Occupational Hazards Associated with the Quality and Training Needs of Public Health Inspectors in Greece †

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Abstract: In terms of evidence of the strong links between occupational risks, training needs, and quality, research on the occupational risks and their consequences to the general wellbeing of public health inspectors has been very limited, despite the fact that the nature of the work presents a range of threats to physical and psychological health. The aim of this study was to report the risks presented to public health inspectors (PHIs') and to investigate their possible relationships with training needs. The study was a cross-sectional, nationwide investigation in Greece, conducted in one phase during the third quarter of 2021. For data collection, an online survey was created, and the web link was distributed to respondents by email. A number of participants were contacted, providing N = 185 responses, which accounted for 27% (185/684) of the population under study. Job risks were measured using a novel instrument, classification, a checklist for risk assessment, and an instrument was developed for measuring training needs and training quality. The findings indicated that 87% of participants provided high ratings in response to psychosocial risks and ergonomic risks, followed by 78% for organizational risks and 74% for biological risks. Physical risks and chemical risks were 55% and 56%, respectively. For organizational risks (β = −0.282, p = 0.001) and perceived training quality (β = 0.195, p = 0.002), 65.41% reported high training requirements. PHIs face a variety of job risks, these findings were among the first to address the occupational health and safety of PHIs worldwide. Adding new information to PHI occupational health and safety could be used 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 their association with risk context severity of exposure and the frequency of impacts of occupational hazards. Perceived job risks, including 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 and their work [2].

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

Occupational hazards are of particular importance within the operational context of public health services. With the impact of the COVID-19 pandemic, the global financial crisis, job insecurity, decreased salaries, and social instability, occupational risks significantly contribute to an understanding of the working conditions and their impact on the performance of employees and the organization of environmental and public health services [4]. In this context, 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 comprise basic elements that highlight the importance of OHS in public health inspection organizations [3,5].

However, the risks that are related to the work life of PHIs are under-researched, although this specific occupation possesses a range of threats to the 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 in terms of their work [2]. Perceived job stress, burn out, and job satisfaction levels were affected by demographics and, more specifically, the workplace environment (urban vs. rural) [1].

Therefore, the purpose of this study was to investigate the perceived job risks experienced by PHIs in Greece and examine the association between job risks, as well as 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 was based on the pilot study of Adamopoulos et al. [3]. To adopt the model to the purposes 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], were 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.

• The public health workforce is of immediate need of high-quality training, infrastructure, and human and technical resources, as well as competitive salaries, opportunities for professional development, standards for workplace performance, and a fostering environment with high levels of job satisfaction for the 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 high quality outcomes [19–21].

1.2. Study Objectives

(a) To investigate the perceived job risks in terms of the experienced severity of exposure and frequency of the impact of occupational hazards on 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 their association with the perceived job risks terms of occupational hazards.
(d) Therefore, the purpose of this study was to assess the perceived job risks experienced by PHIs in Greece, and to investigate the training needs and training quality of Greek PHIs.
2. Methodology

2.1. Methodology

This was a cross-sectional, original research, since data were directly gathered by the researcher from a sample of PHIs in Greece during the COVID-19 Pandemic, in 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 Pan-Hellenic Association of Public Health Inspectors (P.E.D.Y.) and the imprint given by the research carried out, we determined the following:

The number of active inspectors in the Directorates of Health Control and Environmental Hygiene of all the Regions Prefectures, the Ministry of Health of Greece, is 541, in the Unified Food Control Body (E.F.E.T.) of all Peripheral Directorates, it is 143, resulting in a total population of 684 employees. This means that the sample of this study accounted for 27% of active PHIs nationwide. The study took place between March 2021 and June 2021, and included 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 framework of the research study, and to assure them that the survey was anonymous, optional, and encoded. More specifically, an email was sent by the directors of the Human Resources Department of Public Health Services and Organizations, to all 606 current members via their internal mailing list. 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 1 March and 22 June 2021. A reminder notice was sent to members via email on 14 May 2021. Within the 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, management, the 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 consisted of three parts: In Section A, the questions covered 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 and hazards, as well as their intensity. To investigate the perceived job risks experienced, the severity of exposure and frequency of the impact of occupational hazards were included. 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 into six classes, as proposed in the classification and risk factors for the occupational health and safety of PHIs. More specifically, physical, chemical, biological, ergonomic, and psychosocial hazards, and organizational risk factors were included, and the respondent had to answer in terms of the frequency of exposure and the severity of consequences on a five-point Likert scale (0 = not at all/never, 4 = very often/very high).

