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Occupational Stress, Burnout, and Suicide Risk Among Healthcare Workers

DOCTORAL DISSERTATION

Medical and Health Sciences,
Public Health (M 004)

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ABBREVIATIONS

CVD	–	Cardiovascular diseases
HCWs	–	Healthcare workers
JD-R	–	Job Demands-Resources model
SMR	–	Standardised Mortality Ratio
DASS-21	–	The Depression, Anxiety and Stress Scale - 21
RS-11	–	The Resilience Scale 11
SBQ-R	–	The Suicidal Behaviors Questionnaire-Revised

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1. LIST OF PUBLICATIONS

The following papers, denoted by their Roman numerals in the text, serve as the foundation for this thesis.

I. Kavaliauskas, P., Jasilionis, D., Dulskas, A., Kazlauskas, E., & Smailyte, G. (2025). Differences in cause-specific mortality between healthcare workers and all other employees in Lithuania, 2011-2019. *BMC health services research*, *25*(1), 914. https://doi.org/10.1186/s12913-025-13006-y

II. Kavaliauskas, P., Jasilionis, D., Kazlauskas, E., & Smailyte, G. (2025). Differences in all-cause and death by suicide mortality between health care and other employees in Lithuania: a census-linked mortality follow-up study, 2011-19. *European journal of public health.* 2025 Jul 21: ckaf123. Advance online publication. https://doi.org/10.1093/eurpub/ckaf123

III. Kavaliauskas, P., Nomeikaite, A., Gelezelyte, O., Kazlauskas, E., & Smailyte, G. (2024). Work-related stressors and psychological distress predict career change ideation among Lithuanian healthcare workers. *International journal of occupational medicine and environmental health*, *37*(3), 287–299. https://doi.org/10.13075/ijomeh.1896.02350

IV. Kavaliauskas, P., Kazlauskas, E., & Smailyte, G. (2024). Suicide risk factors among Lithuanian medical doctors and residents. *Archives of public health = Archives belges de sante publique*, *82*(1), 243. https://doi.org/10.1186/s13690-024-01478-z

V. Kavaliauskas, P., Kazlauskas, E., & Smailyte, G. (2024). Psychological distress, suicidality and resilience of Lithuanian nurses. *BMC nursing*, *23*(1), 922. https://doi.org/10.1186/s12912-024-02632-2

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2. INTRODUCTION

2.1. The Research Problem and Relevance of the Study

Despite the improved situation since the mid-2000s, Lithuania shows the highest suicide rate on the 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 concentrations 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, and administrative tasks). 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 even though 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). Therefore, in Lithuania there is a significant lack of evident information about healthcare workers' cause-related mortality rates and mental health status. Which is why these theses were prepared.

This thesis is based on five published peer-reviewed articles. Its overall aim was to describe the current situation of mental health among Lithuanian healthcare workers, excluding no single profession, and analyse cause-related mortality further to illuminate the possible problematics of this population group. Papers I and II analysed cause-specific mortality, and paper II emphasised the suicide risk of healthcare workers. Paper III analyses professional exhaustion and career change ideation. Papers IV and V analysed the mental health of two of the most significant groups in the medical community – nurses and physicians.

2.2. The Aim of the Study

A detailed evaluation of the mental health and exhaustion of Lithuanian healthcare workers and an evaluation of their cause-specific mortality.

2.3. The Objectives of the Study

1. Evaluate cause-specific mortality among Lithuanian healthcare workers (Paper I).
2. Evaluate all cause and death by suicide mortality among Lithuanian healthcare workers (Paper II).
3. Evaluate career change ideation and its predictors among Lithuanian healthcare workers (Paper III).
4. Evaluate suicide risk factors among Lithuanian physicians and residents (Paper IV).
5. Evaluate psychological distress, suicidality and resilience among Lithuanian nurses (Paper V).

2.4. The Scientific Novelty of the Study

Researchers widely conducted studies on the psycho-emotional well-being of healthcare professionals internationally, especially after the COVID-19 pandemic; however, in Lithuania such research remains scarce. Researchers have conducted only a few small-scale investigations within specific groups of healthcare workers. These include analyses of stress experienced by intensive care nurses caring for terminally ill patients; assessments of stress and fatigue among anaesthesia resuscitators; examinations of coping strategies among medical residents; and studies of nurses working in cardiac surgery centres. Additional research has addressed stress among healthcare staff in a regional hospital, as well as the stress experienced by family physicians. Furthermore, it has examined physicians' psychosocial work environment factors and their self-perceived health. Most of these studies were conducted at a single institution, relied on relatively small samples, and were primarily completed as master's theses.

Additionally, using unique regional mortality data based on the linkage between the 2011 census and death records for 2011-2019, this study covering the entire population of Lithuania systematically explores all-cause and cause-specific mortality differentials between the three big groups of health care workers (general physicians, nurses and assistant nurses; other health care employees) and the remaining employees employed in all other sectors. This study also contributes to the existing literature by examining whether mortality differences persist between highly educated health care employees and the group of highly educated individuals employed in all other sectors.

3. LITERATURE REVIEW

3.1. Mortality insights of healthcare community

Healthcare workers are a critical element in every society around the world. Working in hazardous conditions exposes this occupational group to numerous well-established (e.g., stress or burnout) and specific health risks, such as higher exposure to communicable diseases (8). These disadvantages could lead to the perception that the mortality rate among medical professionals might also be higher. For example, one of the first pieces of historical evidence about physician mortality in England and Wales in 1860–1880 shows that, compared to the general male population, male physicians had higher death rates for all causes of death and for 23 out of the 27 listed causes of death (9). For suicide deaths, the risk of dying for medical professionals was 1.5 times higher (9). The excess mortality of physicians tends to diminish in time, to a large extent due to a better understanding and control of diseases and lifestyle factors (10).

Recent studies conducted in several European countries reveal that mortality risk among doctors became lower or the same as in the general population, except for suicide. A mortality study from Norway showed doctors had the same death rates as the general population, except for suicide rates, which were 1.7 times higher for men and even 2.9 times higher for women (6). Overall, medical doctors had higher mortality rates than other graduates in Norway. The study from Denmark shows that the standardised mortality ratio (SMR) for medical doctors was lower than for other graduates for cancer, circulatory diseases, and other natural causes (7). However, the SMR for suicide was still 1.6 times higher for males and 1.7 times higher for females. A study from Massachusetts (USA) indicates that healthcare workers had a slightly lower mortality rate from deaths of despair (violent and alcohol- or drug-related deaths) than all other workers (11). The same study revealed that medical assistants and other healthcare support occupation groups faced a striking disadvantage, with more than double the risk of dying from these causes of death (12).

3.2. Suicide risk among healthcare workers

Healthcare workers are routinely exposed to professional stressors that may increase mental health problems, including a higher risk for suicidal behaviour (13,14). Previous studies have indicated that physicians are at higher risk of suicide than the general population (15). A meta-analysis by Dutheil et al. (4)

concluded that physicians are professionals at risk for a suicide attempt, and female gender is a risk factor in this professional group. A study by Aasland et al. analysing 40 years of mortality rates among Norwegian doctors revealed that these doctors had higher mortality rates compared to representatives of other professions, primarily due to elevated suicide rates within the medical field (6). Historically, physician suicide rates were 1.5 times higher than in the general population. However, the gap between the general population and physician suicide rates is closing (10). In Denmark, the overall suicide rates among medical doctors were 1.6 times higher than those of the general population (7).

3.3. Career change ideation, occupational exhaustion, and burnout

Healthcare workers (HCWs) face high levels of occupational stress due to high professional demands, long and unpredictable working hours, night shifts, poor working conditions, and lack of positive feedback (16–18). Work-related exhaustion may negatively affect mental health, such as depression, substance use, and suicidal thoughts (17,19). Multiple studies show a high prevalence of burnout, depression, and anxiety among medical professionals (20–22). High-stress levels and mental health problems affect HCWs from the beginning of their careers and accompany them throughout their training and full-time employment (20,23). Mata et al. (21) performed a meta-analysis of more than 50 studies with more than 8000 physician residents and found that almost one-third suffered from depression or depressive symptoms. Burnout has been shown to affect 40 to 75% of all doctors (20,24). Poor psychological well-being of HCWs can lead to poor patient care, increased overall length of hospital stay, rehospitalizations, and high rates of medical errors (17,25,26). In the study of anaesthesiology residents, 33% of respondents at high risk for burnout and depression reported multiple medical errors (24). The same results can be seen among nurses (25,27) or physicians (26,28).

Occupational burnout arises from prolonged, unaddressed work stress and consists of three main parts: emotional exhaustion, depersonalisation, and low personal achievement (29). Burnout, by definition, is a condition that arises from experiences at work. In addition to this, the Job Demands-Resources (JD-R) model (30) divides work-related stressors into two main groups: job demands and job resources. The revised JD-R model (31,32) explained that if job resources and job demands are imbalanced, they cause strain on a person's psychological welfare, can cause burnout, and can create negative problems by causing mental and physical health problems. On the other hand, the authors supplemented the JD-R theoretical model with an engagement factor,

which is the positive outcome of job resources leading to increased performance.

Norkiene et al. (33) presented how psychological distress predicts career change ideation in the initial stages of the COVID-19 pandemic in Lithuania and the United Kingdom. The study conceptualised career change ideation as a cognitive process of rumination about the switch of careers and leaving healthcare services as a significant burnout indicator among medical professionals. The study found that nearly half of the HCWs (49%) considered changing careers and moving outside healthcare systems (33). Younger age, working in the Lithuanian healthcare system, having low confidence in the effectiveness of the personal protective system, higher depression and stress levels, and lower psychological well-being were significantly associated with an increased career change ideation. We conducted this study in Lithuania on a sample of healthcare workers in intensive care. However, we hypothesised that these mental health problems are not specific to intensive care staff but prevalent among various other healthcare worker groups in Lithuania.

3.4. COVID-19 burden on mental health

The COVID-19 pandemic increased psychological distress, anxiety, and depression among healthcare workers (34,35). Studies conducted during COVID-19 reported different levels of suicidal ideation among doctors and other healthcare professionals. A study from the United Kingdom found that in six COVID-19 pandemic months, suicidal ideation among healthcare workers slightly increased from 10.8% to 11.3% of respondents (36). A review from Groves et al. (37) showed that among nursing professionals, psychiatric, psychological, physical, occupational, and alcohol problems contributed to the higher suicide risk during the COVID-19 pandemic. In addition, research in Mexico found that 62% of nurses and 52.7% of doctors had suicidal risk (38).

The 2019 COVID-19 pandemic has significantly impacted healthcare workers (HCWs) who were already working under stressful conditions. Globally, 23-40% of healthcare workers suffered from anxiety, 23-37% from depression, and almost half of them (49%) from post-traumatic stress disorder during the COVID-19 pandemic (34,39). A meta-analysis by Johns et al. (35) concluded that, although many of these studies are limited by heterogeneity and inconclusive results, depressive and anxiety symptoms were more common compared to the pre-pandemic period at 21% and 26%, respectively. HCWs working with COVID-19 patients were more likely to experience symptoms of depression and post-traumatic stress than those working in other departments (40).

3.5. Mental health of nurses worldwide and in Lithuania

Nursing specialists are vital in providing healthcare services (41). Even though physicians usually lead the medical care team, nurses are often the leading figures in patient care, being the first person the patient interacts with during healthcare provision. Nurses have taken on more tasks in recent years (42). Even though those additional responsibilities are to cope with the shortage of doctors and to provide better care to the patients (42), they can also contribute to staff burnout (16). Furthermore, workers whose job essence involves frequent and intensive interactions with others are at higher risk of experiencing emotional exhaustion, lack of interest in work, problems with interpersonal communication, and deteriorating physical health (3).

Studies in various countries reveal challenging work conditions and poor mental health among nursing staff. A national survey in Canada identified that depression was significantly more prevalent among nurses than among other professionals (43). The prevalence of depression among nurses varies from 25.1 to 35.8% (44,45). Nurses are frontline workers with a high workload, often working every day of the week for prolonged hours. However, night shifts negatively affect mental health, causing more frequent depression and worsening of circadian and sleep rhythms (46). Burnout is a common problem among healthcare workers. A study in the U.S. showed that the main reason for nurses leaving their work is burnout (47). In addition, staff reported a stressful environment and inadequate staffing (47) as crucial factors in their decision to leave their work. The profile of a nurse who is at risk for burnout is a single person with multiple jobs, a high workload, and low work experience (16). However, all nursing specialists can be exposed to burnout, and it does not depend on the position held (48). Lastly, resilience is important when dealing with work challenges and life stressors, as it is the process and outcome of successfully adapting to difficult situations through mental, emotional, or behavioural flexibility (49). Resilience may be viewed as a personality trait or feature. However, it may also be conceptualised as a skill that can be developed. A Cochrane meta-analysis demonstrated that resilience training improved resilience, lowered depression levels, and reduced stress levels or stress perception (3).

3.6. Empirical Evidence Limitations

In Lithuania, there are more than 25,000 nurses, 14,000 physicians, 4,000 odontologists, and (50). However, according to the experts, there is a 16% lack of nursing specialists, 14% of family doctors, and 13% of various

specialists in Lithuania (50). A loss of any healthcare worker is a huge loss for everyone: patients, community, and society. However, there is a lack of recent scientific research exploring this problem.

A study from 2009 showed that 23% of nurses had mental distress, with low social support being the most critical risk factor (51). However, the study was conducted 15 years ago, and responders were from a single district community, so they do not reflect the whole of Lithuania. Another previous study showed that 12.9% of nurses experienced bullying in their workplace, but this was conducted in only part of the country (52).

There was a master's degree thesis exploring professional stress in 2018 (53), a thesis that evaluated anaesthesiologists' mental health (54), a paper that explored resident doctors' coping with stress strategies (55), physicians' and nurses' professional stress and burnout (56), and the professional stress of family doctors (57). These papers are relevant but usually low volume, performed in a single centre, and not published in peer-reviewed journals.

Norkiene et al. (33) published a major significant paper analysis on the mental health of intensive care staff. However, to further extend the knowledge base, evaluate the mental health of all healthcare workers, and evaluate general and cause-specific mortality, it is essential to further investigate the current situation.

4. RESEARCH DESIGN AND METHODS

The whole thesis consists of two main parts: a retrospective cohort mortality risk study and a cross-sectional survey study. Both studies have different populations, methodologies, statistical instruments and outcomes; this is why the further methodology will be represented separately.

The research was conducted in accordance with the Declaration of Helsinki. The study protocol received approval from the Vilnius Regional Biomedical Research Ethics Committee (No. 158200-17-913-423). The committee guided ethical standards and all procedures involving human participants.

4.1. Retrospective cohort mortality risk study

4.1.1 Study Design and Data Source

The study is based on the aggregated cross-sectional census-linked mortality dataset provided by Statistics Lithuania.

The data has been provided by the Statistics Lithuania under the Article 13(4) of the Law on Statistics of the Republic of Lithuania; Regulation (EC) No 223/2009 of the European Parliament and of the Council of 11 March 2009 on European statistics and repealing Regulation (EC, Euratom) No 1101/2008 of the European Parliament and of the Council on the transmission of data subject to statistical confidentiality to the Statistical Office of the European Communities, Council Regulation (EC) No 322/97 on Community Statistics, and Council Decision 89/382/EEC, Euratom establishing a Committee on the Statistical Programmes of the European Communities , as amended by Regulation (EU) 2015/759 of the European Parliament and of the Council of 29 April 2015; and Commission Regulation (EU) No 557/2013 of 17 June 2013 implementing Regulation (EC) No 223/2009 of the European Parliament and of the Council on European Statistics as regards access to confidential data for scientific purposes and repealing Commission Regulation (EC) No 831/2002.

4.1.2. Study Population

The aggregated dataset used for analyses includes cause-specific deaths and population exposures by all possible combinations of the following variables: age, sex, education, and occupation. The final dataset consists of a total

number of 1,082,805 individuals; out of them, 34,427 individuals were employed in the healthcare sector at the moment of the 2011 census. Figure 1 represents the flow of the individuals included in the final analysis.

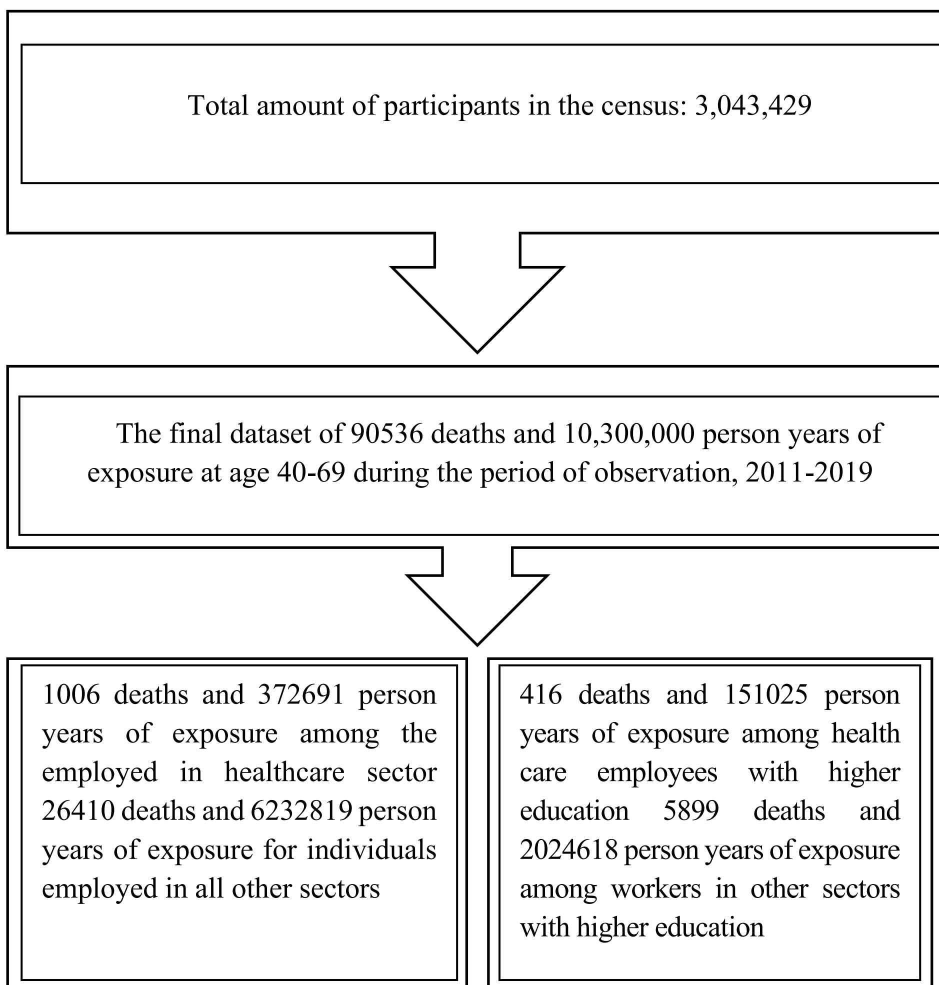

Figure 1. Flow diagram of participants included in the study.

4.1.3. Inclusion and Exclusion Criteria and Data Quality

The study population is restricted to individuals aged 40-69 years for each calendar year of observation. The lower age band of 40 years was selected because information about occupation is fixed at the 2011 census baseline. Thus, for 40-year-old individuals in 2019, information about their occupation comes from the 2011 census conducted 8 years ago – i.e., when these

individuals were approximately 8 years younger. Choosing a lower age limit is not feasible due to the high occupational mobility at younger ages.

All individuals in the census were followed from the census date until their death, emigration, or the end of the observational period. All data linkages were performed at Statistics Lithuania in accordance with data protection rules. Only anonymised data were provided for scientific purposes. The death registration is considered 100% complete. Since not all individuals immediately report their departure from Lithuania, emigration statistics may underestimate the true level of emigration. However, we believe that undercounting emigration does not have a significant influence on our results because a) most emigration occurred below the age of 40, and b) the registration of emigration improved after the introduction of a special compulsory health insurance tax in 2010, which led to strong financial incentives to register departure from Lithuania.

4.1.4. Study Variables and Measures

The final total cause-specific deaths (dependent variables) and exposures were obtained by adding deaths, emigrations, and person-years lived within each calendar year, considering the changing age of all individuals during each year. Independent categorical variables stem from the 2011 census and are fixed at the moment of this census (March 1, 2011).

Cause-specific deaths were classified using the 10th revision of the International Classification of Diseases (ICD-10) (58) by the Institute of Hygiene. Due to the small number of deaths within groups of healthcare workers, only a few broad categories of causes of death were applied. The occupational variable of analysis identifies three large groups of health care workers being employed at the census, including a) physicians, b) nurses and assistant nurses, and c) other health care employees. High educational status was identified using the self-reported information at the 2011 census and later classified using the International Standard Classification of Education (ISCED) 2011 (59) by Statistics Lithuania. Higher education refers to tertiary university or non-university education (ISCED categories).

4.1.5. Study Outcomes

To assess the mortality differences between the three groups of healthcare workers and all remaining employees, a multivariate sex-specific Poisson regression analysis was applied, using the group of employees (workers)

employed in sectors other than healthcare as the reference category. The results based on models controlling for age are reported using Poisson regression mortality rate ratios (MRRs) and their 95% confidence intervals. To account for possible differences in age structure across occupations, all Poisson regression models were controlled for age. The first analysis covered the entire population (the MRRs for the unemployed and economically inactive are not reported), whereas the second analysis was restricted to individuals with high education. We performed statistical analyses using STATA 14.2 (Stata Corp., College Station, Texas, USA).

4.2. Cross-sectional survey study

4.2.1. Study Design and Data Source

The study data were collected between December 2021 and January 2022 via an online platform designated for surveys. The invitation to participate in the study was distributed through various professional unions and associations, internal hospital networks, and Lithuanian HCWs' social networks. Two additional reminders were sent to invite HCWs to participate in the survey after the initial invitation was released. All HCWs were invited to participate in this study to distinguish different medical professions as possible risk factors.

In total, 2354 responders opened the online survey, and 1653 fully completed the questionnaire. After excluding non-medical personnel, 1618 comprised the final sample and were included in data analysis. The participants ranged in age from 19 to 76 years, with 88.4% being women. Table 1 presents the detailed occupational and sociodemographic characteristics of the study participants.

Table 1. Characteristics of the study sample ($N = 1618$).

Variable	Prevalence (%)
Gender	
Male	182 (11.2)
Female	1431 (88.4)
Other	5 (0.3)
Age *M* (*SD*)	40.43 (12.61)
Relationships	
Not in a long-term relationship	336 (20.8)
In a long-term relationship	1282 (79.2)
Professions	
Physician	561 (34.7)
Resident	124 (7.7)
Nurse	588 (36.3)
Other	345 (21.3)
Field of work	
Therapeutic specialist	192 (11.9)
Surgical specialist	129 (8.0)
Paediatric specialist	49 (3.0)
Family medicine doctor	101 (6.2)
Odontologist	90 (5.6)
Resident doctor	124 (7.7)
Nurse	588 (36.3)
Other licensed medical workers	267 (16.5)
Other medical workers (unlicensed nurse assistants included)	78 (4.8)
Type of work	
Outpatient	904 (55.9)
Inpatient	751 (46.4)
Rehabilitation	118 (7.3)
Nursing	185 (11.4)
Emergency department	336 (20.8)
Intensive care unit	138 (8.5)
Level of medical service provision	
Primary	706 (43.6)
Secondary	715 (44.2)
Tertiary	617 (38.1)
Primary workplace location	
One of the five biggest cities	1200 (74.2)
Another smaller city	335 (20.7)
Township/rural area	83 (20.7)
Workload (Full-Time equivalent)	
<1 FTE	706 (43.6)
1 FTE	160 (9.9)
>1 FTE	752 (46.5)
Average work experience after finished training (years) *M* (*SD*)	16.15 (13.15)

4.2.2. Sociodemographic and occupational characteristics

We collected general demographic statistics, including gender, age, relationship status, profession, type of work, level of medical service provision, city size, workplace location, workload, and work experience after completing training. A combined list of factors affecting mental health was extracted from a high-volume meta-analysis and proven to be statistically significant as factors affecting burnout or depression (13,14,14,17,60–62). They include poor working conditions, high workload, working with patients, lack of professional development, limited career perspectives, managers, mobbing, and exhaustion. We asked participants about the work-related stressors and positive factors that affect them daily in their work. The participants could determine whether one factor or another affected them.

4.2.3. Mental health evaluation

4.2.3.1 Psychological distress

The Depression, Anxiety, and Stress Scale-21 (DASS-21) questionnaire was used to evaluate depression, anxiety, and stress (63). The DASS-21 is a widely used self-report measure which includes three subscales, measuring emotional states of depression, anxiety and stress levels. Each subscale consists of seven items measured on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me most of the time). Each subscale allocates a score, which is a sum of responses to each subscale question. The severity of each component was graded by its score: depression (normal/mild <7; moderate 7–10; severe >11), anxiety (normal/mild <6; moderate 6–7; severe >8), stress (normal/mild <10; moderate 10–12; severe >13). In the present study, Cronbach's alpha for each subscale in the current study was excellent: 0.89 (depression), 0.82 (anxiety) and 0.86 (stress). Previous studies supported the validity of the Lithuanian version of the DASS-21 scale (33,64).

4.2.3.2 Suicide risk

The Suicidal Behaviors Questionnaire-Revised (SBQ-R) was used to evaluate suicidality in the sample (65). The American Psychological Association describes suicidality as the risk of suicide, usually indicated by suicidal ideation or intent (49). The SBQ-R comprises four items, each covering a different dimension of suicidality: the first item – lifetime suicidal ideation and attempts; the second – frequency of suicidal ideation over the preceding

12 months; the third – the threat of suicide attempts; and lastly, the fourth – self-reported probability of suicidal behaviour in the future. The four SBQ-R items are each rated on a Likert-type scale. The total score of the SBQ-R is the sum of responses to all four items and ranges between 3 and 18, with a higher score indicating a higher suicidality and a larger suicide risk. A sum of points with a cut-off of ≥7 indicates high suicide risk for the general population studies. The Cronbach's alpha for this scale was 0.8. The four SBQ-R items enable the collection of a wide range of information. The cut-off score of the SBQ-R may be used for screening for the suicide risk in the sample, and individual items tap into various aspects of suicidality, e.g., Item 1: lifetime suicide ideation and/or suicide attempts.

4.2.3.3 Resilience to the stress

The Resilience Scale 11 (RS-11) (66) was used to measure psychological resilience. The RS-11 is a unidimensional measure containing 11 items. Each RS-11 item was rated on a 7-point Likert scale ranging from 1 (“do not agree”) to 7 (“agree”). The total RS-11 score ranges from 11 to 77, with a higher score indicating a higher level of resilience. The Cronbach's alpha for the RS-11 scale was 0.85.

4.2.3.4 Career change ideation

One question asks whether the person has considered changing their occupation to a non-medical job in the past 12 months. Responders had two possible answers: yes or no.

4.2.4. Data analysis

Logistic binary regression was performed to assess the multivariate analysis of career change ideation predictors and suicidal risk. Univariate analysis using the chi-square and Student's t-test was used to investigate whether factors are significantly associated with career change ideation.

A one-way ANOVA test was used to evaluate the association between resilience and psychological distress. Chi-square and Student's t-tests were used for univariate analysis to identify statistically significant risk factors for suicidal ideation. Multivariate binary logistic regression was used to assess risk factors for high suicide risk. A dependent variable was a binary variable of high suicide risk (SBQ-R score ≥7). Normal values were used as a reference for assessing the role of depression and anxiety in the analysis.

Results were statistically significant when $p < 0.05$.

5. RESULTS

Paper I – Evaluation of cause-specific mortality among Lithuanian healthcare workers

Between 1 March 2011 and 31 December 2019, 90.5 thousand deaths occurred in the entire population aged 40–69 years, while 27.4 thousand deaths were reported among employed individuals.

A detailed flowchart represents the total number of individuals, deaths and person-years of exposure in the final study (Figure 1). 1006 deaths were registered among healthcare employees (291 deaths among physicians, 414 deaths among nurses and assistant nurses, and 301 deaths among other healthcare employees). The four most common causes of death among healthcare employees were cancer deaths (470 cases, 47%), cardiovascular deaths (236 cases, 23%), other causes of death (109 cases, 11%), and external causes of death (99 cases, 9.8%). 111 thousand deaths occurred among individuals with higher education; 6315 of them were employed. 416 deaths were registered among the healthcare employees with higher education.

