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Assessment of Occupational Hazards Related Factors among Tobacco Workers

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Abstract

Introduction: The occupational health of workers is the most valued social issue in the society and plays an important role in achieving successful human competence. The current descriptive study aimed to assess the factors related to occupational hazards among tobacco workers in Lattakia in Syria.

Methods: The data was collected from an available sample that included 283 workers in Al-Raija factory, using a questionnaire that consisted of three parts (demographic and health data, 19 questions about occupational hazards and diseases, 15 questions about factors related to the work environment, 9 questions about factors related to the nature of work, and 10 questions about factors relating to occupational health services for workers).

Results: The results showed that more than half of the workers had respiratory and musculoskeletal problems, in addition to fatigue and stress. The factors related to the work environment and occupational health services were at low level, while the factors related to the nature of work were at medium level.

Conclusion: The study recommends the periodic examination of workers, expanding the role of the occupational safety department, and paying attention to the provision and commitment of workers to personal protection means.

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Introduction

The development of economic life and the expansion of its activities have led to increasing hazards to human life in general, and to the lives of wage earners in particular, as an integral part of society, and even the largest active segment within it [1]. The International Labour Organization (ILO) counts about 337 million occupational accidents at work annually, while the number of people suffering from work-related diseases is about two million, resulting in almost 2.3 million deaths each year [2]. These staggering figures were followed by concern on two sides, first, for the lives of all practitioners of economic and professional activities, and second, the weight of the economic burden resulting from poor occupational safety and health practices, which has become extremely heavy [1].

The tobacco industry is among the dangerous professions that are difficult to overcome its impact on its workers. They are more susceptible to many diseases, including cardiovascular diseases due to inhaled nicotine through the respiratory system, and all harmful tobacco components can reach the body through the skin as well. They are also more susceptible to all kinds of cancerous diseases, in addition to various respiratory problems due to the smoking habit that they are used to inside tobacco factories. These factories do not take precautions for occupational protection and safety through which they can reduce the hazard to workers [3,4].

Several studies showed that the most important reasons for workers increased exposure to hazards are reasons related to the same factor such as lack of education, insufficient knowl-

edge, poor awareness of occupational safety and health hazards, and lack of availability or use of personal protective equipment. In addition to factors related to the work environment such as lighting, noise, electricity, unsafe equipment, or factors related to the nature of work that require long standing, continuous bending, lifting weights and other factors [5].

Previous studies and literature have discussed occupational hazards in tobacco workers in order to identify preventive measures to prevent their occurrence. A study was conducted by Reiman & Uitti in 2000 in Finland on exposure to microbes, endotoxins and total dust in the cigarette and cigar industry. Their results showed that gram-negative bacteria, medium fungi, heat-resistant fungi and thermophilic actinomycosis were found, and the highest concentrations of dust and endotoxins were found in the wick-making department of the cigarette factory [6]. Other study conducted by Chloros et al., in 2004 in Greece aimed to assess occupational health hazards in workers processing dried tobacco leaves, where the results showed high levels of total dust suspended in the air of the work environment, the prevalence of bronchitis reached 8.7%, and obstructive pulmonary disease was observed in 13 workers [7]. Zhang et al., study in 2005 aimed to assess environmental fungi and allergic respiratory diseases among tobacco manufacturing workers. The results showed that average dust concentrations ranged from 13.76 to 29.55 mg/m^3 in tobacco processing workshops as well. The prevalence of chronic respiratory or nasal symptoms was higher in workers exposed to tobacco dust causing respiratory or nasal diseases allergic to workers [8].

The importance of the current study comes because the occupational hazards and the resulting physical injuries affect the health and quality of life of the worker. This cause him psychological problems such as (sadness - depression - absenteeism from work - job dissatisfaction). In addition, because of the scarcity of research that dealt with the assessment of factors related to occupational risks and the importance of the tobacco industry in Syria and the large sector operating in it, it was necessary to conduct the current study among tobacco factory workers to reveal the risks that workers suffer from, especially in the absence of the educational role of the occupational safety in explaining occupational hazards to workers before starting work. Thus, the results obtained can form a database provided to the factory management that helps to plan appropriate interventions that support the occupational health and safety aspects of workers. Then, there are two main goals from this study: i) Assess the incidence of occupational hazards (occupational injuries and diseases) among workers in the tobacco industry. ii) Evaluation of factors related to the work environment, factors related to the nature of work, factors related to occupational health services and personal protection means for workers.

