

Original Article**Covariates of occupational accident occurrence in the restaurant sector in Greece: the case of the restaurants in the Piraeus municipality****Vilemine Carayanni**¹, **Afroditi Kalogeraki**², **Fotoula Babatsikou**³, **Alexandros Chalkias**⁴, **Charilaos Koutis**⁵

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Abstract

Background: The hazards to which are exposed the labor force in the restaurant sector vary since they are performing different types of work.

Aim: The aim of this study is to estimate the prevalence of occupational accidents in restaurants of the Piraeus municipality of Attica and to investigate risk factors to being injured.

Method and material: For collecting data, a questionnaire for demographic, health and work environment data was used. Our sample consisted of 180 randomly selected current workers in the restaurants of the Piraeus municipality. Pre-testing was carried out on 20 subjects to screen for potential problems in the questionnaire. Univariate and multivariate logistic models have been used to investigate the covariates of occupational accident occurrence.

Results: Among current workers, 44.3% reported injuries in their current job. Risk factors for work injuries with statistically significant odds ratio >2.0 included having conflicts with supervisors/colleagues, permanent stress and body pains, being kitchen staff, as well as lifting heavy loads. Results showed that psychosocial, health and physical working environment factors constitute strong predictors of the prevalence of work accidents.

Conclusions: A useful measure would be the draft of guidelines addressed to enterprises as to the way they should handle health and safety at work issues.

Key-words: accidents, occupational, restaurants, prevalence, risk factors

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Introduction

Occupational accidents contribute to absenteeism, light duty assignments or other work restrictions, high turnover, and higher workers' compensation costs^{1, 2}. Also, it is known that, the incidence of occupational accidents varies highly from occupation to occupation and from industry sector to industry sector^{1, 3}.

The restaurant sector is one of the most rapidly developing sectors in Europe and in the United States but it comprises equally one of the largest groups of workers injured on the job^{4, 5}. The works taking place in restaurants vary (kitchen staff, waiters, cashiers, cleaning personnel etc), as well as vary the hazards to which are exposed the labor force since they are performing different types of work^{6, 7}.

Hazards and risks such as falls and slip ups, burns, violence, wounds by equipment, electrical devices, knives and blades, are very frequent in the work environment of the restaurant⁸.

The traditional view of occupational accidents so states that accidents are produced by technological as well as individual human failures⁹. Nevertheless, during the three last decades researchers have increasingly recognized that industrial accidents are caused by a dynamic interaction between factors in the social and physical environments, that is, characteristics of the individual and the organization as well as technical forces¹⁰. In other words, researchers have increasingly recognized that occupational accidents are due to different demographic and lifestyle factors, working environment and health factors¹¹⁻¹⁴. That is workers, must not only be protected from chemical and physical hazards but also from psychosocial hazards in the work environment⁶.

Demographic and lifestyle factors include age, and gender, alcohol consumption and smoking¹⁴. Work environment and safety culture and climate fields comprise physical and psychosocial work environment factors. These categories include factors such as noise, temperature and machinery, workplace and ergonomic

conditions, work support and work pressure, risk perception and competence^{10, 15}. All these factors describe the situational circumstances under which the accident took place. Health factors include perceived general health symptoms and symptoms of ill health such as musculoskeletal pains, allergic reactions and impaired hearing¹⁰.

Recent study in Greece estimating the conditions of hygiene and safety in the personnel of restaurant and catering businesses in Santorini Island, has documented an uneasy high percentage of occupational accidents in relation to other studies (30.3%)¹⁶. Also, this study revealed that a significant (56.7%) percentage of workers don't know about the dangers that they face in their work and this means lack of education programs in occupational safety and health. Nevertheless, few are the studies in Greece investigating the relation among these factors and the risk to being injured in the restaurant sector.

The aim of this study is: 1) to estimate the prevalence of occupational injuries in restaurants of the Piraeus Municipality of Attica, Greece, and 2) to investigate the role of the above mentioned factors, to the risk of being injured.

