

# Workplace Environment and Burn out in Public Health Workforce Inspection Services: Research Study

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**Abstract**— Despite the repeated evidence that point out the strong link between emotional exhaustion, personal accomplishment, depersonalization and total burn out, with workplace environment, the research on occupational risks and their consequences to the general wellbeing of Public Health inspection workforce services is limited. The aim of this study was to report the burnout of Public Health workforce in Greece and investigate possible relationships with workplace environment. This is a quantitative, cross-sectional, nationwide research study in Greece, conducted in the second and third quarters of 2021. For data collection, an online survey was conducted via email. The response rate was 27%. Burnout was measured with Maslach Burnout Inventory Questionnaire as adopted and pilot tested. 19.46% of participants report low burnout levels, 37.84% of participant's medium burnout levels and 42.70% high (above average) burnout levels. Burnout total score of rural environments was higher compared to all other groups ( $\chi^2 = 16.017$ ,  $p < 0.01$ ), ( $\beta = 0.455$ ,  $p < 0.001$ ). Medium levels of Emotional exhaustion score were reported. Levels of depersonalization score were low. Personal Accomplishment of rural environment was higher compared to all other groups ( $\chi^2 = 26.417$ ,  $p < 0.01$ ). Depersonalization of semi-urban environment was higher compared to all other groups ( $\chi^2 = 6.188$ ,  $p < 0.05$ ). The findings indicated that burnout has proven to be an issue. This study contributes to the limited evidence supporting the link between burnout and adding new information to occupational health and safety for workplace environment which could be exploited to advance the quality of Public Health Services provision.

**Keywords**— Burnout; Greek Services; Occupational Health; Public Health Inspection; Public Health Workforce; Workplace Environment.

## I. INTRODUCTION

One of the most important, key areas of Public Administration, which contributes fundamentally to the progress of the development and promoting of the well-being in modern societies, while protecting the security and survival of every society, is Public Health and Public Health Services. The Public Health sector ensures, promotes, and acts proactively on health issues. Public health deals with health threats based on population health analysis. The population may be too small or too large so to include residents of many continents - as in the case of the pandemic COVID-19. The dimensions of health include “a state of complete physical, mental and social well-being, not just the absence of disease or disability”, as defined by the International Health Conference, 1946. According to Law 3370/2005 article 1 and 2 “Public Health is an investment for the preservation and improvement of the human capital of the country”.

In Greece, Public Health is exercised by the central and regional administration, the local government, health and social care units, in the community and in the areas of group living and work and, in general, in every area of social activity. Public Health interventions are scientifically substantiated and practiced according to the rules of Bioethics and Medical Ethics. According to L. 2920/2001, L. 3370/2005 & Ministerial Decision 47829, 2017, Public Health includes a wide range of

functions and actions as follows: Monitoring and assessing the health of the population and the biological, environmental, and socio-economic factors that affect it. The protection and promotion of health and the prevention of diseases. The control and effective management of infectious diseases and other high-risk and prevalence diseases. The defense of the health needs of vulnerable groups of the victim. Dealing with emergencies and unforeseen circumstances and natural or other causes.

Particularly, in Greece, public health services were provided by the Ministry of Health, and Directorates of Health Control and Environmental Hygiene of all the Regions Prefectures. Public health services also include the Unified Food Control Body (E.F.E.T.) supervised by the Ministry of Agricultural Development and Food. Public Health Inspectors (PHIs) are under the Medical and Public Health Services of the Ministry of Health and have the mission of taking preventive health measures across a wide range of environmental health care sectors. In Greece, public health services do not include Occupational Health and Safety (OHS) services.

More specifically, OHS inspections are carried out by the Hellenic Labor Inspectorate (S.E.P.E.), which is under the Ministry of Labor and Social Affairs. 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 [1,2]. Yet, the risks that are related to the work life in workplace environments 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 [1, 2,3-16].

The rapidly changing business environment and the economic slowdown of recent decades have increased the probability of the existing occupational hazards and have also introduced new risks for employees, such as psychological risks and burnout [17-20]. Burnout is the negative emotional state of an employee and entails three dimensions, i.e., emotional exhaustion, depersonalization, and lack of personal accomplishment [21]. It is a work-related psychological situation that may lead to poor results and is basically attributed to stress from work [22,23].

In the frame of COVID-19 pandemic, the burden on health workers has been characterized as highly severe in low- and middle-income countries, such as Greece, due to resource constraints, underfunded and understaffed organizations [24], while occupational stress and burnout combined with insufficient resources and health services during the pandemic may put health workers at greater risks of mental health disorders [25]. As well, during the COVID-19 pandemic, healthcare staff has reported moderate to extreme concerns of burnout, nervousness, anxiety, depression, and hopelessness [26].

A recent study in Iran for the healthcare workers at the frontline of fighting COVID-19 showed a higher risk for mental health problems, including stress, anxiety, depression, and insomnia. More specifically, factors such as communications, manager support, change and demand had the greatest impact on employee stress levels [27].

Workplace environment (rural, urban, semi urban) affects perceived levels of burnout. Employees in rural environments report higher levels of burnout compared to employees in urban environments. A pilot study of Adamopoulos et al. [2] in Greece reports high rate of burnout in rural areas of Public Health Inspectors. According to Malakouti et al. [28] in rural areas a significant amount of health workers reported high levels of burnout and mental disorders due to work-related stress, facilitated by increasing duties, job ambiguity and conflict, lack of participation in job planning, and lack of interaction with health authorities. A most recent study from China during the COVID-19 pandemic, utilizing the Maslach Burnout Inventory, demonstrated that more than half of rural healthcare workers reported moderate to severe levels of burnout, raising the issue of immediate strategizing to mitigate this prevalent mental health issue [29]. Leskovic et al. [30] also found that Slovenian healthcare workers in rural areas presented intensified burnout during the COVID-19 pandemic as well as decreased levels of job satisfaction compared to the pre-pandemic era.