The first analysis (Paper I, Table 1) compares all-cause and cause-specific mortality rates among three groups of healthcare employees with those of individuals employed in all other sectors, which serves as the reference category. Male and female MRRs for all-cause mortality reported in Paper I, Table 1 showed no statistically significant differences between any of the three groups and those employed in other sectors. Yet cause-specific results revealed some peculiarities. Female nurses show significantly lower mortality due to malignant neoplasms than all other employees (reference category). In contrast, the corresponding male nurse and nurse assistant groups do not have such an advantage. Male physicians display more than 50% lower smoking-related mortality than in the reference category, whereas the remaining two male healthcare employee groups and all corresponding female groups do not show such a pattern (Paper I, Table 1). Simultaneously, female physicians were the only group among healthcare employees to exhibit significantly lower mortality rates from cardiovascular system diseases compared to the reference category. Male nurses and nurse assistants showed the highest excess mortality (5–6 times) for diseases related to the digestive system and liver. Albeit less pronounced, this disadvantage was also statistically significant for other healthcare employees. Among females, the only group of healthcare employees that exhibited moderate excess mortality from digestive system diseases was nurses and nurse assistants (Paper I, Table 1). Other male healthcare employees also had a threefold mortality excess for alcohol-related causes of death. Finally, nurse and nurse assistant males maintained threefold excess mortality due to all other causes of death. The remaining differences were not statistically significant.

The second analysis was restricted to the employed individuals with high education only and presents a comparison between highly educated individuals employed in health care and highly educated individuals employed in all other sectors (reference group). First, the results on all causes of death combined suggested a significant excess mortality among highly educated health care workers for males and not for females (Paper I, Table 2). Second, cause-specific findings were somewhat unexpected and differed by sex, with highly educated male healthcare workers showing 1.3-1.4 times higher mortality for malignant neoplasms and cardiovascular diseases (CVD). At the same time, highly educated female health workers had lower mortality for neoplasms and higher mortality for all other (remaining) group causes of death (Paper I, Table 2).

Paper II – Evaluation of all-cause and death by suicide mortality among Lithuanian healthcare workers

Between 1 March 2011 and 31 December 2019, the study population experienced a total of 32,900 deaths, with 2,902 of those identified as deaths by suicide. Three hundred eighty-three deaths, including 16 deaths by suicide, occurred among healthcare employees. The total deaths among three categories of healthcare employees are as follows: 87 deaths and eight suicides for physicians, 168 deaths and three suicides for nurses and assistant nurses, and 128 deaths and five suicides for other healthcare employees.

The results presented in Paper II, Table 1 (Model 1) indicate that physicians, nurses, and assistant nurses show the same all-cause mortality risk as other employees working in all other sectors. We observed the same pattern when comparing the three categories of healthcare employees. Meanwhile, suicide mortality shows a notably lower risk among the nurses and assistant nurses. After additional control for education (Model 2), physicians become the group with the highest all-cause mortality risk, even if compared to all other employees (Paper II, Table 1, Model 2). Controlling for education almost does not change findings for suicide risk, except that rate ratios slightly decrease for nurses and assistant nurses (RR=0.29, 95% CI 0.09-0.91). At the same time, controlling for education leads to an increasing tendency in suicide risk among physicians (RR=1.62, 95% CI 0.81-3.28).

Paper III – Evaluation of career change ideation and its predictors among Lithuanian healthcare workers

Work-related stressors

The prevalence of work-related stressors is presented in Paper III, Table 2. On average, participants faced 3.21 stressors (SD = 1.65). Only 35 participants (2.2%) reported that they had not experienced any of the stressors listed.

Mental health indicators

Paper III, Table 3 presents detailed scores of DASS-21 subscales evaluating levels of depression, anxiety, and stress. We found that almost 23% of respondents had severe and extremely severe depression symptoms, 27.4% had severe and extremely severe anxiety, and 21.4% had severe and extremely severe stress levels.

Predictors of career change ideation

About two-thirds (N = 1081, 66.8%) of the sample considered changing careers in the past 12 months. A chi-square test for independence indicated a significant association between career change ideation and all tested work-related stressors (Paper III, Table 3). An independent-samples t-test was conducted to compare the DASS-21 scores for respondents with career change ideation and without. A significant difference was found in depression, anxiety, and stress scores for respondents with and without ideation.

Hierarchical binary logistic regression was performed to assess the role of factors on the likelihood that respondents would report that they had thought about changing careers in the last 12 months. The first model contained three independent variables (age, sex and work experience). The complete model was statistically significant, $\chi 2$ (2) = 58.07, $p < .001$, indicating that the model was able to distinguish between respondents who reported and did not report a career change ideation (Table 2). The model explained between 3.9% (Cox and Snell R square) and 5.3% (Nagelkerke R squared) of the variance in career change ideation status and correctly classified 67.9% of cases. Two significant predictors of reporting career change ideation were gender and age, with odds ratios of 1.44 and 0.95, respectively.

Eight work-related stressors that were identified as statistically significant in univariate analysis (Table 2) were added to the second model, which was statistically significant, χ^2 (10) = 296.03, $p < .001$, and significantly improved the model fit of the first model (χ^2 (8) = 237.39, $p < .001$). The model explained between 18.0% (Cox and Snell R square) and 25.0% (Nagelkerke R squared) of the variance in career change ideation status and correctly classified 74.5% of cases.

In the third model, mental health factors – depression, anxiety, and stress – were added as predictors. The entire model containing all predictors was statistically significant, χ^2 (13) = 424.99, $p < .001$, and significantly improved the model fit of the second model (χ^2 (3) = 128.96, $p < .001$). The model explained between 24.8% (Cox and Snell R square) and 34.4% (Nagelkerke R squared) of the variance in career change ideation status and correctly classified 78.4% of cases. The strongest predictor of reporting career change

ideation was depression, recording an odds ratio of 1.19. This indicated that respondents with higher levels of depression were more likely to report career change ideation than those with lower levels of depression, controlling for all other factors in the model. A detailed model is represented in Table 2.

Table 2. Predictors of Reporting Career Change Ideation (*N* = 1618).

		Odds Ratio	**95.0% C.I.* for Odds Ratio**		**p**
			Lower	**Upper**	
Step 1	Gender (male)	1.43	1.01	2.02	**.04**
	Age	.95	.93	.98	**<.001**
	Work experience	1.02	0.99	1.04	0.13
Step 2	Gender (male)	1.6	1.09	2.36	.017
	Age	.97	.95	.99	**.006**
	Work experience	1.02	.99	1.04	**.163**
	Poor working conditions	2.22	1.69	2.92	**<.001**
	Workload	1.62	1.26	2.08	**<.001**
	Direct contacts with patients	2.19	1.65	2.91	**<.001**
	Lack of personal improvement	1.09	.80	1.51	.576
	Lack of career perspectives	2.24	1.61	3.11	**<.001**
	Managers	1.29	0.98	1.71	.074
	Mobbing	2.37	1.76	3.19	**<.001**
	Exhaustion	2.27	1.74	2.94	**<.001**
Step 3	Gender (male)	1.34	.89	2.01	.162
	Age	.96	.94	.99	**.003**
	Work experience	1.02	.99	1.04	.086
	Poor working conditions	1.91	1.43	2.55	**<.001**
	Workload	1.46	1.17	1.91	**.006**
	Direct contacts with patients	1.84	1.37	2.48	**<.001**
	Lack of personal improvement	1.01	.73	1.43	.916
	Lack of career perspectives	1.95	1.37	2.75	**<.001**
	Managers	1.15	.85	1.54	.368
	Mobbing	1.67	1.22	2.29	**.001**
	Exhaustion	1.51	1.46	2.01	**.005**
	Depression	1.19	1.13	1.25	**<.001**
	Anxiety	.98	.93	1.03	.430
	Stress	1.06	1.00	1.13	**.05**

*CI – confidence interval

Paper IV – Evaluation of suicide risk factors among Lithuanian physicians and residents

The sample included 685 medical doctors and residents. The age ranged from 22 to 76 years. Most participants were female (78.7%) and in a long-term relationship (81.2%). Detailed sociodemographic statistics are shown in Paper IV, Table 1. A total of 208 (30.4%) respondents scored ≥ 7 on the SBQ-R, indicating lifetime suicide risk. Based on the SBQ-R first item, which measures suicide ideation, 282 (41.2%) of respondents reported they had suicidal thoughts in their lifetime. Furthermore, previous suicidal planning was reported by 78 (11.4%) of respondents, and 17 (2.5%) respondents reported previous suicide attempts, of whom 11 attempted suicide once, 5 twice, and 1 three times.

Work-related stressors associated with suicidal behaviour were high workload, lack of professional development, lack of career perspectives, mobbing, and exhaustion. A detailed analysis is presented in Paper IV, Table 2.

Hierarchical binary logistic regression was performed to assess the role of factors associated with high suicide risk in the sample. The first model contained three independent variables (age and gender). The complete model was statistically significant, $\chi2$ (2) = 12.93, p = .002, indicating that the model was able to distinguish between low-risk and high suicide risk participants. The model explained between 1.9% (Cox and Snell R square) and 2.6% (Nagelkerke R squared) of the variance in suicide risk and correctly classified 69.6% of cases. One significant predictor of reporting high suicide risk was age, with an odds ratio of 0.981.

In the second model, which was statistically significant, $\chi2$ (6) = 57.48, p < .001, we added three statistically significant, not adjustable factors: relationship status, having children, and career change ideation. The model improved and explained between 9.7% (Cox and Snell R square) and 13.9% (Nagelkerke R squared) of the variance in suicide risk status and correctly classified 72% of cases.

In the third model, significant work-related stressors were added to the model: poor working conditions, direct contact with patients, lack of career perspectives, mobbing, and exhaustion. The entire model containing all predictors was statistically significant, $\chi2$ (11) = 68.15, p < .001. The model explained between 11.4% (Cox and Snell R square) and 16.3% (Nagelkerke R squared) of the variance in suicidal risk and correctly classified 71.5% of cases.

The fourth and final model in Table 3 included mental health indicators – depression and anxiety – as predictors. The entire model containing all predictors was statistically significant, $\chi2$ (12) = 130.87, p < .001. The model explained between 20.8% (Cox and Snell R square) and 29.7% (Nagelkerke

R squared) of the variance in suicide risk and correctly classified 77.4% of cases. After adding mental health factors, three statistically significant predictors for high suicide risk were left, which were depression, anxiety, and not being in a long-term relationship. Detailed analysis is reported in Table 3.

Table 3. Multivariate analysis of predictors for high suicide risk in the Lithuanian physician and resident population ($N = 685$).

			95.0% C.I. for Odds Ratio		
		Odds Ratio	**Lower**	**Upper**	**P**
Step 1	Gender (male)	1.2	0.79	1.82	0.37
	Age	1.025	1.01	1.04	**0.001**
Step 2	Gender (male)	0.88	0.54	1.44	0.61
	Age	1.01	0.93	1.08	0.92
	Relationship status (no relationship)	2.71	1.63	4.48	**<0.000**
	Having children	1.33	0.83	2.13	0.24
	Work experience	0.98	0.92	1.05	0.64
	Career change ideation	3.47	2.13	5.65	**<0.000**
Step 3	Gender (male)	1.12	0.72	1.99	0.48
	Age	0.99	0.92	1.07	0.82
	Relationship status (no relationship)	2.71	1.62	4.53	**<0.000**
	Having children	0.81	0.49	1.31	0.38
	Work experience	0.99	0.93	1.07	0.9
	Career change ideation	2.63	1.57	4.42	**<0.000**
	Poor working conditions	1.11	0.73	1.7	0.63
	Direct contact with patients	1.22	0.81	1.85	0.33
	Lack of career perspectives	1.18	0.75	1.86	0.46
	Mobbing	1.66	1.04	2.63	**0.03**
	Exhaustion	1.56	0.93	2.62	0.08
Step 4	Gender (male)	0.77	0.45	1.34	0.36
	Age	0.99	0.91	1.08	0.87
	Relationship status (no relationship)	2.48	1.42	4.32	**0.001**
	Having children	0.92	0.55	1.55	0.75
	Career change ideation	1.58	0.91	2.76	0.1
	Poor working conditions	1.01	0.64	1.58	0.98
	Direct contact with patients	1.11	0.71	1.71	0.67
	Lack of career perspectives	0.93	0.57	1.53	0.78
	Mobbing	1.14	0.69	1.89	0.61
	Exhaustion	1.19	0.68	2.08	0.54
	Depression				
	Normal	1			
	Mild	1.46	0.68	3.13	0.33
	Moderate	1.77	0.91	3.49	0.09
	Severe	3.38	1.48	7.66	**0.004**
	Extremely severe	7.09	3.01	16.67	**<0.001**
	Anxiety				
	Normal	1			
	Mild	0.91	0.39	2.1	0.82
	Moderate	1.68	0.93	3.04	0.083
	Severe	2.94	1.32	6.56	**0.008**
	Extremely severe	2.19	1.01	4.73	**0.047**

Note. CI – confidence interval.

Paper V – Evaluation of psychological distress, suicidality and resilience among Lithuanian nurses

Characteristics of the sample

A total of 533 nurses participated in the study, with a mean age of 43.13 years and an age range of 20 to 69 years. Work experience ranged from 1 to 46 years, with a mean work experience of 20.17 years. In the past 12 months, 64.9% (346) of nurses have considered switching to a non-medical profession. The sample was predominantly female, comprising 97.7% of the sample. Paper V Table 1 presents the detailed descriptive characteristics of the study sample. The study identified exhaustion and high workload as the primary negative work-related stressors and patients' gratitude and colleagues' support as the primary positive factors associated with the nursing job. Paper V Table 2 represents the detailed negative and positive factors associated with work.

Resilience and mental health

The average resilience score in the sample was 58.68 (SD ± 9.89), ranging from 22 to 77. Nurses with high suicide risk had lower RS-11 scores, averaging 59.98 (±9.52) for those without suicide risk and 53.85 (±9.75) for those with high suicide risk. Spearman's non-parametric correlation showed a low positive correlation between age and RS-11 score of 0.24 ($p < 0.001$). A positive correlation was found between work experience and the RS-11 score of 0.22 ($p < 0.001$). A one-way ANOVA test was conducted to compare resilience among subsamples with different levels of anxiety and depression, as identified by the DASS-21. The analysis indicated that higher severity of depression and anxiety was significantly associated with lower levels of resilience at $p < 0.001$ (see Paper V Table 3).

Factors associated with psychological distress

In the sample, 62 (11.6%) and 34 (3.4%) nurses were identified as having severe and extremely severe levels of depression, respectively. Additionally, 72 (13.5%) nurses experienced severe anxiety, while 84 (15.8%) had extremely severe anxiety; similarly, 76 (14.3%) nurses reported severe stress and 15 (2.8%) reported extremely severe stress. Univariate analysis for severe and extremely severe depression and anxiety (see Paper V Table 4) showed that work in an outpatient setting was associated with higher levels of depression, and work in an inpatient setting was associated with higher levels of anxiety. Career change ideation, poor working conditions, lack of career perspectives, difficult relationships with managers, mobbing, and exhaustion

were associated with high levels of depression among nurses. However, satisfaction at work, professional development and support from colleagues were protective factors associated with lower depression rates (see Paper V Table 4). Factors such as career change ideation, poor working conditions, difficult managers, mobbing, exhaustion, high workload, and working with patients were linked to more frequent anxiety disorders. Meanwhile, satisfaction with your work was associated with lower anxiety levels (see Paper V Table 4).

Suicidality among the nurse population

In the sample, 113 nurses (21.2%) scored ≥7 on the SBQ-R questionnaire, indicating an increased risk for suicide. Additionally, 27 nurses (5.1%) reported having a suicide plan, and 8 nurses (1.5%) reported previous suicide attempts. Univariate analysis indicated that factors such as having no children, the desire to change jobs, poor working conditions, insufficient professional development, limited career prospects, managerial issues, exhaustion, and low job satisfaction were significantly associated with an increased risk of suicide. Paper V Table 5 presents the detailed results of the univariate analysis of the factors related to suicidality.

Predictors of suicide risk

Multivariable binary logistic regression was conducted to evaluate the role of suicide risk factors, including sociodemographic characteristics, work-related stressors, depression and anxiety, and resilience. The entire model containing all predictors was statistically significant, $\chi 2$ (12) = 116.16, $P < 0.001$. The model explained between 20.4% (Cox and Snell R^2) and 31.7% (Nagelkerke R^2) of the variance in suicidality and correctly classified 81.1% of cases. Managers were a negative work-related stressor with an OR of 0.54 ($p = 0.025$), and extremely severe depression and anxiety were significant risk factors with an OR of 3.8 and 7.6 ($p < 0.001$) for higher suicide risks, respectively. Lower resilience was an important predictor for high suicide risk OR = 0.97, $p = 0.027$). Detailed analysis is presented in Table 4.

Table 4. Multivariate analysis of risk factors associated with high suicide risk among nurses.

		95.0% CI for Odds Ratio		
Variable	**Odds ratio**	**Lower**	**Upper**	**p**
Not having kids	1.4	0.84	2.35	0.191
Career change ideation	1.3	0.69	2.48	0.413
Poor working conditions	1.26	0.72	2.22	0.415
Lack of professional development	0.74	0.38	1.45	0.384
Lack of career perspectives	0.73	0.39	1.35	0.318
Managers	0.54	0.31	0.92	**0.025**
Mobbing	0.74	0.44	1.26	0.364
Exhaustion	0.9	0.5	1.62	0.739
Satisfaction with work	1.09	0.66	1.81	0.735
Depression				
Normal*	1	-	-	-
Mild	1.02	0.4	2.58	0.963
Moderate	1.71	0.78	3.75	0.182
Severe	2.3	0.88	6.05	0.091
Extremely severe	3.79	1.26	11.36	**0.017**
Anxiety				
Normal*	1	-	-	**-**
Mild	2.79	0.88	8.78	**0.071**
Moderate	3.6	1.46	8.87	**0.005**
Severe	2.26	0.79	6.44	0.127
Extremely severe	7.61	2.77	20.85	**<0.001**
Resilience	0.97	0.94	0.99	**0.027**

* - Normal value was used as a reference in a comparison.

DISCUSSION

This study is the first thesis which evaluated Lithuanian healthcare workers' cause-specific mortality and comprehensively and widely evaluated mental health by not excluding any working groups from this investigation.

This thesis presented the most common death causes of Lithuanian HCWs and showed that male physicians were more prone to die from digestive system and liver diseases. Highly educated male healthcare workers had 1.3–1.4 times higher all-cause, cardiovascular, and malignant neoplasm mortality than highly educated workers from all other sectors. Highly educated females working in health care had lower mortality for malignant neoplasms but significantly higher mortality for all other causes of death.

An analysis of all-cause and death by suicide mortality found no significant differences in HCWs' all-cause mortality compared to other sectors. However, after controlling for education, physicians became the highest-risk group. Nurses and assistant nurses had the lowest risk, but no significant differences were found.

A mental health evaluation revealed that 1081 (66.8%) respondents considered changing careers. After evaluating DASS-21 scores, it was found that 23% of respondents had severe and extremely severe depression symptoms, 27.4% had had severe and extremely severe anxiety, and 21.4% had severe and extremely severe stress levels. 113 nurses (21.2%) scored ≥ 7 on the SBQ-R questionnaire, indicating an increased risk for suicide. The lifetime suicide risk of medical doctors and residents was found in 30.4% of the sample.

The results will be further discussed and compared to previous studies in accordance with the specific publications.

Paper I – Evaluation of cause-specific mortality among Lithuanian healthcare workers

This study contributes to filling the evidence gap on mortality differences between the healthcare workers and all other employees in Lithuania, a country in Central and Eastern Europe. The study found no significant differences in all-cause mortality, but focusing on specific causes of death reveals intriguing and unexpected patterns. One of the matters of concern for health policies should be the strikingly high excess mortality due to digestive diseases in the group of nurses and nurse assistants and excess mortality due to alcohol-related causes of death in the group of males working in the other health care sector. Importantly, physicians displayed lower mortality,

especially in the cases of smoking-related cancers (males) and cardiovascular system diseases (females). Focusing only on the employees with high education also led to the identification of peculiar cause-specific patterns and notable sex differences. For example, highly educated males employed in the healthcare sector had a pronounced excess mortality for all causes of death, malignant neoplasms, and cardiovascular system diseases. At the same time, no comparable excess mortality was observed for these causes of death in females. On the contrary, highly educated female healthcare workers had lower mortality for malignant neoplasms. However, highly educated female healthcare workers showed significant excess mortality for all other (remaining) causes of death. These cause-specific patterns should be investigated further in the future with more detailed studies.

Despite some specifics, outcomes of this study generally confirm common patterns found in other countries. For example, a study from the USA highlights the importance of education, which explains lower mortality in the group of healthcare workers (67). Differently from our study, significantly lower all-cause, malignant neoplasm, and cardiovascular mortality in the group of doctors and other graduates was reported by Aasland et al. (6) One of the most striking facts reported in our study concerns the persisting excess mortality of highly educated healthcare workers if compared to highly educated employees in all other sectors. This pattern contradicts the situation in the US, where white male physicians show higher survival rates than lawyers, all other professionals, or all men (12). A similar pattern has been reported in Denmark (7). One Norwegian study also found excess mortality among doctors, which was explained by higher suicide rates (6).

Another important finding from our study concerns lower smoking-related mortality for male physicians. A 50-year observation study from Britain showed that non-smoking doctors survived on average 10 years more than those in the smokers' group (68). In addition to this, ceasing smoking at the age of 50 halved the hazards, and ceasing at 30 almost avoided all of them. A meta-analysis by Besson et al. showed that the prevalence of smoking among physicians was 21% (69). Additionally, it was more common among male physicians and higher in Europe and Asia (69). A study on smoking prevalence among university hospital staff in Lithuania showed that 37.6% of men and 9.7% of women were smokers. The highest prevalence of tobacco smoke was found among auxiliary personnel, men and women (44.9% and 11.3%, respectively), and the lowest among doctors (36.4% and 7.6%, respectively) (70). In the general population, 41.4% of men and 11.3% of women were regular smokers (71). Our study findings, to some extent, could

be explained by lower smoking prevalence among health care workers in the past.

The results of excess mortality due to digestive system diseases are inconsistent with those observed in other countries and can be attributed to a persistent, unfavourable male mortality pattern in former USSR countries. This finding might be considered unexpected because physicians generally have lower mortality rates from digestive tract diseases, attributed to a healthier lifestyle, reduced smoking rates, and better access to healthcare (72). In a study by Aasland et al. (6), male doctors had lower death rates from digestive diseases than the general population. Researchers observed a similar pattern among US doctors (12). Meanwhile, our study not only did not identify any such advantage for physicians but also reported on the strikingly high excess digestive system disease mortality among nurses and assistant nurses (both sexes) and other healthcare workers (males only). This pattern and indications of excess mortality (albeit not statistically significant in the group of nurses and nurse assistants in males) due to alcohol-related causes of death suggest a potential link to excessive alcohol consumption. Despite notable improvements since 2008, Lithuania remained the country with one of the highest global alcohol consumption levels and persisting heavy alcohol-related losses (73). Although alcohol consumption has declined over the past decade—from 15.2 litres per capita (age 15+) to 11 litres (73)—mortality from alcohol-related causes remains among the highest in the European Union (74). Prior studies reported that alcohol-related mortality is particularly high in lower education groups (75). Therefore, a tendency of excess alcohol-related mortality among nurses and other health care employees found in our study might be connected to low-skilled occupations within these groups. In addition, increased and harmful alcohol use among healthcare employees may be associated with job-related chronic stress (8). The role of mental health factors was highlighted in a Norwegian study, showing that excess mortality among doctors was attributable to a higher risk of suicide (6).

Other countries have also observed the importance of alcohol. For example, a study from Massachusetts (11) found that medical assistants, healthcare support staff, nurses, psychiatric, and home health aides had significantly higher mortality from alcoholic liver disease. In contrast, physicians and surgeons had a very low mortality. A large systematic review and meta-analysis by Wilson et al. (76) examined problematic alcohol use among physicians. However, the studies included in the review employed varying methodologies, complicating direct comparisons. Wilson et al. (76) also noted that more recent studies suggest problematic alcohol use is more

prevalent among female and younger physicians. However, patterns of alcohol use varied across different specialities and years of training.

The explanation of the observed mortality differences by specific causes of death requires representative studies on risk factors targeting health care employees. Unfortunately, to our knowledge, such evidence in Lithuania is very scarce or unavailable. Among the few studies, one involving 238 physicians was conducted on alcohol before and during the first years of the COVID-19 pandemic. The study reported about risky or hazardous alcohol use in 31.6% of male and 5.3% of female physicians (77). In comparison, hazardous alcohol consumption was reported by 12.6% of French physicians (78) and 18.8% of Danish doctors (79), with risky alcohol consumption being strongly associated with burnout. There are only fragmentary and small-scale unrepresentative data about smoking prevalence and other CVD risk factors in Lithuania. For example, the 1999 study of the employees of the Kaunas Medical clinics (N=3090) suggests that smoking prevalence was only about 13% (70). The same study reported that the highest proportion of smokers was among the surgeons (42.7%). Sadly, there is no more recent and thorough data on smoking among health and other sector employees in Lithuania. When interpreting specific mortality patterns of healthcare employees in Lithuania, one should mention that health sectors in Central and Eastern Europe are over-represented by a larger number of employees working after retirement (beyond age 65 years) as compared to the situation in other sectors of the economy.

This study has several limitations. The 2011 census first fixed the employment and education status. However, we believe that introducing the lower limit of 40 years substantially diminishes the problem of possible changing occupation during the observational period. However, excluding young adults may result in an underestimation of the impact of specific issues, such as alcohol consumption and external causes of death, among healthcare employees. Second, Lithuania's relatively small population size did not allow for obtaining statistically robust mortality rate ratios even for the aggregated groups. It is possible that such a restriction artificially diminishes the real size of inequalities. Using a larger number and more detailed health care employment groups would provide more realistic and nuanced results about the distribution of group-specific mortality both within the health care sector and between the health care and all other employees. Third, our mortality data do not include any information about risk factors. Considering scarce information about the specifics of risk factors across employment sectors, the study provides very limited insights about potential determinants behind the observed mortality differentials.

Paper II – Evaluation of all-cause and death by suicide mortality among Lithuanian healthcare workers

This study demonstrated similar overall mortality risk for healthcare workers to that of the remaining occupational groups. The results of our study differ from other studies conducted in European countries, where overall mortality risk among physicians was consistently lower than in the general population (5–7,80). Physicians and other medical workers frequently adopt healthy behaviours early, depending on their knowledge and financial resources. Prior studies have also suggested that educational levels and healthy behaviours might explain the lower mortality rates of medical workers compared to the general population. Other studies (5–7,80) show that doctors had lower mortality rates from smoking and lifestyle-related diseases such as lung cancer, cardiovascular diseases, and metabolic diseases. Meanwhile, our study found that controlling for education led to excess all-cause mortality risk among physicians.

Results on suicide risk among medical workers in our study are consistent with those previously reported in other countries (5–7,80). Although we found an indication of increased suicide risk among physicians, the increase was not statistically significant. Other studies also reported a higher risk of suicide death among physicians. 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 for a more detailed analysis of suicide deaths among medical workers. Death by suicide can be associated with a mental state, burnout, or psychiatric disorder, among other factors. Occupational stress and burnout in medical workers may be related to an increased risk of death by suicide among physicians in comparison to the general population with higher education (81). A study conducted in Lithuania showed that burnout was highly prevalent among anaesthetists and intensive care physicians, with two-fifths experienced high burnout levels. Furthermore, the study found a strong correlation between burnout and issues related to alcohol consumption, depression, cardiovascular and digestive disorders, use of sedatives, and overeating (82). In addition, stigmatising mental health problems can be a barrier to getting appropriate help from mental health services. Lastly, it is possible that death by suicide cases can be misclassified as other accidents (83).

Our study has some limitations. One of the concerns is the small number of deaths by suicide in some occupational groups. This limitation is an

obstacle to obtaining statistically robust rate ratios and making reliable statistical inferences about the magnitude of the differentials. In addition, there is a lack of information about more specific risk factors such as mental disorders and alcohol abuse. Finally, we were unable to distinguish between full- and part-time employees.

Paper III – Evaluation of career change ideation and its predictors among Lithuanian healthcare workers

The current study evaluated mental health and career change ideation in a large sample of Lithuanian HCWs during the COVID-19 pandemic. We found that two-thirds (66.8%) of Lithuanian HCWs have considered quitting their job in the past 12 months to work in a non-medical field. A similar study which collected data in 2020 by Norkiene et al. (33) reported that 59.6% of intensive care staff in Lithuania at the peak of the COVID-19 pandemic outbreak exhibited career change ideation. Our data collection was in the later stages of the COVID-19 pandemic after two waves of COVID outbreaks at the end of 2021, beginning in 2022. At the end of our data collection, Lithuania was hit by the third and most intense of the COVID waves, with the highest number of cases (84). However, vaccines were available during this period, massive vaccination was active in Lithuania, and most HCWs had their vaccine shots (85,86).

Furthermore, it was better known how to treat coronavirus-infected patients; the whole population had a better understanding of this infection and the prevention of spreading the disease as the World Health Organisation and the local government released treatment and prevention guidelines (87,88). Still, our latter study found an even higher prevalence of career change ideation than in data in 2020 (33). On the one hand, it was an unexpected finding. However, it can also result from fatigue from the prolonged stressors associated with the pandemic and its burden on the healthcare system (89). On the other hand, we evaluated a much broader spectrum of Lithuanian HCWs and included people working in other departments.