The expected contribution of this study is the improvement of the information in this field and consequently the optimization of choice in prevention policies.

Method and Material

Study design and sample requirements

Piraeus is a city in the Attica Region and the most important port in Greece and the Eastern Mediterranean. It is the third largest municipality in Greece with a population of 175,697. Its area is 50.4 km². The wider region of Piraeus comprises the municipality under the same name and six additional municipalities-outskirts, with a total population of 466,065 inhabitants and is the southwestern section of the city complex of Athens making it the outer rim of the capital.

Probabilistic sampling was carried out in 200 restaurants of the Piraeus municipality. We required a sample size of 180 workers to fulfill our objectives at a 95% confidence level. This sample size was calculated assuming a 30.3% prevalence of accidents according to a previous study in this area, 5% bound-on error and 10% non-response rate¹⁶. Our research comprised 30 out of the 200 restaurants in the Piraeus Municipality, that is, a percentage of 15% of the total population.

The sample consisted of 180 individuals, 48 women and 132 men, aged between 18 and 60 years, currently working in Piraeus restaurants.

For collecting data, a questionnaire for demographic, health work environment and safety climate data was used. This questionnaire is based on an anonymous estimate questionnaire of professional hazard by the Hellenic Institute of Occupational Health and Safety, of the Laboratory of Hygiene and Epidemiology of the Technological Educational Institute of Athens. There were data also used by the Nordic Questionnaire and the check list of the Olympic Games.

Written consent was required and drafted by the enterprises for their participation to the research, whereas there was the voluntary participation of the working force. The questionnaire was filled out in the presence of the researcher and the minimal time required was 50 minutes. Collection of data was made in the morning and afternoon hours during the period from Jan. 7, 2009 to March 7, 2009.

Pre-testing was carried out on 30 subjects to screen for potential problems in the questionnaire. No significant changes were made in the questionnaire. The interviewers discussed the questionnaire thoroughly before data collection, to decrease interviewer bias and variability. In the study, losses were 2%.

Data analysis

The data were entered and analyzed in Statistical Package for Social Sciences 15.0 (SPSS, Inc., Chicago, IL, USA). Data analysis

was based on univariate and multivariate logistic regression.

The variables which had a p-value < 0.25 on univariate analysis were subjected to a stepwise multiple logistic regression analysis to determine which factors were independent predictors of occupational accidents in the subjects. The Hosmer and Lemeshow goodness-of-fit test was also used to select the final model¹⁷. Unadjusted as well as adjusted odds ratios for all potential covariates were recorded with a 95% confidence interval for each. A p-value of < 0.05 was taken as the criterion of significance for all purposes.

Results

71.1% of the participants were of Greek ethnicity. Among the participants, the mean age was 34.62 years (SD = 7.36) and 20.6% had not completed the remaining mandatory years of school graduation. 50% of the sample were never married. The majority of the workers were waiters (36%) and kitchen staff (29.8%) with 37.2% of them having working experience greater than 10 years and 15.6% having working experience less than 1 year in the workplace. Also, 77% of workers had been informed of hazards and their prevention in their working place.

Occupational accidents occurred to 44.3% of the workers in their present job and 41.3% of them had been seriously wounded. The majority of occupational accidents (56.1%) were falls and slips.

Significant results ($p < 0.05$) of the univariate analysis of demographic, health and psycho-social factors as well as physical working environment and safety culture and climate factors associated with occupational accidents, are presented respectively on Tables 1 and 2.

As can be seen on Table 1, being male, aged below 25 years presenting permanent body pains, allergic reactions and stress and having frequently conflicts with supervisors/colleagues were significant risk factors for injuries associated to their current job. Also, it is worth noting, the above mentioned health factors are unbrokenly related to working conditions. The other characteristics investigated

(education level, toxic habits, nationality, marital status) did not present significant associations with the risk of being injured and the results are not shown.

