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Occupational risks within the pharmacy of Hassan II University Hospital in Fez, Morocco

BY

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Abstract

***Objective**: This occupational risk assessment involves identifying hazardous situations, prioritizing and mapping them in order to define the main lines of a global prevention action plan. This is a working tool that can be repeated and used as an indicator for monitoring and managing occupational risks in the hospital sector.*

***Method**: This study is conducted in 2022, focusing on the perception of occupational risks by the pharmacy staff. The used methodology was derived from the Failure Mode, Effects, and Criticality Analysis method.*

***Results**: The participants identified 27 potentially hazardous situations. As for the effects of occupational exposure on the health of pharmacy staff, 59.4% reported high levels of stress and 45.2% experienced sleep disturbances. Health problems related to handling of chemical products were mainly dermatological (28.1%).*

***Conclusion**: This is a participative approach to manage occupational risk. Its aim is to identify and prioritize hazardous situations in order to improve working conditions for staff.*

***Keywords**: Pharmacy, occupational risks, prevention*

***Learning Outcomes:** This occupational risk assessment process involves identifying hazardous situations, prioritizing and mapping them in order to define the main lines of a global prevention action plan. This is a working tool that can be repeated and used as an indicator for monitoring and managing occupational risks in the hospital sector.*

INTRODUCTION

Since 2001, Morocco has adopted a strategy to establish and structure hospital pharmacy in public hospitals [1]. The pharmacy is considered a medico-technical department, with a medico-pharmaceutical component and a production component managed by a pharmacist. In organizational charts, it reports directly to the hospital director [1]. Since 2001, Morocco has adopted a strategy to establish and structure hospital pharmacy in public hospitals [1]. The pharmacy is considered a medico-technical department, with a medico-pharmaceutical component and a production component managed by a pharmacist. In organizational charts, it reports directly to the hospital director [1]. The pharmacy of Hassan II University Hospital is structured into four departments, including the medication department, medical devices department, cytostatic preparation department, and sterilization department.

Under the responsibility of the establishment director, the prevention approach is a dynamic process that involves analyzing risks, prioritizing them, and establishing a mapping in order to implement appropriate solutions [2, 3, 4].

Our objective is about identifying occupational risks faced by professionals in order to provide a tool for managing occupational risks in a hospital sector. This approach gives an inventory of the occupational risks that could affect the quality of working life. it also help to prioritize the risks and establish a cartography of risks, in the perspective to make global prevention action plan focusing on the major risks: musculo-skeletal disorders (MSD), psycho-social risk(PSR), work organization, and the prevention of chemical hazards.

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Therefore, this study could be repeated over time and be an indicator for monitoring the population under study.

Materials and methods

This is a cross-sectional survey conducted in 2022, which involved the development of an anonymous self-questionnaire designed **to assess** occupational risks among the pharmacy staff at Hassan II University Hospital. Each respondent is characterized by socio-professional category (gender, age, and job position), and questioned about the occupational risks **identified** at their workplace.

It includes four items:

- Items relating to the work environment (physical risks, chemical risks at the job position)
- Items concerning risks related to work organization
- Items relating to safety
- Items concerning work accidents and occupational diseases of the past 3 years.

The questionnaire was addressed to all staff, with emphasis on the anonymity of the study; the responses were returned to the occupational medicine department.

According to the study conducted by Mockly-Postal Hélène et al on the practical and technical modalities for prioritizing occupational risks within a pharmacy [5], the same rating scale was adopted, based on three axes (severity, frequency, and risk control) rated 1, 4, 7 or 10 **(Table I).** The combination of these terms defines a criticality index (CI) **(Table II).** The latter allows for the prioritization of potentially hazardous situations [5].

Results

The pharmacy of Hassan II University Hospital employs **63** persons, 48 of whom completed the questionnaire, resulting in a participation rate of **76%.** The average age of the participants ranges from 26 to 35 years. Women account for 64.6% of the respondents, while 30% of them have a professional experience of more than 10 years.

The analysis of the participation rate by job position reveals that pharmacists represent **2.1%,** pharmacy technicians 27.7%, nurses 12.8%, **assistant nurses 36.2%,** secretaries 12.8%, and service agents 8.5%.

The tasks carried out within the pharmacy are distributed as follows: sterilization (37.8%), administrative management (24.4%), handling (15.6%), preparation of cytostatics (8.9%), on-call duty and drugs management(2.2%), restocking unit (2.2%), shift duty (2%), storage (2.2%), and inventory management (1%).