Nevertheless, research on the effects of workplace environment at public health workforce interactive on burnout have remained limited in Greece and worldwide, thus

restricting the access of public health organizations to valuable insights that may contribute to the prevention of negative consequences in employees' general wellbeing and organizational outcomes. As shown above workplace environment may have a negative effect on psychological health of the public health professionals, developing burnout. Following, burnout decreases job satisfaction and performance leading to poor quality of health service provision.

Given the importance of Public Health Services in society and especially for the safety of the population, the quality of Public Health inspection must remain high, and this presupposes the high quality and performance of service provision from employees of Public Health inspection workforce services that oversee these tasks.

### *Study Objectives*

Despite the repeated evidence that point out the strong link between burn out total score, emotional exhaustion, personal accomplishment, depenalization, to this date, on occupational risks and their consequences to the general wellbeing of employees of Public Health inspection workforce is very limited, although the nature of the work presents a range of threats as well as the link of workplace conditions to burnout. The research model of the present study is based on the pilot study of Adamopoulos et al. [2] also on the expanded mediation model of job burnout by Leiter [31] developed for the healthcare setting. The main objectives of the current study are the following:

- 1) To examine the various types and levels of burnout in employees in Public Health Inspection Workforce Services.
- 2) To detect possible differences between employees of Public Health Inspection Workforce Services of urban and rural settings, in burnout.

## II. MATERIALS AND METHODS

### *Research Design*

This is a cross-sectional, original research, since data were gathered by the researcher directly from a sample of employees in Public Health Inspection Workforce Services in Greece, at one time-period, and statistical analysis was utilized to uncover possible associations between the data. As the purpose of this research is to reveal the burn out syndrome of employees in Public Health Inspection Workforce Services and investigate the causal relationship between workplace environment and burnout, the study utilizes a quantitative methodology. The quantitative research method enables the analysis of phenomena through numerical data analyzed using statistical methods and thus allows the generalization of the conclusions drawn from the sample to the general population [32]. In this study, quantitative research is used to quantify the problem by generating numerical data that can be converted into useful statistics. It is used to quantify attitudes, opinions, behaviors, and other variables to generalize the results to a larger population. Quantitative research uses measurable data to reveal patterns in research. Quantitative data collection methods are much more structured than qualitative data collection methods. Data collection methods include various forms of surveys such as questionnaires, interviews, cross-

sectional studies, opinion polls and systematic observations [33].

### *The Sample*

The sample of this study comprised 185 employees in Public Health Inspection Workforce Services 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 and the imprint given by the research carried out, we see the following: The active employees 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 employees in Public Health Inspection Workforce Services Nationwide.

The purpose of gathering data from different prefectures of Greece is to be able to make comparisons between urban and rural areas, of the level of burnout of employees in Public Health Inspection Workforce Services. These comparisons are meaningful due to the body of literature that has found the significant effect of working conditions, and burnout. It is hypothesized that are active in urban areas (Prefecture of Attica & Ministry of Health, Hospitals & Region of Attica E.F.E.T) would exhibit higher levels of perceived job risks and burnout, compared to employees in Public Health Inspection Workforce Services in rural areas Prefectures of all over the Regions of Greece and E.F.E.T.

### *Sampling Process*

Took place between March 2021 and June 2021 and the total number of active Public Health Workforce all over Greece were contacted, providing N=185 responses, which account for 27% (185/684) of the population under study. 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 1<sup>st</sup> and June 22<sup>nd</sup> 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.

### *Materials*

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

A) Demographics, B) Maslach Burnout Inventory. In Section A, the questions cover the participant's basic

demographics (gender, age, marital status) as well as job status and work experience, workplace environment (rural, urban, and semi urban). Section B included the Greek translation of the Maslach Burnout Inventory (MBI) questionnaire, which is considered the gold standard for job burnout assessment, and the specific items and structure was retrieved from the paper of Dwivedi and Purohit [34]. The MBI has three subscales: 9-item emotional exhaustion, 8-item depersonalization, and 5-item personal accomplishment. The answers are given on a 7-point Likert scale (0 = never, 6 = always). The scores of the three subscales are calculated by adding the scores to that sub-scale [34].

### *Statistical Analysis*

Data gathered by the questionnaire were analyzed with SPSS version 20. Firstly, data were gathered by Google Forms and downloaded in the Excel format file (.xlsx). Then data were imported to SPSS and recoding took place to turn all data into arithmetic values specifying the labels accordingly. Once the data were ready for analysis, they were summarized with the use of descriptive statistics.

Frequency analysis was performed for nominal and ordinal demographic and job-characteristic variables, while for scale (dependent) variables mean (M), median (Mdn) and standard deviation (SD) measures were calculated for each variable. Descriptive statistics, while not allowing conclusions about the correlations of the variables considered, are especially important because they visualize the raw data and allow for simpler interpretation of the data.

Cronbach's alpha was calculated to conclude 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. All demographics and job characteristics were examined in relation to the dependent variables (burnout).

Significant differences between groups of the demographic variables (gender, education, marital status, job position etc.) were identified and reported with Mann-Whitney and Kruskal-Wallis tests. Median values were plotted for each group in clustered diagrams to showcase the detected differences. To explore the variety and extent encountered by employees in Public Health Inspection Workforce Services in Greece, descriptive statistics were calculated and presented in summary for each demographic group as well as in total. The associations between burnout, and workplace environment were calculated with non-parametric correlation analysis (Spearman's coefficient).