Materials and methods

Study population

This research was conducted in the tobacco factory in the city of Lattakia, in Syria, within five sections: (cigarette department - emptying department - preparation department - filter department - technical affairs department). Data were collected during the period between (September 2021 - February 2022). The appropriate non-random sampling method was used to select 283 male and female workers, who were appointed for at least 6 months and were able to read and write.

Research methods

The descriptive approach was used for this study. The researcher developed a questionnaire, it consisted of three parts as shown in Figure 1.

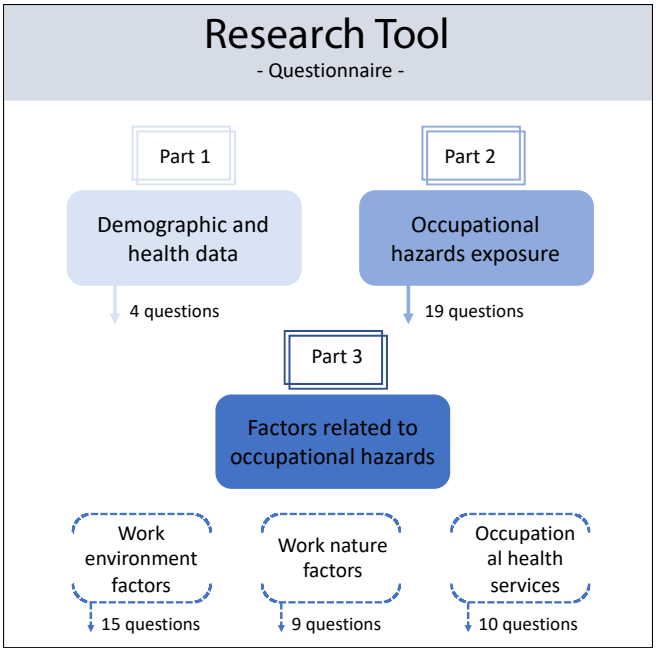

Figure 1: Explicative scheme of the different parts of the questionnaire.

Part I: Demographic and health data of the worker: It included (4) questions about (age, gender, educational level, number of years of experience, current place of work).

Part II: Occupational Hazards Exposure (Occupational Injuries and Diseases): It included (19) questions about certain occupational diseases and injuries. The answer is (yes or no). The yes answer is given (1) and the no answer (0) and if the answer is (yes), the worker is asked to specify the type of occupational disease or injury they have suffered. The number and percentage of each occupational disease or injury are calculated.

Part III: Factors related to occupational hazards: It include questions divided into three sections:

· Work environment factors: It included (15) questions about (ventilation, lighting, radiation, means of dealing with fire, means of noise protection, periodic maintenance of machines, floors, electrical disconnection switch, exhaust fans, means of protection from pollutants, means of protection from shrapnel, first aid equipment, means of protection from pollutants, comfortable means for workers during work). The answer is (yes or no). The yes answer is given (0) and the no answer (1). The total answers range is between (0 and 15).

· Work nature factors: It included (9) questions about (standing or sitting for long hours, carrying heavy weights, dealing with sharp instruments or sharp tools, carrying heavy weights, sitting in a fixed position for a long time, making repetitive movements, exposure to high heat, exposure to fumes). The answer is (yes or no). The yes answer is given (1) and the no answer (0). The total number of answers to it ranges between (0 and 9).

· Occupational health services and the commitment of workers to use means of prevention: It included (10) questions about (availability of a health center; health services; a medical point; first aid; an ambulance; conduct a medical examination;

personal protection means; worker's commitment to personal protection means; health awareness; obligation to means of protection; awareness and education of occupational hazards). Answer to the questions is (yes or no). The yes answer is given (0) and the no answer (1). The total number of answers to it ranges between (0 and 10).