We found that demographic characteristics and occupational factors were significant predictors of career change ideation. In our study, as in similar studies, younger age and less professional experience were risk factors for burnout (16,33,34,60). Furthermore, we identified that work conditions, workload, working with patients, lack of career perspectives, managers, and mobbing were significant work-related stressors associated with career change ideation. Work-related stressos are commonly known and proven causes of burnout and are highly related to career change ideation

(13,16,60,61,90). Multiple studies across different medical specialities have confirmed these factors, yet they appear typical for all healthcare workers. Our research found no statistically significant differences in career change ideations among healthcare professionals.

Another important finding of our study was that psychological distress was associated with career change ideation. Healthcare staff who reported career change ideation had higher levels of depression, anxiety and stress. Occupational stress results in burnout in many medical specialities (91,92). However, our study did not observe any statistical differences in mental health indicators predicting career change ideation after evaluating different specialities among healthcare professionals. Some data shows that emergency department workers are more prone to burnout (14). On the other hand, career satisfaction is related to less burnout (61,93).

Evaluations of mental health showed poor psychological conditions among Lithuanian HCWs. Only half of our evaluated population had no or only mild symptoms of distress and anxiety subscales. Previous studies showed that psychological distress was associated with increased physical symptoms such as headaches, throat pain, anxiety, lethargy (94) and insomnia (94) in HCW samples. Furthermore, high distress was highly correlated with burnout syndrome (95)—moreover, higher distress scores were linked with increased ideation for a career change. Our findings in anxiety prevalence are also comparable to worldwide data, which ranges from 22.6% to 36.3% (39). However, anxiety can often be undetected and untreated (96). Anxiety usually starts in medical school, where more than one-third of students globally suffer from it (97). Still, a detailed evaluation of the most affected population is required.

Logistic regression revealed that depression was the strongest predictor explaining ideation for a career change. These findings are in line with previous studies. A study from Poland compared two burnout scales and concluded that depression explains dimensions of exhaustion and a sense of disillusion (98). A recent meta-analysis revealed that almost one-quarter of all HCWs and 43% of frontline workers in the COVID-19 pandemic suffered from depression (99). Even though the pandemic is under control, the new variants of COVID-19 pose a significant threat to all HCWs (100).

It is essential to look at the results of our study in the context of its limitations. First of all, it was a cross-sectional study. Situations change, and different stressors occur in everyday life. Therefore, longitudinal studies are needed to explore future mental health changes and career change ideation. Secondly, we were limited in how many questions could be asked in the survey. Thus, future studies may focus on career change ideation using a more

elaborate measure. A short survey is essential to keep responders interested and engaged with surveys that are not overwhelmingly long and let investigators evaluate a representative part of the population. Thirdly, we tried to include as many HCWs as possible. However, our sample was predominantly female. The self-referral to the study of more active or prone-to-participate responders could cause biased investigation results. In addition, the COVID-19 pandemic could have significantly impacted our study findings, mainly because we do not have robust pre-pandemic data on mental health and career change ideation in Lithuanian HCWs. Despite the study's limitations, it remains the most extensive research on work-related and mental health stressors among healthcare workers in Lithuania.

Paper IV – Evaluation of suicide risk factors among Lithuanian physicians and residents

We present the first study of Lithuanian medical doctors' and residents' suicidality in the late COVID-19 pandemic period. We found out that almost one-third of respondents had lifetime suicide ideation and behaviours at the high suicide risk level, and the most significant factors associated with the high suicide risk in our study were depression, various work-related stressors, and having no long-term relationship.

First, we identified that 30.4% of medical doctors and residents had suicide risk. Study findings are comparable to other studies that explored suicide risk in medical students and medical doctors; however, we found higher levels of suicidality in comparison to other studies. A study from India analysing medical students found even higher results: 37.2% of respondents had suicidal ideation, 10.9% planned suicide, and 3.3% mentioned attempting suicide (101). Among German veterinary students, suicidal ideation reached 19.9% (102). Suicidal ideation among physicians in two-volume meta-analyses reaches 17–17.4% (4,103), while suicidal attempts reach 1.8% in a lifetime (103). These results are comparable to ours, and they are much higher than the general prevalence of suicidal ideation among the general population, which ranges through different investigations from 4.6% to 10.72% (104–106). A high-volume meta-analysis pooled the prevalence of suicidal ideation for the general population at 12.1% (107). A systematic review by García-Iglesias showed that during the COVID-19 pandemic, healthcare professionals reported increased suicidal ideation ranging from 2.4% to 21.7%, and 0.5% to 3.5% reported recent suicide attempts (108).

Secondly, we identified that relationship status, career change, ideation, mobbing, and exhaustion were associated with suicidality in our sample.

Social isolation has strong links with suicide (109). Additionally, the interpersonal theory of suicide suggests that thwarted belongingness, perceived burdensomeness (110) and loneliness (107) are associated with suicidal ideation. Career change ideation is a factor associated with burnout (33). Burnout is prevalent among physicians (20,26,33). If not addressed, burnout can be one of the factors increasing the risk of suicide (20). Mobbing is a common risk factor in the workplace, despite being a strict taboo in any organisation. A study from Turkey evaluating mobbing experience by nurses found that 10% of participants were considering suicide (111). Previous studies also established exhaustion as a risk factor for suicidal risk (107).

In our study, depression and anxiety were among the factors that had the largest prediction values for high suicide risk in the regression analysis in our sample. A meta-analysis published by Ribeiro et al. (112) found that depression and hopelessness were associated with a 1.96 increased risk for suicide ideation, 1.63 for suicide attempts, and 1.33 for death from suicide. However, the authors of this study admitted that some methodological constraints limited the expected effect of depression on suicidal behaviour. The Diagnostic and Statistical Manual of Mental Disorders, 5th edition, states that one of the main features of major depression is thoughts about death and suicide (113). Furthermore, underlying anxiety can additionally increase suicide risk (114,115). A review by Bertolote et all. concluded that 98% of deaths by suicide had links with mental disorders and 30.2% with mood disorders (116). Depression is associated heavily with physicians' and residents' lives. Research indicates that depression symptoms escalate by 13.5% after medical school (117). Residents have a high prevalence of depression, which varies from 23.2 to 28% (21,39,99) and even 43% for frontline workers (99).

Regarding the limitations of this study, it is essential to note that study participants were self-referred and not randomly selected. This can lead to selection bias, meaning that the results may reflect only the more active segment of the medical doctor population in Lithuania, or that individuals with higher mental health issues might have been more likely to complete the survey. Another limitation is that it is not a longitudinal study, so it is challenging to determine how suicide risk changes over time. The study design did not allow us to evaluate the effects of the COVID-19 pandemic on the study findings. Our data collection was conducted in December 2021 and January 2022. At that time, Lithuania had already dealt with two COVID-19 waves and successfully dealt with them (84). In addition, vaccination was at its highest pace (85) and it was much more known how to deal with this disease. The World Health Organisation prepared and extended guidelines

(87), and personal protective equipment was available and accessible. The study data were collected when most medical doctors were vaccinated for COVID-19 in Lithuania. Lastly, the COVID-19 pandemic did not end, and the disease is a huge part of everyday doctors' lives (100).

Paper V – Evaluation of psychological distress, suicidality and resilience among Lithuanian nurses

This study is the first attempt to evaluate the mental health of Lithuanian nurses in a national survey. We found out that 18% of nurses reported severe and extremely severe levels of depression symptoms, 29.3% anxiety, and 17.1% stress. Around one-fifth of the sample (21.2%) had a high lifetime suicide risk, and 1.5% reported a previous suicide attempt.

A meta-analysis by Huang et al. (45) showed that among nurses in the intensive care unit, depression prevalence was almost 25%. Another meta-analysis (118) showed that 22% of nurses had depression. Our study was conducted during the COVID-19 pandemic, which may have impacted the sample's mental health. At the time of data collection in Lithuania, all healthcare employees were vaccinated against COVID-19, and more than half had booster vaccines. However, the pandemic was associated with a high workload and work-related stressors in healthcare systems. We found higher levels of depression in comparison to previous studies, with 18% of nurses having severe and highly severe depressive symptoms, and in addition to this, 29.8% had moderate depression symptoms. It is more than twice the rate of the general population, with an average prevalence of 7.2% (119), according to epidemiological studies.

Anxiety and anxiety disorders are significant for healthcare workers. In our study, 32% of nurses had moderate anxiety symptoms, and 29.3% had severe and extremely severe anxiety symptoms. The prevalence of anxiety disorders ranged from 23.2% to 37% (34,39,118) based on several published meta-analyses of healthcare staff in other studies. Prolonged mental problems can cause lower motivation, leading to poorer care for patients (120); major depression, risk of cardiac events, worsened quality of life and relationships (121), and lastly, severe anxiety can be associated with increased suicide risk (114,121).

In logistic binary regression, we found a significant relationship between low resilience and high suicide risk and poor mental health. Resilience is the ability to adapt to stress and adverse situations (122). Yu et al. showed that stress, burnout, post-traumatic stress disorder and bullying were associated with poorer resilience (123). A high-volume meta-analysis from Cochrane has

shown that resilience training may have a positive impact on healthcare workers. However, the evidence for resilience training is uncertain (3). Therefore, promoting mental health in nurses should focus on several directions: addressing work conditions, reducing work-related stressors, and providing resilience training.

Using the SBQ-R questionnaire, we identified that 21.2% of our study participants had a high suicide risk. Suicidal ideation differs from country to country and the specific populations, and it ranges among nurses from 5.2% to 62% (38,124–126). High variability of suicide risk prevalence is associated with the methodology used in these studies. However, our study indicates a concerning prevalence of suicide risk among nursing staff in Lithuania. The binary logistic regression identified that depression and anxiety were significant risk factors, increasing suicide risk up to 3.8 and 7.6 times. The findings are in line with previous studies, which revealed that depression and hopelessness can increase the death risk by suicide up to 1.9 to 2.2 times (112,115). In addition, anxiety is also a proven risk factor, contributing to increased suicide risk in previous studies (114,115).

Coping with the COVID-19 pandemic puts additional strain on all healthcare workers' psychological well-being and increases the burden of existing mental health problems (127). In the early stages of the COVID-19 outbreak in Wuhan, frontline workers, especially female nurses, suffered the most due to depression, anxiety, insomnia and distress (128). Additionally, Cai et al. (129) indicated that nurses experienced higher anxiety and nervousness relative to other healthcare professionals. Lastly, some reviews hypothesised that the COVID-19 pandemic can be an independent risk factor for worsened mental health (130). However, we need not forget that the COVID-19 pandemic may not be the last; as shown in the 2015 MERS outbreak (131), frontline workers had the highest risk for post-traumatic stress disorder symptoms during the pandemic. Such outbreaks and pandemics will be a huge burden for all medical staff in the future, especially those who are closely involved with patients, particularly nurses.

Our study had some limitations. First, this was a cross-sectional study, and we did not use a longitudinal design; therefore, future longitudinal studies could provide more information on the role of various risk factors in mental health changes among Lithuanian nurses. Second, while we aimed to conduct a large-scale national study of healthcare workers' mental health, the recruitment of the study participants was not random and included self-referred participants willing to respond to our survey. Lastly, COVID-19 might have had an impact on the study findings. At the time of data collection, the COVID-19 pandemic was ongoing, and patients and healthcare workers

were still exposed to its dangers. However, the data collection coincided with the third wave of the COVID-19 pandemic. There were enough protection measures in hospitals, the Lithuanian Ministry of Health had issued sufficient information and guidelines on how to deal with patients, and there was experience in how to deal with patients because the country had already been living with the COVID-19 pandemic for more than one and a half years. In addition, all health workers (including nurses) were vaccinated on a priority basis and had already received two or more vaccines (85). Due to these factors and the lack of sufficient baseline data, we are unable to determine the extent of the COVID pandemic's impact on our nursing staff. Lastly, COVID-19 has not disappeared; revaccination is ongoing every year, and the virus has become a part of life in societies (100). The mental health of the medical community has always been a major concern. Since nurses and other medical practitioners play a vital role in society, it is essential to conduct periodic investigations and evaluations of this community to understand their challenges.

CONCLUSIONS

1. This study provides the first systematic evidence about differences in cause-specific mortality between the three groups of healthcare workers and employees in other sectors. Striking excess mortality due to digestive system diseases and alcohol-related causes of death among nurses and other health care employees is a particular matter of concern and should be addressed by appropriate prevention policies.
2. A Lithuanian study reveals that healthcare workers face similar mortality risks to other occupational groups, but physicians face a significant excess of all-cause mortality. Additionally, suicide risk among physicians and other healthcare employees shows almost the same high risk as those employed in other sectors.
3. We found that 66.8% of Lithuanian HCWs had an ideation to change careers outside medicine in the last 12 months. Age, work experience, poor working conditions, workload, working with patients, lack of career perspectives, mobbing, exhaustion, depression, anxiety, and stress were significant risk factors for career change ideation. The strongest career change predictors were poor working conditions, direct contact with patients, lack of career perspective, mobbing, and exhaustion.
4. This is the first empirical study to report suicidality in a large sample of Lithuanian medical doctors and residents using the SBQ-R. We found that 30.4% of respondents had a lifetime suicide risk. Moreover, 11.4% of respondents had suicidal planning ideation in their lifetime, and 2.5% reported previous suicide attempts. Multivariate binary regression showed that having no long-term relationships and higher depression and anxiety were significant suicide risk factors in medical doctors and residents.
5. We found that 20.95 % of Lithuanian nurses had severe or extremely severe symptoms of depression, and 20.21 % severe and extremely severe anxiety problems. In addition to this, 21.2% had increased suicide risk. Multivariate analysis presented that managers, severe depression, severe anxiety, and poor resilience were associated with increased suicide risk.

FUTURE PERSPECTIVES/PRACTICAL RECOMMENDATIONS

The study reported the results of a large sample of Lithuanian HCWs. Additionally, although some factors do not significantly correlate with career change ideation, they still affect more than two-thirds of the population. This is why it is important to address the mental health of HCWs because, with clearly identified problems, it becomes much easier to address them. Planned and consistent psychosocial interventions are necessary to manage occupational stress and promote mental health among medical staff. The findings from this study can help to develop and justify the national mental health services which could help healthcare workers independently from their workplace.

More targeted efforts are needed to produce comprehensive survey-based evidence on CVD and cancer risk factors explaining cause- and sex-specific patterns of mortality differences between the groups of healthcare and other sector employees in Lithuania. These findings contribute to a better understanding of medical workers' overall mortality and suicide risk and provide valuable information for well-being and preventive programs.

The results of the study can help develop national prevention strategies by identifying populations that may be at high risk of developing mental health symptoms and conditions and supporting experts in implementing specific interventions to address mental health problems and prevent suicide.

Our investigation into this population revealed that nurses require improved mental health care to reduce depression and anxiety and prevent suicides. Secondly, our multivariate analysis revealed that enhancing healthcare management could lead to improved mental health among nurses. While significant structural changes in healthcare services and institutions are challenging and time-consuming, our study reveals that resilience training can enhance stress management skills, potentially reduce psychological distress, improve mental health, and possibly reduce suicidality. Each institution can easily implement resilience training locally, without the need for national legislators. Finally, for mental health promotion among nurses, it is essential to target and reduce exhaustion, increase job satisfaction, improve working conditions, reduce workload, and, most importantly, eliminate mobbing. All these concerns are directly related to the place where healthcare workers' jobs are, so each institution should make an effort to lower work-related stressors.

It is essential to address these problems in the national healthcare system to prevent the medical community and society from losing its valuable members and patients from losing essential caretakers.

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SUMMARY IN LITHUANIAN

Ši daktaro disertacija parengta mokslinių straipsnių, kurie tolesniame tekste žymimi romėniškais skaitmenimis, rinkinio pagrindu:

I. Kavaliauskas, P., Jasilionis, D., Dulskas, A., Kazlauskas, E., & Smailyte, G. (2025). Differences in cause-specific mortality between healthcare workers and all other employees in Lithuania, 2011-2019. *BMC health services research*, *25*(1), 914. https://doi.org/10.1186/s12913-025-13006-y

II. Kavaliauskas, P., Jasilionis, D., Kazlauskas, E., & Smailyte, G. (2025). Differences in all-cause and death by suicide mortality between health care and other employees in Lithuania: a census-linked mortality follow-up study, 2011-19. *European journal of public health*. 2025 Jul 21: ckaf123. Advance online publication. https://doi.org/10.1093/eurpub/ckaf123

III. Kavaliauskas, P., Nomeikaite, A., Gelezelyte, O., Kazlauskas, E., & Smailyte, G. (2024). Work-related stressors and psychological distress predict career change ideation among Lithuanian healthcare workers. *International journal of occupational medicine and environmental health*, *37*(3), 287–299. https://doi.org/10.13075/ijomeh.1896.02350

IV. Kavaliauskas, P., Kazlauskas, E., & Smailyte, G. (2024). Suicide risk factors among Lithuanian medical doctors and residents. *Archives of public health = Archives belges de sante publique*, *82*(1), 243. https://doi.org/10.1186/s13690-024-01478-z

V. Kavaliauskas, P., Kazlauskas, E., & Smailyte, G. (2024). Psychological distress, suicidality and resilience of Lithuanian nurses. *BMC nursing*, *23*(1), 922. https://doi.org/10.1186/s12912-024-02632-2

1. ĮVADAS

1.1. Tyrimo problema ir jos aktualumas

Nepaisant pagerėjusios situacijos nuo 2000-ųjų vidurio, Lietuva, pagal oficialius Europos Komisijos statistikos puslapio „Eurostat“ duomenis, išlieka šalis, turinti didžiausią mirtingumo dėl savižudybių rodiklį (1). Ankstesni tyrimai parodė, kad pertekliniai savižudybių rodikliai nacionaliniu lygmeniu yra susiję su reikšminga socialine ir ekonomine nelygybe bei didesne savižudybių koncentracija rizikos grupėse – tarp bedarbių ir ekonomiškai neaktyvių vyrų, taip pat tarp gyvenančių mažesniuose miestuose ar kaimo vietovėse (2). Nors savižudybių problema Lietuvai tebėra itin svarbi visuomenės sveikatos požiūriu, vis dar trūksta detalesnių duomenų apie tam tikras rizikos grupes. Sveikatos priežiūros darbuotojai, tokie kaip slaugytojai ir gydytojai, susiduria su įvairiais profesiniais pavojais, tarp jų – su skirtingais darbo aplinkos stresoriais (pvz., pacientų priežiūra, laiko stoka, administraciniai reikalavimai). Jie patiria didesnę riziką susirgti psichikos ligomis (3). Kai kuriose šalyse atliktuose tyrimuose nustatyta, kad tam tikrose sveikatos priežiūros profesijose savižudybės rizika yra padidėjusi (4,5). Ši situacija išlieka ilgą laiką nepaisant to, kad mirtingumas nuo daugumos kitų mirties priežasčių tarp gydytojų Europoje tapo apskritai mažesnis nei bendroje populiacijoje (6,7). Kadangi Lietuvoje trūksta duomenų apie sveikatos priežiūros darbuotojų mirčių priežastis ir jų psichikos sveikatos būklę, buvo nuspręsta parengti šią disertaciją.

Ši disertacija parengta remiantis penkiais recenzuojamuose leidiniuose publikuotais straipsniais. Bendras jos tikslas buvo aprašyti dabartinę Lietuvos sveikatos priežiūros darbuotojų psichikos sveikatos situaciją ir išanalizuoti su atskiromis mirties priežasčių grupėmis susijusį mirtingumą, siekiant išsamiau atskleisti galimas šios populiacijos rizikas. I ir II straipsniuose buvo nagrinėtos mirčių priežastys ir mirtingumo rizika, o II straipsnyje ypatingas dėmesys skirtas sveikatos priežiūros darbuotojų savižudybių rizikai. III straipsnyje analizuotas profesinis stresas ir ketinimas keisti karjerą. IV ir V straipsniai skirti dviejų svarbiausių medicinos bendruomenės grupių – slaugytojų ir gydytojų – psichikos sveikatai.

1.2. Tyrimo tikslas

Išsamus Lietuvos sveikatos priežiūros darbuotojų psichikos sveikatos ir perdegimo įvertinimas bei jų mirtingumo pagal priežastis analizė.

1.3. Tyrimo uždaviniai

1. Įvertinti Lietuvos sveikatos priežiūros darbuotojų mirtingumą pagal mirties priežastis (I straipsnis).
2. Įvertinti bendrąjį mirtingumą ir mirtis dėl savižudybių tarp Lietuvos sveikatos priežiūros darbuotojų (II straipsnis).
3. Įvertinti ketinimus keisti karjerą ir jų prognozinius veiksnius tarp Lietuvos sveikatos priežiūros darbuotojų (III straipsnis).
4. Įvertinti savižudybės rizikos veiksnius tarp Lietuvos gydytojų ir rezidentų (IV straipsnis).
5. Įvertinti psichologinę būklę, suicidiškumą ir atsparumą stresui tarp Lietuvos slaugytojų (V straipsnis).

2. METODIKA

Visa disertacija sudaryta iš dviejų pagrindinių dalių: retrospektyvaus kohortinio mirtingumo rizikos tyrimo ir skerspjūvio tyrimo. Abu tyrimai apėmė skirtingas populiacijas, metodikas ir statistinius instrumentus, todėl abiejų tyrimų metodikos aprašomos atskirai.

Tyrimas buvo atliktas laikantis Helsinkio deklaracijos nuostatų. Tyrimo protokolą patvirtino Vilniaus regiono biomedicininių tyrimų etikos komitetas (Nr. 158200-17-913-423).

2.1. Retrospektyvinis kohortinis mirtingumo rizikos tyrimas

2.1.1. Tyrimo dizainas ir duomenų šaltiniai

Mirtingumo rizikos vertinimas buvo atliktas remiantis agreguotais visos Lietuvos populiacijos duomenimis 2011-2017 m. laikotarpiu. Informacija apie mirties priežastis buvo gauta jungiant mirčių ir 2011 m. surašymo įrašus.

Duomenis, vadovaujantis Lietuvos Respublikos statistikos įstatymo 13 straipsnio 4 dalimi, taip pat Europos Parlamento ir Tarybos 2009 m. kovo 11 d. reglamentu (EB) Nr. 223/2009 dėl Europos statistikos ir panaikinant Reglamentą (EB, Euratomas) Nr. 1101/2008 dėl statistikos konfidencialumą užtikrinančių duomenų perdavimo Europos Bendrijų statistikos tarnybai, Tarybos reglamentą (EB) Nr. 322/97 dėl Bendrijos statistikos ir Tarybos sprendimą 89/382/EEB, Euratom, įsteigiantį Europos Bendrijų statistikos programų komitetą, su pakeitimais pagal Europos Parlamento ir Tarybos 2015 m. balandžio 29 d. reglamentą (ES) 2015/759, bei Komisijos 2013 m. birželio 17 d. reglamentą (ES) Nr. 557/2013, įgyvendinantį Reglamento (EB) Nr.

223/2009 nuostatas dėl prieigos prie konfidencialių duomenų moksliniais tikslais ir panaikinantį Komisijos reglamentą (EB) Nr. 831/2002, pateikė Lietuvos statistikos departamentas.

2.1.2. Tyrimo dizainas ir duomenų šaltiniai

Analizei naudotas apibendrintas duomenų rinkinys apima su mirties priežastimis susijusius atvejus ir gyventojų ekspozicijas pagal visas galimas šių kintamųjų kombinacijas: amžių, lytį, išsilavinimą ir profesiją. Galutinį duomenų rinkinį sudarė 1 082 805 asmenys; iš jų 34 427 2011 m. gyventojų surašymo metu dirbo sveikatos priežiūros sektoriuje. 1 paveiksle pateikiama į galutinę analizę įtrauktų asmenų atrankos schema.

2.1.3. Įtraukimo ir neįtraukimo kriterijai bei duomenų kokybė

Tyrimo populiacija buvo apribota 40–69 metų amžiaus asmenimis. Apatinė amžiaus riba – 40 metų – pasirinkta todėl, kad profesijos informacija yra fiksuota pagal 2011 m. gyventojų surašymo duomenis. Taigi 40 metų amžiaus asmenims 2019 m. informacija apie jų profesiją gaunama iš 2011 m. surašymo, atlikto prieš 8 metus, t. y. kai šie asmenys buvo maždaug 8 metais jaunesni. Mažesnės apatinės amžiaus ribos pasirinkti nebuvo tikslinga dėl didelio profesinio mobilumo jaunesniame amžiuje.

Visi gyventojų surašyme dalyvavę asmenys buvo stebimi nuo surašymo datos iki jų mirties arba emigracijos datos arba iki stebėjimo laikotarpio pabaigos. Visi duomenų sujungimai buvo atlikti Lietuvos statistikos departamente, laikantis duomenų apsaugos taisyklių. Tyrėjams duomenys buvo pateikti dažnių lentelių formatu.

Atsižvelgiant į tai, kad ne visi asmenys iš karto praneša apie išvykimą iš Lietuvos, emigracijos statistika gali nepakankamai atspindėti tikrąjį emigracijos mastą. Vis dėlto manome, kad emigracijos nepakankamas registravimas neturi reikšmingos įtakos mūsų rezultatams, nes: a) dauguma emigracijos įvyko iki 40 metų amžiaus, ir b) emigracijos registracija pagerėjo po to, kai 2010 m. buvo įvestas specialus privalomojo sveikatos draudimo mokestis, sukūręs stiprias finansines paskatas deklaruoti išvykimą iš Lietuvos.

2.1.4. Tyrimo kintamieji ir matavimo rodikliai

Galutinis su mirties priežastimis susijusių mirčių (priklausomųjų kintamųjų) ir ekspozicijų skaičius buvo gautas sudedant mirtis, emigracijos atvejus ir asmens metų skaičių kiekvienais kalendoriniais metais, atsižvelgiant į besikeičiantį visų asmenų amžių kiekvienais metais. Nepriklausomi

kategoriniai kintamieji buvo paimti iš 2011 m. gyventojų surašymo duomenų ir fiksuoti surašymo metu (2011 m. kovo 1 d.).

Mirties priežastys buvo klasifikuotos pagal Tarptautinės ligų klasifikacijos 10-ąją redakciją (TLK-10) (53). Dėl nedidelio mirčių skaičiaus tarp sveikatos priežiūros darbuotojų buvo taikomos tik kelios apibendrintos mirties priežasčių kategorijos. Profesinis kintamasis išskyrė tris dideles sveikatos priežiūros darbuotojų grupes, dirbusias surašymo metu: a) gydytojai, b) slaugytojai ir slaugytojų padėjėjai, c) kiti sveikatos priežiūros darbuotojai. Aukštasis išsilavinimas buvo nustatytas pagal 2011 m. surašymo metu pačių asmenų pateiktą informaciją, o vėliau suklasifikuotas pagal Tarptautinę standartinę švietimo klasifikaciją (ISCED) 2011 (54), taikytą Lietuvos statistikos departamento. Aukštasis išsilavinimas reiškia universitetinį arba neuniversitetinį aukštąjį mokslą (ISCED kategorijos).

2.1.5. Tyrimo baigtys

Norint įvertinti mirtingumo skirtumus tarp trijų sveikatos priežiūros darbuotojų grupių ir visų kitų dirbančiųjų, buvo taikyta daugiamatė pagal lytį suskaidyta Puasono regresija, kaip atskaitos kategoriją naudojant darbuotojus, dirbančius sektoriuose, nesusijusiuose su sveikatos priežiūra. Rezultatai, pagrįsti modeliais, kuriuose kontroliuotas amžiaus veiksnys, pateikiami kaip mirtingumo rodiklių santykis (MRR) ir jų 95 % pasikliautinius intervalus. Siekiant atsižvelgti į galimus amžiaus struktūros skirtumus tarp profesijų, visuose Puasono regresijos modeliuose buvo kontroliuotas amžius.

Pirmoji analizė apėmė visą populiaciją (MRR bedarbiams ir ekonomiškai neaktyviems asmenims nepateikiami), o antroji analizė buvo apribota tik aukštąjį išsilavinimą turinčiais asmenimis. Statistinė analizė atlikta naudojant STATA 14.2 programinę įrangą (Stata Corp., College Station, Teksasas, JAV).

2.2. Skerspjūvio tyrimas

2.2.1. Tyrimo dizainas ir duomenų rinkimas

Tyrimo duomenys buvo renkami 2021 m. gruodžio – 2022 m. sausio mėnesiais, naudojantis specialiai apklausoms skirta internetine platforma. Kvietimas dalyvauti tyrime buvo išplatintas per sveikatos priežiūros darbuotojų profesines sąjungas ir asociacijas, gydymo įstaigų vidinius tinklus bei Lietuvos sveikatos priežiūros darbuotojų socialinius tinklus. Po pirminio kvietimo buvo išsiųsti dar du priminimai, siekiant pakviesti kuo daugiau

sveikatos priežiūros darbuotojų dalyvauti apklausoje. Į tyrimą buvo kviečiami visi sveikatos priežiūros darbuotojai, kad būtų galima identifikuoti skirtingas medicinos profesijas kaip galimus rizikos veiksnius.