Section C included a short set of questions to assess the training quality (two items) and training needs (seven items) of PHIs, in terms of overall training satisfaction [31]. Training needs included health and safety at work, stress management, health services
administration, and 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 five-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 measurements 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, which showed non-normal distributions leading to non-parametric statistical test selection. The associations between job risks, 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 included 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% were head of department, and 10.27% were supervisors or directors. Most participants were married (63.24%) and had children (70.27%).

The prevailing educational level was College/University level (60%) followed by MSc./MA or postgraduate diploma level (36.76%) and PhD level (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.

Then, 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 by 87% of participants for both categories; organizational risks by 78%, and biological risks by 74%, chemical risks by 56%, and physical risks by 55%.

![Figure 1. Total scores in each risk category (low risk-high risk).](image-url)
**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, as well as psychosocial risks ($r = 0.513, p < 0.01$). The associations between job risks and training needs and quality were examined with Spearman correlation coefficients. It shows a medium to strong positive association with biological ($r = 0.371, p < 0.01$), ergonomic ($r = 0.418, p < 0.01$), and organizational ($r = 0.351, p < 0.01$) risks, and a strong positive correlation with psychosocial risks ($r = 0.513, p < 0.01$).

The associations between job risks and training needs and quality were examined with Spearman correlation coefficients, as presented in Table 1. It shows a medium to strong positive association with biological ($r = 0.371, p < 0.01$), ergonomic ($r = 0.418, p < 0.01$), and organizational ($r = 0.351, p < 0.01$) risks, and a strong positive correlation with psychosocial risks ($r = 0.513, p < 0.01$). Moreover, training needs are positively associated with physical ($r = 0.337, p < 0.01$) and organizational ($r = 0.350, p < 0.01$) risks. Physical risks and chemical risks do not have important correlations with training needs. Training quality is rated as low by 43.78%, while only 17.30% rate training quality as high; 64.51% of participants report high training needs, while only 8.11% report low training needs, as presented in Figure 2.

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

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**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).

A study in Denmark proposed the training of OHS inspectors in musculoskeletal pain prevention in workplaces [34]. Female employees, and employees with lower educational levels in urban workplaces have higher levels of training needs. 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, training needs 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 risk of infection, and therefore personal protective equipment has been found to be of great importance for their health and safety [3,30]. One of the factors of walk-through inspections of worksites, water quality regulations, emergency events with hazardous substances, and disaster management capability in industrial settings is staff education and training [32].

It is also noteworthy that more correlation parameters, based on the theoretical literature, have been provided, and that perceptions of psychosocial risks have been associated with higher levels of burnout, while perceived organizational risks and emotional exhaustion have been linked to decreased job satisfaction [2–4,33].

- 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 corona virus 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].

- However, job risks were not significant predictors of training needs, while demographics pertaining to gender, age, educational level, and workplace environment were the only significant predictors. More specifically, younger employees, female employees, and employees with lower educational levels in urban workplace environments have higher levels of training needs.

A study in Denmark proposed the training of OHS inspectors in 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 with 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 were 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 against chemical agents). This study contributes to the literature in several ways. First, areas for development were highlighted relative to the occupational hazards (job risks) that are encountered by Greek public health inspectors, updating the evidence from the limited global literature. In fact, there is no connection in the literature and scientific publications within 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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and N.S.; visualization, I.A.; supervision, I.A.; project administration, I.A.; funding acquisition, I.A. All authors have read and agreed to the published version of the manuscript.

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