Since the main aim of this study was to investigate associated to burnout and workplace environment. Specifically, for burnout, each dimension (emotional exhaustion, depersonalization, personal accomplishment) was examined as separate dependent variables as well. For each dependent variable, hierarchical linear regression analysis was used to assess the effect of workplace environment. Statistical analyses were performed using the statistical package SPSS 20 and statistical significance was set at  $p < 0.05$ .



III. RESULTS

Main Sample Characteristics

The sample of the main research study included 185 employees in Public Health Inspection Workforce Services, 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 are 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%). Most participants lived (56.22%) in an urban environment, while 27% lived in a Provincial city (semi-urban environment) and 16.76% in Village-Town (rural environment). Regarding their workplace most participants worked (61.08%) in an urban environment, 19.46% in a Provincial city (semi-urban environment) and 19.46% in Village-Town (rural environment). Detailed results are presented in Table 1.

For the Maslach Burnout Inventory, principal components analysis with varimax rotation was conducted for all 22-items (KMO 0.893,  $\chi^2=2762$ ,  $p<0.001$ ). By analyzing both the eigenvalues and the scree plot it was found that three components can be extracted. The three-component solution explained 63.15% of the variance of the initial 22 items. The total Cronbach's alpha for the Maslach Burnout Inventory was  $\alpha=0.792$ , and the resulting subscales have a Cronbach's alpha reliability index as follows: Regarding Emotional Exhaustion (EE) only six items that are theoretically assigned to this subscale have loadings more than 0.4 (items 1-5 and 9). Nevertheless, EE subscale with 9 items has a Cronbach's alpha of  $\alpha=0.791$  which is acceptable. Likewise, even though only four items of the Personal Accomplishment (PA) subscale (10, 15-17) have loadings over 0.4, Cronbach's alpha of PA is  $\alpha=0.563$  which is also acceptable. On the other hand, only two items (19 and 20) load to the third subscale (Depersonalization, DP), with a Cronbach's alpha of  $\alpha=0.817$ .

Burnout and Workplace Environment

Table 2 presents the summary statistics for Emotional Exhaustion (EE), Personal Accomplishment (PA), Depersonalization (DP), and Burnout (Total) in the sample of the final study (N=185). Burnout and its dimensions range at a

7-point Likert scale (0=never, 6=always), meaning that average values equal to or larger than 3 indicate high levels of burnout, while values less than or equal to 2 indicate low levels of burnout. Mean scores of burn out in the range (2,3) were considered as medium levels of burnout. On average, medium levels of Emotional Exhaustion score (M=2.97, SD=0.99) and Personal Accomplishment score (M=2.54, SD=0.83) are reported. Levels of Depersonalization score are low (M=1.81, SD=1.17). The total score of Burnout (M=2.72, SD=0.69) indicates an average burnout level among participants, yet the histogram in Figure 1, is slightly negatively skewed (Skewness = -0.378). More specifically, Figure 2 presents the distribution of the sample according to this categorization: 19.46% of participants report low burnout levels, 37.84% of participants' medium burnout levels and 42.70% high (above average) burnout levels. This means that although the majority of the sample (57.3%) report low to medium burnout levels, there is a significant proportion (42.7%) that reports above average burnout.

TABLE 1. Individual characteristics of the final study sample (N=185)

		N	%
Gender	Men	70	37.84%
	Women	115	62.16%
Marital Status	Single	36	19.46%
	Divorced	31	16.76%
	Married	117	63.24%
	Widowed	1	0.54%
Job Position	Employee	120	64.86%
	Head of office	24	12.97%
	Head of department	22	11.89%
	Supervisor / Director	19	10.27%
Educational level	College/University	111	60.00%
	MSc/MA or postgraduate diploma	68	36.76%
	Ph.D	6	3.24%
Have children	Yes	130	70.27%
	No	55	29.73%
Residence	Urban environment	104	56.22%
	Provincial city (semi-urban environment)	50	27.03%
	Village-Town (rural environment)	31	16.76%
Workplace	Urban environment	113	61.08%
	Provincial city (semi-urban environment)	36	19.46%
	Village-Town (rural environment)	36	19.46%
Age in years (M,SD)		48.96 (8.22)	
Work Experience in years (M,SD)		15.84 (8.53)	

TABLE 2. Summary statistics for Emotional Exhaustion (EE), Personal Accomplishment (PA), Depersonalization (DP), and Burnout (Total) (N=185)

	Mean	SD	Median	Range	IQR	Skewness	Kurtosis
Emotional Exhaustion (EE)	2.967	0.99221	3.000	5.110	1.390	-0.394	-0.127
Personal Accomplishment (PA)	2.5426	0.82964	2.500	3.750	1.250	0.065	-0.635
Depersonalization (DP)	1.8189	1.17071	1.500	5.500	1.500	0.465	-0.264
Burnout Score (Total)	2.7233	0.69808	2.770	2.860	1.050	-0.378	-0.8

Table 3 presents the results of the Kruskal-Wallis tests of burnout in relation to job position and no significant effect was detected.

Table 4 presents the results of the Kruskal-Wallis tests of burnout in relation to workplace of residence. Table 5 presents the results of the Univariate analyses of burnout in relation to workplace (Kruskal-Wallis test). Personal Accomplishment of

Village-Town (rural environment) (Mdn=3.56) was higher compared to all other groups, a difference that was statistically significant,  $\chi^2=26.417$ ,  $p<0.01$ . Depersonalization of Provincial city (semi-urban environment) (Mdn=2.00) was higher compared to all other groups, a difference that was statistically significant,  $\chi^2=6.188$ ,  $p<0.05$ .

