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Original Article

Suicide Mortality Across Broad Occupational Groups in Greece: A Descriptive Study

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ABSTRACT

Background: Several studies have investigated the relationship between specific occupations and suicide mortality, as suicide rates differ by profession. The aim of this study was to investigate suicide mortality ratios across broad occupational groups in Greece for both sexes in the period 2000–2009.
Methods: Data of suicide deaths were retrieved from the Hellenic Statistical Authority and comparative mortality ratios were calculated. Occupational classification was based on the International Classification of Occupations (ISCO-88) and the coding for Intentional self-harm (X60–X84) was based on the international classification of diseases (ICD-10).
Results: Male dominant occupations, mainly armed forces, skilled farmers and elementary workers, and female high-skilled occupations were seen as high risk groups for suicide in a period of 10 years. The age-productive group of 30–39 years in Greek male elementary workers and the 50–59 age-productive group of Greek professional women proved to have the most elevated number of suicide deaths.
Conclusion: Further research is needed into the work-related stressors of occupations with high suicide mortality risk and focused suicide prevention strategies should be applied within vulnerable working age populations.

1. Introduction

Research has shown that mental illness and experience of social stressors and adverse life events increase suicide risk considerably [1–3]. The burden of suicide and suicidal behavior across nonpsychiatric groups with high suicide risk and the associated cost to societies has further indicated the importance of preventive actions towards the possible causes [4,5]. Unemployment, employment, and specific occupations have been linked to suicide and suicidal behavior, in a variety of studies [6–10]. Sex has been found to play an important role in occupation-related suicide risk and self-harming behaviors, but the over-representation of men in many occupational categories may act as a barrier in evaluating the association of stressful working environment and suicide for each sex [7,11–18]. For instance, males in professions that are deemed as masculine such as the armed forces, construction work, and agriculture have an elevated suicide risk; whereas in sex equal professions such as physicians and professionals, females have a higher suicide risk [7,11,19–22]. While health care professionals and police personnel have an elevated suicide risk, higher mortality from suicide has been reported for labor and agricultural related occupations [14,20,23–25]. Professional groups with an easier access to lethal means of suicide such as medical doctors, police, military personnel, and farmers have demonstrated a higher suicide rate when compared to other occupational groups [19,26–28]. It seems that methodological limitations cause some inconclusive results on the same professional groups among studies [29,30].

Age and sex constitute the main factors that should be taken into account into estimates of suicide risks related to each profession [30], but other factors like psychiatric morbidity, client-dependent professions, and skill level/seniority of occupations

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provide a more clear focus for suicide prevention strategies within occupational groups [21,30–32].

The aim of this study was to investigate suicide mortality ratios across broad occupational groups in Greece for both sexes among the 15–39 years, 40–49 years, and 50–59 years age groups for the period 2000–2009.

2. Materials and methods

The occupational coding in our study was based on the International Standard Classification of Occupations (ISCO), version 2008 [33]. All 10 (2-digit) categories according to ISCO-88 were studied for both sexes: (0) armed forces (unclassified persons); (1) managers, executives, and directors (members); (2) professionals; (3) technologists and associate professionals; (4) clerks; (5) service and market sales workers; (6) skilled agricultural and fishery workers; (7) craft and related trades workers; (8) plant and machine operator assemblers; and (9) elementary occupations (Table 1). Tables S1 and S2 show male and female population distribution by occupational group. The Hellenic Statistical Authority (ELSTAT) collects demographic and occupational information from different census schedules and from vital status forms. Data on the working population were collected by ELSTAT quarterly each year starting in 1998, through the labor force survey. The labor force survey follows a two-stage stratified sampling scheme covering the total country.

