

Occupational and Psychological Hazards among Workers in Medical Analysis Laboratories in Healthcare Institutions: A Case Study of the Medical Analysis Laboratory at the Boulev Polyclinic in El Kala, EL Tarf

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Abstract:

This study provides an analytical examination of the occupational and psychological hazards faced by workers in the Medical Analysis Laboratory at the Boulev Polyclinic in El Kala, Tarf. Identified hazards include biological, chemical, physical (noise, ventilation, vibrations, heat), and mechanical risks, alongside psychological stress, occupational fatigue, and strain. The study also evaluates the implementation of occupational safety protocols in the laboratory through semi-structured interviews with staff. The findings culminate in recommendations to improve the work environment and ensure the safety and security of medical laboratory personnel.

Key Words: hazards, Occupational hazards, psychological hazards, medical analysis, Work, laboratory.

Introduction:

Medical analysis laboratories form the backbone of the healthcare system, playing a vital role in processing diagnostic test results and providing essential medical support. However, the increasing workload and demands on laboratory workers—particularly during recent disease outbreaks and the COVID-19 pandemic—have exposed them to diverse occupational and psychological hazards. These risks negatively impact their physical and mental health, as well as their overall safety. Hazards include exposure to chemical and biological substances, physical injuries from mechanical risks associated with equipment, and physical hazards such as toxicity due to poor hygiene, inadequate ventilation, and insufficient lighting. Psychological risks, including burnout, stress, and energy depletion from excessive workloads, further degrade their professional quality of life and long-term mental well-being.

Effective handling of hazardous materials and risk mitigation require robust preventive measures, adequate training on safe practices, consistent use of personal protective equipment (PPE), and fostering a culture of health awareness and occupational safety. Healthcare institutions must adopt clear policies to protect workers from psychological risks, provide mental health support, and implement strategies to enhance psychological well-being, thereby reducing workplace accidents and injuries.

This study highlights the occupational and psychological hazards prevalent in healthcare institutions, which pose significant challenges to laboratory workers. It concludes with scientifically grounded recommendations to prevent risks, improve laboratory environments, and ensure safe and efficient task performance.

١. Study Proble:

Workers in health institution laboratories face several challenges that raise concern and fear due to the variety of risks they encounter, ranging from toxic chemicals that pose a danger and threat to their health and safety, to infectious diseases that may be transmitted through direct contact or the surrounding environment, such as respiratory infections, seasonal flu, or COVID-١٩. Additionally, psychological stress, depression, anxiety, and work pressure have become widespread and noticeable among workers. These threats represent a significant obstacle to their safety and health.

According to the World Health Organization, (٢٠١٨) "time pressure, lack of control over work tasks, long working hours, shift work, lack of support, and moral distress are significant risk factors that cause occupational stress, burnout, and fatigue among healthcare workers."

The European Agency for Safety and Health at Work sees stress as the most common problem at work, affecting ٢٢% of the total workforce in the European Union (٢٠١٢, Lambert et al., Flohimont).

Therefore, it is imperative for healthcare institutions to develop effective and carefully studied strategies to manage the risks surrounding workers. These strategies should include regular training on safe work practices and the provision of advanced personal protective equipment based on modern technology to meet their needs. Additionally, continuous evaluation of the implementation of occupational safety and health procedures in laboratories, which are environments fraught with risks and complexities, is necessary to ensure improved working conditions and reduce the likelihood of exposure to risks that could negatively impact the mental and physical health of workers alike.

Despite the series of measures introduced by the Algerian legislator within the framework of protecting health in the workplace, especially Law ١٨-١١, which stipulates that the objectives of workplace health are to promote the physical, mental, and social well-being of workers in all professions and to maintain the highest possible level of these. It also addresses the need to assign workers to jobs that match their physiological and psychological capabilities and to keep them in those positions (Boualia, ٢٠٢٢, p. ٨٩). Despite the existence of regulations and procedures related to occupational safety and health, the rate of exposure to risks continues to increase. This necessitates a genuine commitment from both management and employees to effectively implement these regulations and procedures, ensuring that situations do not worsen or become more complex, and those preventive measures are strictly increased.

Accordingly, periodic awareness campaigns should be organized, focusing on raising awareness of risks and how to avoid and confront them in correct and successful ways, thereby enhancing the security and professional culture among

employees and reducing the psychological fears associated with a risky work environment.

Familiarizing workers with potential risks increases their ability to take timely preventive measures to protect themselves and their colleagues, ensuring a safer and more stable work environment.

Enhancing security culture and necessary precautions is not limited to the management of the healthcare institution; it is a responsibility that falls on all employees in medical laboratories. The spirit of teamwork, joint efforts, good coordination, and knowledge exchange among all actors will lead to reducing professional and psychological risks, which will positively reflect on the quality and type of services, thereby achieving the highest level of safety.

Amidst all of the above, the study came to answer the following question: What are the occupational and psychological hazards faced by the workers in the medical analysis Laboratory at the Boulev Polyclinic in El Kala - El Tarf?