TABLE 3. Univariate analyses of burnout in relation to job position (Kruskal-Wallis test)

Job Position	Emotional Exhaustion (EE)	Personal Accomplishment (PA)	Depersonalization (DP)	Burnout Score (Total)	
Employee	Mean	3.0935	2.5406	1.7042	2.7659
	Std. Deviation	0.93107	0.89527	1.08755	0.71763
	Median	3.3333	2.5000	1.5000	2.8182
	Range	4.44	3.75	5.50	2.86
Head of office	Mean	2.9491	2.6771	2.0208	2.8011
	Std. Deviation	0.91565	0.83236	1.32270	0.65278
	Median	2.8333	2.7500	2.0000	2.8636
	Range	3.67	3.00	4.50	2.32
Head of department	Mean	2.6768	2.4375	1.8864	2.5434
	Std. Deviation	1.05404	0.70684	1.22408	0.64990
	Median	2.7778	2.4375	1.5000	2.4545
	Range	4.33	2.50	4.50	2.36
Supervisor / Director	Mean	2.5263	2.5066	2.2105	2.5646
	Std. Deviation	1.24493	0.47957	1.37756	0.67323
	Median	2.5556	2.6250	2.5000	2.6364
	Range	5.11	1.88	4.50	2.50
Kruskal-Wallis	$\chi^2$	7.283	0.901	4.02	3.803
	p	0.063	0.825	0.259	0.284

Burnout total score of Village-Town (rural environment) (Mdn=3.32) was higher compared to all other groups, a difference that was statistically significant,  $\chi^2= 16.017$ ,  $p<0.01$ .

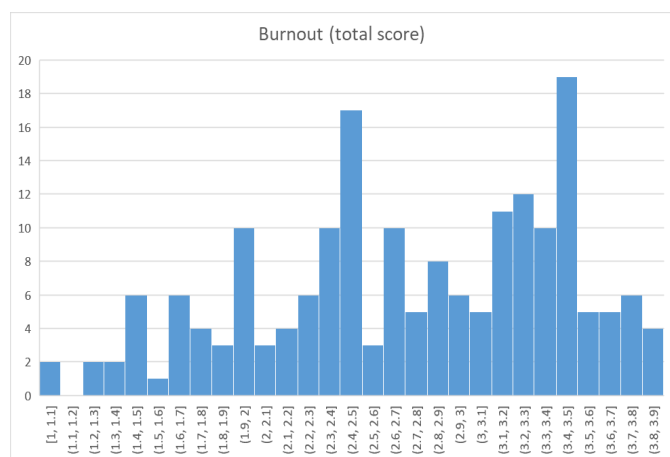


Figure 1. Histogram of burnout total score (N=185)

TABLE 4. Univariate analyses of burnout and in relation to residence (Kruskal-Wallis test)

Residence	Emotional Exhaustion (EE)	Personal Accomplishment (PA)	Depersonalization (DP)	Burnout Score (Total)	
Urban environment	Mean	2.8697	2.2969	1.6442	2.5616
	Std. Deviation	0.98404	0.71843	1.17555	0.66873
	Median	2.8333	2.2500	1.5000	2.5000
	Range	4.44	3.63	5.50	2.77
Provincial city (semi-urban environment)	Mean	3.0844	2.6650	2.1500	2.8673
	Std. Deviation	1.03103	0.79075	1.19202	0.67594
	Median	3.3333	2.6875	2.0000	3.0227
	Range	4.44	3.50	4.50	2.86
Village-Town (rural environment)	Mean	3.1039	3.1694	1.8710	3.0337
	Std. Deviation	0.94974	0.88773	1.02443	0.69462
	Median	3.5556	3.5000	1.5000	3.3182
	Range	3.89	3.13	4.50	2.41
Kruskal-Wallis	$\chi^2$	4.098	26.417	6.188	16.017
	p	0.129	0.000	0.045	0.000

TABLE 5. Univariate analyses of burnout in relation to workplace (Kruskal-Wallis test)

Workplace	Emotional Exhaustion (EE)	Personal Accomplishment (PA)	Depersonalization (DP)	Burnout Score (Total)	
Urban environment	Mean	2.8092	2.2865	1.6195	2.5294
	Std. Deviation	1.04194	0.71606	1.17693	0.68184
	Median	2.7778	2.2500	1.5000	2.4545
	Range	5.11	3.63	5.50	2.77
Provincial city (semi-urban environment)	Mean	3.0895	2.6250	1.9167	2.8497
	Std. Deviation	1.02416	.86137	1.11163	0.68306
	Median	3.2778	2.5000	1.5000	2.8409
	Range	4.11	3.50	4.50	2.86
Village-Town (rural environment)	Mean	3.3395	3.2639	2.3472	3.2058
	Std. Deviation	0.64348	0.69422	1.05437	0.47988
	Median	3.5556	3.4375	2.5000	3.3182
	Range	3.22	3.13	4.00	2.45
Kruskal-Wallis	$\chi^2$	4.098	26.417	6.188	16.017
	p	0.129	0.000	0.045	0.000

Total distribution of participants per burnout level presented in Figure 2.

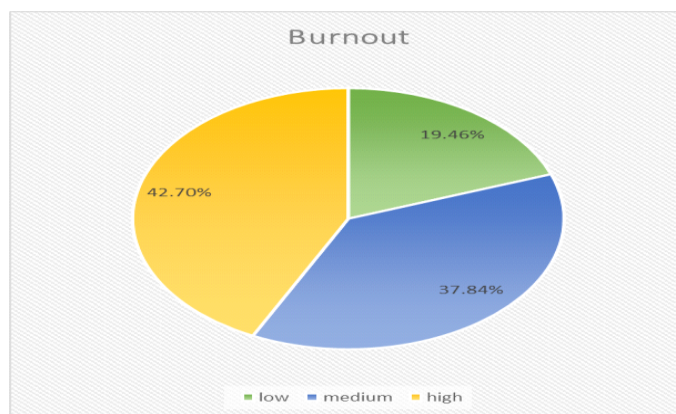


Figure 2. Distribution of participants per burnout level: Low<2, Medium 2-3, High >3

Similar results were derived for the Median values of burnout and workplace environment as presented in Figure 3.