The number of deaths due to suicides was recorded by the Forensic Medicine and Criminal Investigation Authorities. Monitoring causes of death is part of the Vital Statistics Survey, which is a census survey and it covers all the deaths, which occur all over Greece. In cooperation with the Regional Statistical Offices of ELSTAT, personal statistical data on vital events (births, deaths, marriages, registered partnerships) are collected on a monthly basis from the Civil Register Offices all over Greece. Data on the causes of death are compiled on the basis of death certificates filled in by medical practitioners or forensic pathologists. Vital statistics data, after having been collected from the Civil Register Offices, undergo the necessary quality checks, and then they are processed and tabulated. As regards sudden deaths, where the cause of death is not specified and more research is needed, the data on the causes of death are collected through the Forensic Medicine Authorities. The survey produces statistical results on a yearly basis. As far as it concerns the Legal Framework, the survey is fully harmonized with the European statistical practice. It is governed by Law 344/76 concerning the "Registration of vital events" which lays down the obligations of the Civil Register Offices to collect and then to transmit the data, as well as by Law 3832/2010 on the "Hellenic Statistical System".

Methodology, validation, and survey results can be found on the ELSTAT official website [34]. Concerning the calculation of suicide rates by age and occupation group, national statistics were used for the denominator. The three past Greek censuses (1981, 1991, and 2001) were also used for exploring differences in the age compositions between groups [35]. The causes of death are coding based to the 9th Revision of the International Classification of Diseases (ICD-9) of the World Health Organization (WHO) and nowadays the coding e.g., for intentional self-harm (X 60–X84) is based on the international classification of diseases (ICD-10) [36].

Our analysis was performed for three working-age groups: 15–39 years, 40–49 years, and 50–59 years. In the official ELSTAT database were registered and assigned in occupational groups 1,618 deaths in the age group of 15–59 years (Table S3), out of a total of 3,661 deaths in all age groups, during the study period. The ratio of standardized cumulative incidences of each group (i.e., the number of deaths per year, sex, and occupational group divided by the corresponding occupational group) to the total incidence (i.e., irrespectively of occupational group) was defined as the comparative mortality ratio (CMR). The exact 95% confidence intervals (CI) were calculated assuming a Poisson distribution of the observed number of cases (Open Epi – Rollins School of Public Health, Emory University, Mid-P exact CI). The statistical analysis was performed with SPSS version 19 (IBM Corp., Armonk, NY, USA).

3. Results

Males in armed forces, clerks, skilled agricultural and fishery professions, and those in elementary occupations had the highest number of suicides in the 10 year period (Table S3). Males aged 50–59 years in armed forces (and unclassified) and young men aged 15–39 years in elementary occupations exhibited the highest CMRs (Table 2). Young female managers, executives, and director and

Table 1
Occupational categories based on the International Standard Classification of Occupations (ISCO; version 2008)

2-Level	Category of professions	Subclasses of professions
1 (1)	Unclassified persons	Armed forces, other unclassified persons
3 (3)	Managers, executives, directors	Employers, directors, managers, & executives of public administration, big & small public & private enterprises & organizations
7 (4)	Professionals	Scientists (mathematicians, physicians, biologists, architects, engineers, lawyers, teachers, & relevant professions), & persons that practice scientific, artistic & relevant professions
4 (4)	Technologists & associate professionals	Technologists & technicians of sciences (natural, health, engineering etc.) & relevant professions. Specialists on sales, stock broking, agents, services, & relevant professions
2 (2)	Clerks	Clerks, employees of service of customers
3 (2)	Service workers & market sale workers	Occupied in the benefit of personal services. Occupied in the benefit of services of protection. Models, salesmen, & those practicing in relevant professions
7 (1)	Skilled agricultural & fishery workers	Specialized farmers (any type of culture), specialized cattle breeders, bird-breeders, foresters, wood-cutters, fishermen, & relevant professions
8 (4)	Craft & related trade workers	Miners, construction workers, metal workers, welders, mechanics, workers in food industry, craftsmen in typo, wood, furniture, textile, clothing, & relevant professions
8 (3)	Plant & machine operators & assemblers	Machine or equipment operators & assemblers in industry (metal, chemical, wood, printing, textile, food, drink, tobacco etc.), professional drivers, & relevant professions
3 (3)	Elementary occupations	Unskilled workers in agriculture, fishing, etc. Unskilled workers in mines, manufacturing, transportation, etc. Peddlers etc.