Iš viso 2354 asmenys atidarė internetinę apklausą, o 1653 visiškai užpildė klausimyną. Pašalinus ne medicinos personalą, galutinę imtį sudarė 1618 dalyvių, kurie buvo įtraukti į duomenų analizę. Dalyvių amžius svyravo nuo 19 iki 76 metų, o 88,4 % sudarė moterys. 1 lentelėje pateikiamos išsamios tiriamųjų profesinės ir sociodemografinės charakteristikos.

2.2.2. Sociodemografinės ir profesinės charakteristikos

Buvo surinkti bendrieji demografiniai duomenys, įskaitant lytį, amžių, santykių statusą, profesiją, darbo pobūdį, medicininių paslaugų teikimo lygį, miesto dydį, darbo krūvį ir darbo patirtį po mokymų baigimo. Sudarytas su darbo aplinkos stresorių sąrašas remiantis didelių apimčių metaanalizėmis; šie veiksniai buvo statistiškai patvirtinti kaip reikšmingi profesinio perdegimo arba depresyvumo rizikos veiksniai (14,35,36,36,55–57). Jie apima prastas darbo sąlygas, didelį darbo krūvį, darbą su pacientais, profesinio tobulėjimo stoką, ribotas karjeros perspektyvas, vadovų spaudimą, mobingą ir išsekimą. Dalyvių buvo klausiama, kokie stresoriai ar teigiami veiksniai kasdien gali turėti įtakos jų darbui. Dalyviai galėjo nurodyti, ar konkretus veiksnys jiems daro įtaką.

2.2.3. Psichinės sveikatos įvertinimas

2.2.3.1. Psichologinė būklė

Depresijai, nerimui ir stresui įvertinti buvo naudotas klausimynas „Depression, Anxiety and Stress Scale-21“ (DASS-21) (58). DASS-21 yra plačiai taikoma savęs vertinimo priemonė, apimanti tris subskalės, matuojančias depresijos, nerimo ir streso lygį. Kiekvieną subskalę sudaro septyni teiginiai, vertinami pagal 4 balų Likerto skalę nuo 0 („visiškai man netaikoma“) iki 3 („taikoma man didžiąją laiko dalį“). Kiekvienai subskalei priskiriamas balas, apskaičiuojamas sudėjus atsakymus į visus subskalės klausimus.

Kiekvieno komponento sunkumas buvo vertinamas pagal gautą balų sumą: depresija (normali / lengva <7; vidutinė 7–10; sunki >11), nerimas (normalus / lengvas <6; vidutinis 6–7; sunkus >8), stresas (normalus / lengvas <10; vidutinis 10–12; sunkus >13). Šiame tyrime Kronbacho alfa kiekvienai subskalei buvo puiki: 0,89 (depresija), 0,82 (nerimas) ir 0,86 (stresas).

Ankstesni tyrimai patvirtino lietuviškosios DASS-21 skalės versijos validumą (30,59).

2.2.3.2. Savižudybių rizika

Tiriamųjų suicidiškumui vertinti buvo taikytas „Suicidal Behaviors Questionnaire-Revised“ (SBQ-R) klausimynas (60). SBQ-R sudaro keturi klausimai, apimantys skirtingas suicidiškumo dimensijas: pirmasis klausimas – apie savižudybės mintis ir bandymus per visą gyvenimą; antrasis – apie savižudybės minčių dažnumą per pastaruosius 12 mėnesių; trečiasis – apie savižudybės bandymo grėsmę; ketvirtasis – apie paties vertinamą tikimybę ateityje atlikti suicidinius veiksmus. Visi keturi SBQ-R klausimai vertinami pagal Likerto tipo skalę.

Bendras SBQ-R balas gaunamas sudėjus atsakymus į visus keturis klausimus; jis gali svyruoti nuo 3 iki 18, o didesnis balas rodo didesnį suicidiškumą ir didesnę savižudybės riziką. Bendras balas, kurio ribinė reikšmė yra ≥7, bendrosiose populiacijos studijose laikomas didelės savižudybės rizikos rodikliu. Šios skalės Kronbacho alfa buvo 0,8. SBQ-R klausimai leidžia surinkti platų duomenų spektrą: bendras balas gali būti naudojamas atrankai pagal savižudybės riziką imtyje, o atskiri klausimai atspindi įvairius suicidiškumo aspektus, pvz., 1 klausimas – suicidinės mintys ir / arba bandymai nusižudyti per gyvenimą.

2.2.3.3. Psichologinis atsparumas

Psichologiniam atsparumui vertinti buvo taikyta „Resilience Scale 11“ (RS-11) skalė (61). RS-11 yra viendimensinis instrumentas, sudarytas iš 11 teiginių. Kiekvienas RS-11 teiginys buvo vertinamas pagal 7 balų Likerto skalę nuo 1 („nesutinku“) iki 7 („sutinku“). Bendras RS-11 balas gali svyruoti nuo 11 iki 77; kuo didesnis balas, tuo aukštesnis atsparumo lygis. Šios skalės Kronbacho alfa buvo 0,85.

2.2.3.4. Ketinimas keisti karjerą

Vienas klausimas buvo skirtas išsiaiškinti, ar asmuo per pastaruosius 12 mėnesių svarstė galimybę pakeisti savo profesiją į darbą, nesusijusį su medicina. Respondentai galėjo pasirinkti vieną iš dviejų atsakymų variantų: „taip“ arba „ne“.

2.2.4. Duomenų analizė

Siekiant įvertinti ketinimų keisti karjerą prognostinius veiksnius , buvo naudota hierarchinė logistinė regresija. Vienmatė analizė, naudojant χ^2 kriterijų ir Student t testą, buvo taikyta siekiant nustatyti, ar tam tikri veiksniai yra statistiškai reikšmingai susiję su ketinimais keisti karjerą.

Vienfaktorinė dispersinė analizė (ANOVA) buvo atlikta vertinant atsparumo ir psichologinės būklės sąsajas. χ^2 kriterijus ir Student t testas buvo taikyti vienanarėje analizėje, siekiant nustatyti statistiškai reikšmingus savižudybės rizikos veiksnius. Hierarchinė logistinė regresija buvo taikyta vertinant aukštos savižudybės rizikos veiksnius. Priklausomasis kintamasis buvo dvejetainis – didelė savižudybės rizika (SBQ-R balas ≥7). Analizėje depresijos ir nerimo reikšmėms vertinti buvo naudojamos normaliosios vertės kaip atskaitos kategorija.

Rezultatai buvo laikomi statistiškai reikšmingais, kai $p < 0{,}05$.

3. REZULTATAI

3.1. I straipsnis – Mirtingumo rizikos pagal priežastis vertinimas tarp Lietuvos sveikatos priežiūros darbuotojų

2011 m. kovo 1 d. – 2019 m. gruodžio 31 d. laikotarpiu visoje 40–69 metų amžiaus populiacijoje užregistruota 90,5 tūkst. mirčių, o tarp dirbančiųjų – 27,4 tūkst. mirčių.

Schemoje (1 pav.) pateikiamas bendras į tyrimą įtrauktų asmenų, mirčių ir asmens metų skaičius galutiniame tyrime. Tarp sveikatos priežiūros darbuotojų buvo užregistruota 1006 mirtys (291 mirtis tarp gydytojų, 414 – tarp slaugytojų ir slaugytojų padėjėjų, 301 – tarp kitų sveikatos priežiūros darbuotojų). Keturios dažniausios mirties priežasčių grupės tarp sveikatos priežiūros darbuotojų buvo šios: mirtys nuo onkologinių ligų (470 atvejų, 47 %), mirtys nuo širdies ir kraujagyslių ligų (236 atvejai, 23 %), mirtys dėl kitų priežasčių (109 atvejai, 11 %) ir išorinės mirties priežastys (99 atvejai, 9,8 %). Tarp asmenų, turinčių aukštąjį išsilavinimą, užregistruota 111 tūkst. mirčių; iš jų 6315 buvo dirbantieji. Tarp sveikatos priežiūros darbuotojų, turinčių aukštąjį išsilavinimą, buvo užregistruota 416 mirčių.

Pirmojoje analizėje (I straipsnis 1 lentelė) lyginami bendrojo ir pagal mirčių priežasčių grupes mirtingumo rodikliai tarp trijų sveikatos priežiūros darbuotojų grupių ir asmenų, dirbančių visuose kituose sektoriuose, kurie laikomi atskaitos kategorija. I straipsnio 1 lentelėje pateikti vyrų ir moterų bendrojo mirtingumo rizikos rodikliai neparodė statistiškai reikšmingų

skirtumų tarp nė vienos iš trijų grupių ir darbuotojų kituose sektoriuose. Vis dėlto pagal mirties priežastis atlikta analizė atskleidė tam tikrų ypatumų.

Moterims slaugytojoms nustatyta statistiškai reikšmingai mažesnė mirtingumo rizika dėl piktybinių navikų, palyginti su visais kitais darbuotojais (atskaitos kategorija), tuo tarpu atitinkamos vyrų slaugytojų ir slaugytojų padėjėjų grupės tokio pranašumo neturėjo. Vyrams gydytojams buvo būdinga daugiau nei 50 % mažesnė mirtingumo rizika nuo rūkymo sukeltų priežasčių nei atskaitos kategorijos darbuotojams, o likusios dvi vyrų sveikatos priežiūros darbuotojų grupės ir visos atitinkamos moterų grupės tokių rezultatų nedemonstravo (I straipsnis 1 lentelė).

Moterys gydytojos buvo vienintelė sveikatos priežiūros darbuotojų grupė, turėjusi statistiškai reikšmingai mažesnę mirtingumo nuo širdies ir kraujagyslių ligų riziką, palyginti su atskaitos kategorija. Vyrams slaugytojams ir slaugytojų padėjėjams nustatyta didžiausia mirtingumo rizika (5–6 kartus) nuo virškinimo sistemos ir kepenų ligų. Nors šis nepalankus rodiklis buvo mažiau ryškus, jis statistiškai reikšmingas nustatytas ir kitų sveikatos priežiūros darbuotojų grupėje. Tarp moterų vienintelė sveikatos priežiūros darbuotojų grupė, kuriai buvo nustatytas mirtingumo rizikos padidėjimas nuo virškinimo sistemos ligų, buvo slaugytojos ir slaugytojų padėjėjos (I straipsnis 1 lentelė).

Kiti sveikatos priežiūros darbuotojai vyrai turėjo tris kartus didesnį mirtingumą nuo su alkoholiu susijusių mirčių priežasčių, o vyrai slaugytojai ir slaugytojų padėjėjai išsiskyrė tris kartus didesne mirtingumo rizika dėl visų kitų mirties priežasčių. Kiti nustatyti skirtumai nebuvo reikšmingi.

Antroji analizė buvo apribota tik dirbančiais aukštąjį išsilavinimą turinčiais asmenimis ir pateikia palyginimą tarp aukštąjį išsilavinimą turinčių sveikatos priežiūros sektoriuje dirbančių asmenų bei aukštąjį išsilavinimą turinčių visų kitų sektorių darbuotojų (atskaitos grupė). Pirmiausia, bendri visų mirties priežasčių rezultatai parodė reikšmingai didesnę mirtingumo riziką tarp aukštąjį išsilavinimą turinčių sveikatos priežiūros sektoriaus vyrų darbuotojų, tačiau ne tarp moterų (I straipsnis 2 lentelė). Antra, pagal priežastis išskirti rezultatai skyrėsi pagal lytį: aukštąjį išsilavinimą turintys sveikatos priežiūros sektoriaus vyrams nustatyta 1,3–1,4 didesnė mirtingumo rizika nuo piktybinių navikų ir širdies bei kraujagyslių ligų (ŠKL). Tuo pat metu aukštąjį išsilavinimą turinčios sveikatos priežiūros sektoriaus moterys pasižymėjo mažesniu mirtingumu nuo piktybinių navikų ir didesniu mirtingumu nuo visų kitų (likusių) mirties priežasčių grupių (I straipsnis 2 lentelė).

3.2. II straipsnis Visų mirčių priežasčių ir savižudybių nulemtos mirtingumo rizikos tarp Lietuvos sveikatos priežiūros darbuotojų vertinimas

Tyrimo laikotarpiu nuo 2011 m. kovo 1 d. iki 2019 m. gruodžio 31 d. tiriamąją populiaciją sudarė iš viso 32 900 mirčių atvejų, iš kurių 2 902 buvo identifikuotos kaip savižudybės. Tarp sveikatos priežiūros darbuotojų užfiksuotos 383 mirtys, įskaitant 16 savižudybių atvejų. Mirčių pasiskirstymas pagal tris sveikatos priežiūros darbuotojų kategorijas buvo toks: gydytojų grupėje – 87 mirtys, iš jų aštuonios savižudybės; slaugytojų ir slaugytojo padėjėjų grupėje – 168 mirtys, iš jų trys savižudybės; kitų sveikatos priežiūros darbuotojų grupėje – 128 mirtys, iš jų penkios savižudybės.

II straipsnio 1 lentelėje pateikti rezultatai (1 modelis) rodo, kad gydytojų, slaugytojų ir slaugytojo padėjėjų visų priežasčių mirtingumo rizika yra tokia pati kaip kitų darbuotojų, kurie dirba visuose kituose sektoriuose. Nagrinėjant savižudybių riziką nustatyta, kad slaugytojų ir slaugytojo padėjėjų grupėje ši rizika reikšmingai mažesnė. Įtraukus papildomą išsilavinimo kontrolę (2 modelis), gydytojai tapo grupe, turinčia didžiausią visų priežasčių mirtingumo riziką, net ir lyginant su kitų sektorių darbuotojais (II straipsnis 1 lentelė, 2 modelis). Išsilavinimo kontrolė beveik nepakeitė savižudybių rizikos rezultatų, išskyrus tai, kad slaugytojų ir slaugytojo padėjėjų rodiklių santykiai šiek tiek sumažėjo (RR=0,29; 95 % PI 0,09–0,91). Įvertinus išsilavinimą tarp gydytojų stebėta savižudybių rizikos padidėjimo tendencija (RR=1,62; 95 % PI 0,81–3,28).

3.3. III straipsnis – Karjeros keitimo ketinimų ir juos lemiančių veiksnių vertinimas tarp Lietuvos sveikatos priežiūros darbuotojų

Darbo aplinkos stresoriai

Darbo aplinkos stresorių paplitimas pateiktas III straipsnio 1 lentelėje. Vidutiniškai dalyviai susidūrė su 3,21 stresoriumi (SN = 1,65). Tik 35 dalyviai (2,2 %) nurodė, kad nepatyrė nė vieno iš išvardytų stresorių.

Psichinės sveikatos rodikliai

III straipsnio 2 lentelėje pateikiami detalūs DASS-21 subskalių įverčiai, vertinantys depresijos, nerimo ir streso lygius. Nustatėme, kad beveik 23 % respondentų turėjo sunkių ir ypač sunkių depresijos simptomų, 27,4 % – sunkių ir ypač sunkių nerimo simptomų, o 21,4 % – sunkių ir ypač sunkių streso lygių.

Karjeros keitimo ketinimų rodikliai

Apie du trečdalius imties dalyvių (N = 1081; 66,8 %) per pastaruosius 12 mėnesių svarstė galimybę keisti karjerą. χ^2 testas parodė reikšmingą sąsają tarp karjeros keitimo ketinimų ir visų tirtų darbo aplinkos stresorių (III straipsnis 3 lentelė). Nepriklausomų imčių t testas buvo atliktas siekiant palyginti DASS-21 įverčius tarp respondentų, turinčių ir neturinčių karjeros keitimo ketinimų. Nustatyti reikšmingi depresijos, nerimo ir streso įverčių skirtumai tarp šių dviejų grupių.

Hierarchinė logistinė regresija buvo atlikta siekiant įvertinti veiksnių vaidmenį prognozuojant tikimybę, kad respondentai nurodys per pastaruosius 12 mėnesių galvoję apie karjeros keitimą. Pirmasis modelis apėmė tris nepriklausomus kintamuosius (amžių, lytį ir darbo patirtį). Išsamus modelis buvo statistiškai reikšmingas, χ^2 (2) = 58,07, $p < 0,001$, rodantis, kad gali atskirti respondentus, kurie nurodė ir kurie nenurodė karjeros keitimo ketinimų (2 lentelė). Modelis paaiškino nuo 3,9 % (Cox ir Snell R^2) iki 5,3 % (Nagelkerke R^2) karjeros keitimo ketinimų statuso dispersijos ir teisingai klasifikavo 67,9 % atvejų. Du reikšmingi karjeros keitimo ketinimų rodikliai buvo lytis ir amžius, kurių šansų santykiai atitinkamai sudarė 1,44 ir 0,95.

Aštuoni darbo aplinkos stresoriai, kurie vienmatėje analizėje buvo identifikuoti kaip statistiškai reikšmingi (III straipsnis 4 lentelė), buvo įtraukti į antrąjį modelį, kuris taip pat pasirodė statistiškai reikšmingas, χ^2 (10) = 296,03, $p < 0,001$, ir reikšmingai pagerino pirmojo modelio tinkamumą (χ^2 (8) = 237,39, $p < 0,001$). Šis modelis paaiškino nuo 18,0 % (Cox ir Snell R^2) iki 25,0 % (Nagelkerke R^2) karjeros keitimo ketinimų statuso dispersijos ir teisingai klasifikavo 74,5 % atvejų.

Trečiajame modelyje buvo įtraukti psichikos sveikatos veiksniai – depresija, nerimas ir stresas. Visas modelis, apimantis visus rodiklius, buvo statistiškai reikšmingas, χ^2 (13) = 424,99, $p < 0,001$, ir reikšmingai pagerino antrojo modelio tinkamumą (χ^2 (3) = 128,96, $p < 0,001$). Modelis paaiškino nuo 24,8 % (Cox ir Snell R^2) iki 34,4 % (Nagelkerke R^2) karjeros keitimo ketinimų statuso dispersijos ir teisingai klasifikavo 78,4 % atvejų. Stipriausias karjeros keitimo ketinimų rodikliai buvo depresija, kurios šansų santykis siekė 1,19. Tai rodo, kad respondentai, turėję aukštesnius depresijos lygius, buvo labiau linkę nurodyti ketinimus keisti karjerą, palyginti su tais, kurių depresijos lygiai buvo žemesni, kontroliuojant visus kitus modelio veiksnius. Išsamūs rezultatai pateikiami 2 lentelėje.

3.4. IV straipsnis – Savižudybės rizikos veiksnių vertinimas tarp Lietuvos gydytojų ir rezidentų

Imtį sudarė 685 gydytojai ir rezidentai. Amžius svyravo nuo 22 iki 76 metų. Dauguma dalyvių buvo moterys (78,7 %) ir asmenys esantys ilgalaikiuose santykiuose (81,2 %). Išsami tiriamosios grupės charakteristika pateikiama 9 lentelėje. Iš viso 208 (30,4 %) respondentai SBQ-R skalėje surinko ≥ 7 balus, kas rodo savižudybės riziką per gyvenimą. Remiantis pirmuoju SBQ-R klausimu, kuris matuoja ketinimus nusižudyti, 282 (41,2 %) respondentai nurodė, kad per gyvenimą turėjo minčių apie savižudybę. Be to, 78 (11,4 %) respondentai pateikė informaciją apie ankstesnius savižudybės planus, o 17 (2,5 %) – apie ankstesnius bandymus nusižudyti, iš kurių 11 bandė nusižudyti vieną kartą, 5 – du kartus, o 1 – tris kartus.

Darbo aplinkos stresoriai sietini su savižudišku elgesiu, buvo didelis darbo krūvis, profesinės raidos stoka, karjeros perspektyvų nebuvimas, mobingas ir pervargimas. Išsami analizė pateikiama 10 lentelėje.

Hierarchinė logistinė regresija buvo atlikta siekiant įvertinti veiksnių, susijusių su didele savižudybės rizika, vaidmenį imtyje. Pirmasis modelis apėmė du nepriklausomus kintamuosius (amžių ir lytį). Išsamus modelis buvo statistiškai reikšmingas, χ^2 (2) = 12,93, p = 0,002, rodantis, kad modelis gali atskirti mažos ir didelės savižudybės rizikos dalyvius. Modelis paaiškino nuo 1,9 % (Cox ir Snell R^2) iki 2,6 % (Nagelkerke R^2) savižudybės rizikos dispersijos ir teisingai klasifikavo 69,6 % atvejų. Vienas reikšmingas didelės savižudybės rizikos prognostinis veiksnys buvo amžius, kurio šansų santykis sudarė 0,981.

Antrajame modelyje, kuris taip pat buvo statistiškai reikšmingas, χ^2 (6) = 57,48, p < 0,001, buvo pridėti trys statistiškai reikšmingi, nekintami veiksniai: santykių statusas, vaikų turėjimas ir karjeros keitimo ketinimai. Modelis pagerėjo ir paaiškino nuo 9,7 % (Cox ir Snell R^2) iki 13,9 % (Nagelkerke R^2) savižudybės rizikos dispersijos ir teisingai klasifikavo 72 % atvejų.

Trečiajame modelyje buvo įtraukti reikšmingi darbo aplinkos stresoriai: prastos darbo sąlygos, tiesioginis kontaktas su pacientais, karjeros perspektyvų nebuvimas, mobingas ir pervargimas. Visas modelis, apimantis visus rodiklius, buvo statistiškai reikšmingas, χ^2 (11) = 68,15, p < 0,001. Modelis paaiškino nuo 11,4 % (Cox ir Snell R^2) iki 16,3 % (Nagelkerke R^2) savižudybės rizikos dispersijos ir teisingai klasifikavo 71,5 % atvejų.

Ketvirtasis ir galutinis modelis, kaip rodiklius įtraukė psichikos sveikatos rodiklius – depresiją ir nerimą. Visas modelis, apimantis visus rodiklius, buvo statistiškai reikšmingas, χ^2 (12) = 130,87, p < 0,001. Modelis paaiškino nuo 20,8 % (Cox ir Snell R^2) iki 29,7 % (Nagelkerke R^2) savižudybės rizikos

dispersijos ir teisingai klasifikavo 77,4 % atvejų. Įtraukus psichikos sveikatos veiksnius, liko trys statistiškai reikšmingi didelės savižudybės rizikos rodikliai: depresija, nerimas ir ilgalaikių santykių neturėjimas. Išsami analizė pateikiama 3 lentelėje.

3.5. V straipsnis – Psichologinės būklės, suicidiškumo ir atsparumo stresui vertinimas tarp Lietuvos slaugytojų

Imties charakteristikos

Iš viso tyrime dalyvavo 533 slaugytojos (-ai), kurių vidutinis amžius buvo 43,13 metų, o amžiaus ribos siekė nuo 20 iki 69 metų. Darbo patirtis svyravo nuo 1 iki 46 metų, vidutiniškai sudarydama 20,17 metų. Per pastaruosius 12 mėnesių 64,9 % (346) slaugytojų svarstė galimybę pereiti dirbti į ne medicinos sritį. Imtį daugiausia sudarė moterys, kurios sudarė 97,7 % visų dalyvių. Išsamios tiriamosios imties aprašomosios charakteristikos pateikiamos V straipsnio 1 lentelėje. Tyrimas identifikavo pervargimą ir didelį darbo krūvį kaip pagrindinius neigiamus veiksnius, o pacientų dėkingumą ir kolegų palaikymą – kaip pagrindinius teigiamus veiksnius, susijusius su slaugytojo darbu. Išsami neigiamų ir teigiamų darbo aplinkos stresorių analizė pateikiama V straipsnio 2 lentelėje.

Atsparumas stresui ir psichikos sveikata

Vidutinis atsparumo stresui balas imtyje buvo 58,68 (SN ± 9,89), svyravęs nuo 22 iki 77. Slaugytojos (-ai), turėję didelę savižudybės riziką, pasižymėjo žemesniais RS-11 balais: vidutiniškai 59,98 (±9,52) tarp neturinčių savižudybės rizikos ir 53,85 (±9,75) tarp turinčių didelę savižudybės riziką. Spearmano neparametrinė koreliacija parodė silpną teigiamą ryšį tarp amžiaus ir RS-11 balo (0,24; $p < 0,001$). Nustatyta teigiama koreliacija tarp darbo patirties ir RS-11 balo (0,22; $p < 0,001$). Vienkrypčiu ANOVA testu buvo lyginamas atsparumo lygis tarp pogrupių, turinčių skirtingą nerimo ir depresijos lygį, nustatytą pagal DASS-21. Analizė parodė, kad didesnis depresijos ir nerimo sunkumas statistiškai reikšmingai siejosi su žemesniu atsparumo lygiu ($p < 0,001$) (V straipsnis 3 lentelė).

Psichologinė būklė tyrimo imtyje

Imtyje 62 (11,6 %) ir 34 (3,4 %) slaugytojos (-ai) buvo identifikuotos (-i) kaip turinčios sunkų ir ypač sunkų depresijos lygį. Be to, 72 (13,5 %) slaugytojos (-ai) patyrė sunkų nerimą, o 84 (15,8 %) – ypač sunkų nerimą; panašiai, 76 (14,3 %) slaugytojos (-ai) nurodė sunkų stresą, o 15 (2,8 %) – ypač sunkų stresą. Vienmatė analizė, atlikta dėl sunkaus ir ypač sunkaus depresijos bei

nerimo (V straipsnis 4 lentelė), parodė, kad darbas ambulatorinėje įstaigoje buvo susijęs su aukštesniu depresijos lygiu, o darbas stacionarinėje įstaigoje – su aukštesniu nerimo lygiu. Karjeros keitimo ketinimai, prastos darbo sąlygos, karjeros perspektyvų nebuvimas, sudėtingi santykiai su vadovais, mobingas ir pervargimas buvo susiję su aukštais depresijos lygiais tarp slaugytojų. Tačiau pasitenkinimas darbu, profesinis tobulėjimas ir kolegų palaikymas buvo apsauginiai veiksniai, susiję su mažesniais depresijos rodikliais (V straipsnis 5 lentelė). Tokie veiksniai kaip karjeros keitimo ketinimai, prastos darbo sąlygos, sudėtingi vadovai, mobingas, pervargimas, didelis darbo krūvis ir darbas su pacientais buvo susiję su dažnesniais nerimo sutrikimais. Tuo tarpu pasitenkinimas darbu buvo siejamas su žemesniais nerimo lygiais (V straipsnis 5 lentelė).

Suicidiškumas tarp slaugytojų

Imtyje 113 slaugytojų (21,2 %) pagal SBQ-R klausimyną surinko ≥7 balus, kas rodo padidėjusią savižudybės riziką. Be to, 27 slaugytojos (-ai) (5,1 %) pranešė turėjusios (-ę) savižudybės planą, o 8 slaugytojos (-ai) (1,5 %) – apie ankstesnius bandymus nusižudyti. Vienmatė analizė parodė, kad tokie veiksniai kaip vaikų neturėjimas, noras keisti darbą, prastos darbo sąlygos, nepakankama profesinė raida, ribotos karjeros perspektyvos, problemos su vadovybe, pervargimas ir žemas pasitenkinimas darbu buvo statistiškai reikšmingai susiję su padidėjusia savižudybės rizika. Išsamūs vienmatės analizės rezultatai, susiję su suicidiškumu, pateikiami V straipsnio 5 lentelėje.

Savižudybės rizikos rodikliai

Daugiaveiksnė logistinė regresija buvo naudota siekiant įvertinti savižudybės rizikos veiksnių – sociodemografinių charakteristikų, darbo aplinkos stresorių, depresijos ir nerimo bei atsparumo – vaidmenį. Visas modelis, apimantis visus rodiklius, buvo statistiškai reikšmingas, χ^2 (12) = 116,16, p < 0,001. Modelis paaiškino nuo 20,4 % (Cox ir Snell R^2) iki 31,7 % (Nagelkerke R^2) suicidiškumo dispersijos ir teisingai klasifikavo 81,1 % atvejų. Vadovai pasirodė esą neigiamas darbo aplinkos stresorius, kurio ŠS sudarė 0,54 (p = 0,025), o ypač sunki depresija ir nerimas buvo reikšmingi rizikos veiksniai, atitinkamai turintys 3,8 ir 7,6 ŠS (p < 0,001) didesnei savižudybės rizikai. Žemesnis atsparumas buvo svarbus didelės savižudybės rizikos rodiklius (ŠS = 0,97; p = 0,027). Išsami analizė pateikiama 4 lentelėje.

4. REZULTATŲ APTARIMAS

Šis darbas yra pirmasis tyrimas, kuriame buvo įvertintas Lietuvos sveikatos priežiūros darbuotojų priežasčiai specifinis mirtingumas ir psichikos sveikata, neišskiriant kurios nors darbuotojų grupės.