٢. Research Questions:

Based on the main question, there are several sub-questions:

- What are the most prevalent occupational and psychological hazards in the medical analysis laboratory at the Boulev Polyclinic in El Kala, Taref?
- Does the nature of laboratory work contribute to the spread of these hazards in the medical analysis laboratory at the Boulev Polyclinic in El Kala, Taref?
- Are existing preventive measures in the medical analysis laboratory at the Boulev Polyclinic in El Kala sufficient and properly implemented?

٣. Study Objectives:

- Identify the most common occupational and psychological hazards in the medical analysis laboratory at the Boulev Polyclinic in El Kala, Taref .
- Examine how the nature of laboratory work exacerbates these hazards in the medical analysis laboratory at the Boulev Polyclinic in El Kala, Taref.
- Evaluate the implementation and adequacy of preventive measures in the medical analysis laboratory at the Boulev Polyclinic in El Kala, Taref.

٤. Study Key Terms:

- **Occupational hazards:**

Occupational hazards refer to those dangers that workers are exposed to while performing their duties or due to their profession. These hazards may be of a chemical nature, such as gases, and are called chemical hazards; or they may be of a physical nature, such as heat, noise, and vibrations, and are called physical hazards; or they may be due to collisions with solid objects or handling equipment, and are called mechanical or engineering hazards. (Slimane Lagra, ١٩٩٠, p٥)

Occupational hazards are linked to general working conditions and threaten the deterioration of workers' health, whether through illness or accidents. The employer must eliminate or reduce these risks to ensure the safety of users and protect their physical and mental health. (Miziani, ٢٠١٤, p. ٩٢)

Moreover, the minor physical injuries resulting from potential accidents while handling complex devices and tools in laboratories are among the risks that should be addressed, as these accidents can cause physical injuries with long-lasting effects, such as chronic pain or disability.

- **Psychological Hazards:**

According to Dahmani (٢٠١٩), psychological risks are those human pressures that arise from the implementation of the organization's strategy, taking various forms such as anxiety and stress, violence, mental burden, and poor communication, among others. These pressures are transmitted differently among employees depending on their position within the organization. (Naqbil et al., ٢٠٢٣, p. ١٨)

Identifying psychological hazards is considered an essential part of occupational health and safety management, as it contributes to improving the work environment and reducing accidents and occupational diseases.

In addition, the significant work pressure that many healthcare workers experience cannot be ignored, as it may lead to chronic psychological stress, a risk that requires serious attention.

According to the International Labor Organization, "(٢٠٢٢): if work-related stress persists for a long time and/or is severe, it can cause psychological and physical injuries. While pressure is normal in many workplaces, stress occurs when 'the pressure becomes excessive or unmanageable.'"

٥. Study Methodology:

In this study, we relied on conducting a number of semi-structured interviews with several employees at the medical analysis laboratory at the Boulev Polyclinic in El Kala - El Tarf, who varied between technicians and laboratory analysis doctors. Participants were given the opportunity to express their opinions on the nature of the work environment and the types of risks they encounter, and to evaluate the extent of the application of occupational safety procedures in the medical analysis laboratory at the Boulev Polyclinic in El Kala - El Tarf.

٦. Presentation and Discussion of the Study Results:

After collecting data and analyzing the results according to each axis to determine the extent of occupational and psychological hazards and their impact on laboratory workers at the Boulev Polyclinic in El Kala - El Tarf, leading to an evaluation of the extent of the application of occupational safety measures in the medical analysis laboratory, the following is the analysis of the results for each axis:

a) Personal Information

Through the analysis of data related to gender, educational level, and years of experience, we observe that the majority of the sample is females, and that university education is predominant among the respondents. This confirms the impact of academic knowledge on workers' awareness of occupational and psychological hazards. It can also be noted how the lack of experience affects laboratory workers, making them more susceptible to risks due to accumulated physical fatigue.

b) The Nature of Work in The Laboratory:

Through analyzing the interviews with the respondents, the workers of the at the Boulev Polyclinic el Kala medical laboratory, the diversity of tasks performed by the workers is evident, highlighting the nature of their exposure to risks.

The results also showed that the work environment is somewhat unsafe, but adherence to occupational safety standards reflects the workers' readiness to deal with various hazards.

c) Types of Occupational and Psychological Risks Faced by Workers

• Biological Hazards:

Most of the workers in the medical analysis laboratory at Bouzid Ammar Hospital in El Kala confirmed that they are in a constant and continuous state of exposure to biological risks through handling blood, urine, and stool samples. Some participants mentioned that they have experienced incidents such as needle stick injuries, and some noted that preventive measures like wearing gloves and masks are available, but adherence to them varies among the workers.

The percentage of workers who have been exposed to contaminated biological materials is very low, and they are committed to wearing personal protective equipment inside the laboratory. Especially with the recent Corona pandemic, which made the workers adhere to safety conditions and take the necessary precautions. This was confirmed by the study of Najat Habirsh (٢٠٢٠), which aimed to identify occupational hazards in healthcare institutions in light of the spread of the coronavirus. The results showed that a large percentage of workers stated that biological hazards were the most threatening to them in the institution, at a rate of ٧١%.