Modalities

1. The required approvals were obtained from the Faculty of Nursing, the Presidency of Tishreen University, and the Tobacco Factory Administration in Lattakia to conduct the current study.
2. The questionnaire was developed from previous studies and the credibility of its content was verified by presenting it to 5 community health nursing experts at the College of Nursing and all modifications were taken.
3. An indicative study was conducted on (10%) of the study population, and modifications were made to the questionnaire after it was presented to them, and therefore they were not included in the study sample.
4. The stability of the tool was investigated using the Cronbach alpha test, and its value for the different axes ranged between (0.78 - 0.92), which is a suitable stability value for conducting the study.
5. The objective of the study was explained to each worker and obtaining verbal approval before starting to fill out the questionnaire. The time required to fill out the questionnaire in a subjective way is between (15 - 30) minutes.
6. The data taken from the questionnaires were coded and analyzed statistically using the statistical analysis software (SPSS) version 20.
7. The degree of presence of hazard factors is classified as following: high if the percentage of the total answers is ≥75%, medium if the percentage of the total responses is between 50% and 75% and low if the percentage of total responses is ≤50%.

Statistical tests

Arithmetic Mean (M), Standard Deviation (SD), Frequency (N), and percentages (%) were used to present the result. T Test for independent samples is used for differences in occupational hazards according to two-class variables and One-way ANOVA test for occupational hazard differences according to variables from more than two categories. Difference at the significance threshold (p value ≤ 0.05) were considered as statistically significant.

Results

Demographic and occupational data

Table 1 shows that more than half of the sample (57.6%) are males, most of them (46.3%) is in the age group (31 - 45 years), and (67.1%) are married. Nearly a quarter (24%) of the them are holders of a primary education certificate, and more than half (52.3%) have more than 7 years of work experience in the factory.

Table 1: Distribution of respondents according to demographic and occupational data.

Demographic variables	Variable categories	Sample count = 283	
		Frequency N	Percentage %
Sex	Male	163	57.6
	Female	120	42.4
Age	20 - 30 years	57	20.1
	31 - 45 years	131	46.3
	46 - 60 years	95	33.6
Marital status	Single	66	23.3
	Married	190	67.1
	Widowed or divorced	27	9.6
Education	Primary	68	24.0
	Preparatory	55	19.4
	Secondary (general or industrial)	86	30.4
	Institute	55	19.4
	University	19	6,7
Number of years working	6 months to less than 2 years	40	14.1
	2 years to less than 4 years	38	13.4
	4 – 7 years	57	20.1
	Over 7 years	148	52.3

Occupational injuries and diseases

Table 2 shows that more than half of the workers in the factory suffer from one of the following issues: Respiratory problems such as allergic rhinitis (53%), fatigue or psychological exhaustion during their work (53%), psychological stress (50.9%), cervical or lumbar disc (50.5%) and (51.2%) have problems as a result of long standing, and about half of them (48.2%) suffer from hearing problems.

Table 2: Distribution of respondents according to the percentages of their answers to the occurrence of occupational injuries and diseases in the factory.

Factors	N	%
1. Hearing problems during your work such as hearing loss?	136	48.1
2. Eye problems while doing your job such as low vision?	113	39.9
3. Problems as a result of standing for long hours such as varicose veins?	145	51.2
4. Orthopedic problems such as cervical/lumbar disc?	143	50.5
5. Bone problems such as a hernia of the nucleus pulposus?	85	30.0
6. Respiratory problems such as shortness of breath?	128	45.2
7. Respiratory problems such as asthma?	37	13.1
8. Respiratory problems such as allergic rhinitis?	150	53.0