Hierarchical linear regression analysis was performed for Emotional Exhaustion. For Emotional Exhaustion, the model was adjusted for demographics. For the unadjusted model, higher levels of emotional exhaustion for public health inspectors ( $R^2=0.304$ ). When adjusting for demographics ( $R^2=0.391$ ), were significant predictor of emotional exhaustion ( $\beta=0.500$ ,  $p<0.001$ ), while being married ( $\beta=-0.155$ ,  $p=0.041$ ) decreased emotional exhaustion. Hierarchical linear regression analysis was performed for Personal Accomplishment.

For Personal Accomplishment, the model was adjusted for demographics. For the unadjusted model, were associated with higher levels in lack of personal accomplishment for employees in Public Health Inspection Workforce Services ( $R^2=0.176$ ). When adjusting for demographics ( $R^2=0.401$ ), and rural workplace ( $\beta=0.271$ ,  $p=0.023$ ) were associated with lower levels of personal accomplishment, while urban workplace ( $\beta=-0.174$ ,  $p=0.029$ ) was associated with higher levels of personal accomplishment.

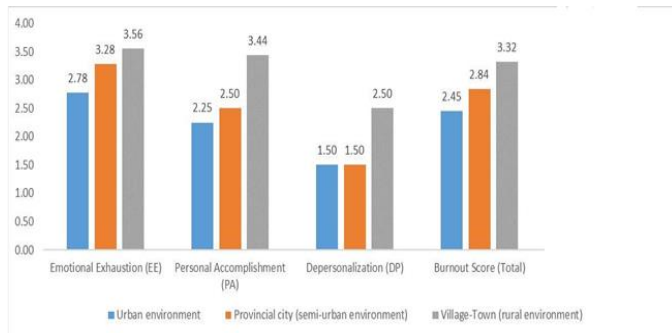


Figure 3. Median values of burnout and workplace environment

Depersonalization, the model was adjusted for demographics. For the unadjusted model, were significant predictors of depersonalization ( $R^2=0.299$ ). When adjusting for demographics ( $R^2=0.451$ ), rural workplace ( $\beta=0.152$ ,  $p=0.044$ ) were associated with higher levels of depersonalization, while being married ( $\beta=-0.168$ ,  $p=0.019$ ) and urban workplace ( $\beta=-0.174$ ,  $p=0.025$ ) were associated with lower levels of depersonalization.

Hierarchical linear regression analysis was performed for Burnout total score. For Burnout, variables that were significantly correlated were imported the model was adjusted for demographics. For the unadjusted model, higher levels of burnout for employees in Public Health Inspection Workforce Services ( $R^2=0.284$ ). When adjusting for demographics ( $R^2=0.449$ ), were significant predictor of burnout total ( $\beta=0.455$ ,  $p<0.001$ ), while being married ( $\beta=-0.166$ ,  $p=0.022$ ) and working in an urban environment ( $\beta=-0.184$ ,  $p=0.017$ ) decreased burnout. On the other hand, working in a rural environment ( $\beta=0.167$ ,  $p=0.031$ ) had a positive effect on burnout.

#### IV. DISCUSSION

The purpose of this study was to investigate the extent and severity of burnout experienced by Public Health Workforce employees in Greece and their relationship to workplace environment. A cross-sectional, nationwide quantitative research was designed, and an online survey was distributed to Public Health Workforce, including demographics and instruments to measure, burnout. In this study, burn out in different workplace environment has been identified as relevant to the employees in Public Health Inspection Workforce Services in Greece [2,47,48,49,50].

Public Health employees' workforce is tasked with health promotion, responding to emerging threats to Public Health and the prevention and control of communicable and environmental disease. These tasks are achieved through a variety of functions including, but not limited to, inspections and assessments, consultation with public as well as other agencies, data and sample collection, and enforcement of regulations. Given the breadth of their duties, it comes as little surprise that face many health and safety issues while at work [1, 2, 47,48,49].

Health and safety, as well as employee well-being at has been found to relate to several qualitative values that influence the workplace [48,49,50], in the frame of organizational and prevention culture. More specifically, Zwetsloot et al [35]

argued that the sense of connection and support from peers, which include participation in decision making and trust enhance health and safety at work. Moreover, justice and responsibility, as well as compliance of individual and organizational development leads to growth and resilience [35]. Burnout has proven to be an issue for Public Health Workforce Inspection Services since 42.7% of participants' report above average burnout scores. Indeed, health related professions are more prone to burnout as depicted by previous research [36].

The predominant dimension of burnout was emotional exhaustion [37, 38] with no difference between groups for gender and job position. More specifically, previous research has showcased that health workers presented high levels in all dimensions of burnout with a key factor of emotional exhaustion due to job stress [39]. Moreover, in the frame of COVID-19 pandemic, the burden on health workers has been characterized as highly severe in low- and middle-income Countries, due to resource constraints, underfunded and understaffed organizations [24].

Another study argues that occupational stress and burnout combined with insufficient resources and health services during the pandemic may put Health Workers at greater risks of mental health disorders [40,49]. It has been recently reported that burnout is a significant problem in health-related professions and needs to be acknowledged as an occupational factor and not a personal failure of the employee [41].