Table 1. Significant results of the univariate analysis of demographic, health and psychosocial factors associated with occupational accidents in the Piraeus workers

Variables	Frequencies n (%)		p-value ^a	Unadjusted OR ^b	95% CI ^c
	Total	Occupational accidents occurrence			
Age					
<25 years	44 (24.4)	26 (59.1)	0.03	2.48	(1.34-4.58)
≥25 years	136 (85.6)	55 (36.3)	-	1.0	-
Gender					
Men	132 (73.3)	66 (50.0)	0.03	2.12	(1.06-4.28)
Women	48 (26.7)	15 (29.2)	-	1.0	-
Musculoskeletal pains					
Every day	128 (71.1)	71 (54.7)	0.00	4.50	(2.12-9.53)
Never/seldom	52 (28.9)	10 (21.2)	-	1.0	-
Allergic reactions					
Every day	38 (21.1)	24 (62.2)	0.01	2.56	(1.22-5.36)
Never/seldom	142 (78.9)	57 (40.1)	-	1.0	-
Stress					
Every day	61 (33.9)	42 (68.9)	0.00	4.53	(2.34-8.80)
Never/seldom	119 (66.1)	39 (32.8)	-	1.0	-
Conflicts with supervisor/colleagues					
Every day	43 (23.9)	33 (74.4)	0.00	5.22	(2.42-11.27)
Never/seldom	137 (76.1)	48 (35.8)	-	1.0	-

^a p: Wald test describing level

^b OR: Odds ratio

^c CI 95%:95% confidence interval

Also, the univariate analysis, (Table 2), revealed a strong relation between physical environment factors such as ventilation problems, thermal discomfort and humidity, noise, lifting of heavy goods, being kitchen staff. Significant associations also have been observed in some safety culture and climate factors such as the knowledge of

how to act in case of fire and the belief in the existence of work hazards and the risk of being injured. Other factors such as inappropriate lighting, passive smoking, safety equipment, and working time did not present significant associations with the risk of being injured and the results are not shown.

Table 2. Significant results of the univariate analysis of physical working environment and safety culture factors associated with occupational accidents, in the Piraeus workers

Variables	Frequencies n (%)		p-value ^a	Unadjusted OR ^{b,c}	95% CI ^d
	Total	Occupational accidents occurrence			
Noise					
Normal	105 (58.3)	40 (49.4)	-	1	-
High	75 (41.7)	41 (54.7)	0.03	1.96	(1.07-3.58)
Ventilation					
Normal	122 (67.8)	43 (35.2)	-	1.0	-
Problematic	58 (32.2)	38 (65.5)	0.03	2.84	(1.43-5.06)
Lifting of Heavy loads					
Never/seldom	73 (28.9)	17 (23.3)	-	1.0	-
Frequently	107 (59.4)	64 (59.8)	0.00	4.90	(2.52-9.55)
Workplace					
Kitchen staff	52 (28.9)	30 (57.7)	0.00	2.06	(1.07-3.96)
Other	128 (71.1)	51 (39.8)	-	1.0	-
Humidity					
Normal	121 (67.2)	43 (35.2)	-	1.0	-
High	59 (32.8)	38 (65.5)	0.02	2.14	(1.14-4.03)
Thermal discomfort					
Yes	102 (43.3)	60 (58.8)	0.00	3,23	(1.73-6.39)
No	78 (56.7)	21 (26.9)	-	1.0	-
Knowing how to act in case of fire					
Yes	122 (67.8)	41 (33.6)	-	1.0	-
No	58 (32.2)	40 (69.0)	0.00	3.4	(1.66-6.99)
Risks in the working environment					
Never/Seldom	26 (18.9)	4 (15.4)	-	1.0	-
Frequently	154 (81.1)	77 (50.0)	0.0	5.5	(1.81-16.71)

^a p: Wald test describing level

^b OR: Odds ratio

^c CI 95%:95% confidence interval

Table 3 shows the final results of the multivariate analysis of the factors associated with the risk of being injured. After adjustments for confounders, working as kitchen staff, complaining of daily musculoskeletal pains (likely physical

consequences of working conditions) and stress, having conflicts with supervisors and colleagues as well as having to lift heavy loads remained significantly ($p < 0.05$) associated with the risk of being injured.

