | | |
| the most probsble source of work-related infections in the health organizations is one of the following:<br>air-borne [ ] feces and urine [ ] blood and body fluids [ ]<br>body contact [ ] | True | 437 | 90.1 | 0.90 | 0.30 | 90 | G |
| | False | 48 | 9.9 | | | | |
| which of the following activities has more probability of a needle stick injury to occur?<br>recapping [ ] transporting to the sharp's disposal safety box [ ]<br>handling equipment before use [ ] handling equipment after disposal [ ] | True | 296 | 61 | 0.61 | 0.49 | 61 | A |
| | False | 189 | 39 | | | | |
| which of the following violates the standard precautions?<br>l. aspirating for blood before intramuscular injections [ ] recapping needles after use [ ] leaving needles attached to syringes after use [ ] | True | 141 | 29.1 | 0.29 | 0.45 | 29 | P |
| | False | 344 | 70.9 | | | | |
| hand washing is good to prevent occupational cross infection after procedures<br>l. Yes [ ] No[ ] Don't know [ ] | True | 433 | 89.3 | 0.89 | 0.31 | 89 | G |
| | False | 52 | 10.7 | | | | |
| tick the sign that refer to warning regarding biological hazard<br>[ ]  [ ]  <br>[ ]  [ ]  | True | 246 | 50.7 | 0.52 | 0.54 | 52 | A |
| | False | 239 | 49.3 | | | | |
| tick the sign that refer to warning regarding radiation hazard<br>[ ]  [ ]  <br>[ ]  [ ]  | True | 199 | 41 | 0.42 | 0.56 | 42 | A |
| | False | 286 | 59 | | | | |

Ev.: Evaluated as [0.00 – 33.33] Poor (P); [33.34 – 66.66] Accepted (A); [66.67– 100] Good (G).

Table 2 regarding the part concerned with "general knowledge" of medical and paramedical staff the highest percentage of true answers (85.6%) of Medical and Paramedical staff with "good" knowledge score answered correctly about "You have knowledge regarding to safety and health at workplace environment", (85.4%) about "You have a sufficient awareness to the risks surrounding your workplace", (82.9%) about "you have sufficient knowledge about type of illness and injuries associated with your work", (72.6%) about " Are you aware of what signboards in your workplace indicates to", (70.9%) about "Biological infections transmitted only through contact with the patient", and (67.6%) about "you have knowledge regarding the risks of exposing to doses of radiation in your workplace", followed by answers evaluated as "acceptable knowledge" by (63.7%) about "do you have the capacity to recognize the surrounding workplace hazards", (56.1%) about "There is a Department of Occupational Safety in workplace", (52.4%) about "Did You receive adequate training by the administration of safety and health unit of how to manage with occupational hazards in your workplace", (51.8%) about "do you know how to use the fire extinguishers appropriately" and (50.5%) about "do you know your rights when you are exposed to work related injury or illness". While "specific knowledge"

of the staff revealed evaluation with “good knowledge” and high percentages of true answers of (92.6%) about “Which one is not a hospital workplace environment hazard”, (90.1%) about “The MOST probsble source of WORK-RELATED infections in the health organizations is one of the following” and (89.3%) about “Hand washing is good to prevent occupational cross infection after procedures”, followed by “acceptable knowledge” evaluation answers by (61%) about “ which of the following activities has more probability of a needle stick injury to occur”, (50.7%) about “Tick the sign that refer to warning regarding biological hazard”, (41%) about “Tick the sign that refer to warning regarding radiation hazard” and (35.7%) about “Which one of the following is a workplace infection in hospital environemnt” then the staff had “poor “ knowledge with true answers by (29.1%) about “Which of the following violates the Standard Precautions?”

## 5. Discussion

The findings revealed that medical and paramedical staff had an "Accepted" knowledge evaluation, with "Good" knowledge for the "General Knowledge" subdomain and "Accepted" Knowledge, This result is similar to previous study in Kerbala, Iraq [16], Alkut City [17], Jamica [18], and with results in Cyprus [19]. This study, on the other hand, contrasts with study in Ghana, where the staff knowledge was on average higher in our studied sample[20], as well as other studies in Africa [21], Ethiopia which found a high percentage of knowledge among the studied staff [22], in Indonesia [23], in Nigeria by [24], also in Serbia by [25]. This study result differs from that found in North Eastern Nigeria where the majority of the staff had "poor" knowledge [26], as well as that found in Egypt before applying the educational program to the staff [27]; these differences may be attributed to the activity and role of OSH departments in the health facilities, as well as their involvement in effective training and educating the medical and paramedical staff in order to raise their knowledge, attitudes, and practices concerning with occupational hazards in their surrounding environment.

In the "General Knowledge" subdomain, the responses "You have knowledge of matters relating to OSH" and "You are aware of the level of risk surrounding your workplace" were both categorized as "Good" knowledge scores, which is similar to discovered results in a previous study in Nigeria [3]. While the answer for "There is a Department of OSH in the Workplace" that was "Accepted" among the staff, agrees with the results found in Sulaymaniyah City by [28], however, differs from the results found in Cyprus [19], The above disagreement could be linked to the official healthcare administration's interest in the OSH programs and the continued care and inspection of the safety programs. The study results for "Did you receive adequate training from the Department of OSH in how to deal with occupational" and "You are aware of your rights if you are exposed to any risk while working" differ from those found in [28], This difference could be due to the increased activity of OSH departments in Sulaymaniyah.

The response of the staff about “you have adequate information on how to use the fire extinguisher in your workplace” agrees with the health workers' response to India [29]. The response for "You are aware of the level of risk surrounding your workplace" and the MCQ "the most likely source of infection," which test the staff's knowledge of their surroundings hazards and which they had "Accepted" knowledge score as average of two related MCQ, agrees with a Nigerian study done by [30]. While the response "You are aware of the risk of biological hazards and their transmission" differs from that of in Nigeria, where the risk was higher [26]. “You know the big risks resulted from exposing to radiation during your work” this study's findings nearly agree with [31].

The staff demonstrated "Good" knowledge with accurate answers about hand wash importance to prevent illness transmission after work processes, which is consistent with a Nigerian study [3]. The "Accepted" answers to the MCQs about staff understanding of needle stick hazard coincide with Ethiopian study [22]. For MCQs about a procedure that breaks standard precautions, this study found "Poor" knowledge and differ from Nigeria, which was "Good" in terms of overall knowledge [3].

According to this research, staff members "Accepted knowledge" about safety and warning signs, but only half of those surveyed could identify a "Biological hazard" sign, and the majority of them could not identify a “Radiation hazard” sign. No previous study could confirm or reject these findings, but these two questions are indicators of the "poor" knowledge of the staff, despite the fact that many of them believe that they have it.

## 7. Recommendation

The introduction of modern educational programs among medical and paramedical personnel is essential in order to expand their understanding of occupational hazards in their respective fields of practice.

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