Disertacijoje išnagrinėtos dažniausios Lietuvos sveikatos priežiūros darbuotojų mirčių priežastys ir parodyta, kad gydytojai vyrai dažniau mirdavo nuo virškinimo sistemos ir kepenų ligų. Aukštąjį išsilavinimą turintys sveikatos priežiūros darbuotojai vyrai turėjo 1,3–1,4 karto didesnį bendrą, širdies ir kraujagyslių bei piktybinių navikų mirtingumą nei tokią pat kvalifikaciją turintys kitų sektorių darbuotojai. Aukštąjį išsilavinimą turinčios moterys, dirbančios sveikatos priežiūroje, pasižymėjo mažesniu mirtingumu nuo piktybinių navikų, tačiau reikšmingai didesniu mirtingumu nuo kitų mirties priežasčių.

Atlikus visų priežasčių ir savižudybių mirtingumo analizę, reikšmingų skirtumų tarp sveikatos priežiūros darbuotojų ir kitų sektorių darbuotojų nenustatyta. Tačiau, įvertinus išsilavinimą, gydytojai tapo didžiausios rizikos grupe. Slaugytojos ir slaugytojų padėjėjos turėjo mažiausią riziką, tačiau reikšmingų skirtumų nenustatyta.

Psichikos sveikatos vertinimas parodė, kad 1081 (66,8 %) respondentas svarstė apie karjeros keitimą. Įvertinus DASS-21 įverčius, nustatyta, kad 23 % respondentų turėjo sunkių ir ypač sunkių depresijos simptomų, 27,4 % – sunkių ir ypač sunkių nerimo simptomų, o 21,4 % – sunkių ir ypač sunkių streso lygių. Pagal SBQ-R klausimyną, 113 slaugytojų (21,2 %) surinko ≥7 balų, kas rodo padidėjusią savižudybės riziką. Gyvenimo eigoje patiriama savižudybės rizika buvo nustatyta 30,4 % gydytojų ir rezidentų.

Rezultatai toliau bus aptariami ir lyginami su ankstesniais tyrimais pagal atskiras publikacijas.

4.1. I straipsnis – Mirtingumo pagal priežastis vertinimas tarp Lietuvos sveikatos priežiūros darbuotojų

Šis tyrimas prisideda prie įrodymų spragos mažinimo, analizuojant sveikatos priežiūros darbuotojų ir visų kitų darbuotojų mirtingumo skirtumus Lietuvoje, Centrinės ir Rytų Europos šalyje. Tyrimas neparodė reikšmingų visų priežasčių mirtingumo skirtumų, tačiau sutelkus dėmesį į specifines mirties priežastis atsiskleidė netikėti dėsningumai. Vienu iš sveikatos politikai svarbių aspektų turėtų būti ženkliai didesnis mirtingumas dėl virškinamojo trakto ligų tarp slaugytojų ir slaugytojų padėjėjų bei perteklinis mirtingumas dėl su alkoholiu susijusių mirties priežasčių tarp vyrų, dirbančių kitose

sveikatos priežiūros srityse. Svarbu pažymėti, kad gydytojai pasižymėjo mažesniu mirtingumu, ypač nuo su rūkymu susijusių piktybinių navikų (vyrai) ir širdies bei kraujagyslių ligų (moterys).

Apribojus tyrimą tik aukštąjį išsilavinimą turinčiais darbuotojais, taip pat atsiskleidė specifinis mirtingumo pasiskirstymas ir ryškūs lyčių skirtumai. Aukštąjį išsilavinimą turintys vyrai, dirbantys sveikatos priežiūros sektoriuje, padidėjusią mirtingumo riziką pagal visas mirties priežastis, piktybinius navikus ir širdies bei kraujagyslių sistemos ligas. Tuo tarpu tarp moterų dėl šių priežasčių mirtingumo rizikos padidėjimas nestebėtas. Priešingai – aukštąjį išsilavinimą turinčios moterys, dirbančios sveikatos priežiūros srityje, pasižymėjo mažesniu mirtingumu nuo piktybinių navikų, bet reikšmingai didesniu mirtingumu nuo visų kitų (likusių) mirčių priežasčių. Šie priežastiniai specifiniai dėsningumai ateityje turėtų būti nagrinėjami detalesniuose tyrimuose.

Nepaisant kai kurių specifinių bruožų, šio tyrimo rezultatai iš esmės patvirtina kituose kraštuose nustatytas tendencijas. Pavyzdžiui, JAV atliktas tyrimas pabrėžia išsilavinimo svarbą kaip veiksnį, paaiškinantį mažesnį sveikatos priežiūros darbuotojų mirtingumą (67). Skirtingai nei mūsų tyrime, Aasland ir kt. (6) nustatė reikšmingai mažesnę bendro, dėl piktybinių navikų ir dėl širdies bei kraujagyslių ligų mirtingumo riziką tarp gydytojų ir kitų aukštąjį išsilavinimą turinčių darbuotojų. Mūsų tyrime nustatyta, kad aukštąjį išsilavinimą turintys sveikatos priežiūros darbuotojai vis dar pasižymi didesne mirtingumo rizika, palyginti su tokį pat išsilavinimą turinčiais kitų sektorių darbuotojais. Ši tendencija prieštarauja JAV situacijai, kur baltieji gydytojai vyrai išgyvena ilgiau nei teisininkai, kitų profesijų atstovai ar visi vyrai (12). Panaši tendencija fiksuota ir Danijoje (7). Norvegijoje atliktame tyrime taip pat nustatyta didesnė gydytojų mirtingumo rizika, kuri buvo siejama su didesne savižudybių rizika (6).

Kitas svarbus mūsų tyrimo rezultatas – mažesnis su rūkymu susijęs mirtingumas tarp gydytojų vyrų. Jungtinėje Karalystėje atliktas 50 metų trukmės stebėsenos tyrimas parodė, kad nerūkantys gydytojai vidutiniškai gyveno 10 metų ilgiau nei rūkantys (68). Be to, metimas rūkyti 50 metų amžiuje reikšmingai sumažindavo riziką, o metimas 30 metų beveik visiškai ją eliminuodavo. Besson ir kt. metaanalizė parodė, kad rūkymo paplitimas tarp gydytojų siekė 21 % (69) ir buvo dažnesnis tarp vyrų bei didesnis Europoje ir Azijoje, nei Okeanijoje (69). Tyrimas apie rūkymą tarp universitetinės ligoninės darbuotojų Lietuvoje parodė, kad rūkančiųjų buvo 37,6 % vyrų ir 9,7 % moterų, o didžiausias paplitimas nustatytas tarp pagalbinio personalo (44,9 % vyrų ir 11,3 % moterų), mažiausias – tarp gydytojų (36,4 % ir 7,6 % atitinkamai) (70). Bendrojoje populiacijoje rūkančių buvo 41,4 % vyrų ir 11,3

% moterų (71). Tam tikra dalimi mūsų tyrimo rezultatus galėtų paaiškinti mažesnis rūkymo paplitimas tarp sveikatos priežiūros darbuotojų praeityje.

Mirtingumo rizikos padidėjimas dėl virškinamojo trakto ligų rezultatai nėra nuoseklūs su kitų šalių duomenimis ir gali būti siejami su išliekančiais nepalankiais vyrų mirtingumo dėsningumais buvusiose SSRS šalyse. Šis rezultatas gali būti laikomas netikėtu, nes gydytojai paprastai pasižymi mažesniu mirtingumu nuo virškinamojo trakto ligų dėl sveikesnio gyvenimo būdo, mažesnio rūkymo ir geresnės sveikatos priežiūros prieigos (72). Aasland ir kt. (6) tyrime gydytojai vyrai turėjo mažesnį mirtingumą nuo virškinamojo trakto ligų nei bendroji populiacija. Panaši tendencija nustatyta ir tarp JAV gydytojų (12). Tuo tarpu mūsų tyrimas ne tik nenustatė jokio tokio pranašumo gydytojų grupėje, bet ir parodė itin didelį dėl virškinamojo trakto ligų mirtingumo rizikos padidėjimą tarp slaugytojų ir slaugytojų padėjėjų (abiejų lyčių), taip pat tarp kitų sveikatos priežiūros darbuotojų (tik vyrų). Šis dėsningumas kartu su mirtingumu dėl su alkoholiu susijusių priežasčių (nors statistiškai nereikšmingas tarp slaugytojų ir slaugytojų padėjėjų vyrų grupėje), leidžia įtarti ryšį su pertekliniu alkoholio vartojimu (73). Pastarąjį dešimtmetį alkoholio vartojimas sumažėjo nuo 15,2 litro vienam gyventojui (15 metų ir vyresniems) iki 11 litrų (73), tačiau mirtingumas nuo su alkoholiu susijusių priežasčių tebėra vienas didžiausių Europos Sąjungoje (74). Ankstesni tyrimai parodė, kad su alkoholiu susijęs mirtingumas ypač didelis tarp mažesnio išsilavinimo grupių (75). Be to, padidėjęs ir žalingas alkoholio vartojimas tarp sveikatos priežiūros darbuotojų gali būti susijęs su lėtiniu su darbu susijusiu stresu (8). Psichikos sveikatos veiksnių vaidmenį pabrėžė ir Norvegijoje atliktas tyrimas, kuriame gydytojų mirtingumo rizikos padidėjimas buvo susijęs su didesne mirčių dėl savižudybių rizika (6).

Alkoholio svarba pastebėta ir kitose šalyse. Pavyzdžiui, Masačiusetse atliktas tyrimas (11) parodė, kad medicinos padėjėjai, sveikatos priežiūros pagalbinis personalas, slaugytojai, psichiatrijos ir namų priežiūros darbuotojai turėjo reikšmingai didesnį mirtingumą nuo alkoholinės kepenų ligos, o gydytojai ir chirurgai – labai mažą. Didelė sisteminė apžvalga ir metaanalizė, atlikta Wilson ir kt. (76), nagrinėjo probleminį alkoholio vartojimą tarp gydytojų. Pažymėtina, kad į apžvalgą įtraukti tyrimai naudojo skirtingus metodus, todėl tiesioginis palyginimas buvo sudėtingas. Apžvalgoje pastebėta, kad naujesni tyrimai rodo didesnį probleminio alkoholio vartojimo paplitimą tarp gydytojų moterų ir jaunesnių specialistų.

Norint paaiškinti stebimus mirtingumo skirtumus pagal specifines mirties priežastis, būtini reprezentatyvūs tyrimai apie rizikos veiksnius tarp sveikatos priežiūros darbuotojų. Deja, mūsų žiniomis, tokie duomenys Lietuvoje yra labai riboti arba visai neprieinami. Tarp nedaugelio tyrimų galima paminėti

vieną apie alkoholio vartojimą iki COVID-19 pandemijos ir jos pradžioje. Į tyrimo grupę įtraukti 238 gydytojai. Tyrimas parodė rizikingą ar žalingą alkoholio vartojimą tarp 31,6 % gydytojų vyrų ir 5,3 % gydytojų moterų (77). Palyginimui, pavojingą alkoholio vartojimą nurodė 12,6 % Prancūzijos gydytojų (78) ir 18,8 % Danijos gydytojų (79). Lietuvoje apie rūkymo paplitimą ir kitus ŠKL rizikos veiksnius turimi tik fragmentiški ir nereprezentatyvūs duomenys. Pavyzdžiui, 1999 m. atliktas Kauno medicinos klinikų darbuotojų (N = 3090) tyrimas parodė, kad rūkymo paplitimas siekė tik apie 13 % (70). Tas pats tyrimas parodė, kad daugiausia rūkančiųjų buvo tarp chirurgų (42,7 %). Deja, naujesnių ir išsamių duomenų apie rūkymą tarp sveikatos priežiūros ir kitų sektorių darbuotojų Lietuvoje nėra. Vertinant specifinius sveikatos priežiūros darbuotojų mirtingumo dėsningumus Lietuvoje, būtina paminėti, kad sveikatos sektoriuje Centrinėje ir Rytų Europoje yra santykinai daugiau darbuotojų, dirbančių pensiniame amžiuje (vyresnių nei 65 metų), palyginti su kitais ekonomikos sektoriais.

Šis tyrimas turi keletą apribojimų. 2011 m. surašymas pirmą kartą fiksavo užimtumo ir išsilavinimo būklę. Vis dėlto manome, kad apatinės 40 metų amžiaus ribos nustatymas iš esmės sumažina galimą profesijos pasikeitimo riziką stebėjimo laikotarpiu. Jaunų asmenų neįtraukimas gali lemti specifinių problemų, pavyzdžiui, alkoholio vartojimo ar išorinių mirties priežasčių, poveikio nepakankamą įvertinimą tarp sveikatos priežiūros darbuotojų. Antra, santykinai nedidelis Lietuvos gyventojų skaičius neleido gauti statistiškai patikimų mirtingumo rodiklių net ir apjungtoms grupėms. Gali būti, kad toks apribojimas dirbtinai sumažina tikrąjį netolygumų mastą. Didesnio dalyvių skaičiaus ir detalesnio sveikatos priežiūros profesijų suskirstymo naudojimas leistų gauti realesnius ir tikslesnius rezultatus apie grupėms būdingą mirtingumo pasiskirstymą tiek sveikatos priežiūros sektoriaus viduje, tiek lyginant jį su kitais sektoriais. Trečia, mūsų mirtingumo duomenyse nėra jokios informacijos apie rizikos veiksnius. Atsižvelgiant į ribotą informaciją apie rizikos veiksnių specifiką skirtinguose užimtumo sektoriuose, tyrimas suteikia labai ribotų įžvalgų apie galimus veiksnius, lemiančius stebimus mirtingumo skirtumus.

4.2. II straipsnis – Visų mirčių priežasčių ir savižudybių nulemtos mirtingumo rizikos tarp Lietuvos sveikatos priežiūros darbuotojų vertinimas

Šis tyrimas parodė panašią bendrą mirtingumo riziką tarp sveikatos priežiūros darbuotojų ir kitų profesinių grupių. Mūsų tyrimo rezultatai skiriasi nuo kitų Europos šalyse atliktų tyrimų, kuriuose gydytojų bendroji mirtingumo rizika

buvo nuosekliai mažesnė nei bendrojoje populiacijoje (5–7,80). Gydytojai ir kiti medicinos darbuotojai dažnai anksti perima sveikos gyvensenos įpročius, remdamiesi savo žiniomis ir finansiniais ištekliais. Ankstesni tyrimai taip pat parodė, kad žemesni mirtingumo rodikliai tarp medicinos darbuotojų, palyginti su bendra populiacija, gali būti aiškinami jų išsilavinimu ir sveikesne elgsena. Kitų tyrimų rezultatai (5–7,80) parodė, kad gydytojai turėjo mažesnį mirtingumą nuo su rūkymu ir gyvenimo būdu susijusių ligų, tokių kaip plaučių vėžys, širdies ir kraujagyslių ligos bei metaboliniai sutrikimai. Tuo tarpu mūsų tyrime nustatyta, kad kontroliuojant pagal išsilavinimą gydytojų visų priežasčių mirtingumo rizika buvo didesnė.

Mūsų tyrimo savižudybės rizikos rezultatai tarp sveikatos priežiūros darbuotojų sutampa su duomenimis, gautais kituose kraštuose (5–7, 75). Nors nustatėme padidėjusią savižudybės riziką tarp gydytojų, šis padidėjimas nebuvo statistiškai reikšmingas. Kitų tyrimų rezultatai taip pat patvirtino didesnę gydytojų savižudybių riziką. Pavyzdžiui, Norvegijoje atliktame tyrime nustatyta didesnė savižudybių rizika tarp gydytojų, palyginti su kitais medicinos darbuotojais ir bendra populiacija (6).

Savižudiškas elgesys yra sudėtingas daugiaveiksmis reiškinys, o mūsų tyrimo dizainas neleidžia atlikti detalesnės savižudybių analizės tarp medicinos darbuotojų. Mirtis dėl savižudybės gali būti susijusi su psichikos būkle, perdegimu ar psichikos sutrikimais, taip pat kitais veiksniais. Profesinis stresas ir perdegimas tarp medicinos darbuotojų gali būti siejami su didesne savižudybės rizika tarp gydytojų, palyginti su aukštąjį išsilavinimą turinčia bendra populiacija (81). Lietuvoje atliktame tyrime nustatyta, kad perdegimas buvo labai paplitęs tarp anesteziologų ir intensyviosios terapijos gydytojų, ir du penktadaliai jų turėjo aukštą perdegimo lygį. Be to, tyrime nustatytas stiprus ryšys tarp perdegimo ir problemų, susijusių su alkoholio vartojimu, depresija, širdies ir kraujagyslių bei virškinamojo trakto ligomis, raminamųjų vartojimu ir persivalgymu (82). Be to, psichikos sveikatos sutrikimų stigmatizacija gali būti kliūtis gauti tinkamą pagalbą psichikos sveikatos sistemoje. Galiausiai galima, kad savižudybės atvejai gali būti klaidingai priskiriami kitoms mirčių priežasčių grupėms (83).

Mūsų tyrimas turi tam tikrų apribojimų. Vienas iš jų – mažas savižudybių skaičius kai kuriose profesinėse grupėse. Šis apribojimas apsunkina statistiškai patikimų rodiklių gavimą ir riboja galimybes daryti pagrįstas išvadas apie skirtumų mastą. Be to, trūksta informacijos apie specifinius rizikos veiksnius, tokius kaip psichikos sutrikimai ar alkoholio vartojimas. Galiausiai nebuvome pajėgūs atskirti darbuotojų pagal darbo krūvį (pilnas ar ne visas etatas).

4.3. III straipsnis – Karjeros keitimo ketinimų ir juos lemiančių veiksnių vertinimas tarp Lietuvos sveikatos priežiūros darbuotojų

Šiame tyrime buvo įvertinta psichikos sveikata ir karjeros keitimo ketinimai didelėje Lietuvos sveikatos priežiūros darbuotojų imtyje COVID-19 pandemijos laikotarpiu. Nustatėme, kad du trečdaliai (66,8 %) Lietuvos sveikatos priežiūros darbuotojų per pastaruosius 12 mėnesių svarstė galimybę palikti darbą ir dirbti ne medicinos srityje. Panašiame tyrime, kurio duomenis 2020 m. rinko Norkienė ir kt. (33), nustatyta, kad pandemijos pradžioje karjeros keitimo ketinimus išreiškė 59,6 % intensyviosios terapijos specialistų Lietuvoje. Mūsų duomenys surinkti vėlesnėse pandemijos stadijose – po dviejų COVID protrūkių bangų 2021 m. pabaigoje ir 2022 m. pradžioje. Duomenų rinkimo pabaigoje Lietuva patyrė trečiąją ir intensyviausią bangą, kuriai būdingas didžiausias užsikrėtimo skaičius (84). Tačiau tuo metu jau buvo prieinamos vakcinos, vyko masinė vakcinacija, ir dauguma sveikatos priežiūros darbuotojų buvo paskiepyti (85,86). Be to, jau buvo geriau žinoma, kaip gydyti nuo koronaviruso infekcijos sergančius pacientus, visuomenė geriau suprato infekcijos plitimą ir prevenciją, nes Pasaulio sveikatos organizacija ir vietos valdžios institucijos pateikė gydymo bei prevencijos rekomendacijas (87,88). Vis dėlto mūsų vėlyvesniame tyrime nustatytas dar didesnis karjeros keitimo ketinimų paplitimas nei 2020 m. (33). Tai galėtų būti nulemta ilgalaikio pandemijos keliamo streso ir jo poveikio sveikatos sistemai (89). Taip pat mūsų tyrime buvo įtrauktas gerokai platesnis Lietuvos sveikatos priežiūros darbuotojų spektras, įskaitant kitų profilių darbuotojus.

Mūsų tyrimas atskleidė, kad demografinės charakteristikos ir profesiniai veiksniai yra svarbūs prognozuojant karjeros keitimo ketinimus. Kaip ir kituose panašiuose tyrimuose, jaunesnis amžius ir mažesnė profesinė patirtis buvo perdegimo rizikos veiksniai (16,33,34,60). Taip pat nustatėme, kad darbo sąlygos, darbo krūvis, darbas su pacientais, karjeros perspektyvų stoka, vadovai ir mobingas buvo reikšmingi veiksniai, susiję su karjeros keitimo ketinimais. Su darbu susiję veiksniai yra plačiai žinomi ir patvirtinti perdegimo priežastys, glaudžiai susijusios su karjeros keitimu (13,16,60,61,90). Daugybė tyrimų įvairiose medicinos specialybėse patvirtino šiuos veiksnius, tačiau jie, atrodo, būdingi visiems sveikatos priežiūros darbuotojams. Mūsų tyrimas neatskleidė statistiškai reikšmingų skirtumų tarp skirtingų profesinių grupių karjeros keitimo ketinimų atžvilgiu.

Kitas svarbus rezultatas buvo tas, kad psichologinis distresas buvo susijęs su karjeros keitimo ketinimais. Sveikatos priežiūros darbuotojai, nurodę ketinimus keisti karjerą, turėjo aukštesnius depresijos, nerimo ir streso lygius. Profesinis stresas daugelyje medicinos specialybių sukelia perdegimą (91,92).

Tačiau mūsų tyrime, įvertinus skirtingas specialybes, nebuvo nustatyta statistiškai reikšmingų psichikos sveikatos rodiklių skirtumų, prognozuojančių karjeros keitimo ketinimus. Kai kurie duomenys rodo, kad skubios pagalbos skyrių darbuotojai yra labiau linkę perdegti (14). Kita vertus, pasitenkinimas darbu siejamas su mažesniu perdegimu (61,93).

Psichikos sveikatos vertinimas parodė prastą Lietuvos sveikatos priežiūros darbuotojų psichologinę būklę. Tik pusė mūsų vertintos populiacijos neturėjo arba turėjo tik nežymius depresijos ir nerimo simptomus. Ankstesni tyrimai parodė, kad psichologinis distresas buvo susijęs su padidėjusiais fiziniais simptomais, tokiais kaip galvos skausmai, gerklės skausmas, nerimas, vangumas (94) ir nemiga (94). Be to, didelis depresiškumas buvo glaudžiai susijęs su perdegimo sindromu (95). Dar daugiau – aukštesni distreso įverčiai siejosi su didesniais karjeros keitimo ketinimais. Mūsų nerimo paplitimo rodikliai taip pat panašūs į pasaulinius duomenis, kurie svyruoja nuo 22,6 % iki 36,3 % (39). Tačiau nerimas dažnai lieka nepastebėtas ir negydomas (96). Psichologinis nerimas dažnai prasideda medicinos studijų metu, ir jį patiria daugiau nei trečdalis studentų visame pasaulyje (97).

Logistinė regresija parodė, kad depresija buvo stipriausias karjeros keitimo ketinimus paaiškinantis rodiklis. Šie rezultatai atitinka ankstesnius tyrimus. Pavyzdžiui, Lenkijoje atliktas tyrimas, lyginęs dvi perdegimo skales, parodė, kad depresija paaiškina išsekimo ir nusivylimo dimensijas (98). Naujausia metaanalizė parodė, kad beveik ketvirtadalis visų sveikatos priežiūros darbuotojų ir 43 % pirmosios linijos darbuotojų COVID-19 pandemijos metu patyrė depresiją (99). Nepaisant pandemijos suvaldymo, naujos COVID-19 atmainos tebėra reikšminga grėsmė visiems sveikatos priežiūros darbuotojams (100).

Mūsų tyrimo rezultatai turėtų būti interpretuojami atsižvelgiant į jo apribojimus. Visų pirma, tai buvo skerspjūvio tyrimas. Situacijos keičiasi, kasdien atsiranda skirtingų stresorių. Todėl ateityje reikalingi tęstiniai tyrimai, siekiant įvertinti psichikos sveikatos pokyčius ir karjeros keitimo ketinimus. Antra, ribotas klausimų skaičius apklausoje neleido giliau tirti kai kurių aspektų. Todėl būsimi tyrimai galėtų naudoti išsamesnes priemones karjeros keitimo ketinimams vertinti. Trumpos apklausos yra svarbios tam, kad respondentai išliktų įsitraukę ir neapkrauti, bei leistų tyrėjams įvertinti reprezentatyvią populiacijos dalį. Trečia, stengėmės įtraukti kuo daugiau skirtingų sveikatos priežiūros darbuotojų, tačiau mūsų imtyje dominavo moterys. Aktyvesnių ar dažniau dalyvaujančių respondentų savanoriškas įsitraukimas galėjo iškreipti rezultatus. Be to, COVID-19 pandemija galėjo reikšmingai paveikti mūsų tyrimo išvadas, ypač dėl to, kad neturime patikimų iki pandemijos surinktų duomenų apie psichikos sveikatą ir karjeros keitimo

ketinimus tarp Lietuvos sveikatos priežiūros darbuotojų. Nepaisant apribojimų, šis tyrimas yra didžiausios apimties tyrimas apie darbo ir psichikos sveikatos stresorius tarp sveikatos priežiūros darbuotojų Lietuvoje.

4.4. IV straipsnis – Savižudybės rizikos veiksnių vertinimas tarp Lietuvos gydytojų ir rezidentų

Pateikiame pirmąjį tyrimą, kuriame vertinamas Lietuvos gydytojų ir rezidentų suicidiškumas vėlyvuoju COVID-19 pandemijos laikotarpiu. Nustatėme, kad beveik trečdalis respondentų per gyvenimą turėjo minčių apie savižudybę ar suicidinio elgesio, atitinkančio didelės savižudybės rizikos lygį, o reikšmingiausi veiksniai, susiję su didele savižudybės rizika, buvo depresija, įvairūs su darbu susiję stresoriai ir ilgalaikių santykių neturėjimas.

Pirmiausia nustatėme, kad 30,4 % gydytojų ir rezidentų turėjo savižudybės riziką. Šie rezultatai yra panašūs į kitus tyrimus, kuriuose nagrinėta medicinos studentų ir gydytojų suicidiškumo rizika, tačiau mūsų tyrime nustatyti aukštesni rodikliai. Indijoje atliktame tyrime nustatyta dar didesnė suicidiškumo paplitimo dalis: 37,2 % medicinos studentų buvo patyrę suicidinių minčių, 10,9 % buvo planavę savižudybę, o 3,3 % buvo bandę nusižudyti (101). Tarp Vokietijos veterinarijos studentų suicidinės mintys siekė 19,9 % (102). Metaanalizių duomenimis, gydytojų suicidinės mintys svyruoja nuo 17 iki 17,4 % (4,103), o bandymų nusižudyti paplitimas gyvenimo eigoje siekia 1,8 % (103). Šie rezultatai panašūs į mūsų tyrime nustatytus ir yra gerokai didesni nei savižudybių minčių paplitimas bendrojoje populiacijoje, kuris įvairiuose tyrimuose svyruoja nuo 4,6 iki 10,72 % (104–106). Didelės apimties metaanalizė nustatė vidutinį suicidinių minčių paplitimą bendrojoje populiacijoje – 12,1 % (107). Sisteminė García-Iglesias apžvalga parodė, kad COVID-19 pandemijos metu sveikatos priežiūros darbuotojų suicidinių minčių paplitimas siekė nuo 2,4 iki 21,7 %, o 0,5–3,5 % buvo neseniai bandę nusižudyti (108).

Antra, nustatėme, kad mūsų imtyje su suicidiškumu buvo susiję tokie veiksniai kaip ilgalaikių santykių neturėjimas, karjeros keitimo ketinimai, mobingas ir pervargimas. Socialinė izoliacija glaudžiai siejasi su savižudybe (109). Be to, tarpasmeninė savižudybės teorija teigia, kad sutrikęs priklausymo jausmas, suvokiama našta (110) ir vienišumas (107) yra susiję su suicidinėmis mintimis. Karjeros keitimo ketinimai siejami su perdegimu (33). Perdegimas paplitęs tarp gydytojų (20,26,33). Jei jis nevaldomas, perdegimas gali būti vienas iš suicidinės rizikos veiksnių (20). Mobingas yra dažnas darbo aplinkos stresorius, nors bet kurioje organizacijoje turėtų būti griežtai netoleruojamas. Turkijoje atliktame tyrime, vertinusiame mobingą tarp

slaugytojų, 10 % dalyvių svarstė apie savižudybę (111). Ankstesni tyrimai taip pat nustatė pervargimą kaip suicidinę riziką didinantį veiksnį (107).

Mūsų tyrime depresija ir nerimas buvo tarp tų veiksnių, kurie regresijos analizėje turėjo didžiausią prognozinę vertę didelei savižudybės rizikai. Ribeiro ir kt. (112) publikuota metaanalizė nustatė, kad depresija ir beviltiškumas didina savižudiškų minčių riziką 1,96 karto, savižudiškų bandymų – 1,63 karto, o mirties nuo savižudybės – 1,33 karto. Tačiau autoriai pripažino, kad kai kurie metodologiniai apribojimai susilpnino tikėtiną depresijos poveikį suicidiniam elgesiui. Psichikos sutrikimų diagnostikos ir statistikos vadovas (DSM-5) nurodo, kad vienas pagrindinių didžiosios depresijos požymių yra mintys apie mirtį ir savižudybę (113). Be to, nerimas gali papildomai didinti savižudybės riziką (114,115). Bertolote ir kt. apžvalgoje nurodoma, kad 98 % mirčių dėl savižudybės buvo susijusios su psichikos sutrikimais, o 30,2 % – su nuotaikos sutrikimais (116). Depresija glaudžiai susijusi su gydytojų ir rezidentų gyvenimu. Tyrimai rodo, kad depresijos simptomai po medicinos studijų padidėja 13,5 % (117). Depresijos paplitimas tarp rezidentų yra didelis – nuo 23,2 iki 28 % (21,39,99) ir net iki 43 % tarp tiesiogiai su COVID-19 sergančiaisiais dirbusių specialistų (99).