- **Chemical hazards:**

Interviews with medical laboratory workers revealed that they handle hazardous chemicals such as acids and organic solvents, which can lead to respiratory problems or skin irritations and burns with repeated exposure. Some respondents expressed concern about the lack of adequate ventilation in certain laboratory sections, increasing the risk of inhaling harmful chemicals. They also indicated that while protective measures are available when handling chemicals, they are insufficient.

- **Physical and Mechanical Hazards:**

Some workers at in the medical analysis Laboratory at the Boulev Polyclinic in El Kala confirmed that they suffer from issues related to insufficient lighting in the lab, which causes them visual fatigue. The respondents also noted the lack of adequate and appropriate ventilation in some sections of the lab to avoid inhaling chemical substances. Additionally, others complained about the fear of exposure to radiation and electromagnetic waves, which affect their health. Meanwhile, injuries caused by sharp tools were minor and not permanent or significant. This was confirmed by the study (Nqbeel et al., ٢٠٢٣), which indicated that the intensity of work and the difficult tasks that involve many physical risks, such as electrocution resulting from working in places with high-capacity electrical generators, and sometimes the worker finds himself facing complex tasks that he cannot solve, and he does not receive support and assistance from colleagues or his direct supervisor to intervene safely.

- **Psychological Risks and Occupational Stress:**

Interviews showed that the majority of workers in the medical analysis laboratory are in a state of fatigue and exhaustion due to the large number of samples that need to be analyzed daily and the small number of staff, leading to physical and mental strain. They also indicated that they are continuously exposed to work pressures, which was confirmed by the study (Nqbil et al., ٢٠٢٣) that found ٦٥% of workers are exposed to work pressures. This is an indicator that a large percentage of the employees in this institution need care and attention from the management.

The respondents also acknowledged that one of the most significant factors causing professional burnout and psychological stress is long working hours, which have affected the quality of their personal lives, and consequently, the quality of their performance and professional safety. This necessitates the need to improve working conditions and provide psychological support for employees.

d) Evaluation of the Extent of Implementation of Occupational Safety Procedures in the Medical Laboratory:

The opinions of the laboratory staff regarding the implementation of occupational safety procedures were divided. Some believe that the hospital provides them with personal protective equipment but not consistently, and there is a shortage of some equipment and materials, as well as a minimum level of protection. Others think that the hospital management somewhat provides a safe working environment for the laboratory staff. Some respondents also pointed out the absence of a clear protocol for dealing with occupational accidents in the laboratory. The staff suggested improvements to enhance safety in the laboratory. Based on the above, the results showed that a large percentage of the respondents were dissatisfied with these procedures.

Based on the analysis of the respondents' answers, we observe the spread of occupational and psychological risks in the medical analysis Laboratory at the Boulev Polyclinic in El Kala. However, this does not pose a significant danger due to the awareness of some workers and their adherence to preventive measures, despite the inefficiency of the measures taken. Additionally, they are psychologically affected by work pressure, the abundance of tasks, long working hours, and the shortage of healthcare staff. All of this is in an effort to enhance occupational safety and reduce the rate of occupational and psychological risks within the laboratory.

V. Recommendations and Conclusions:

Based on the interview results, several recommendations can be drawn to improve the work environment and ensure the safety of the staff in the medical analysis laboratory at the Boulev Polyclinic in El Kala, EL Tarf Province Providing

psychologists to offer psychological consultations to laboratory staff and creating a more balanced work environment free from stress to improve the quality of employee performance.

- Hiring more healthcare staff, including technicians, laboratory doctors, and laboratory assistants, and improving task distribution to reduce and avoid physical and mental fatigue.
- Designing the laboratory work environment according to the ergonomic dimension to be more practical and comfortable for the workers.
- Providing personal protective equipment consistently and adequately, and implementing strict protocols to reduce the risk of infection.
- Enhancing ventilation systems, good lighting, and appropriate heating to reduce exposure to harmful chemicals.
- Periodic inspection of laboratory devices and equipment to ensure the safety of workers.
- Conducting periodic training sessions for employees to raise awareness about occupational safety standards.
- Establish a clear protocol for handling accidents and occupational diseases.

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General Summary:

The nature of work in medical laboratories, involving exposure to chemical and biological hazards, as well as physical hazards such as noise, ventilation, and vibrations in the work environment, in addition to continuous work pressures, stress, and psychological fatigue, all contribute to affecting the health, safety, and job performance of workers, as well as the decline in the quality of their professional and personal lives. Therefore, it is essential to enhance a safe work environment by supporting the mental health of workers, implementing occupational safety procedures seriously and strictly, and supporting awareness and training programs. Implementing the mentioned recommendations will contribute to reducing occupational and psychological hazards and improving the quality of work within medical laboratories.

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