Employees in rural workplaces report higher scores of burnout in all dimensions (emotional exhaustion, personal accomplishment, and depersonalization). These findings are supported by the results of Malakouti et al. [28] which indicate that even in rural areas significant amount of health workers report high levels of burnout and mental disorders due to job stress, facilitated the increasing duties, job ambiguity and conflict, lack of participation in job planning, and lack of interaction with health authorities. A most recent study from China during the COVID-19 pandemic, utilizing the Maslach Burnout Inventory, demonstrated that more than half of rural healthcare workers reported moderate to severe levels of burnout, raising the issue of immediate strategizing to mitigate this prevalent mental health issue [29].

Significant differences were detected for marital status, where married participants with children reported lower levels of emotional exhaustion, lack of personal accomplishment and depersonalization. Nevertheless, some studies reported that married Health Workers are more likely to develop job related stress and burnout, compared to single employees [42,43], while the study of Godifay et al. [44] showed that no married Health Workers are more at risk of burnout.

Combining the results of emotional exhaustion of single Greek workforce public health employees with their perception of higher ergonomic and psychosocial risks, the link between risk perception and burnout seems evident. Nonetheless, increased burnout levels of non-married employees have been found in previous literature.

More specifically, the study of Maslach & Jackson [37] reported that employees with family responsibilities score lower in all burnout dimensions, a phenomenon that may be explained by the following: a) married employees with children



are older and more psychologically mature, b) settling down and creating a family provides employees with a stable life-style and a different perspective in life, c) family provides a context that facilitates a different view of the job, i.e., salary, benefits and security are more important factors compared to personal fulfillment and excitement, d) family may indicate more experience of employees in dealing with people and resolving interpersonal problems with patience e) family is an emotional resource, a social support systems, that helps employees to cope with job stress [37].

Lack of personal accomplishment levels were higher for college/university graduates, yet no effect was detected on the total score of burn out. These results contrast with the findings of the systematic review performed by Mengist et al. [45] that showed having a lower educational level is a predictor of burnout, which may be explained by the fact that employees in Public Health Workforce in Greece have at least a university degree. Recent literature has found that social support systems mediates the negative effects of burnout on Health of Physicians and Nurses in Ecuador, regardless of gender [46].

#### V. LIMITATIONS OF THE STUDY

This study has several limitations. As far as the sample size of the main study is concerned, an adequate proportion of the population (27%) was examined allowing for generalization of the results. Nevertheless, working in urban or semi-urban environments were under-represented due to sampling limitations. Sampling bias is expected to influence statistical measurement, yet several demographic variables and individual characteristics of participants were added as control variables in the multivariate regression analysis to mitigate this effect. Yet, the limited access of the researcher to the population presents a concern relative to the ability of the sample to be representative of the population.

#### VI. CONCLUSIONS

Workplace environment (urban vs rural) has been proved an important factor for variables examined in this study, since 42.7% of participants' report above (usually) average burnout scores. Moreover, employees in rural workplaces report higher scores of burnout in all dimensions (emotional exhaustion, personal accomplishment, and depersonalization).

During the pandemic in Greece, the combination of limited technical and manpower resources as well as long work hours may explain the higher levels of burnout of employees in Public Health Inspection Workforce Services in rural areas.

These results can help the public administration from programs and interventions in order to provide a safe work environment for employees in Public Health Inspection Workforce Services and other Healthcare Employees and Professionals. Also, the public administration may use these results and insights in the effort to increase performance and productivity of the public sector, through job satisfaction and the reduction of burnout.

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#### REFERENCES

- [1]. Tustin, J., Hau, J. and Hon, C. Occupational health and safety hazards encountered by Ontario Public Health Inspectors. *Environmental Health Review*, 62(1), pp.14-19, 2019.
- [2]. Adamopoulos, I., Lamnisos, D., Syrou, N. & Boustras, G. Public health and work safety pilot study: Inspection of job risks, burn out syndrome and job satisfaction of public health inspectors in Greece. *Safety Science*, 147, 2022. doi.org/10.1016/j.ssci.2021.105592.
- [3]. Thorn, J., Beijer, L., & Rylander, R. Work related symptoms among sewage workers: a nationwide survey in Sweden. *Occupational and environmental medicine*, 59(8), 562-566, 2002.
- [4]. Okunribido, O. O., Shimbles, S. J., Magnusson, M., & Pope, M. City bus driving and low back pain: a study of the exposures to posture demands, manual materials handling and whole-body vibration. *Applied ergonomics*, 38(1), 29-38, 2007.
- [5]. Garbarino, S., Cuomo, G., Chioggi, C., & Magnavita, N. Association of work-related stress with mental health problems in a special police force unit. *BMJ Open*, 3(7), e002791, 2013. doi: 10.1136/bmjopen-2013-002791.
- [6]. Idris, M., Dollard, M., Coward, J., & Dormann, C. Psychosocial safety climate: Conceptual distinctiveness and effect on job demands and worker psychological health. *Safety Science*, 50(1), 19-28, 2012. doi: 10.1016/j.ssci.2011.06.005.
- [7]. Tuckey, M., Winwood, P., & Dollard, M. Psychosocial culture and pathways to psychological injury within policing. *Police Practice And Research*, 13(3), 224-240, 2012. doi: 10.1080/15614263.2011.574072.
- [8]. D'Ettoire, G., & Greco, M. Healthcare work and organizational interventions to prevent work-related stress in Brindisi, Italy. *Safety and health at work*, 6(1), 35-38, 2015.
- [9]. Georeva, P., Kuneva, T., Karamfiloff, K., & Stoykova, J. Analysis Of Labour Inspectors' Temporary Incapacity For Work. *Journal Of Biomedical And Clinical Research*, 8(1), 68-71, 2015. doi: 10.1515/jbcr-2015-0154
- [10]. Hoven H., Wahrendorf, M., Siegrist, J. Occupational position, work stress and depressive symptoms: a pathway analysis of longitudinal SHARE data. *Journal of Epidemiology and Community Health May 2015 - Volume 69 - 5*
- [11]. Potter, R., Dollard, M., Owen, M., O'Keefe, V., Bailey, T., & Leka, S. Assessing a national work health and safety policy intervention using the psychosocial safety climate framework. *Safety Science*, 100, 91-102, 2017. doi: 10.1016/j.ssci.2017.05.011
- [12]. Wasley, A. April 19. Special investigation: How bullying and intimidation in abattoirs threatens food safety checks, 2017. Available at: Ecologist: <https://theecologist.org/2017/apr/19/special-investigation-how-bullying-and-intimidation-abattoirs-threatens-food-safety>.
- [13]. Varianou Mikellidou, C., Shakou, L., Boustras, G., & Dimopoulos, C. Energy critical infrastructures at risk from climate change: A state of the art review. *Safety Science*, 110, 110-120, 2018. doi: 10.1016/j.ssci.2017.12.022
- [14]. Akodu, A., Ashalejo, Z.. Work-related musculoskeletal disorders and work ability among hospital nurses. *Journal Taibah University Medical Science* 14(3): 252-261, 2019. doi: 10.1016/j.jtumed.2019.02.009
- [15]. Moda, H. M., Filho, W. L., & Minhas, A. Impacts of Climate Change on Outdoor Workers and their Safety: Some Research Priorities. *International journal of environmental research and public health*, 16(18), 3458, 2019. <https://doi.org/10.3390/ijerph16183458>
- [16]. Varghese, B. M., Hansen, A. L., Williams, S., Bi, P., Hanson-Easey, S., Barnett, A. G., & Pisaniello, D. L. Determinants of heat-related injuries in Australian workplaces: Perceptions of health and safety professionals. *Science of the total environment*, 718, 137138, 2020.