9. Respiratory problems such as acute/chronic bronchitis?	60	21.2
10. Occupational injury while working in the department? Such as: wounds/bruises?	98	34.6
11. Occupational injury while working in the department? Such as: burns?	37	13.1
12. Occupational injury while working in the department? Such as: fractions?	23	8.1
13. Occupational injury while working in the department? Such as: amputation of a limb?	16	5.7
14. Stress while doing your job?	144	50.9
15. Psychological problems such as feeling stressed or anxious while doing your job?	111	39.2
16. Sadness or depression while doing your job?	51	18.0
17. Fatigue or psychological exhaustion during your work?	150	53.0
18. Inability to adapt in your work environment?	53	18.7
19. Suffer from job dissatisfaction with your work?	51	18.0

Work environment factors

Table 3 shows the averages of work environment factors related to occupational hazards in the opinion of workers. It was found at low level, reaching (35.3%) in whole the factory. Comparing the departments, the degree of hazard was higher in the emptying section (41.3%) and lowest in the technical affairs department (14.7%).

Table 3: Averages of work environment factors related to occupational hazards among the study sample.

Department	M	SD	%	Ranking	Risk
Cigarettes	5.6	4.023	37.3	2	Low
Emptying	6.2	3.634	41.3	1	Low
Preparation	2.9	2.940	18.3	4	Low
Filter	5.3	3.159	35.3	3	Low
Technical Affairs	2.2	2.963	14.7	5	Low
Factory	5.3	3.901	35.3	Low	

Work nature factors

Table 4 shows the averages of the work nature factors related to occupational hazards in the opinion of workers in the tobacco factory. The average was (56.7%) in the whole factory. When the sections were compared between them, the highest hazard score was in the cigarette section at (61.1%) at a medium level, and the lowest in the preparation section at (30%) at a low level.

Table 4: Average of work nature factors related to occupational hazards among the study sample.

Department	M	SD	%*	Ranking	Risk
Cigarettes	5.5	2.021	61.1	1	Medium
Emptying	5.1	1.569	56.7	2	Medium
Preparation	2.7	0.767	30.0	5	Low
Filter	3.9	1.974	43.3	4	Low
Technical Affairs	4.9	2.585	54.4	3	Medium
Factory	5.1	2.080	56.7	Medium	

*: Indicates the percentage of the total number of answers for this axis (9).

Occupational health factors

Table 5 shows the average occupational health factors related to occupational hazards in the opinion of workers in the tobacco factory. It was found to be low with only (23%) in the whole factory. The highest hazard score was in the cigarette department at (26%), and the lowest score was in the technical affairs department at (9%).

Table 5: Averages of occupational health services factors related to occupational hazards among the study sample.

Department	M	SD	%*	Ranking	Risk
Cigarettes	2.6	1.979	26.0	1	Low
Emptying	2.2	2.084	22.0	2	Low
Preparation	2.1	2.447	21.0	3	Low
Filter	1.6	2.246	16.0	4	Low
Technical Affairs	0.9	1.616	9.0	5	Low
Factory	5.1	2.080	56.7		Low

Discussion

The results of the current study showed that more than half of the workers in the tobacco factory have respiratory problems, musculoskeletal or varicose veins problems as a result of long standing. In addition, they suffer from physical fatigue, psychological fatigue and stress during work, or even hearing problems as a result of noise. The author attributes the high incidence of this type of occupational diseases to 3 raisons: i) the fact that the work in the factory need great muscular effort, ii) the high percentage of dust that is seen with the naked eye in the factory departments, iii) the high levels of noise that hinder workers from hearing each other's even at close distance. This finding is in accord with those of Zago et al., 2016 study that assessed the high incidence of non-fatal work-related events in tobacco farmers, [9] and a Ali et al., 2021 study that showed that 90% of tobacco workers think that the work in tobacco production and processing carries significant health hazards [10]. A study of Khatun et al., 2013 in Koshtia, Bangladesh, showed that more than half of the workers have respiratory symptoms, the majority of them suffer from general physical weakness, about two-thirds have muscle pain in the limbs, especially the hands and feet, and more than half have poor nutritional and social status [11].