Pagrindinis šio tyrimo apribojimas - dalyvių įsitraukimas savanoriškai, o ne reprezentatyvios imties sudarymo būdu. Tai gali lemti atrankos šališkumą, reiškiantį, kad rezultatai gali atspindėti aktyvesnę gydytojų populiacijos dalį arba asmenis, turinčius daugiau psichikos sveikatos sunkumų. Kitas apribojimas yra tas, kad tyrimas nebuvo tęstinis, todėl sunku įvertinti, kaip laikui bėgant keičiasi savižudybės rizika. Tyrimo dizainas taip pat neleido įvertinti COVID-19 pandemijos poveikio tyrimo rezultatams. Mūsų duomenys rinkti 2021 m. gruodžio ir 2022 m. sausio mėnesiais. Tuo metu Lietuva jau buvo įveikusi dvi COVID-19 bangas (84). Be to, vakcinacija vyko sparčiausiu tempu (85), ir buvo daug aiškiau, kaip valdyti ligą. Pasaulio sveikatos organizacija parengė ir išplėtė gaires (87), o asmens apsaugos priemonės buvo prieinamos. Duomenys rinkti tuo metu, kai dauguma Lietuvos gydytojų jau buvo paskiepyti nuo COVID-19. Galiausiai COVID-19 pandemija dar nebuvo pasibaigusi, ir ši liga išliko svarbia kasdienio gydytojų darbo dalimi (100).

4.5. V straipsnis – Psichologinės būklės, suicidiškumo ir atsparumo stresui vertinimas tarp Lietuvos slaugytojų

Šis tyrimas yra pirmasis bandymas nacionaliniu mastu įvertinti Lietuvos slaugytojų psichikos sveikatą. Nustatėme, kad 18 % slaugytojų nurodė sunkius ir ypač sunkius depresijos simptomus, 29,3 % – nerimo simptomus, o

17,1 % – streso simptomus. Be to, apie penktadalis imties (21,2 %) turėjo didelę savižudybės riziką, o 1,5 % nurodė ankstesnį bandymą nusižudyti.

Huang ir kt. (45) metaanalizė parodė, kad tarp intensyviosios terapijos slaugytojų depresijos paplitimas siekia beveik 25 %. Kita metaanalizė (118) nustatė, kad 22 % slaugytojų patiria depresiją. Mūsų tyrimas buvo atliktas COVID-19 pandemijos metu, todėl pandemija galėjo turėti įtakos tiriamosios imties psichikos sveikatai. Duomenų rinkimo metu visi sveikatos priežiūros darbuotojai Lietuvoje buvo paskiepyti nuo COVID-19, o daugiau nei pusė jų buvo gavę stiprinančiąją dozę. Vis dėlto pandemija buvo susijusi su dideliu darbo krūviu ir su darbu susijusiais stresoriais sveikatos priežiūros sistemoje. Mūsų tyrime depresijos lygiai buvo aukštesni nei ankstesniuose tyrimuose: 18 % slaugytojų patyrė sunkius ir ypač sunkius depresijos simptomus, o dar 29,8 % – vidutinio sunkumo depresiją. Tai daugiau nei du kartus viršija bendrosios ES populiacijos vidurkį (7,2 %) (119).

Nerimas ir nerimo sutrikimai yra reikšmingas veiksnys sveikatos priežiūros darbuotojams. Mūsų tyrime 32 % slaugytojų turėjo vidutinio sunkumo nerimo simptomus, o 29,3 % – sunkius ir ypač sunkius simptomus. Kitų tyrimų ir metaanalizių duomenimis, nerimo sutrikimų paplitimas tarp sveikatos priežiūros specialistų svyruoja nuo 23,2 % iki 37 % (34,39,118). Ilgalaikės psichikos sveikatos problemos gali mažinti motyvaciją ir lemti prastesnę pacientų priežiūrą (120), didesnę didžiosios depresijos, širdies įvykių riziką, prastesnę gyvenimo kokybę ir santykius (121), o sunkus nerimas gali būti siejamas ir su padidėjusia savižudybės rizika (114,121).

Atlikus logistinę regresiją, nustatytas reikšmingas ryšys tarp žemo atsparumo stresui ir didelės savižudybės rizikos bei prastesnės psichikos sveikatos. Atsparumas stresui apibrėžiamas kaip gebėjimas prisitaikyti prie streso ir nepalankių situacijų (122). Yu ir kt. nustatė, kad stresas, perdegimas, potrauminio streso sutrikimas ir patyčios siejasi su mažesniu atsparumu (123). Cochrane metaanalizė parodė, kad atsparumo stresui ugdymas gali turėti teigiamą poveikį sveikatos priežiūros darbuotojams, tačiau įrodymai dėl tokio mokymo efektyvumo išlieka nepakankami (3). Todėl slaugytojų psichikos sveikatos stiprinimas turėtų apimti kelias kryptis: darbo sąlygų gerinimą, su darbu susijusių stresorių mažinimą ir atsparumo ugdymą.

Naudodami SBQ-R klausimyną nustatėme, kad 21,2 % mūsų tyrimo dalyvių turėjo didelę savižudybės riziką. Suicidinių minčių paplitimas skiriasi priklausomai nuo šalies ir tiriamos populiacijos – tarp slaugytojų jis gali svyruoti nuo 5,2 % iki 62 % (38,124–126). Didelė suicidiškumo paplitimo variacija gali būti susijusi su skirtinga tyrimų metodologija. Vis dėlto mūsų tyrimo rezultatai atskleidžia nerimą keliantį savižudybės rizikos lygį tarp Lietuvos slaugytojų. Logistinė regresija parodė, kad depresija ir nerimas buvo reikšmingi rizikos veiksniai, kurie atitinkamai 3,8 ir 7,6 karto padidino

savižudybės riziką. Šie rezultatai sutampa su ankstesniais tyrimais, kurie parodė, kad depresija ir beviltiškumas gali 1,9–2,2 karto padidinti mirties dėl savižudybės riziką (112,115). Be to, ankstesni tyrimai patvirtino, kad nerimas taip pat yra savižudybės riziką didinantis veiksnys (114,115).

Kova su COVID-19 pandemija papildomai apsunkina sveikatos priežiūros darbuotojų psichologinę savijautą ir padidina esamų psichikos sveikatos problemų naštą (127). Ankstyvaisiais COVID-19 protrūkio etapais Uhane tiesiogiai su sergančiais dirbę sveikatos priežiūros darbuotojai, ypač slaugytojos, daugiausia patyrė depresiją, nerimą ir nemigą (128). Be to, Cai ir kt.(129) tyrimas parodė, kad slaugytojai patyrė didesnį nerimą ir įtampą nei kiti sveikatos priežiūros specialistai. Kai kurios apžvalgos taip pat kelia hipotezę, kad COVID-19 pandemija gali būti nepriklausomas veiksnys, bloginantis psichikos sveikatą (130). Negalima pamiršti, kad COVID-19 pandemija gali nebūti paskutinė – 2015 m. MERS protrūkio metu tiesiogiai dirbę su sergančiaisiais darbuotojai turėjo didžiausią potrauminio streso sutrikimo riziką (131). Tokie protrūkiai ir pandemijos ateityje bus didelė našta visam medicinos personalui, ypač tiems, kurie artimai dirba su pacientais, ypač slaugytojams.

Šis tyrimas turi keletą apribojimų. Pirmiausia, tai buvo skerspjūvio tyrimas – nenaudotas tęstinio tyrimo dizainas, todėl ateityje būtini tęstiniai tyrimai, kurie suteiktų daugiau informacijos apie įvairių rizikos veiksnių vaidmenį psichikos sveikatos pokyčiuose tarp Lietuvos slaugytojų. Antra, nors siekėme atlikti plataus masto nacionalinį sveikatos priežiūros darbuotojų psichikos sveikatos tyrimą, dalyviai buvo savanoriai, o ne atsitiktinai atrinkti, todėl tai gali lemti atrankos šališkumą. Galiausiai COVID-19 pandemija galėjo turėti įtakos tyrimo rezultatams. Duomenys buvo renkami pandemijai tebesitęsiant, kai pacientai ir sveikatos priežiūros darbuotojai vis dar susidūrė su jos keliama rizika. Tačiau duomenų rinkimas sutapo su trečiąja COVID-19 bangos faze. Ligoninėse buvo pakankamai apsaugos priemonių, Lietuvos sveikatos apsaugos ministerija buvo parengusi rekomendacijas, o sveikatos priežiūros įstaigos jau turėjo patirties, kaip valdyti situaciją, nes šalis su pandemija gyveno daugiau nei pusantrų metų. Be to, visi sveikatos priežiūros darbuotojai (įskaitant slaugytojus) buvo paskiepyti prioritetine tvarka ir buvo gavę dvi ar daugiau vakcinų dozių (85). Dėl šių veiksnių ir bazinių duomenų stokos negalime tiksliai įvertinti COVID-19 pandemijos poveikio slaugytojų psichikos sveikatai. Galiausiai COVID-19 neišnyko – revakcinacija vyksta kasmet, o virusas tapo kasdienio gyvenimo dalimi (100). Medicinos bendruomenės psichikos sveikata visada buvo svarbus rūpestis. Kadangi slaugytojai ir kiti medicinos specialistai atlieka esminį vaidmenį visuomenėje, būtina periodiškai tirti ir vertinti šią grupę, siekiant suprasti jų patiriamus sunkumus.

5. IŠVADOS

1. Šis tyrimas pirmą kartą sistemingai atskleidė priežasčiai specifinio mirtingumo skirtumus tarp trijų sveikatos priežiūros darbuotojų grupių ir kitų sektorių darbuotojų. Ypač nerimą kelia ryškus mirtingumo perteklius dėl virškinimo sistemos ligų ir nuo alkoholio priklausančių mirties priežasčių tarp slaugytojų ir kitų sveikatos priežiūros darbuotojų, todėl tai turėtų būti sprendžiama taikant tinkamą prevencijos politiką.

2. Lietuvoje atliktas tyrimas parodė, kad sveikatos priežiūros darbuotojų mirtingumo rizika yra panaši kaip ir kitų profesinių grupių, tačiau gydytojams būdingas reikšmingas mirtingumo dėl visų priežasčių rizikos padidėjimas. Nustatyta, kad gydytojų ir kitų sveikatos priežiūros darbuotojų savižudybių rizika panaši į kitų dirbančiųjų savižudybių riziką.

3. Nustatėme, kad 66,8 % Lietuvos sveikatos priežiūros darbuotojai per pastaruosius 12 mėnesių svarstė galimybę keisti karjerą ne sveikatos priežiūros sektoriuje. Jaunesnis amžius, prastos darbo sąlygos, didesnis darbo krūvis, darbas su pacientais, karjeros perspektyvų stoka, mobingas, pervargimas, depresija, aukštas nerimas ir stresas buvo reikšmingi karjeros keitimo ketinimų rizikos veiksniai.

4. Tai pirmasis empirinis tyrimas, kuriame, naudojant SBQ-R, įvertintas suicidiškumas didelėje Lietuvos gydytojų ir rezidentų grupėje. Nustatėme, kad 30,4 % respondentų turėjo savižudybės riziką per gyvenimą. Be to, 11,4 % respondentų buvo turėję savižudiškų minčių planavimo lygmeniu, o 2,5 % pranešė apie ankstesnius bandymus nusižudyti. Atlikta analizė parodė, kad ilgalaikių santykių neturėjimas bei didesnis depresijos ir nerimo lygis buvo reikšmingi savižudybės rizikos veiksniai tarp gydytojų ir rezidentų.

5. Nustatėme, kad didelė dalis slaugytojų Lietuvoje patyrė aukštą psichologinių sunkumų lygį – 20,95 % Lietuvos slaugytojų turėjo sunkius arba itin sunkius depresijos simptomus, o 20,21 % – sunkių ar itin sunkių nerimo sutrikimų. Be to, 21,2 % jų buvo padidėjusi savižudybės rizika. Daugiaveiksnė analizė parodė, kad vadovai, sunki depresija, stiprus nerimas ir silpnas atsparumas stresui buvo susiję su padidėjusia savižudybės rizika.

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PUBLISHED PAPERS

I. Differences in cause-specific mortality between healthcare workers and all other employees in Lithuania, 2011-2019

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RESEARCH

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Differences in cause-specific mortality between healthcare workers and all other employees in Lithuania, 2011–2019

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Abstract

Background Healthcare workers face health risks, including stress, burnout, and communicable diseases, leading to higher mortality rates. However, excess mortality diminishes with better disease control and lifestyle factors.

Methods The study is based on the aggregated census-linked mortality dataset provided by Statistics Lithuania. The dataset was based on all 2011 census records, as well as death and emigration records from March 1, 2011, to December 31, 2019. The primary variable identified three groups: physicians, nurses and assistant nurses, and other healthcare workers. The reference groups consisted of individuals who were employed in all other sectors. We also conducted an analysis comparing highly educated healthcare workers to the highly educated workers in other sectors. The results are presented using age-adjusted sex-specific Poisson regression mortality rate ratios.

Results The four most common causes of death among healthcare employees were cancer, cardiovascular deaths, other causes of death, and external causes of death. Female nurses show significantly lower 0.86 (0.74–0.99) mortality due to malignant neoplasms than all other employees. Male physicians had lower mortality rates from smoking-related cancer (0.47 (0.24–0.95)); however, significantly higher mortality was found for digestive system diseases 6.29 (2.36–16.79) and liver diseases 5.1 (1.27–20.42). Highly educated male healthcare workers had 1.3–1.4 times higher all-cause, cardiovascular, and malignant neoplasm mortality than highly educated workers from all other sectors. Highly educated females working in health care had lower mortality for malignant neoplasms but significantly higher mortality for all other causes of death.

Conclusions Excess mortality due to digestive system diseases and alcohol-related causes of death among nurses and other health care employees is a particular matter of concern and should be addressed by appropriate prevention policies. Further in-depth studies on risk factors are needed to explain mortality differences between the groups of healthcare and other sector employees in Lithuania.

Keywords Mortality, Causes of death, Physicians, Healthcare workers

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Introduction

Healthcare workers are a critical element in every society around the world. Working in hazardous conditions exposes this occupational group to numerous well-established (e.g., stress or burnout) and specific health risks, such as higher exposure to communicable diseases [1]. These disadvantages could lead to the perception that the mortality rate among medical professionals might also be higher. For example, one of the first pieces of historical evidence about physician mortality in England and Wales in 1860–1880 shows that if compared to the general male population, male physicians had higher death rates for all causes of death and for 23 out of the 27 listed causes of death [2]. For suicide deaths, the risk of dying for medical professionals was 1.5 times higher [2]. The excess mortality of physicians tends to diminish in time, to a large extent due to a better understanding and control of diseases and lifestyle factors [3].

Recent studies conducted in several European countries reveal that mortality risk among doctors became lower or the same as in the general population, except for suicide. A mortality study from Norway showed doctors had the same death rates as the general population, except for suicide rates, which were 1.7 times higher for men and even 2.9 times higher for women [4]. Overall, medical doctors had higher mortality rates than other graduates in Norway. The study from Denmark shows that the standardised mortality ratio (SMR) for medical doctors was lower than for other graduates for cancer, circulatory diseases, and other natural causes [5]. However, the SMR for suicide was still 1.6 times higher for males and 1.7 times higher for females. A study from Massachusetts (USA) indicates that healthcare workers had a slightly lower mortality rate from deaths of despair (violent and alcohol- or drug-related deaths) than all other workers [6]. The same study revealed a striking disadvantage of medical assistants and other healthcare support occupation groups, showing more than two times the disadvantage in the risk of dying from these causes of death [7].

Systematic evidence about cause-specific patterns and specific determinants explaining mortality differentials between various groups of health care workers remains scarce, especially for the Central and Eastern European region. Using unique regional mortality data based on the linkage between the 2011 census and death records for 2011–2019, this study covering the entire population of Lithuania systematically explores all-cause and cause-specific mortality differentials between the three big groups of health care workers (general physicians; nurses and assistant nurses; other health care employees) and the remaining employees employed in all other sectors. This study also contributes to the existing literature by exploring whether mortality differences also prevail between highly educated health care employees and the group of highly educated individuals employed in all other sectors.

Materials and methods

Study design

The study is based on the aggregated cross-sectional census-linked mortality dataset provided by Statistics Lithuania.

Study population

The aggregated dataset used for analyses includes cause-specific deaths and population exposures by all possible combinations of the following variables: age, sex, education, and occupation. The final dataset includes the total number of 1,082,805 individuals; out of them, 34,427 individuals were employed in the healthcare sector at the moment of the 2011 census. Figure 1 represents the flow of the individuals included in the final analysis.

Inclusion and exclusion criteria

The study population is restricted to the ages 40–69 years for each calendar year of observation. The lower age band of 40 years was selected because information about occupation is fixed at the 2011 census baseline. Thus, for 40-year-old persons in 2019, information about their occupation comes from the 2011 census conducted 8 years ago – i.e., when these persons were approximately 8 years younger. Choosing a lower age limit is not feasible because of high occupational mobility at younger ages.

Data sources

The dataset was built by implementing a longitudinal mortality follow-up using the baseline at the 2011 population census on March 1, 2011, and the end of the observational period on December 31, 2019.

Data quality

All individuals at the census were followed from the census date until their death or emigration dates or until the end of the observational period. All data linkages were performed at Statistics Lithuania following data protection rules. Only anonymised data were provided for scientific purposes. The death registration is considered as 100% complete. Due to the fact that not all individuals immediately report their departure from Lithuania, emigration statistics may underestimate true emigration. However, we believe that undercounting emigration does not have any significant influence on our results because (a) most of emigration occurred below the age of 40 and (b) registration of emigration improved after introducing a special compulsory health insurance tax in 2010, which led to strong financial incentives to register departure from Lithuania.

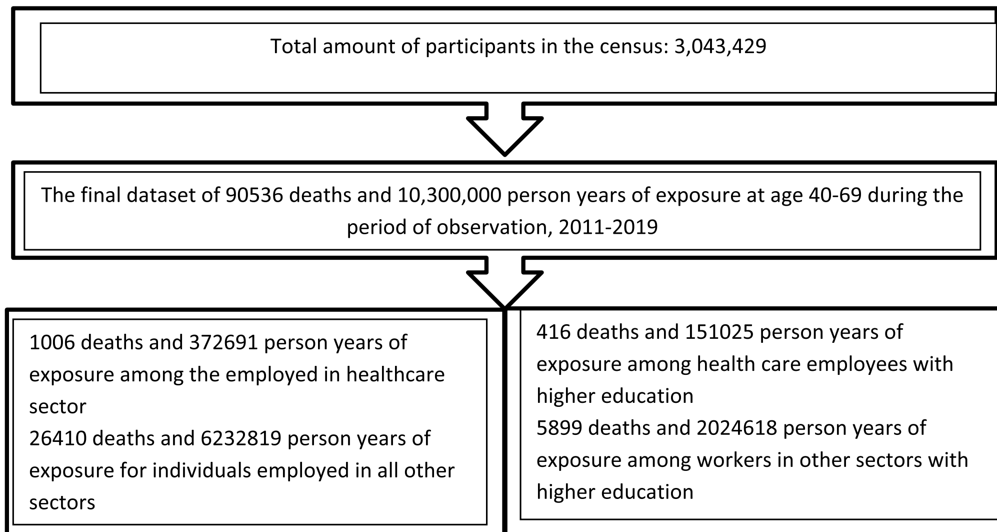

Fig. 1 Flow diagram of participants included in the study

Study variables

The final total cause-specific deaths (dependent variables) and exposures were obtained by adding deaths, emigrations, and person-years lived within each calendar year and considering the changing age of all individuals during each calendar year. Independent categorical variables stem from the 2011 census and are fixed at the moment of this census (March 1, 2011).

Study measures

Cause-specific deaths were classified using the 10th revision of the International Classification of Diseases (ICD-10) by the Institute of Hygiene. Due to the small number of deaths within groups of healthcare workers, only a few broad categories of causes of death were applied. The occupational variable of analysis identifies three large groups of health care workers being employed at the census, including (a) physicians, (b) nurses and assistant nurses, and (c) other health care employees. High educational status was identified using the self-reported information at the 2011 census and later classified using the International Standard Classification of Education (ISCED) 2011 [8] by Statistics Lithuania. Higher education refers to tertiary university or non-university education (ISCED categories) [5–8].

Study outcomes

To assess the mortality differences between the three groups of healthcare workers and all remaining employees, a multivariate sex-specific Poisson regression was applied using the group of the employees (workers) employed in other than healthcare sectors as a reference category. The results based on models controlling for age are reported using Poisson regression mortality rate ratios (MRRs) and their 95% confidence intervals. In order to take into account possible differences in age structure across occupations, all Poisson regression models were controlled for age. The first analysis covered the entire population (the MRRs for unemployed and economically inactive are not reported), whereas the second analysis was restricted only to the individuals with high education. Additional sensitivity analyses on the distribution of age-standardised death rates for all causes of death are shown in the Online Annex 1. We performed statistical analyses using STATA 14.2 (Stata Corp., College Station, Texas, USA).

Results

During the follow-up period between 1 March 2011 and 31 December 2019, the entire population aged 40–69 years experienced 90.5 thousand deaths, whereas 27.4 thousand deaths occurred among the employed individuals.

A detailed flow chart represents the total number of individuals, deaths and person-years of exposure in the final study (Fig. 1). 1006 deaths were registered among healthcare employees (291 deaths among physicians, 414 deaths among nurses and assistant nurses, and 301 deaths among other healthcare employees). The four most common causes of death among healthcare employees were

cancer deaths (470 cases, 47%), cardiovascular deaths (236 cases, 23%), other causes of death (109 cases, 11%), and external causes of death (99 cases, 9.8%). 111 thousand deaths occurred among individuals with higher education; 6315 of them were employed. 416 deaths were registered among the healthcare employees with higher education.

The first analysis (Table 1) compares all-cause and cause-specific mortality in the three groups of healthcare employees to the group of the employed in all other sectors (a reference category). Male and female MRRs for all-cause mortality reported in Table 1 showed that there are no statistically significant differences between any of the three groups and the employed in other sectors. Yet cause-specific results revealed some peculiarities. Female nurses show significantly lower mortality due to malignant neoplasms than all other employees (reference category), whereas the corresponding male nurse and nurse assistant groups do not have such an advantage. Male physicians display more than 50% lower smoking-related mortality than in the reference category, whereas the remaining two male healthcare employee groups and all corresponding female groups do not show such a pattern (Table 1). At the same time, female physicians were the only healthcare employee group showing significantly lower mortality due to cardiovascular system diseases than in the reference category. The highest excess mortality (5–6 times) was found among nurse and nurse assistant males for digestive system and liver diseases. Albeit less pronounced, this disadvantage was also statistically significant for other healthcare employees. For females, the only healthcare employee group showing moderate excess mortality due to digestive system diseases was nurses and nurse assistants (Table 1). Other male healthcare employees also had a threefold mortality excess for alcohol-related causes of death. Finally, nurse and nurse assistant males maintained threefold excess mortality due to all other causes of death. The remaining differences were not statistically significant.

The second analysis was restricted to the employed individuals with high education only and presents a comparison between highly educated individuals employed in health care and highly educated individuals employed in all other sectors (reference group). First, the results on all causes of death combined suggested a significant excess mortality among highly educated health care workers for males and not for females (Table 2). Second, cause-specific findings were somewhat unexpected and also differed by sex, with highly educated male healthcare workers showing 1.3–1.4 times higher mortality for malignant neoplasms and cardiovascular diseases. At the same time, highly educated female health workers had lower mortality for neoplasms and higher mortality for all other (remaining) group causes of death (Table 2).

Discussion

This study contributes to filling the evidence gap on mortality differences between the healthcare workers and all other employees in Lithuania, a country in Central and Eastern Europe. Although no significant differences were found for all-cause mortality, focusing on specific causes of death reveals interesting and unexpected patterns. One of the matters of concern for health policies should be strikingly high excess mortality due to digestive diseases in the group of nurses and nurse assistants and excess mortality due to alcohol-related causes of death in the group of males working in the other health care sector. Importantly, physicians displayed lower mortality, especially in the cases of smoking-related cancers (males) and cardiovascular system diseases (females). Focusing only on the employees with high education also led to the identification of peculiar cause-specific patterns and notable sex differences. For example, highly educated males employed in the healthcare sector had a pronounced excess mortality for all causes of death, malignant neoplasms, and cardiovascular system diseases. At the same time, any similar excess mortality was observed for these causes of death for females. On the contrary, highly educated female healthcare workers had lower mortality for malignant neoplasms. However, highly educated female healthcare workers showed significant excess mortality for all other (remaining) causes of death. These cause-specific patterns should be investigated further in the future with more detailed studies.

Despite some specifics, outcomes of this study generally confirm common patterns found in other countries. For example, a study from the USA highlights the importance of education, which explains lower mortality in the group of healthcare workers [9]. Differently from our study, significantly lower all-cause, malignant neoplasm, and cardiovascular mortality in the group of doctors and other graduates was reported by Aasland et al. [4] One of the most striking facts reported in our study concerns persisting mortality excess of highly educated healthcare workers if compared to highly educated employees in all other sectors. This pattern contradicts the situation in the US, where white male physicians show higher survival rates than lawyers, all other professionals, or all men [7]. A similar pattern has been reported in Denmark [5]. One Norwegian study also found excess mortality among doctors which was explained by higher suicide rates [4].

Another important finding from our study concerns lower smoking-related mortality for male physicians. A 50-year observation study from Britain showed that non-smoking doctors survived on average 10 years more than those in the smokers' group [10]. In addition to this, ceasing smoking at the age of 50 halved the hazards, and ceasing at 30 almost avoided all of them. A meta-analysis by Besson et al. showed that the prevalence of

Table 1 Poisson regression mortality rate ratios for males and females at ages 40–69 years. 2011–2019. Reference group: employed in all other sectors

	Physicians and specialists				Nurses and assistant nurses				Other healthcare workers			
	Death counts	MRR	Confidence limits		Death counts	MRR	Confidence limits		Death counts	MRR	Confidence limits	
MALES												
All causes of death	148	0.97	0.83	1.14	13	1.30	0.75	2.23	65	0.96	0.75	1.23
All malignant neoplasms (C00–C97)	48	0.94	0.71	1.25	3	0.95	0.31	2.95	17	0.82	0.51	1.32
Smoking-related cancer (C00-C14, C32-C34)	7	**0.47**	**0.24**	**0.95**	2	1.90	0.47	7.60	5	0.73	0.30	1.75
All cardiovascular diseases (I00-I99)	61	1.05	0.82	1.35	3	0.81	0.26	2.52	26	1.06	0.72	1.56
Digestive system diseases (K00-K92)	7	0.78	0.37	1.64	4	**6.29**	**2.36**	**16.79**	**10**	**2.26**	**1.21**	**4.21**
Liver diseases (K70-K77)	5	0.93	0.38	2.23	2	**5.10**	**1.27**	**20.42**	**9**	**3.27**	**1.69**	**6.30**
All external causes of death (V01-Y98)	17	0.76	0.47	1.22	0	-	-	-	10	0.87	0.47	1.61
Alcohol-related causes (F10, K70, K74, X45, I42.6)	6	0.83	0.37	1.84	2	3.76	0.94	15.06	**11**	**2.94**	**1.62**	**5.32**
All other (remaining) causes of death	15	1.07	0.65	1.78	3	**3.13**	**1.01**	**9.73**	2	0.30	0.08	1.22
FEMALES												
All causes of death	143	0.87	0.74	1.03	401	0.94	0.85	1.04	236	0.96	0.85	1.10
All malignant neoplasms (C00–C97)	82	0.92	0.74	1.14	197	**0.86**	**0.74**	**0.99**	123	0.93	0.78	1.11
Smoking-related cancer (C00-C14, C32-C34)	6	0.81	0.36	1.81	14	0.76	0.45	1.30	12	1.13	0.63	2.01
All cardiovascular diseases (I00-I99)	24	**0.62**	**0.41**	**0.92**	79	0.84	0.67	1.05	43	0.78	0.58	1.06
Digestive system diseases (K00-K92)	9	0.89	0.46	1.73	41	**1.41**	**1.02**	**1.93**	21	1.28	0.83	1.99
Liver diseases (K70-K77)	6	0.91	0.40	2.03	28	1.39	0.95	2.05	11	0.98	0.54	1.79
All external causes of death (V01-Y98)	13	1.01	0.58	1.75	38	0.98	0.71	1.36	21	0.98	0.63	1.51
Alcohol-related causes (F10, K70, K74, X45, I42.6)	4	0.53	0.20	1.43	27	1.20	0.81	1.76	14	1.11	0.65	1.89
All other (remaining) causes of death	15	1.13	0.68	1.89	46	1.27	0.94	1.72	28	1.37	0.94	2.00

Bolded values are marked as statistically significant $p < 0.05$

Table 2 Poisson regression mortality rate ratios for highly educated males and females at age 40–69 years working in health care. 2011–2019. Reference group: highly educated and employed in all other sectors

	MALES				FEMALES			
	Death counts	MRR	Confidence limits		Death counts	MRR	Confidence limits	
All causes of death	174	**1.34**	**1.15**	**1.57**	242	0.95	0.83	1.08
All malignant neoplasms (C00–C97)	55	**1.34**	**1.02**	**1.75**	127	**0.83**	**0.69**	**0.99**
Smoking-related cancer (C00-C14, C33-C34)	9	1.20	0.64	2.26	10	1.01	0.53	1.94
All cardiovascular diseases (I00-I99)	70	**1.38**	**1.08**	**1.75**	45	0.89	0.65	1.20
Digestive system diseases (K00-K92)	13	1.73	0.99	3.03	15	1.20	0.70	2.06
Liver diseases (K70-K77)	9	1.91	0.97	3.76	10	1.29	0.67	2.49
All external causes of death (V01-Y98)	20	1.11	0.71	1.73	24	1.33	0.87	2.04
Alcohol-related causes (F10, K70, K74, X45, I42.6)	10	1.62	0.85	3.05	12	1.25	0.68	2.27
All other (remaining) causes of death	16	1.29	0.78	2.13	31	**1.48**	**1.01**	**2.16**

Bolded values are marked as statistically significant $p < 0.05$

smoking among physicians was 21% [11]. Additionally, it was more common among male physicians and higher in Europe and Asia [11]. A study on smoking prevalence among university hospital staff in Lithuania showed that 37.6% of men and 9.7% of women were smokers. The highest prevalence of tobacco smoke was found among auxiliary personnel, men and women (44.9% and 11.3%, accordingly), and the lowest among doctors (36.4% and 7.6%, accordingly) [12]. In the general population, 41.4% of men and 11.3% of women were regular smokers [13]. Our study findings, to some extent, could be explained by lower smoking prevalence among health care workers in the past.