The participants identified 27 potentially hazardous situations, with 13 (48.15%) related to organizational risks, 10 (37.03%) related to physical risks, and 4 (14.81%) related to chemical risks (Table III). These situations are considered under control by one-third of the respondents, representing 16%.

As per 65.7% of the respondents, collective protective equipment (general ventilation and local ventilation systems) is not provided for all workplaces where chemicals are used. On the other hand, 72.2% of the respondents report that personal protective equipment (gloves, goggles, protective masks, respirators) is provided to personnel using chemicals. 71.4% consider that they are not properly trained to use and handle hazardous substances and preparations. Waste management is organized according to 82.1%.

The health effects of occupational exposure:
47.4% of the pharmacy staff expresses dissatisfaction with their work, also reporting high levels of stress (59.4%) and sleep disturbances (45.2%). The staff believes they are continuously exposed to ambient noise (62.5% of cases), leading to difficulties in concentration for 53.5% of them.

The staff considers that the chemicals used (medications, latex…) as hazardous and toxic (71.3% of respondents), corrosive (31.3%), irritating (56.3%), carcinogenic (40.6%), toxic to reproduction (34.4%), explosive, and flammable (40.6%). The main methods of exposure identified are through skin contact (73.5%) and inhalation (14.7%). In 28.1% of cases, the health problems related to this handling are primarily dermatological.

Concerning MSD, 59.5% of the surveyed staff adopts fatiguing and constraining postures during their work. In the last 6 months, the staff reported health problems such as muscle soreness, pain, discomfort, and numbness in the neck and nape (44.4%), shoulder and arm (36.1%), elbow and forearm (19.4%), wrist and hand (22.2%), upper back and dorsal region (66.7%), and lumbar region (75%).

Furthermore, Concerning PSR**,** 15.2% of the respondents perceive themselves as victims of internal violence, while 17% report experiencing external violence.

Work accidents and occupational diseases in the last 3 years:
The number of reported work accidents per year varies between 2 and 4 for 20.5% of the cases. The most frequent types of accidents are falls (37.9%), lumbago (31%), inhalation of chemicals at high doses (85.5%), ophthalmopathy(3.4%), and burns (3.4%). According to 81.8% of respondents, the administrative reporting of work accidents is not done systematically.

Discussion

This occupational risk assessment involves identifying hazardous situations, prioritizing and mapping them in order to define the main lines of a global prevention action plan**.** The pharmacy must be located and organized in a way that allows fast and reliable communication with the medical-technical department and all other hospital departments. It must be equipped with all necessary logistical and material resources (handling, transportation, and storage equipment) to accomplish its basic missions [1]. The design of the premises and ventilation of the spaces should be adapted to the tasks performed within the pharmacy, such as storage, dispensing, distribution, medication preparations, medical devices, quality controls, sterilization, and administrative tasks. Its architecture should facilitate efficient management of flows

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(of products and staff) while respecting the two fundamental principles of forward motion and cross-flow [1].

The prevention approach is a dynamic process that involves analyzing risks, establishing their mapping within the establishment, and implementing preventive measures [4]. The main occupational risks perceived at the workplace within the pharmacy of Hassan II University Hospital are primarily related to organization (PSR and MSD), physical risks, and chemical risks (figure 1).

The obtained results seem consistent with evaluations published in the field of health in Morocco and internationally [5] [6]. The prevalence of stress risk factors was 79.1% according to a Moroccan study focusing on healthcare personnel [6]. The chemical risk is the most frequently mentioned, with 26% of hazardous situations involving risks related to the handling of chemical products [7]. According to a study on the perception of occupational and psychosocial risks within the Parisian military hospital, more than half of the respondents (55%) reported exposure to chemical agents. The overall assessment of the ergonomic environment was unsatisfactory for 321 staff members (18.9%) [8].

Concerning MSD, our results are in line with international publications. An epidemiological study of 1472 midwives in France. The Professionals reported more MSD in lumbar spine (89.4%), cervical spine (88.3%), thoracic spine (87.8%), shoulders (81.4%), wrists (79.1%) [9].

Another cross-sectional study (January 2010 - June 2010) involved a cohort of hospital staff at Monastir University Hospital (Tunisia). The cohort comprised 173 doctors, 215 paramedical staff, and 51 workers. The incidence of MSD in this population was 65.3%. MSDs were dominated by lumbago (74%), cervicalgia (38.1%), and gonalgia (23.3%)[10].