- [17]. Leitão, S., & Greiner, B. A. Psychosocial, health promotion and safety culture management—are health and safety practitioners involved? *Safety science*, 91, 84-92, 2017.
- [18]. Anyfantis, I., Boustras, G., & Karageorgiou, A. Maintaining occupational safety and health levels during the financial crisis—A conceptual model. *Safety science*, 106, 246-254, 2018.
- [19]. Anyfantis, I., Boustras, G. The effects of part-time employment and employment in rotating periods on occupational accidents. The case of Greece. *Saf. Sci.* 121, 1–4, 2020. <https://doi.org/10.1016/j.ssci.2019.09.001>.
- [20]. Anyfantis, I., Psychouli, P., Varianou-Mikelidou, C., & Boustras, G. Cross-Sectional Survey on Burnout and Musculoskeletal Disorders in Greek and Cypriot Occupational Therapists. *Occupational Therapy In Mental Health*, 36(3), 291-302, 2020. doi: 10.1080/0164212x.2020.1779630
- [21]. Maslach, C., Leiter, M.P. Understanding the burnout experience: recent research and its implications for psychiatry. *World Psychiatry Off. J. World Psychiatr. Assoc. WPA* 15, 103–111, 2016. <https://doi.org/10.1002/wps.20311>
- [22]. Aronsson, G., Theorell T., Grape, T., Hammarström A., Hogstedt C, Marteinsdottir, I., Skoog, I., Träskman-Bendz L. & Hall C. A systematic review including meta-analysis of work environment and burnout symptoms. *BMC Public Health* volume 17, Article number: 264, 2017.
- [23]. Castelo-Branco, C., Figueras, F., Eixarch, E., Quereda, F., Cancelo, M. J., Gonzalez, S., & Balasch, J. Stress symptoms and burnout in obstetric and gynaecology residents. *BJOG: An International Journal of Obstetrics & Gynaecology*, 114(1), 94-98, 2007.
- [24]. Deng, D., & Naslund, J. A. Psychological Impact of COVID-19 Pandemic on Frontline Health Workers in Low- and Middle-Income Countries. *Harvard public health review* (Cambridge, Mass.), 28, 2020.
- [25]. Stratil, J. M., Biallas, R. L., Burns, J., Arnold, L., Geffert, K., Kunzler, A. M., Monsef, I., Stadelmaier, J., Wabnitz, K., Litwin, T., Kreutz, C., Boger, A. H., Lindner, S., Verboom, B., Voss, S., & Movsisyan, A. Non-pharmacological measures implemented in the setting of long-term care facilities to prevent SARS-CoV-2 infections and their consequences: a rapid review. *The Cochrane database of systematic reviews*, 9(9), 2021, CD015085. <https://doi.org/10.1002/14651858.CD015085.pub2>
- [26]. Peck, J., & Sonney, J. Exhausted and Burned Out: COVID-19 Emerging Impacts Threaten the Health of the Pediatric Advanced Practice Registered Nursing Workforce. *Journal Of Pediatric Health Care*, 35(4), 414-424, 2021. doi: 10.1016/j.pedhc.2021.04.012
- [27]. Zare, S., Mohammadi dameneh, M., Esmaeili, R., Kazemi, R., Naseri, S., & Panahi, D. Occupational stress assessment of health care workers (HCWs) facing COVID-19 patients in Kerman province hospitals in Iran. *Heliyon*, 7(5), e07035, 2021. doi: 10.1016/j.heliyon. 2021.e07035
- [28]. Malakouti, S. K., Nojomi, M., Salehi, M., & Bijari, B. Job stress and burnout syndrome in a sample of rural health workers, behvarzes, in Tehran, Iran. *Iranian journal of psychiatry*, 6(2), 70–74, 2011.
- [29]. Xu, W., Pan, Z., Li, Z., Lu, S., & Zhang, L. Job Burnout Among Primary Healthcare Workers in Rural China: A Multilevel Analysis. *International journal of environmental research and public health*, 17(3), 727, 2020. <https://doi.org/10.3390/ijerph17030727>
- [30]. Leskovic, L., Erjavec, K., Leskovic, R., & Vuković, G. Burnout and job satisfaction of healthcare workers in Slovenian nursing homes in rural areas during the COVID-19 pandemic. *Annals Of Agricultural And Environmental Medicine*, 27(4), 664-671, 2020. doi: 10.26444/aaem/128236
- [31]. Leiter, M. P. Perception of risk: An organizational model of occupational risk, burnout, and physical symptoms. *Anxiety, Stress & Coping*, 18(2), 131-144, 2005.
- [32]. Wyse, S. What is the difference between qualitative research and quantitative research?, 2011. Available at: <http://www.snapsurveys.com/blog/what-is-the-difference-between-qualitative-research-and-quantitative-research/>