The results about excess mortality due to digestive system diseases are not consistent with those observed in other countries and can be attributed to a persisting unfavourable male mortality pattern in the former USSR countries. This finding might be considered as unexpected because physicians generally display lower mortality due to digestive tract mortality, due to a usually healthier lifestyle, reduced smoking rates and better healthcare access [14]. In a study by Aasland et al. [4], male doctors had lower digestive system disease death rates than the general population. Quite similar pattern was observed among the US doctors [7]. Meanwhile, our study not only did not find any such advantage for physicians but also reported on the strikingly high excess digestive system disease mortality among nurses and assistant nurses (both sexes) and other healthcare workers (males only). This pattern and indications of excess mortality (albeit not statistically significant in the group of nurses and nurse assistants in males) due to alcohol-related causes of death suggest a potential link to excessive alcohol consumption. Despite notable improvements since 2008, Lithuania remained the country with one of the highest global alcohol consumption levels and persisting heavy alcohol-related losses [15]. Although alcohol consumption has declined over the past decade—from 15.2 L per capita (age 15+) to 11 L [15]—mortality from alcohol-related causes remains among the highest in the European Union [16]. Prior studies reported that alcohol-related mortality is particularly high in lower education groups [17]. Therefore, a tendency of excess alcohol-related mortality among nurses and other health care employees found in our study might be connected to low-skilled occupations within these groups. In addition, increased and harmful alcohol use among healthcare employees may be associated with job-related chronic stress [1]. The role of mental health factors was highlighted in a Norwegian study, showing that excess mortality among doctors was attributable to a higher risk of suicide [4].

The importance of alcohol was also observed in other countries. For example, a study from Massachusetts [6] found that medical assistants, healthcare support staff, nursing, psychiatric, and home health aides had significantly higher mortality from alcoholic liver disease In contrast, physicians and surgeons had very low mortality. A large systematic review and meta-analysis by Wilson et al. [18] examined problematic alcohol use among physicians. However, the studies included in the review employed varying methodologies, complicating direct comparisons. Wilson et al. also noted that more recent studies suggest problematic alcohol use is more prevalent among female and younger physicians. However, patterns of alcohol use varied across different specialities and years of training.

The explanation of the observed mortality differences by specific causes of death requires representative studies on risk factors targeting health care employees. Unfortunately, to our knowledge, such evidence in Lithuania is very scarce or unavailable. Among the few studies, one study involving 238 physicians has been conducted on alcohol before and during the first years of the COVID-19 pandemic. The study reported about risky or hazardous alcohol use in 31.6% of male and 5.3% of female physicians [19]. In comparison, hazardous alcohol consumption was reported by 12.6% of French physicians

[20] and 18.8% of Danish doctors [21], with risky alcohol consumption being strongly associated with burnout. There are only fragmentary and small-scale unrepresentative data about smoking prevalence and other CVD risk factors in Lithuania. For example, the 1999 study of the employees of the Kaunas Medical clinics (N= 3090) suggests that smoking prevalence was only about 13% [12]. The same study reported that the highest proportion of smokers was among the surgeons (42.7%). Unfortunately, there is no more comprehensive and more recent data comparing smoking among the employees in health and other sectors in Lithuania. When interpreting specific mortality patterns of healthcare employees in Lithuania, one should mention that health sectors in Central and Eastern Europe are over-represented by a larger number of employees working after retirement (beyond age 65 years) as compared to the situation in other sectors of the economy.

This study has several limitations. First, the employment and education status have been fixed in the 2011 census. However, we believe that introducing the lower limit of 40 years substantially diminishes the problem of possible changing occupation during the observational period. However, excluding young adults leads to a potential undercount of the role of specific problems among healthcare employees, such as alcohol consumption and external causes of death. Second, Lithuania's relatively small population size did not allow for obtaining statistically robust mortality rate ratios even for the aggregated groups. It is possible that such a restriction artificially diminishes the real size of inequalities. Using a larger number and more detailed health care employment groups would provide more realistic and nuanced results about the distribution of group-specific mortality both within the health care sector and between the health care and all other employees. Third, our mortality data do not include any information about risk factors. Considering scarce information about the specifics of risk factors across employment sectors, the study provides very limited insights about potential determinants behind the observed mortality differentials.

Conclusion

This study provides the first systematic evidence about differences in cause-specific mortality between the three groups of healthcare workers and employees in other sectors Striking excess mortality due to digestive system diseases and alcohol-related causes of death among nurses and other health care employees is a particular matter of concern and should be addressed by appropriate prevention policies. More targeted efforts are needed to produce comprehensive survey-based evidence on CVD and cancer risk factors explaining cause- and sex-specific patterns of mortality differences between the groups of health care and other sector employees in Lithuania.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-025-13006-y.

Supplementary Material 1.

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Authors' contributions
PK served as the primary investigator, prepared the initial draft of the manuscript, critically reviewed and revised the manuscript. DJ was responsible for the data, study conceptualization, instrument preparation, statistical analysis. Additionally, he served as the lead consultant for the study and significantly contributed to the manuscript preparation. EK and AD conceptualized the study and critically reviewed and revised the manuscript. GS led the study, developed the study's concept, coordinated all assignments, and significantly contributed to the manuscript preparation. All authors read and approved of the final manuscript.

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Data availability
The original data used in this study were provided by Statistics Lithuania. Due to the agreement terms and data protection rules these data cannot be passed to the third party and should be requested directly from Statistics Lithuania. The STATA code used for analyses will be shared on reasonable request to the corresponding author.

Declarations

Ethics approval and consent to participate
This study was conducted in accordance with the Declaration of Helsinki and was reviewed and approved by the Vilnius Regional Bioethics Committee (ID: 2021/5-1350-826). The committee guided ethical standards and all procedures involving human participants. The data was used retrospectively, and consent was impossible to obtain, so the committee waived consent to participate. The data has been provided by the Statistics Lithuania under the Article 13(4) of the Law on Statistics of the Republic of Lithuania; Regulation (EC) No 223/2009 of the European Parliament and of the Council of 11 March 2009 on European statistics and repealing Regulation (EC, Euratom) No 1101/2008 of the European Parliament and of the Council on the transmission of data subject to statistical confidentiality to the Statistical Office of the European Communities, Council Regulation (EC) No 322/97 on Community Statistics, and Council Decision 89/382/EEC, Euratom establishing a Committee on the Statistical Programmes of the European Communities, as amended by Regulation (EU) 2015/759 of the European Parliament and of the Council of 29 April 2015; and Commission Regulation (EU) No 557/2013 of 17 June 2013 implementing Regulation (EC) No 223/2009 of the European Parliament and of the Council on European Statistics as regards access to confidential data for scientific purposes and repealing Commission Regulation (EC) No 831/2002.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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II. Differences in all-cause and death by suicide mortality between health care and other employees in Lithuania: a census-linked mortality follow-up study, 2011-19.

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Differences in all-cause and death by suicide mortality between health care and other employees in Lithuania: a census-linked mortality follow-up study, 2011–19

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Abstract
Lithuania has one of the highest adult mortality rates in Europe. A study analysing three large groups of health-care employees, physicians, nurses, and assistant nurses, found no significant differences in all-cause mortality compared to other sectors. However, after controlling for education, physicians became the highest-risk group. Nurses and assistant nurses had the lowest risk, but no significant differences were found. Excess all-cause mortality of physicians after controlling for education is striking and needs to be investigated further. Given the low number of deaths by suicide among healthcare workers, more research is required to obtain more statistically robust inferences.

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Introduction

Despite the improving situation, Lithuania still shows one of the highest all-cause and suicide rates among men in the European Union [1]. Excess suicide rates are related to significant inequalities by socioeconomic status and a high concentration of deaths by suicide in disadvantaged groups, such as unemployed and economically inactive men or those residing in small cities and rural areas [2]. More detailed evidence about certain risk groups is still missing. Medical workers such as nurses and physicians are subject to various occupational hazards, including 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]. Such a disadvantage persists even though mortality from other causes among medical doctors in European countries has become generally lower than general population [5, 6]. The current study focuses on all-cause 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 anonymized 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 anonymized data were provided for analysis based on the confidentiality of 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 Census. The survival time is censored either at the moment of death or emigration. The final dataset includes 1 082 805 individuals of whom 34 427 were employed in the healthcare sector at the time of the 2011 Census. The primary analysis identified three groups: physicians, nurses, assistant nurses, and other health care employees (kinesitherapists, ergotherapists, etc.). Additionally, this study 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 people with unknown activity status. High educational status was identified using the self-reported information at the 2011 census and later classified using the International Standard Classification of Education 2011 by Statistics Lithuania. Deaths by suicide were identified by linking the 2011 Census data with the death records from the Population Register of Lithuania and Cause of Death Register at the Institute of Hygiene. The corresponding codes of the 10th revision of the International Classification of Diseases for death by suicide were X60 and X84 (intentional self-harm). The modelling results were reported using Cox regression mortality rate ratios (RR) and 95% confidence intervals (CIs). Statistical significance for mortality rate ratios was defined using *P*-values $<.05$. 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

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Table 1. Cox regression all-cause mortality and suicide mortality rate ratios and their 95% confidence intervals by occupational categories

Occupation	All causes		Deaths by suicide	
	Model 1	Model 2	Model 1	Model 2
1. Entire population[a]				
Employed in all other sectors (*D* = 12 800, *S* = 1286, *N* = 744 092)	1	1	1	1
Physicians (*D* = 87, *S* = 8, *N* = 7335)	0.87 (0.70–1.07)	1.31 (1.06–1.62)[b]	0.92 (0.46–1.84)	1.62 (0.81–3.28)
Nurses and assistant nurses (*D* = 168, *S* = 3, *N* = 15 793)	0.94 (0.80–1.09)	0.88 (0.76–1.03)	0.31 (0.10–0.97)[b]	0.29 (0.09–0.91)[b]
Other healthcare employees (*D* = 128, *S* = 5, *N* = 11 299)	0.97 (0.22–1.28)	1.04 (0.88–1.24)	0.53 (0.22–1.28)	0.60 (0.25–1.45)
2. Employed in health care only				
Physicians (*D* = 87, *S* = 8, *N* = 7335)	1	1	1	
Nurses and assistant nurses (*D* = 168, *S* = 3, *N* = 15 793)	1.11 (0.83–1.49)	0.88 (0.62–1.24)	0.22 (0.05–0.90)[b]	0.21 (0.04–1.17)
Other healthcare employees (*D* = 128, *S* = 5, *N* = 11 299)	1.14 (0.86–1.51)	0.94 (0.68–1.29)	0.48 (0.15–1.50)	0.47 (0.13–1.77)

Lithuanian population aged 25–50 years at the 2011 Census, 2011–19.
Model 1—controlled for age and sex; Model 2—controlled for age, sex, and education. *N*, number of participants at the 2011 Census baseline; *D*, number of all-cause and deaths by suicide; *S*, number of deaths by suicide.
a: Mortality rate ratios for unemployed and other economically inactive are not shown.
b: Statistically significant results, when $P < 0.05$.

deaths; 2902 of these deaths were identified as deaths by suicide. Three hundred and eighty-three deaths, including 16 deaths by suicide, occurred among healthcare employees. The deaths for three healthcare employee categories include 87 deaths and eight deaths by suicide for physicians, 168 deaths and three deaths by suicide for nurses and assistant nurses, and 128 deaths and five deaths by suicide for other healthcare employees.

The results presented in Table 1 (Model 1) indicate that physicians, nurses, and assistant nurses show the same all-cause mortality risk as other employees working in all other sectors. The same pattern was observed when comparing the three categories of healthcare employees. Meanwhile, suicide mortality shows a notably lower risk among the nurses and assistant nurses. After additional control for education (Model 2), physicians become the group with the highest all-cause mortality risk, even if compared to all other employees (Table 1, Model 2). Controlling for education almost does not change findings for suicide risk, except that rate ratios slightly decrease for nurses and assistant nurses (RR = 0.29, 95% CI 0.09–0.91). At the same time, controlling for education leads to an increasing tendency in suicide risk among physicians (RR = 1.62, 95% CI 0.81–3.28).

Discussion

This study demonstrated similar overall mortality risk for healthcare workers to the remaining occupational groups. The results of our study differ from other studies conducted in European countries, where overall mortality risk among physicians was consistently lower than in the general population [5–7]. Physicians and other medical workers are frequently early adopters of healthy behaviours based on their knowledge and economic resources. Prior studies also suggest that educational level and health behaviour might explain the lower mortality of medical workers compared to the general population. Other studies [5–7] show that doctors had lower mortality rates from smoking and lifestyle-related diseases such as lung cancer, cardiovascular diseases, and metabolic diseases. Meanwhile, our study found that controlling for education led to excess all-cause mortality risk among physicians.

Results on suicide risk among medical workers in our study are consistent with those previously reported in other countries [5–7]. Although we found an indication of increased suicide risk among physicians, the increase was not statistically significant. A higher risk of death by suicide in physicians was also reported in other studies. For example, a Norwegian study reported excess suicide rates among Norwegian medical physicians compared with other medical workers and the general population [5].

Suicidal behaviours are a complex multifactorial phenomenon, and our study design does not allow for a more detailed analysis of deaths by suicide among medical workers. Deaths by suicide can be associated with mental state, burnout or psychiatric disorder, among other factors. Occupational stress and burnout in medical workers may be related to an increased risk of death by suicide among physicians in comparison to the general population with higher education [8]. 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, depression, cardiovascular and digestive disorders, use of sedatives, and overeating [9]. In addition, stigmatization of mental health problems can be a barrier to getting appropriate help through mental health services. Lastly, it is possible that death by suicide cases can be misclassified as other accidents [10].

Our study has some limitations. One of the concerns is the small number of deaths by suicide in some occupational groups. This limitation is an obstacle to obtaining statistically robust rate ratios and making reliable statistical inferences about the magnitude of the differentials. In addition, there is a lack of information about more specific risk factors such as mental disorders and alcohol abuse. Finally, we were not able to distinguish between full- and part-time employees.

A Lithuanian study reveals that healthcare workers face similar mortality risks to other occupational groups, but physicians face a significant excess of all-cause mortality. Additionally, suicide risk among physicians and other healthcare employees shows almost the same high risk as those employed in other sectors. These findings contribute to a better understanding of medical workers' overall mortality and suicide risk, providing valuable information for well-being and preventive programmes.

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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.

Conflict of interest: The authors declare no conflict of interest.

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analyses, or interpretation of data; the writing of the manuscript; or the decision to publish the results.

Data availability

The original data used in this study were provided by Statistics Lithuania. Due to the agreement terms and data protection rules, these data cannot be passed to the third party and should be requested directly from Statistics Lithuania.

Key points

- The new findings suggest that physicians become the highest all-cause mortality risk group after controlling for education.
- Even if physicians and other healthcare employees do not exhibit a higher suicide risk, this finding should be considered worrying due to the very high suicide rate in the general population of Lithuania.
- More detailed data and research are needed to understand and address peculiar mortality patterns of healthcare employees in Lithuania, especially with respect to the mortality disadvantage of physicians.
- The findings should be an additional reason to strengthen prevention and policies to tackle general health problems and the mental health of healthcare employees in Lithuania.

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III. Work-related stressors and psychological distress predict career change ideation among Lithuanian healthcare workers.

Kavaliauskas, P., Nomeikaite, A., Gelezelyte, O., Kazlauskas, E., & Smailyte, G. (2024). *International journal of occupational medicine and environmental health*, *37*(3), 287–299. https://doi.org/10.13075/ijomeh.1896.02350

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WORK-RELATED STRESSORS AND PSYCHOLOGICAL DISTRESS PREDICT CAREER CHANGE IDEATION AMONG LITHUANIAN HEALTHCARE WORKERS

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Abstract
Objectives: The study aimed to assess the mental health and well-being of Lithuanian healthcare workers by gathering demographic information, identifying common stressors affecting the work environment, evaluating mental health, and exploring directions for psychosocial care. Additionally, the research explored the prevalence of considering a career change among respondents. **Material and Methods:** The study included 1618 responders who completed an online survey in December 2021 – January 2022. Participants included in this study: physicians, nurses, residents and other healthcare workers. It evaluated their demographics, most common stressors affecting their work environment and mental health on the *Depression, Anxiety and Stress Scale – 21* (DASS-21) scale. Lastly, all responders asked if they had considered changing their occupation to a non-medical job. Univariate analysis was performed using χ^2 and Student's t test, and binary logistic regression evaluated career change predictors. **Results:** Career change was considered by 1081 (66.8%) responders. The main career change predictors were poor working conditions (OR 1.91, $p < 0.001$), direct contact with patients (OR 1.84, $p < 0.001$), lack of career perspectives (OR 1.95, $p < 0.001$), mobbing (OR 1.67, $p = 0.001$) and exhaustion (OR 1.51, $p = 0.005$). After evaluating DASS-21 scores, it was found that 23% of respondents had severe and extremely severe depression symptoms, 27.4% severe and extremely severe anxiety, and 21.4% had severe and extremely severe stress levels. **Conclusions:** Lithuanian healthcare workers are in high distress and have poor mental health. They are in need psychosocial assistance to avoid burnout and staff loss. Int J Occup Med Environ Health. 2024;37(3):287–99

Key words:
anxiety, burnout, mental health, depression, healthcare workers, career change

INTRODUCTION

Healthcare workers (HCWs) face high levels of occupational stress due to high professional demands, long and unpredictable working hours, night shifts, poor working conditions, and lack of positive feedback [1–3]. Work-related exhaustion may negatively affect mental health, such as depression, substance use, and suicidal thoughts [2,4]. Multiple studies show a high prevalence of burnout, depression, and anxiety among medical professionals [5–7]. High-stress levels and mental health prob-

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lems affect HCWs from the beginning of their careers and accompany them throughout their training and full-time employment [5,8]. Mata et al. [6] performed a meta-analysis of >50 studies with >8000 physician residents and found that almost one-third suffered from depression or depressive symptoms. Burnout has been shown to affect 40–75% of all doctors [5,9]. Poor psychological well-being of HCWs can lead to poor patient care, increased overall length of hospital stay, re-hospitalizations, and high rates of medical errors [2,10,11]. In the study of anesthesiology residents, 33% of respondents at high risk for burnout and depression reported multiple medical errors [9]. The same results can be seen among nurses [10,12] or physicians [11,13].

The 2019 COVID-19 pandemic has taken a toll on HCWs who were already working under stressful conditions. Globally, 23–40% of healthcare workers suffered from anxiety, 23–37% from depression, and almost half of them (49%) from post-traumatic stress disorder during the COVID-19 pandemic [14,15]. A meta-analysis by Johnset al. [16] concluded that although many of these studies are limited by heterogeneity and inconclusive results, depressive and anxiety symptoms were more common compared to the pre-pandemic period at 21% and 26%, respectively. HCWs working with COVID-19 patients were more likely to experience symptoms of depression and post-traumatic stress than those working in other departments [17].

Norkiene et al. [18] presented how psychological distress predicts career change ideation in the initial stages of the COVID-19 pandemic in Lithuania and the UK. The study conceptualized career change ideation as a cognitive process of rumination about the switch of career and moving out of healthcare services as a significant burnout indicator among medical professionals. The study found that nearly half of the HCWs (49%) considered changing careers and moving outside healthcare systems [18]. Younger age, working in the Lithuanian healthcare system, having low confidence in the effectiveness of the personal protective system, higher depression and stress levels, and lower psychological well-being was significantly associated with an increased carrier change ideation. This study in Lithuania was conducted on a sample of HCWs in intensive care. However, the authors hypothesized that these mental health problems are not specific to intensive care staff but prevalent among various other healthcare worker groups in Lithuania.

Occupational burnout emerges from prolonged, unaddressed work stress and consists of 3 main parts: emotional exhaustion, depersonalization, and low personal achievement [19]. Burnout, by its definition, is a condition that emerges from experience at work. In addition to this, the job demands-resources (JD-R) model [20] divides work-related risk factors into 2 main groups: job demands and job resources. The revised JD-R model [21] explained that if job resources and job demands are imbalanced, they cause strain on person psychological welfare and can cause burnout, and can create negative problems by causing mental and physical health problems. On the other hand, the authors supplemented the JD-R theoretical model with an engagement factor, which is the positive outcome of job resources leading to increased performance.

This study was focused on the medical community because it is a job with extreme demands, but on the other hand, it can be really rewarding. Additionally, people who join this HCWs community are highly motivated and devoted to their jobs. So, it was hypothesized that career change ideation is an indicator of burnout, and the authors wanted to evaluate how broadly it is widespread among Lithuanian HCWs. In addition, the study aimed to evaluate the occupational and mental health factors of Lithuanian HCWs related to career change ideation during the later stages of the COVID-19 pandemic. Furthermore, it was aimed to identify the prevalence and role of various risk factors associated with the mental

health of HCWs. Finally, the study explored potential directions for the development of psychosocial care for HCWs based on the findings.

MATERIAL AND METHODS

Participants and procedure

The study data was collected in December 2021 – January 2022 via an online platform designated for surveys. The invitation to participate in the study was distributed through various professional unions and associations, internal hospital networks, and Lithuanian HCWs' social networks. All professional organizations and professional unions that are registered in Lithuania and whose contact information is possible to acquire were invited to participate. There were no specialty-related selection criteria used to recruit participants for the survey. Two additional reminders were sent to invite HCWs to participate in the survey after the release of the initial invitation. All HCWs were invited to participate in this study to distinguish different medical professions as possible risk factors.

In total, 2354 responders opened the online survey, and 1653 fully completed the questionnaire. After excluding non-medical personnel, 1618 comprised the final sample and were included in data analysis. The participants' age ranged 19–76 years, and 88.4% were women. Detailed occupational and sociodemographic characteristics of the study participants are presented in Table 1.

Sociodemographic and occupational characteristics

General demographic statistics were collected such as gender, age, relationship status, profession, type of work, level of medical service provision, size of the city, where they work, workload and work experience after finishing training. A detailed search of the literature to identify factors that are associated with poorer mental health was performed. A combined list of negative factors affecting mental health was extracted from a high-volume meta-analysis and proven to be statistically significant as factors affecting burnout or depressiveness [2,19–23]. This list consists of these factors: poor working conditions, high workload, work with patients, lack of professional development, lack of career perspectives, managers, mobbing and exhaustion. The participants could check if one or another factor affected them. The factors were presented in items formulated in plain, daily language without additional explanations.

Psychological distress

The *Depression, Anxiety and Stress Scale – 21* (DASS-21) questionnaire was used to evaluate depression, anxiety and stress [24]. The DASS-21 is a widely used self-report measure which includes 3 subscales, measuring emotional states of depression, anxiety and stress levels. Each subscale consists of 7 items measured on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me most of the time). Each subscale gives a score, which is a sum of responses to each subscale question. The severity of each component was graded by its score: depression (normal/mild <7; moderate 7–10; severe >11), anxiety (normal/mild <6; moderate 6–7; severe >8), stress (normal/mild <10; moderate 10–12; severe >13). In the present study, Cronbach's α for each subscale in the current study was good: 0.89 (depression), 0.82 (anxiety) and 0.86 (stress). Previous studies supported the validity of the Lithuanian version of the DASS-21 scale [18,25]

Career change ideation

A single item is whether, in the last 12 months, the person had thought about changing their occupation to a non-medical job. Responders had 2 possible answers: yes or no.

Data analysis

Logistic binary regression was performed to assess the multivariate analysis of career change ideation pre-

Table 1. Characteristics of the study sample of Lithuanian healthcare workers who completed an online survey in December 2021 – January 2022

Variable	Participants (N = 1618)
Gender [n (%)]	
male	182 (11.2)
female	1431 (88.4)
other	5 (0.3)
Age [years] (M±SD)	40.43±12.61
Relationships [n (%)]	
not in a long-term relationship	336 (20.8)
in a long-term relationship	1282 (79.2)
Professions [n (%)]	
physician	561 (34.7)
resident	124 (7.7)
nurse	588 (36.3)
other	345 (21.3)
Field of work [n (%)]	
therapeutic specialist	192 (11.9)
surgical specialist	129 (8.0)
paediatric specialist	49 (3.0)
family medicine doctor	101 (6.2)
odontologist	90 (5.6)
resident doctor	124 (7.7)
nurse	588 (36.3)
other licensed medical worker	267 (16.5)
other medical worker (unlicensed nurse assistants included)	78 (4.8)
Type of work [n (%)]	
outpatient	904 (55.9)
inpatient	751 (46.4)
rehabilitation	118 (7.3)
nursing	185 (11.4)
emergency department	336 (20.8)
intensive care unit	138 (8.5)
Level of medical service provision [n (%)]	
primary	706 (43.6)
secondary	715 (44.2)
tertiary	617 (38.1)
Primary workplace location	
1 of the 5 biggest cities	1200 (74.2)
another smaller city	335 (20.7)
township/rural area	83 (20.7)
Workload [n (%)]	
<1 FTE	706 (43.6)
1 FTE	160 (9.9)
>1 FTE	752 (46.5)
Work experience after finished training [years] (M±SD)	16.15±13.15

FTE – full-time equivalent.

dictors. Statistical analysis was performed using IBM SPSS 26.0. Univariate analysis using χ^2 and Student's t test was used to investigate whether factors are significantly associated with career change ideation.

Ethical approval

Permission for the study was obtained from the Vilnius Regional Bioethics Committee (ID: 2021/5-1350-826). All participants were thoroughly introduced to the study and consented to participate before starting the online questionnaire. All methods were carried out following relevant local guidelines and regulations.

RESULTS

Work-related stressors

The prevalence of work-related stressors is presented in Table 2. On average, participants faced 3.21 stressors (SD = 1.65). Only 35 participants (2.2%) reported that they had not experienced any of the stressors listed.

Mental health indicators

Detailed scores of DASS-21 subscales evaluating levels of depression, anxiety and stress are presented in Table 3. It was found that almost 23% of respondents had severe

Table 2. Prevalence of work-related stressors among Lithuanian healthcare workers who completed an online survey in December 2021 – January 2022

Work stressor	Participants (N = 1618) [n (%)]
Poor working conditions	646 (39.9)
High workload	1007 (62.2)
Work with patients	466 (28.8)
Lack of professional development	383 (23.7)
Lack of career perspectives	422 (26.1)
Managers	596 (36.8)
Mobbing	518 (32.0)
Exhaustion	1152 (71.2)

Table 3. Prevalence of psychological distress in the *Depression, Anxiety and Stress Scale* – 21 (DASS–21) among the study sample of Lithuanian healthcare workers who completed an online survey in December 2021 – January 2022

DASS-21 sub-scale	Participants (N = 1618) [n (%)]
Depression	
normal/mild	780 (48.3)
moderate	465 (28.7)
severe	204 (12.6)
extremely severe	169 (10.4)
Anxiety	
normal/mild	699 (43.2)
moderate	477 (29.5)
severe	192 (11.9)
extremely severe	250 (15.5)
Stress	
normal/mild	909 (56.1
moderate	363 (22.4)
severe	276 (17.1)
extremely severe	70 (4.3)

and extremely severe depression symptoms, 27.4% severe and extremely severe anxiety, and 21.4% had severe and extremely severe stress levels.

