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Abstract

Background: Evidence the strong link between occupational risks, and training needs & quality, the research on occupational risks and their consequences to the general wellbeing of Public Health Inspectors is very limited, although the nature of the work presents a range of threats to physical and psychological health. The aim of this study was to report the job risks of Public Health Inspectors (PHIs') and investigate possible relationships with training needs.

Methods: This is cross-sectional, nationwide study in Greece, conducted in one phase at the third quarter of 2021. For data collection, an online survey was created, and the web link was distributed to respondents by email. A total number were contacted, providing N=185 responses, which account for 27% (185/684) of the population under study. Job risks were measured with a novel instrument developed, proposed classification, also a checklist was proposed for risk assessment, and developed instrument for measured training needs and quality.

Results: The findings indicated that 87% of participants gave high ratings to psychosocial risks and ergonomic risks, followed by 78% for organizational risks and 74% for biological risks. Physical risks and chemical risks are 55% and 56%. Organizational risks (β=-0.282, p=0.001), perceived training quality (β= 0.195, p=0.002), 65.41% reported high training needs.

Conclusions: PHIs' face a variety of job risks, these findings were among the first to address Occupational Health and Safety of PHIs' worldwide. Adding new information to occupational health and safety, which could be exploited to advance the quality of Public Health Services provision.

Keywords: *Public Health Inspectors, Public Health Services, Occupational Hazards, Occupational Safety and Health*

1. Introduction

To explore the educational training needs and training quality of Public Health Inspectors (PHIs), in Greece and its association with risks contexts severity of exposure and frequency of impact of occupational hazards. Perceived job risks stress, burn out and job satisfaction levels were affected by demographics and more specifically the workplace environment (urban vs rural) [1]. Environmental factors, such as job characteristics, pay, equality, and

justice in the workplace, have a significant impact on the satisfaction of the individual with his work [2].

The examination of job risks and employees' risk perceptions is becoming increasingly important for the protection of health and safety at work, as well as the prevention of the consequences of harmful factors in the workplace [3]. Based on the reports, complaints and working conditions, responsibilities, and duties of the PHIs, as well as the personal observations and remarks of the researchers, which are confirmed by the international literature, this research was selected in such an important profession that remains neglected despite the fact that it contributes significantly to the protection of society.

Occupational hazards, as of particular importance for the operation of Public Health Services. With the impact of the COVID-19 pandemic, global financial crisis, job insecurity, decreased salaries and social instability, the results on occupational risks, contribute significantly to the understanding of the working conditions and the impact on the performance of employees and the organization in Environmental and Public Health Services [4]. In this frame, it can be argued that the multidisciplinary nature of public health inspections, different environments and materials of inspected facilities, out-of-office work, and the responsibilities of PHIs, constitute the basic elements that highlight the importance of OHS in public health inspection organizations [5,3].

Yet, the risks that are related to the work life of PHIs are under-researched, although this specific occupation possesses a range of threats to physical and psychological health of employees, similar to a variety of risks that have been reported by the extended literature for healthcare workers and law enforcement officers [6-16]. Environmental factors, such as job characteristics, pay, equality, and justice in the workplace, have a significant impact on the satisfaction of the individual with his work [2]. Perceived job risks stress, burn out and job satisfaction levels were affected by demographics and more specifically the workplace environment (urban vs rural) [1].

Therefore, the purpose aimed to investigate of this study was to assess the perceived job risks experienced by PHIs in Greece and examine the association between job risks, and to explore the educational training needs and training quality of PHIs in Greece.

1.1 State of the art

The research model of the present study is based on the pilot study of Adamopoulos et al. [3]. To adopt model to the purpose of this study and the setting of public health services in Greece, several modifications were implemented. More specifically verbal abuse, along with other factors such as harassment [5] was included in the category of psychosocial risks. Job risks were not examined as a single construct, but separately, with the sub-categories of physical, chemical, biological, ergonomic, organizational, and psychosocial risk factors.

Training needs. (Health and safety at work, Stress management, Health services administration, crisis management in the health sector - natural disasters, personal protective

equipment (masks, gloves, antiseptics, labor investor, etc.), protection against biological agents, protection from chemical agents.), according to proposed classification.

- Public health workforce was of immediate need of high-quality training, infrastructure, human and technical resources as well as competitive salaries, opportunities for professional development, standards for workplace performance, and fostering environment with high levels of job satisfaction for effective delivery of services [17].
- Training has been documented as a key part of health and safety at work [18].
- Job training is needed to ensure the high quality of outcomes [19,20,21].