- [33]. Herman, J. B. Are situational contingencies limiting job attitude—job performance relationships? *Organizational Behavior and Human Performance*, 10(2), 208-224. 1973.
- [34]. Dwivedi, A. and Purohit, B. Is Dentistry Turning Into Weary Profession? Dimensionality of Experienced Professional Burnout among Dentists in Central India. *Dentistry*, 6(8), 2016 .
- [35]. Zwetsloot, G., Scheppingen, A., Bos, E., Dijkman, A., & Starren, A. (). The Core Values that Support Health, Safety, and Well-being at Work. *Safety and Health at Work*, 4(4), 187-196, 2013. doi: 10.1016/j.shaw.2013.10.001.
- [36]. Maslach-Pines, A. Keeping the spark alive: Preventing burnout in love and marriage. St. Martin Press, 1997.
- [37]. Maslach, C., & Jackson, S. E. The measurement of experienced burnout. *Journal of organizational behavior*, 2(2), 99-113, 1981.
- [38]. Brotheridge, C. M., & Grandey, A. A. Emotional labor and burnout: Comparing two perspectives of “people work”. *Journal of vocational behavior*, 60(1), 17-39, 2002.
- [39]. Guveli, H., Anuk, D., Oflaz, S., Guveli, M., Yildirim, N., Ozkan, M., & Ozkan, S. (2015). Oncology staff: burnout, job satisfaction and coping with stress. *Psycho-Oncology*, 24(8), 926-931. doi: 10.1002/pon.3743
- [40]. Elhadi, M., Mshergih, A., Elgzairi, M., Alhashimi, A., Bouhuwaish, A., Biala, M., Abuelmeda, S., Khel, S., Khaled, A., Alsoufi, A., Elmabrouk, A., Alshiteewi, F. B., Hamed, T. B., Alhadi, B., Alhaddad, S., Elhadi, A., & Zaid, A. (2020). Burnout Syndrome Among Hospital Healthcare Workers During the COVID-19 Pandemic and Civil War: A Cross-Sectional Study. *Frontiers in psychiatry*, 11, 579563.
- [41]. Reddy, S., Yennu, S., Tanco, K., Anderson, A., Guzman, D., & Williams, J. et al. (2022). Frequency and prediction of Burn-Out among Physicians who completed Palliative care Fellowship Training - A 10 year survey. *Journal Of Pain And Symptom Management*. doi: 10.1016/j.jpainsymman.2022.02.009
- [42]. Anand S, Mejid A. Prevalence and associated factors of work related stress among nurses working in worabe comprehensive and specialized hospital, south west Ethiopia. *Int J Acad Res Dev*. 2018;3:260–266.
- [43]. Nemer AC, Alemu T. Assessment of job related stress and its predictors among nurses working in government hospitals of West Shoa Zone, Oromia Region, Ethiopia, 2018.
- [44]. [Godifay G, Worku W, Kebede G, Tafese A. Work related stress among health care workers in Mekelle City administration public hospitals, north Ethiopia. *J Health Med Nurs*.;46:189–195, 2018.
- [45]. Mengist, B., Amha, H., Ayenew, T., Gedfew, M., Akalu, T. Y., Assemie, M. A., Alene, M., & Desta, M. Occupational Stress and Burnout Among Health Care Workers in Ethiopia: A Systematic Review and Meta-analysis. *Archives of rehabilitation research and clinical translation*, 3(2), 100125, 2021 <https://doi.org/10.1016/j.arrct.2021.100125>
- [46]. Ruisoto, P., Ramírez, M., García, P., Paladines-Costa, B., Vaca, S., & Clemente-Suárez, V. Social Support Mediates the Effect of Burnout on Health in Health Care Professionals. *Frontiers In Psychology*, 11. 2021 doi: 10.3389/fpsyg.2020.623587
- [47]. Adamopoulos I, Lamnisos D., Syrou N., Boustras G., Inspection of job risks, burn out syndrome and job satisfaction of Greek Public Health Inspectors, *Safety and Health at Work*, Volume 13, Supplement,2022, Page S294, ISSN 2093-7911, <https://doi.org/10.1016/j.shaw.2021.12.1670>
- [48]. Adamopoulos, I. P. and Syrou, N. F. Workplace Safety and Occupational Health Job Risks Hazards in Public Health Sector in Greece. *European Journal of Environment and Public Health*, 6(2), 2022 em0118. <https://doi.org/10.21601/ejeph/12229>
- [49]. Adamopoulos, I. P. and Syrou, N. F.. Associations and correlations of job stress, job satisfaction and burn out in public health sector. *European Journal of Environment and Public Health*, 6(2), 2022, em0113. <https://doi.org/10.21601/ejeph/12166>
- [50]. Adamopoulos, I. P. .Job Satisfaction in Public Health Care Sector, Measures Scales and Theoretical Background. *European Journal of Environment and Public Health*, 6(2), 2022, em0116. <https://doi.org/10.21601/ejeph/12187>