The prevalence of musculoskeletal disorders of the upper limbs among care staff in public hospitals, during the twelve months preceding the study, was equal to 40.27% for shoulders, 15.01% for elbows, 29.35% for wrists[11].

For sleep disorders, a Cross-sectional study of paramedical staff at CHU Mongi Slim Tunis assess sleep disorders in paramedical staff working an atypical schedule. It were detected in 40.5% of cases. In our study, 45.2% suffered from them [12].

Another Cross-sectional study conducted using a questionnaire among nursing staff at Fattouma Bourguiba Hospital (Monastir, Tunisia) to determine the prevalence of sleep disorders among nursing staff. Nursing staff had poor sleep quality in (45%)[13].

The methodology used is derived from FMECA method (Failure Mode, Effects, and Criticality Analysis). The rating of potentially hazardous situations defines a criticality index allowing their prioritization [5]. This is a participative approach which has involved staff, as they are the first to be affected by the occupational risks. This approach aims to obtain an in-depth analysis of the actual exposure conditions to risks, with the goal of improving the working conditions of the personnel through the implementation of appropriate preventive measures [4].

The prevention of occupational risks involves taking the necessary measures to preserve the health and safety of workers. These measures must comply with the general principles of prevention [9]. These results should be taken into consideration in the development of the University Hospital action plan for prevention, implementing the following:

- Primary prevention measures: continuous training, raising awareness among the staff about occupational risks, reinforcing collective and individual protection measures, adopting an approach focused on the quality of work-life, and strengthening the role of occupational medicine...
- Secondary prevention measures: implementing multidisciplinary consultations for lumbago, **MSD,** work-related stress...
- Tertiary prevention measures: accompaniment, professional reintegration, and job retention...

The implementation of all these measures requires a multidisciplinary collaboration involving medical, organizational, and technical competence.

The prevention approach is leverage for progress. The employer and employees will find it hard to accept a safety culture if they don't understand its benefits. It enables hazards to be identified thereby improving organizational performance. For its success, it is necessary the employer's commitment, selects appropriate assessment tools, and involves employees.

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Table III: Summary of potentially hazardous situations identified within the pharmacy.

Organizational risks
- Workload - Tasks described do not correspond to the professional training - Load handling - Lack of flexibility regarding working hours - Lack of professional recognition - Limited workspace - Unregulated and non-lockable access - No specific internal risk signage - Continuous work without breaks - Stress - Transport problems between university hospitaland home - Internal violence - External violence
Physical risks
- Carrying heavy loads - Postural constraints - Falling materials - Manipulation of handling equipment - Exposure to noise hazards - Thermal discomfort - Computer screen work - Handling electrical equipment - Exposure to dust (fabric, cardboard, paper ...) - Fire and explosion risks
Chemical risks
- Handling of disinfection products - Handling of reagents - Exposure to toxic substances (medications, cytotoxic, pharmaceutical waste...) - Exposure to latex.

Table II: Classification of occupational risks by criticality

	Chemical risks	Physical risks		Organizational risks	
		Fire	MSD	MSD	PSR
Severity index	7	10	7	7	7
Frequency index	7	1	4	10	10
Criticality index	196	40	169	490	700

MSD: musculo-skeletal disorders

PSR: psycho social risk

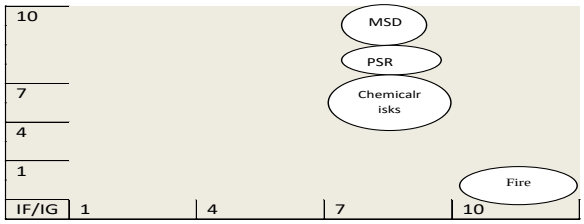

Figure 1: Risk mapping based on severity and frequency of exposure.

Musculoskeletal disorders (MSD)
Psychosocial risks (PSR).
Severity index (IG)
Frequency index (IF)

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Conclusion

We found it interesting, in the perspective of optimizing our organizations, to implement this working tool at Hassan II University Hospital of Fez, Morocco. This approach aims to assess risks in a healthcare environment and actively involves the staff. It has enabled us to draw up an inventory of occupational risks that could have an impact on quality of work-life. Furthermore, it enabled us to prioritize these risks and create a mapping. Thus, we were able to outline a comprehensive prevention action plan focused on major risks related to (MSD), (PSR), work organization, and chemical risk prevention. Moreover, this study could be repeated over time to serve as a monitoring indicator for the studied population.

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