1.2 Study objectives:

a) To investigate the perceived job risks experienced severity of exposure and frequency of impact of occupational hazards, of PHIs in Greece.

b) To explore the educational training needs and training quality of PHIs in Greece.

c) To explore the educational training needs and training quality of PHIs in Greece and its association with the perceived job risks of occupational hazards.

Therefore, the purpose of this study was to assess the perceived job risks experienced by PHIs in Greece, aimed to investigate the training needs and training quality of Greek PHIs.

2. Methodology –Results

2.1 Methodology

This is a cross-sectional, original research, since data were gathered by the researcher directly from a sample of PHIs in Greece during COVID-19 Pandemic, at one time-period, and statistical analysis was utilized to uncover possible associations between the data. An online survey was created, and the web link was distributed to respondents by email, through the National Public Health Inspectorate Administration, while anonymity was retained. The research was approved by the Scientific Council of the Department of Public Health Services and the European University of Cyprus.

2.2 The Sample

The sample of this study comprised 185 PHIs in Greece. We should point out that according to the information that existed from the Human Resources Directorates and the organizational charts of the Services of Public Health Organizations as well as from the Panhellenic Association of Public Health Inspectors (P.E.D.Y.) and the imprint given by the research carried out, we see the following:

The active Inspectors in the Directorates of Health Control and Environmental Hygiene of all the Regions Prefectures, Ministry of Health of Greece are 541, in the Unified Food Control Body (E.F.E.T.) of all Peripheral Directorates is 143, summing up to total population of 684 employees. This means that the sample of this study account for 27% of active PHIs

nationwide. Took place between March 2021 and June 2021 and the total number of active Public Health Inspectors allover Greece. The sampling process was carried out by first communicating via email with Inspectors to explain the purpose and frame of the research study and assure them that the survey will be anonymous, optional, and encoded. More specifically, an email was sent by the Directors of Human Resources Department of Public Health Services and Organizations, all 606 currently members via their internal listserv. The email was an invitation to participate and included a summary of the study, the study's consent form, and an electronic link to the web-based survey.

The web-based survey was hosted on Google Forms and was made available between March 1st and June 22nd of 2021. A reminder notice was sent to members via the listserv on 14 May 2021. Public Health Inspection Organizations and Departments Nationwide from the services departments, participants could be working in any capacity within a health unit including, but not limited to, manager, inspection of food premises, water quality, and public health promotion.

2.3 Instrument of data collection

In this study a questionnaire was utilized for data collection, which consists of three parts:

In Section A, the questions cover the participant's basic demographics (gender, age, marital status) as well as job status and work experience.

Section B included a questionnaire designed to record participants' perceptions of the possible types of occupational risks hazards and their intensity. To investigate the perceived job risks experienced, severity of exposure and frequency of impact of occupational hazards. In the development of the risk assessment questionnaire, the content of the questionnaire was based on the findings of previous researches [5, 22-30]. Occupational hazards were divided in six classes as proposed in the classification and risk factors for occupational health and safety of PHIs. More specifically, physical, chemical, biological, ergonomic, a psychosocial hazards and Organizational risk factors were included, and the respondent had to answer with the frequency of exposure and the severity of consequences in a 5-point Likert scale (0= not at all/never, 4=very often/very high).

Section C included a short set of questions to assess training quality (2 items) and training needs (7 items) of PHIs, as training satisfaction [31]. Training needs included health and safety of work, stress management, health services administration, crisis management in the health sector, natural disasters, personal protective equipment (masks, gloves, antiseptics, etc.), protection against biological agents, and protection from chemical agents. The answers were given on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree).

2.4 Statistical analysis

Data were summarized with the use of descriptive statistics. Frequency analysis was performed for nominal and ordinal demographic and job-characteristic variables, while for scale variables mean, median, standard deviation and range measures were calculated.

Cronbach's alpha was calculated to assess the reliability of each questionnaire and sub-scale. Based on the scoring of each survey section, new variables were calculated, and they

were examined relative to their distribution characteristics with the Shapiro-Wilk test, that showed non-normal distributions leading to non-parametric statistical test selection.

The associations between job risks, and training needs, and training quality were calculated with non-parametric correlation analysis (Spearman's coefficient).

Since the main aim of this study was to investigate how the perceived job risks of Greek PHIs are associated to training needs, and training quality, job risks were considered as independent variables. Statistical analyses were performed using the statistical package SPSS v.20 and statistical significance was set at $p < 0.05$.

