Differences in all-cause and suicide mortality between health care and other employees in Lithuania: a census-linked mortality follow-up study, 2011-2019

Povilas Kavaliauskas (povilas.kavaliauskas@mf.vu.lt)
Department of Public Health, Institute of Health Sciences, Faculty of Medicine, Vilnius University

Domantas Jasilionis
Max Planck Institute for Demographic Research

Evaldas Kazlauskas
Center for Psychotraumatology, Institute of Psychology, Vilnius University

Giedre Smailyte
Department of Public Health, Institute of Health Sciences, Faculty of Medicine, Vilnius University

Short Report

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Abstract

Background

Lithuania shows one of the highest suicide rates worldwide. Studies from other countries report the elevated suicide risk among certain healthcare occupations even though mortality from other causes of death among medical doctors has become generally lower than mortality in the general population.

Methods

This study is based on the census-linked mortality dataset covering the entire population of Lithuania. The anonymised individual-level dataset includes all records from the 2011 census and death and emigration records between 1 March 2011 and 31 December 2019. The main variable of analysis identifies three groups: physicians, nurses and assistant nurses, and other health care employees. All-cause and suicide mortality rate ratios were estimated using a simple Cox survival regression model controlling for sex and age.

Results

Physicians, nurses and assistant nurses, and other health care employees have significantly higher all-cause mortality than the highly educated employees working in all other sectors (1.32 (1.07–1.64), 1.42 (1.21–1.66), and 1.48 (1.23–1.76), respectively). The corresponding rate ratios for suicide risk were 1.75 (0.87–3.55) for physicians and 0.58 (0.19–1.82) for nurses and assistant nurses, indicating lacking statistically significant relationships. Lacking statistically significant results for suicides can be explained by overall very low numbers of suicides among highly educated people (also including health workers).

Conclusions

The study indicates that healthcare workers show statistically significant excess all-cause mortality. The same (albeit statistically insignificant) tendency was observed in suicide risk among physicians.

Introduction

Despite the improving situation since the mid-2000s, Lithuania shows the highest suicide rate official European commission statistics page - Eurostat (1). Prior studies revealed that excess suicide rates at the national level are related to significant inequalities by socioeconomic status and high concentration of suicides in disadvantaged groups such as unemployed and economically inactive men or those residing in small cities and rural areas (2). Despite the public health importance of the suicide problem for Lithuania, more detailed evidence about certain risk groups is still missing. Medical workers such as nurses and physicians are subject to various occupational hazards, including different work-related
stressors (e.g. patient care, time pressure, administration). They are at increased risk of developing mental disorders (3). Some studies from other countries report elevated suicide risk among certain healthcare occupations (4, 5). Such a disadvantage persists despite the fact that mortality from most of the other causes of death among medical doctors in European countries has become generally lower than mortality in the general population (6, 7). Using census-linked mortality follow-up data covering the entire population of Lithuania for 2011–2019, the current study focuses on overall mortality and suicide risks among the three broad groups of health workers (nursing specialists, physicians, and other occupations)

**Methods**

This study is based on the census-linked mortality dataset covering the entire population of Lithuania. The anonymised individual-level dataset includes all records from the 2011 census and death and emigration records between 1 March 2011 (2011 census date) and 31 December 2019. All record linkage procedures were implemented at Statistics Lithuania by its employees having permission to work with confidential data. Only anonymised data were provided for the analysis based on the confidential data provision rules by Statistics Lithuania. The current study uses the census and mortality follow-up data for those aged 25–50 years at the moment of the census. The survival time is censored either at the moment of death or emigration. The final dataset includes 1,082,805 individuals out of the 34,427 individuals employed in the healthcare sector at the moment of the 2011 census. All explanatory variables are fixed at the census baseline. The primary variable of analysis identifies three large groups of health care workers being employed at the census: physicians, nurses and assistant nurses, and other health care employees (kinesitherapist, ergotherapist, etc.). Besides these three groups, this variable also includes the categories of employed in all other sectors with high education, employed in all other sectors with lower education, all unemployed, and all economically inactive or persons with unknown activity status. All-cause and suicide mortality rate ratios by occupation group were estimated using a simple Cox survival regression model, controlling for sex and age. Permission for the study was obtained from the Vilnius Regional Bioethics Committee (ID: 2021/5-1350-826). The modelling was performed using STATA software. (STATA corp.).

**Results**

During the follow-up period between 1 March 2011 and 31 December 2019, the whole study population experienced 32,900 deaths; 2902 of these deaths were identified as suicides. 383 deaths, including 16 suicides, occurred among healthcare employees. The deaths for three healthcare employee categories include 87 deaths and 8 suicides for physicians, 168 deaths and 3 suicides for nurses and assistant nurses, and 128 deaths and 5 suicides for other healthcare employees.