Table 3. Significant results of the multivariate analysis of covariates associated with occupational accidents, in the Piraeus workers

Variables	p-value ^a	Adjusted OR ^{b,c}	95% CI ^d
Musculoskeletal pains			
Every day versus never/seldom	0.00	4.36	(1.78-10.67)
Conflicts with supervisor/colleagues			
Every day versus never/seldom	0.00	4.00	(1.62-9.92)
Kitchen staff			
Yes versus no	0.00	3.81	(1.69-7.83)
Lifting of heavy loads			
Frequently versus never/seldom	0.00	3.63	(1.57-7.01)
Stress			
Every day versus never/seldom	0.00	3.50	(1.6-7.7)

p: Wald test describing level

^bOR: Odds ratio

^cAdjusted by the logistic regression method for all the variables listed in the table and additionally for age and gender

^dCI 95%:95% confidence interval.

Discussion

This study documents an uneasy situation: 44.3% of the workers under study had experienced a work injury in their current job. This percentage is significantly higher than in other studies of the same field¹⁶.

Also, physical and demographic known risk factors such as workplace microclimate (thermal and ventilation discomfort and humidity problems), being male and young present significant association with the risk of being injured in univariate analyses but not in the final multivariate analysis^{15, 18}.

Equally, safety culture and climate factors, such as knowledge of acting in case of fire and risks perception are significant in the univariate models. It is known that, perceived work safety and climate together

with physical and psychosocial work environment factors significantly influence the workers' experience of occupational accidents^{1,10,19,20}.

Nevertheless, no significant associations have been observed between these factors and the risk of being injured in the final multivariate model. Also, no significant associations have been observed between the presence of safety equipment (gloves, shoes, caps) and the workers experience of occupational accidents. It has been stressed that in the recent bibliography, the presence of safety equipment did not prevent occurrence of work injuries. It is likely that jobs with safety equipment were more hazardous ones, and either younger workers did not use them or used them incorrectly¹⁵.

On the contrary, this study provides evidence that working as kitchen staff,

complaining of daily musculoskeletal pains (likely physical consequences of working conditions) and stress, having conflicts with supervisors and colleagues, having to lift heavy loads are independent risk factors for being injured in an occupational accident. These results are consistent with a large body of literature. It is known that *mental and physical stresses in the work are risk factors for being injured in an occupational accident*^{1, 19, 20}. Because of the nature of their work, kitchen staff tend to get more occupational accidents^{4, 5, 6}. Health problems related to working conditions constitute also risk factors recognized by the international bibliography¹⁰.

Some limitations of this study merit discussion. First, it is a cross sectional retrospective study and the study design allowed that data on independent variables were collected after an occupational accident occurred. It is possible that the scores on the risk factors have been influenced by the fact that a study subject had been injured in an occupational accident. Secondly, data on being injured in an occupational accident in this study were based on self report. They could not be verified by an independent observer and this might be a source of information bias. Additionally, data do not allow for an investigation for accident frequency per respondent.

However, as mentioned above the incidence data and the associations with work environment, health and demographic factors are all in line with the literature.

Conclusions

To conclude, in this cross sectional study, we found significant relative risks for being injured in an occupational accident for both psychosocial, health and physical working environment factors. The fact of the disquieting high of workers, who experienced occupational accidents in their current work, makes it imperative that programs be created concerning Health Education for restaurant workers.

A useful measure would be the draft of guidelines addressed to enterprises as to the way they should handle health and safety

at work issues. The results also suggest that the work group should be taken into account when studying accident frequency and health, safety and work environment interventions should be targeted towards the work group level in addition to the organization as a whole.

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