3. Results

The population under study, 37.84% men (N=70) and 62.16% women (N=115) with a mean age of 48.96 years (SD=8.22) and a mean work experience of 15.84 years (SD=8.53). Most participants were employees (64.86%), yet 12.97% had the position of Head of office, 11.89% of Head of department and 10.27% Supervisor or Director. Most participants were married (63.24%) and had children (70.27%). The prevailing educational level was College/University (60%) followed by MSc/MA or postgraduate diploma (36.76%) and PhD (3.24%). Descriptive statistics (mean values and standard deviations) of the perceptions relative to the 33 different job risk factors. Several risk factors have been identified as relevant to the job of PHIs in Greece.

Following, frequencies of participants providing above average (>2) and below average (<2) total scores in each risk category were calculated and the results are presented in Figure 1. Psychosocial and ergonomic risks were perceived as high from 87% of participants for both categories, organizational risks at 78% and biological risks at 74%, chemical 56% and physical at 55%.

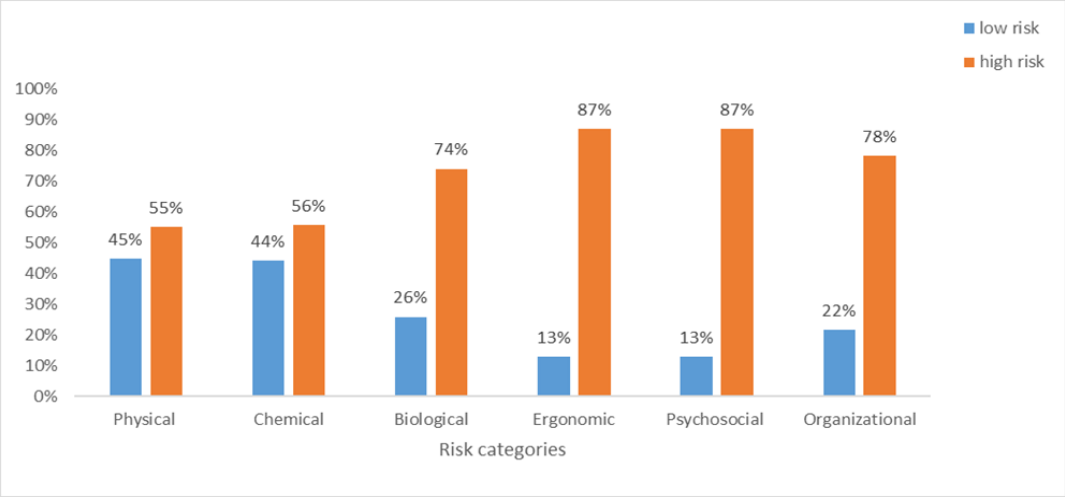

Figure 1. *Total scores in each risk category (low risk- high risk).*

3.1 Associations and multiple regression analysis

Hierarchical linear regression analysis was performed for the total score of job risk variables as predictors (chemical, biological, ergonomic, psychosocial and organizational

risks), with biological (r=0.371, p<0.01), ergonomic (r=0.418, p<0.01) and organizational (r=0.351, p<0.01) risks, psychosocial risks (r=0.513, p<0.01).The associations between job risks, and training needs & quality were examined with Spearman correlation coefficients, as presented in Table 2. It is shown that had medium to strong positive association with biological (r=371, p<0.01), ergonomic (r=0.418, p<0.01) and organizational (r=0.351, p<0.01) risks, and strong positive correlation with psychosocial risks (r=0.513, p<0.01).

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Table 1. *Spearman correlation coefficients between job risks, training quality and training needs*

		1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Physical risks	1												
2.	Chemical risks	.666**	1											
3.	Biological risks	.450**	.589**	1										
4.	Ergonomic risks	.360**	.448**	.609**	1									
5.	Psychosocial risks	.349**	.446**	.579**	.628**	1								
6.	Organizational risks	.363**	.359**	.523**	.517**	.656**	1							
7.	Training Quality	0.098	-0.041	-0.032	-0.06	-0.057	-0.012	-0.071	-0.132	-0.136	-0.12	.194**	1	
8.	Training Needs	.337**	.185*	.185*	.175*	.260**	.350**	0.011	-.151*	-.272**	-0.093	-0.136	0.02	1