In this study, work environment factors related to occupational hazards in the opinion of workers were at low level in general with a higher level in the emptying department and lower in the technical affairs department. The author proposes 3 raisons for this: i) the lack of information of workers regarding the types of occupational hazards, ii) the lack of their ability to assess hazards iii) they belief that their answers can be presented to the management of the factory and this can cause embarrassment or punishment. There is no statistics in the management of occupational injuries in the factory where occupational accidents and diseases are not recognized and recorded only in a traditional way, and often not declared. Even when the workers were asked, they do not remember all the accidents they

have during previous years. Our results are inconsistent with the findings of Soytas et al. in 2006 which showed that workers have been exposed to high levels of noise, and the study of Chloros et al. in 2004 which showed high levels of dust suspended in the air of the work environment [7,12]. Also, the study of Shaikh et al. in 2018 demonstrated that healthcare facilities are associated with a high level of exposure to hazard factors [13].

In the other hand, our results also showed that the factors of the nature of work associated with occupational hazards are at medium level in general with the highest hazard score is in the cigarette section and the lowest one in the preparation section. The author attributes this to the presence of many machines that the worker must remain attached to for long hours and continuously in the cigarette department. While the preparation department does not contain these machines and the nature of work in it is not restricted to the worker. Technical affairs workers are exposed to severe hazards resulting from dealing with electricity, air conditioning, compressors, diesel and spare parts. It means that the nature of their work is related to sitting, standing, carrying weights and exposure to steam and gases. In this concern, the results of the Shaikh et al., study in 2018 showed that health workers are exposed to occupational hazards resulting from prolonged work, sitting, pulling and bending, scattering, and sharps injury, all of which are related to the nature of work. In addition, Ayenew et al, in 2022 showed that night shift work is associated with occupational hazards among health workers, night shift workers were eight times more likely to be exposed to hazards compared to those who work during the day [13,14].

Finally, our results showed that the occupational health services factors related to occupational hazards in the tobacco factory were at low level in general. The highest score was in the cigarette department and lowest in the technical affairs department. The author attributes this result to the fact that the Personal Protection Equipment (PPE) is present in the factory and available to workers, in addition to the presence of a main health center and a second health center affiliated to the Department of Technical and Administrative Affairs. These centers provide full and comprehensive medical services to injured workers and transfer those who need hospitalization to government and private hospitals with the tobacco factory bearing the full cost of treatment for the worker. Thus, there is a state of general satisfaction with occupational health services among workers. Indeed, a study of Ayenew et al., in 2022 in Ethiopia showed that the lack of PPE and the absence of measures to ensure prompt treatment for injured workers, was associated with an increased likelihood of work-related occupational hazards. The workers with lacking PPE were about four times more likely to develop occupational hazards compared to those with access to such equipment [14].

Conclusion and recommendations

- More than half of the workers in the tobacco factory have respiratory problems, musculoskeletal or varicose veins as a result of long standing, in addition to fatigue, psychological fatigue, stress during work, and hearing problems.
- The working environment factors related to occupational hazards are low, the highest in the emptying department and the lowest in the technical affairs department.
- Factors of the nature of work related to occupational hazards are medium, the highest in the cigarette department and the lowest in the preparation department.
- Occupational health services factors related to occupational hazards are low, highest in the cigarette department and lowest in the technical department.
- Conducting a periodic assessment of the health status of workers because this helps in the early detection of occupational diseases.
- Establishing laws that oblige the worker to use personal protection means and reward the obligated materially and morally.
- Activating of the educational role of the Occupational Safety Department in the factory in order to increase the commitment of workers to personal protection means.
- Activating the preventive role of the health center in order to early detection and treatment of occupational diseases before they escalate, which improves the productivity of workers and the institution in general.
- Changing the nature of the work of workers who are exposed to risks for a period of more than 7 years, in order to ensure their safety and reduce the possibility of exposure to occupational risks.
- Interventions for protection from occupational hazards should take into account the demographic and occupational factors of workers because they are linked to and influence them.

Declarations

Conflicts of interest: The authors have no conflict of interest to declare.

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