The results presented in Table 1 indicate that physicians, nurses, and assistant nurses have significantly higher all-cause mortality than highly educated employees working in all other sectors. Yet their mortality is still significantly lower than among lower-educated employees working in all other sectors. At the same
time, all-cause mortality for other healthcare employees seems to be as high as for other lower-educated employees. The results from the data sample restricted to healthcare employees confirm that there are any statistically significant differences (Table 1).

**Table 1**


<table>
<thead>
<tr>
<th>Occupation</th>
<th>All causes</th>
<th>Suicides</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Entire population</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed in all other sectors with high education</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Employed in all other sectors with lower than high education</td>
<td>1.78 (1.71–1.86)</td>
<td>2.36 (2.04–2.74)</td>
</tr>
<tr>
<td>Physicians</td>
<td>1.32 (1.07–1.64)</td>
<td>1.75 (0.87–3.55)</td>
</tr>
<tr>
<td>Nurses and assistant nurses</td>
<td>1.42 (1.21–1.66)</td>
<td>0.58 (0.19–1.82)</td>
</tr>
<tr>
<td>Other healthcare employees</td>
<td>1.48 (1.23–1.76)</td>
<td>1.00 (0.41–2.43)</td>
</tr>
<tr>
<td><strong>2. Employed in health care only</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physicians</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nurses and assistant nurses</td>
<td>1.11 (0.83–1.49)</td>
<td>0.22 (0.05–0.90)</td>
</tr>
<tr>
<td>Other healthcare employees</td>
<td>1.14 (0.85–1.51)</td>
<td>0.48 (0.15–1.50)</td>
</tr>
</tbody>
</table>

Results for suicide revealed no statistically significant differences between those employed in health care and highly educated employees working in all other sectors. In particular, although physicians tend towards higher suicide risk, the suicide rate ratios indicating relative differences from all categories seem not statistically significant. Meanwhile, nurses and assistant nurses show a lower risk of suicide than highly educated employees working in all other sectors. A separate analysis restricting the data to those employed in health care confirms that nurses and assistant nurses maintain much lower suicide risk than physicians.

**Discussion**

This study demonstrated higher overall mortality risk in all groups of healthcare workers and higher suicide risk among physicians compared to the workers in other sectors with higher education. The results of our study differ from other studies conducted in European countries, where overall mortality risk among physicians was consistently reported to be lower than in the general population (6–11). The use of general population mortality to calculate standardised mortality ratios may partly explain this discrepancy. Physicians and other medical workers frequently are early adopters of healthy behaviours based on their knowledge and economic resources. Educational level and health behaviour might explain lower mortality of medical workers if they were compared to the general population. The evidence from
other studies shows that doctors had lower mortality rates from smoking and lifestyle-related diseases such as lung cancer, cardiovascular diseases, and metabolic diseases.

Results on suicide risk among medical workers in our study are consistent with those previously reported in other countries (6–13). Although we found an indication of increased suicide risk among physicians, the suicide rate ratio for this group was not statistically significant (due to a small number of deaths). A higher risk of suicide in physicians was also reported in other studies comparing suicide rates to the general population. For example, a Norwegian study reported excess suicide rates among Norwegian medical physicians compared with other medical workers and the general population (6).

Suicidal behaviours are a complex multifactorial phenomenon, and our study design does not allow us for a more detailed analysis of suicide among medical workers. Suicide can be associated with mental state, burnout or psychiatric disorder, among other factors (13). We could assume that occupational stress and burnout in medical workers can be associated with an increased risk for suicide among physicians in comparison to the general population with higher education (14). A study conducted in Lithuania showed that burnout was highly prevalent among anaesthetists and intensive care physicians, with two-fifths having high burnout levels. Moreover, burnout was strongly correlated with a problem with alcohol consumption, depressiveness, cardiovascular and digestive disorders, use of sedatives and overeating (15).

Our study has, however, some limitations. As in all such studies, the main challenge is the data's validity and reliability. Also, there is a lack of information about more specific risk factors for suicide, such as mental disorders and alcohol abuse. Finally, the overall number of suicide deaths was relatively small and did not allow us to perform a more detailed analysis in subgroups and get more statistically robust rate ratios.

In summary, our findings showed an increased overall mortality risk in all groups of healthcare workers and a higher suicide risk among physicians. Our findings contribute to a better understanding of the overall mortality and suicide risk of medical workers, as all-cause and suicide mortality risks analysis could provide relevant information for well-being and preventive programs in medical workers.

**Declarations**

*Author Contributions:* G.S. and D.J. conceived the idea of the study and designed the article methodology; D.J. prepared statistical analysis; P.K. wrote the first draft of the article, and all authors critically reviewed and participated in improving subsequent drafts; All authors read and agreed to the published version of the manuscript.

*Acknowledgements:* Not applicable.

*Conflicts of Interest:* The authors declare no conflict of interest