** p< 0.01 level (2-tailed), * p< 0.05 level (2-tailed).

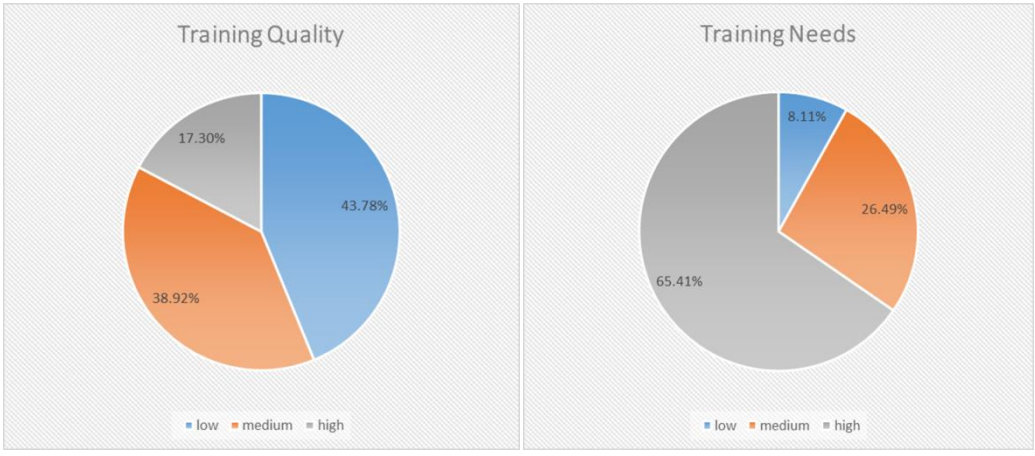

Figure 2. *Training quality level (1-6): low (≤3), medium (3,4), and high (≥4)/ Training needs level (0-4): low (≤2), medium (2,3), and high (≥3).*

4. Discussion

Training has been documented as a key part of health and safety at work [18]. During the COVID-19 pandemic, PHIs and Healthcare Workers faced greater biological risks of infections and therefore personal protective equipment has been found to be of great importance for their health and safety [30,3]. One of the factors of walk-through inspection of worksites, water quality regulations, emergency events with hazardous substances and disaster management capability in industrial settings is staff education and training [32].

Also need to mention more correlations parameters based on the theoretical literature, evidence have been provided, that perceptions of psychosocial risks were associated with higher levels of burnout, while perceived organizational risks and emotional exhaustion were linked to decreased job satisfaction [2,3,4,33].

- Most participants (65.41%) reported high training needs, especially in the fields of health and safety at work, stress management, personal protective equipment, protection against biological agents and protection from chemical agents. Especially, protection against biological agents such as coronavirus SARS-CoV-2 (COVID-19) was the only training need that was reported as equally significant for public health inspectors in all workplace environments (urban, semi-urban, rural).
- Training needs were associated with physical, biological, ergonomic, psychosocial, and organizational risks, but none of the risk categories were significant predictors of training needs. In this frame, an ongoing communication based on the specific training needs and circumstances of employees, between the organization and the training institutions is a key factor to facilitate best outcomes [34].
- Yet, job risks were not significant predictors of training needs, while demographics, gender, age, educational level and workplace environment were the only significant predictors. More specifically, younger, women employees and employees with lower educational levels in urban workplace environments have higher levels of training needs.

A study in Denmark proposed training of OHS Inspectors on musculoskeletal pain prevention in workplaces [34].

5. Conclusions

The purpose of this study was to investigate the perceived importance of job risks experienced by Public Health Inspectors in Greece and their relationship to Training needs. Perceptions of job risks have been studied based on the classification proposed, including physical, chemical, biological, ergonomic, psychosocial, and organizational risks. Overall, psychosocial and organizational risk factors were perceived as the most important by Greek PHIs, followed by ergonomic, biological, physical and chemical risks.

Job risks including but not limited to biological, ergonomic, psychosocial and organizational factors, are perceived as hazardous by public health inspectors, 87% of

participants gave high ratings to psychosocial risks and ergonomic risks, followed by 78% for organizational risks and 74% for biological risks.

Physical risks and chemical risks are less prevalent (55% and 56%, respectively).

Most participants (65.41%) reported high training needs (health and safety at work, stress management, personal protective equipment, protection against biological agents and protection from chemical agents).

This study contributes to the literature in several ways. First, were provided relative to the occupational hazards (job risks) that are encountered by Greek Public Health Inspectors, updating the evidence from a limited global literature. In fact, there is no connection in the literature and scientific publications of Occupational Health and Safety with Public Health and Hygiene, this connection is essential because they are interrelated as Occupational Health and Safety is part of Public Health.

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