Predictors of career change ideation

About two-thirds (N = 1081, 66.8%) of the sample considered changing careers in the last 12 months. A χ^2 test for independence indicated a significant association between career change ideation and all tested work stressors (Table 4). An independent-samples t-test was conducted to compare the DASS-21 scores for respondents with career change ideation and without. A significant difference was found in depression, anxiety, and stress scores for respondents with and without ideation.

Hierarchical binary logistic regression was performed to assess the role of factors on the likelihood that respondents would report that they had thought about changing career in the last 12 months. The first model contained 3 independent variables (age, sex and work experience). The complete model was statistically significant, χ^2 (2) = 58.07, $p < 0.001$, indicating that the model was able to distinguish between respondents who reported and did not report a career change ideation (Table 5). The model explained between 3.9% (Cox and Snell R^2) and 5.3% (Nagelkerke R^2) of the variance in career change ideation status and correctly classified 67.9% of cases. Two significant predictors of reporting career change ideation were gender and age, with an odds ratio of 1.44 and 0.95, respectively.

Eight work-related stressors that were identified as statistically significant in univariate analysis (Table 4) were added to the second model, which was statistically significant, χ^2 (10) = 296.03, $p < 0.001$, and significantly improved the model fit of the first model (χ^2 (8) = 237.39, $p < 0.001$). The model explained between 18.0% (Cox and Snell R^2) and 25.0% (Nagelkerke R^2) of the variance in career change ideation status and correctly classified 74.5% of cases.

In the third model, mental health factors – depression, anxiety, stress – were added as predictors. The entire model containing all predictors was statistically significant,

Table 4. The relationship between career change ideation and occupational and sociodemographic factors among Lithuanian healthcare workers who completed an online survey in December 2021 – January 2022

Variable	Participants (N = 1618)		χ^2 (df)	t (df)
	no career change ideation (N = 537)	career change ideation (N = 1081)		
Gender [n (%)]			4.96 (2)	
male	70 (13.0)	112 (10.4)		
female	467 (87.0)	964 (89.2)		
other	0 (0.0)	5 (0.5)		
Age [years] (M±SD)	43.77±13.49	38.76±11.81		–7.32 (953.33) ***
Relationship status [n (%)]			0.71 (1)	
in a long-term relationship	419 (78.9)	863 (79.8)		
not in a long-term relationship	118 (22.0)	218 (20.2)		
Workload [n (%)]			2.72 (2)	
<1 FTE	221 (41.2)	485 (44.9)		
1 FTE	60 (11.2)	100 (9.3)		
>1 FTE	256 (47.7)	496 (45.9)		
Work experience [years] (M±SD)	18.9±14.0	14.7±12.5		5.76 (923.73)***
Workplace location [n (%)]			3.75 (2)	
1 of the 5 biggest	385 (71.7)	815 (75.4)		
another smaller city	126 (23.5)	209 (19.3)		
township/rural area	26 (4.8)	57 (5.3)		
Specialization [n (%)]			6.29 (3)	
physician	185 (34.5)	376 (34.8)		
resident	29 (5.4)	95 (8.8)		
nurse	205 (38.2)	383 (35.4)		
other	118 (22.0)	227 (21.0)		
Work stressor [n (%)]				
poor working conditions			94.97 (1)***	
no	413 (76.9)	559 (51.7)		
yes	124 (23.1)	522 (48.3)		
workload			36.16 (1)***	
no	258 (48.0)	353 (32.7)		
yes	279 (52.0)	728 (67.3)		
direct contacts with patients			28.34 (1)***	
no	428 (79.7)	724 (67.0)		
yes	109 (20.3)	357 (33.0)		

Table 4. The relationship between career change ideation and occupational and sociodemographic factors among Lithuanian healthcare workers who completed an online survey in December 2021 – January 2022– cont.

Variable	Participants (N = 1618)		χ^2 (df)	t (df)
	no career change ideation (N = 537)	career change ideation (N = 1081)		
Work stressor [n (%)]– cont.				
lack of personal improvement			14.94 (1)***	
no	441 (82.1)	794 (73.5)		
yes	96 (17.9)	287 (26.5)		
lack of career perspectives			55.68 (1)***	
no	459 (85.5)	737 (68.2)		
yes	78 (14.5)	344 (31.8)		
managers			41.43 (1)***	
no	398 (74.1)	624 (57.7)		
yes	139 (25.9)	457 (42.3)		
mobbing			57.35 (1)***	
no	432 (80.4)	668 (61.8)		
yes	105 (19.6)	413 (38.2)		
exhaustion			79.21 (1)***	
no	231 (43.0)	235 (21.7)		
yes	306 (57.0)	846 (78.3)		
Mental health factor (M±SD)				
depression	4.72±3.60	8.58±4.43		18.77 (1283.70)***
anxiety	4.06±3.25	6.38±3.87		12.64 (1248.76)***
stress	7.14±3.46	10.25±3.82		16.43 (1168.43)***

df – degrees of freedom; FTE – full-time equivalent.
* p < 0.05; ** p < 0.01; *** p < 0.001.

χ^2 (13) = 424.99, p < 0.001, and significantly improved the model fit of the second model (χ^2 (3) = 128.96, p < 0.001). The model explained between 24.8% (Cox and Snell R^2) and 34.4% (Nagelkerke R^2) of the variance in career change ideation status and correctly classified 78.4% of cases. The strongest predictor of reporting career change ideation was depression, recording an OR of 1.19. This indicated that respondents with higher levels of depression were more likely to report career change ideation than those with lower levels of depression, controlling for all other factors in the model.

DISCUSSION

The current study evaluated mental health and career change ideation in a large sample of Lithuanian HCWs during the COVID-19 pandemic. The authors found that two-thirds (66.8%) of Lithuanian HCWs have considered quitting their job in the last 12 months to work in a non-medical field. A similar study which collected data in 2020 by Norkiene et al. [18] reported that 59.6% of intensive care staff in Lithuania at the peak of the COVID-19 pandemic outbreak exhibited career change ideation. The data collection was in the later stages of the COVID-19

Table 5. Predictors of reporting career change ideation among Lithuanian healthcare workers who completed an online survey in December 2021 – January 2022

Variable	OR	95% CI	p
Step 1			
gender (male)	1.43	1.01–2.02	**0.04**
age	0.95	0.93–0.98	**<0.001**
work experience	1.02	0.99–1.04	0.13
Step 2			
gender (male)	1.6	1.09–2.36	0.017
age	0.97	0.95–0.99	**0.006**
work experience	1.02	0.99–1.04	**0.163**
poor working conditions	2.22	1.69–2.92	**<0.001**
workload	1.62	1.26–2.08	**<0.001**
direct contacts with patients	2.19	1.65–2.91	**<0.001**
lack of personal improvement	1.09	0.80–1.51	0.576
lack of career perspectives	2.24	1.61–3.11	**<0.001**
managers	1.29	0.98–1.71	0.074
mobbing	2.37	1.76–3.19	**<0.001**
exhaustion	2.27	1.74–2.94	**<0.001**
Step 3			
gender (male)	1.34	0.89–2.01	0.162
age	0.96	0.94–0.99	**0.003**
work experience	1.02	0.99–1.04	0.086
poor working conditions	1.91	1.43–2.55	**<0.001**
workload	1.46	1.17–1.91	**0.006**
direct contacts with patients	1.84	1.37–2.48	**<0.001**
lack of personal improvement	1.01	0.73–1.43	0.916
lack of career perspectives	1.95	1.37–2.75	**<0.001**
managers	1.15	0.85–1.54	0.368
mobbing	1.67	1.22–2.29	**0.001**
exhaustion	1.51	1.46–2.01	**0.005**
depression	1.19	1.13–1.25	**<0.001**
anxiety	0.98	0.93–1.03	0.430
stress	1.06	1.00–1.13	**0.05**

Bolded are marked as $p < 0.05$.
A hierarchical binary logistic regression was conducted to examine the influence of factors on the probability of respondents reporting that they had thought about changing career within the last year. The first step (model) contained three independent variables (age, sex, and work experience). Eight work-related stressors, identified as statistically significant in univariate analysis, comprised the second step (model). In the third step (model), mental health factors – depression, anxiety, and stress – were added as predictors. A detailed explanation is presented in the results section under the "Predictors of career change ideation" paragraph.

pandemic after 2 waves of COVID outbreak at the end of 2021, beginning in 2022. At the end of the data collection, Lithuania was hit by the third and most intense of the COVID waves, with the highest number of cases [26]. However, vaccines were available during this period, massive vaccination was active in Lithuania, and most HCWs had their vaccine shots [27,28].

Furthermore, it was more known how to treat coronavirus-infected patients; the whole population had a better understanding of this infection and the prevention of spreading the disease as the WHO and the local government released treatment and prevention guidelines [25,29]. Still, the latter study found an even higher prevalence of career change ideation than in data in 2020 [18]. On the one hand, it was an unexpected finding. However, it can also result from fatigue from the prolonged stressors associated with the pandemic and its burden on the healthcare system [30]. On the other hand, the authors evaluated a much broader spectrum of Lithuanian HCW and included people working in other departments.

It was found that demographic characteristics and occupational factors were important in predicting career change ideation. In this study, as in similar studies, younger age and less professional experience were risk factors for burnout [1,14,18,20]. Furthermore, it was identified that work conditions, workload, work with patients, lack of career perspectives, managers, and mobbing were significant factors associated with career change ideation. Work-related factors are commonly known and proven causes of burnout and are highly related to career change ideation [1,20–22,31]. These factors are confirmed through multiple studies with different medical specialities; however, they look typical for all HCWs. The research found no statistically significant differences regarding career change ideations among the profession.

Another important finding of this study was that psychological distress was associated with career change ideation. Healthcare staff who reported career change ideation had higher levels of depression, anxiety and stress. Occupational stress results in burnout in many medical specialities [32,33]. However, the authors did not find any statistical differences in mental health indicators predicting career change ideation after evaluating different specialities of healthcare professionals. Some data shows that emergency department workers are more prone to burnout [19]. On the other hand, career satisfaction is related to less burnout [22,34].

Evaluation of mental health showed poor psychological condition among Lithuanian HCWs. Only half of the evaluated population had no or only mild symptoms of distress and anxiety subscales. Previous studies showed that psychological distress was associated with increased physical symptoms such as headaches, throat pain, anxiety, lethargy [35] and insomnia [35,36] in HCWs samples. Furthermore, high distress was highly correlated with burnout syndrome [37,38] – moreover, higher distress scores were linked with increased ideation for a career change. The findings in anxiety prevalence are also comparable to worldwide data, which ranges 22.6–36.3% [15,38–41]. However, anxiety can often be undetected and untreated [42,43]. Anxiety usually starts in medical school, where more than one-third of students globally suffer from it [44]. Still, a detailed evaluation of the most affected population is required.

Logistic regression revealed that depression was the strongest predictor explaining ideation for a career change. These findings are in line with previous studies. A study from Poland compared 2 burnout scales and concluded that depression explains dimensions of exhaustion and a sense of disillusion [45]. A recent meta-analysis revealed that almost one-quarter of all HCWs and 43% of frontline workers in the COVID-19 pandemic suffered from depression [46]. Even though the pandemic is under control, the new variants of COVID-19 pose a significant threat to all HCWs [47]. Multiple strategies can be applied to improve the mental health of HCWs.

Cognitive behavioural therapy, mindfulness-based psychosocial well-being promotion programs, and strict work-hour limitations can improve productivity and help manage burnout in HCWs [2]. In addition, organization-directed interventions may have significant effects on lower burnout rates in HCWs [48], which can be applied to improve personnel wellbeing.

It is essential to look at the results of this study in the context of its limitations. First of all, it was a cross-sectional study. Situation changes and different stressors occur in everyday life. Therefore, longitudinal studies are needed to explore future mental health changes and career change ideation. Secondly, the study was limited in how many questions could be asked in the survey. Thus, future studies may focus on career change ideation using a more elaborate measure. A short survey is essential to keep responders interested and engaged with not overwhelmingly long surveys and letting investigators evaluate a representative part of the population. Thirdly, the authors tried to include as many HCWs as possible. However, the sample was predominantly female. The self-referral to the study of more active or prone to participate responders could cause biased investigation results. Furthermore, items with binary response options were used to evaluate the prevalence of work-related stress factors and career change ideation, which can constrain the generalizability of the results. In addition, the COVID-19 pandemic could have significantly impacted this study findings, mainly because the authors did not have robust pre-pandemic data on mental health and career change ideation in Lithuanian HCWs. Even in the context of the study's limitations, this study is the most extensive study on work-related and mental health stressors among HCWs in Lithuania.

The study reported the results of a large sample of Lithuanian HCWs. Additionally, even though some factors do not significantly correlate with career change ideation, they are affecting more than two-thirds of the population. This is why it is important to address the mental health of HCWs because, with clearly identified problems, it becomes much easier to address them.

CONCLUSIONS

The study found that 66.8% of Lithuanian HCWs had an ideation to change career outside medicine in the last 12 months. Age, work experience, poor working conditions, workload, work with patients, lack of career perspectives, mobbing, exhaustion, depression, anxiety and stress were significant risk factors for career change ideation. The strongest career change predictors were poor working conditions, direct contact with patients, lack of career perspectives, mobbing and exhaustion. Planned and consistent psychosocial interventions are needed to manage occupational stress and mental health in medical staff, and findings from this study could be used in planning well-being programs for healthcare staff.

Author contributions

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IV. Suicide risk factors among Lithuanian medical doctors and residents.

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Suicide risk factors among Lithuanian medical doctors and residents

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Abstract

Background Medical doctors and residents are regularly exposed to multiple stressors that may lead to mental health problems. Work-related stressors contribute to elevated levels of psychological distress, anxiety, and depression among health care workers. This is the first investigation evaluating suicidal behaviour and thoughts among Lithuanian medical doctors and residents exposed to various professional stressors at two years after the start of the COVID-19 pandemic. The aim of the study was to evaluate suicidality and factors associated with high suicide risk in a large sample of Lithuanian medical doctors and residents.

Methods The research included 685 participants who completed an online questionnaire over a two-month period in December 2021 and January 2022. Medical doctors and residents from all specialties were invited to participate in the survey. The most common stressors in their work environment were measured. Mental health was assessed using the Depression, Anxiety and Stress Scale-21 (DASS-21) scale, and suicidality was measured with the Suicidal Behaviors Questionnaire-Revised (SBQ-R).

Results The lifetime suicide risk was found in 30.4% of the sample. Moreover, 11.4% of medical doctors and residents were identified as having previous or current suicide planning ideation, and 2.5% reported a previous suicide attempt. Univariate analysis showed that younger age, having no long-term relationships, shorter work experience, career change ideation, higher depression and anxiety, poor working conditions, at the direct contact with patients, lack of career perspectives, and exposure to mobbing and exhaustion at work were statistically significant risk factors for higher suicidality. Furthermore, regression analysis supported that having no long-term relationship, high depression, and high anxiety were significant risk factors for suicide risk in the sample.

Conclusion We found out that almost one-third of medical doctors and residents had lifetime suicide ideations and behaviours at the high suicide risk level. Main suicide risk factors were poor mental health, work-related stressors, and a lack of long-term relationships. The results of the study can help to develop prevention strategies by identifying populations that may be at high risk for mental health problems and provide evidence in implementing specific interventions to address mental health problems in healthcare workers.

Keywords Medical doctors and residents, Lithuania, Suicidal behavior, Suicide risk

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Text box 1. Contributions to the literature

• Medical doctors encounter enormous demands, high workloads, and long working hours. Work-related exhaustion may negatively affect mental health, such as depression, anxiety problems, and suicidal thoughts.

• Our data offers profound insights into the mental health of Lithuanian medical doctors. Given the dearth of studies on occupation-related mental health issues in our country, this study establishes baseline data for future investigations.

• Implementing mental health policies, prevention programs, and our data-based interventions in daily practice is mandatory.

Background

Healthcare workers are routinely exposed to professional stressors that may increase mental health problems, including a higher risk for suicidal behaviour [1, 2]. Previous studies have indicated that physicians are at higher risk of suicide than the general population [3]. A meta-analysis by Dutheil et al. [4] concluded that physicians are professionals at risk for a suicide attempt, and female gender is a risk factor in this professional group. A study from Aasland analysing 40 years of mortality rates of Norwegian doctors showed that doctors had higher mortality rates than other professions representatives due to higher suicide rates among doctors [5]. Historically, physician suicide rates were 1.5 times higher than in the general population. However, the gap between the general population and physician suicide rates is closing [6]. Similar results are seen among medical doctors in Denmark's population, where total suicide rates were 1.6 times higher than the general population [7].

The COVID-19 pandemic increased psychological distress, anxiety, and depression among healthcare workers [8, 9]. Studies conducted during COVID-19 reported different levels of suicidal ideation among doctors and other healthcare professionals. A study from the United Kingdom found that in six COVID-19 pandemic months, suicidal ideation among healthcare workers slightly increased from 10.8 to 11.3% of respondents [10]. A review from Groves et al. [11] showed that among nursing professionals, psychiatric, psychological, physical, occupational, and alcohol problems contributed to the higher suicide risk during the COVID-19 pandemic. In addition, research in Mexico found that 62% of nurses and 52.7% of doctors had suicidal risk [12].

This study aimed to evaluate suicidality and factors associated with suicide risk among medical doctors and residents in Lithuania at the two years after the start of COVID-19. In particular, we aimed to explore suicidality, identify the prevalence of suicide risk among medical doctors and residents, and identify how anxiety, depression, and various professional stressors are associated with high suicide risk.

Methods

Participants and procedure

The data collection period lasted from December 2021 to January 2022. We invited participants to respond to an online survey during this two-month period. Invitations to participate in the study were distributed through professional unions and associations of medical doctors, internal hospital networks, and Lithuanian doctors and residents social network groups. Participants were reminded twice to complete questionnaires after the initial invitation. Data from a total of 561 medical doctors and 124 residents who completed the survey were included in the analysis.

Sociodemographic statistics and covariates

General demographic data was collected, including gender, age, relationship status, profession, type of work, level of medical service provision, size of the city, where they work, workload, and work experience after finishing training. A comprehensive search of the available literature was carried out with the purpose of identifying factors that are associated with poorer mental health among medical doctors. For the purpose of evaluating the role of factors that affect mood disorders, stress, and burnout, a comprehensive list of negative factors that have an impact on mental health was extracted from a high-volume meta-analysis [1, 2, 13–16]. These factors included poor working conditions, high workload, work with patients, lack of professional development, lack of career perspectives, problems with managers, mobbing, and exhaustion. Respondents were asked to indicate if any of those factors affected their daily lives by responding on a binary "yes/no" to the items listing these factors.

Suicide risk and psychological distress

The Suicidal Behaviors Questionnaire-Revised (SBQ-R) was used to evaluate suicidality in the sample [17]. The American Psychological Association describes suicidality as the risk of suicide, usually indicated by suicidal ideation or intent [18]. The SBQ-R comprises four items, each covering a different dimension of suicidality: the first item - lifetime suicidal ideation and attempts; the second - frequency of suicidal ideation over the preceding 12 months; the third - the threat of suicide attempts; and lastly, the fourth - self-reported probability of suicidal behaviour in the future. The four SBQ-R items are each rated on Likert type scale. The total score of the SBQ-R is the sum of responses to all four items and range between 3 and 18 with higher score indicating a higher suicidality and a larger suicide risk. A sum of points with a cut-off of ≥7 indicates high suicide risk for the general population studies. The Cronbach alpha for this scale was 0.8. The four SBQ-R items allow for the collection of a wide variety of information. The cut-off score of the

SBQ-R may be used for screening for the suicide risk in the sample, and individual items tap into various aspects of suicidality, e.g., Item 1: lifetime suicide ideation and/or suicide attempts.

The Depression, Anxiety and Stress Scale −21 (DASS-21) was used for the assessment of depression and anxiety [19]. The DASS-21 is a widely used self-report measure that includes three subscales, measuring depression, anxiety, and stress levels. Each subscale consists of seven items measured on a 4-point Likert scale ranging from 0 (did not apply to me at all) to 3 (applied to me most of the time). The DASS-21 subscales are scored by summing the responses to each of the item with a higher score indicating higher depression or anxiety. We used these cut-off scores to identify the severity of depression and anxiety based on the previous studies: depression (normal < 9; mild 10–13; moderate 14–20; severe 21–27; extremely severe ≥ 28), anxiety (normal < 7; mild 8–9; moderate 10–14; severe 15–19; extremely severe ≥ 20). In this study, only two scales (DASS-21) were included in the data analysis. The Cronbach alpha for depression and anxiety scales were 0.89 and 0.82, respectively.

Data analysis

Statistical analysis was performed using IBM SPSS 26.0. Chi-square and Student-t tests were used for univariate analysis to identify statistically significant risk factors for suicidal ideation. Hierarchical binary logistic regression was performed to assess predictors of high suicide risk in a multivariate analysis. Results were held statistically significant when $p < 0.05$.

Results

The sample included 685 medical doctors and residents. The age ranged from 22 to 76 years. Most participants were female (78.7%) and in a long-term relationship (81.2%). Detailed sociodemographic statistics are shown in Table 1. A total of 208 (30.4%) respondents scored ≥ 7 on the SBQ-R, indicating lifetime suicide risk. Based on the SBQ-R first item, which measures suicide ideation, 282 (41.2%) of respondents reported they had suicidal thoughts in their lifetime. Furthermore, previous suicidal planning was reported by 78 (11.4%) of respondents, and 17 (2.5%) respondents reported previous suicide attempts, of whom 11 attempted suicide once, 5 twice, and 1 three times.

Work-related stress factors associated with suicidal behaviour were high workload, lack of professional development, lack of career perspectives, mobbing, and exhaustion. Detailed analysis is represented in Table 2.

Hierarchical binary logistic regression was performed to assess the role of factors associated with high suicide risk in the sample. The first model contained three independent variables (age and gender). The complete model was statistically significant, χ^2 (2) = 12.93, $p = 0.002$, indicating that the model was able to distinguish between low-risk and high suicide risk participants. The model explained between 1.9% (Cox and Snell R square) and 2.6% (Nagelkerke R squared) of the variance in suicide risk and correctly classified 69.6% of cases. One significant predictor of reporting high suicide risk was age, with an odds ratio of 0.981.

In the second model, which was statistically significant, χ^2 (6) = 57.48 $p < 0.001$, we added three statistically significant, not adjustable factors: relationship status, having children, and career change ideation. The model improved and explained between 9.7% (Cox and Snell R square) and 13.9% (Nagelkerke R squared) of the variance in suicide risk status and correctly classified 72% of cases.

In the third model, significant work-related stress factors were added to the model: poor working conditions, direct contact with patients, lack of career perspectives, mobbing, and exhaustion. The entire model containing all predictors was statistically significant, χ^2 (11) = 68.15, $p < 0.001$. The model explained between 11.4% (Cox and Snell R square) and 16.3% (Nagelkerke R squared) of the variance in suicidal risk and correctly classified 71.5% of cases.

The fourth and final model in Table 3 included mental health indicators – depression and anxiety as predictors. The entire model containing all predictors was statistically significant, χ^2 (12) = 130,87, $p < 0.001$. The model explained between 20.8% (Cox and Snell R square) and 29.7% (Nagelkerke R squared) of the variance in suicide risk and correctly classified 77.4% of cases. After adding mental health factors, three statistically significant predictors for high suicide risk were left, which were depression, anxiety, and not being in a long-term relationship. Detailed analysis is reported in Table 3.

Discussion

We present the first study of Lithuanian medical doctors' and residents' suicidality in the late COVID-19 pandemic period. We found out that almost one-third of respondents had lifetime suicide ideation and behaviors at the high suicide risk level, and the most significant factors associated with the high suicide risk in our study were depression, various work-related stressors, and having no long-term relationship.

First, we identified that 30.4% of medical doctors and residents had suicide risk. Study findings are comparable to other studies that explored suicide risk in medical students and medical doctors; however, we found higher levels of suicidality in comparison to other studies. A study from India analysing medical students found even higher results: 37.2% of respondents had suicidal ideation, 10.9% planned suicide, and 3.3% mentioned attempting suicide [20]. Among German veterinary

Table 1 Sociodemographic characteristics and suicide risk in Lithuanian medical doctors and residents

Variable	Overall population ($N=685$)	SBQ-R* Score		P
		< 7 (low suicide risk) ($N=519$)	≥ 7 (high suicide risk) ($N=208$)	
Gender (%)				$P=0.279$
Male	146 (21.3%)	107 (73.3%)	39 (26.7%)	
Female	539 (78.7%)	370 (68.6%)	169 (31.4%)	
Age (years, mean, SD)	39.57 (± 12.25)	40.63 (± 12.46)	37.14 (± 11.4)	$P=0.001$
Relationships				
Not in a long-term relationship	129 (18.8%)	73 (56.6%)	56 (43.4%)	$P<0.001$
In a long-term relationship	556 (81.2%)	404 (72.7%)	152 (27.3%)	
Having children				
Yes	389 (56.8%)	293 (75.3%)	96 (24.7%)	$P<0.001$
No	296 (43.2%)	184 (62.2%)	112 (37.8%)	
Professions				
Medical doctor	561 (81.9%)	399 (71.1%)	162 (28.9%)	$P=0.072$
Resident	124 (18.1%)	78 (62.9%)	46 (37.1%)	
Type of work				
Outpatient				
Yes	479 (69.9%)	337 (70.4%)	142 (29.6%)	$P=0.532$
No	206 (30.1%)	140 (68.0%)	66 (29.6%)	
Inpatient				
Yes	343 (50.1%)	243 (71.1%)	99 (28.9%)	$P=0.42$
No	342 (49.9%)	234 (68.2%)	109 (31.8%)	
Rehabilitation				
Yes	26 (3.8%)	22 (84.6%)	4 (15.4%)	$P=0.09$
No	659 (96.2%)	455 (69.0%)	204 (31.0%)	
Nursing				
Yes	12 (1.8%)	11 (91.7%)	1 (8.3%)	$P=0.094$
No	673 (98.2%)	466 (69.2%)	207 (30.8%)	
Emergency department				
Yes	188 (27.4%)	121 (64.4%)	67 (35.6%)	$P=0.065$
No	497 (72.6%)	356 (71.6%)	141 (28.4%)	
Intensive care unit				
Yes	57 (8.3%)	36 (63.2%)	21 (36.8%)	$P=0.267$
No	628 (91.7%)	441 (70.2%)	187 (29.8%)	
Level of medical service provision				
Primary				
Yes	285 (41.6%)	201 (70.5%)	84 (29.5%)	$P=0.669$
No	400 (58.4%)	276 (69.0%)	124 (31.0%)	
Secondary				
Yes	323 (47.2%)	229 (70.9%)	94 (29.1%)	$P=0.497$
No	362 (52.8%)	248 (68.5%)	114 (31.5%)	
Tertiary				
Yes	313 (45.7%)	221 (67.4%)	102 (32.6%)	$P=0.246$
No	372 (54.3%)	266 (71.5%)	106 (28.5%)	
Primary workplace location				
One of the five biggest cities	542 (79.1%)	374 (69.0%)	168 (31.0%)	$P=0.776$
Another smaller city	117 (17.1%)	84 (71.8%)	33 (28.2%)	
Township/rural area	26 (3.8%)	19 (73.1%)	7 (26.9%)	
Workload (Full-Time equivalent)				
< 1 FTE	72 (10.5%)	55 (76.4%)	17 (23.6%)	$P=0.418$
1 FTE	236 (34.5%)	162 (68.6%)	74 (31.4%)	
> 1 FTE	377 (55%)	260 (69.0%)	117 (31.0%)	
Average work experience after finished training (years) *M* (*SD*)	14.75 (± 12.58)	15.72 (± 12.38)	12.38 (± 11.86)	$P=0.004$

Table 1 (continued)

Variable	Overall population ($N=685$)	SBQ-*R** Score		*P*
		< 7 (low suicide risk) ($N=519$)	≥ 7 (high suicide risk) ($N=208$)	
Had career change ideation in last 12 months				
Yes	471 (68.8%)	297 (63.1%)	174 (36.9%)	$P<0.001$
No	214 (31.2%)	180 (84.1%)	34 (15.9%)	
Depression, according to DASS-21				
None	203 (29.6%)	178 (87.7%)	25 (12.3%)	$P<0.001$
Mild	104 (15.2%)	82 (78.8%)	22 (21.2%)	
Moderate	192 (28%)	140 (72.9%)	52 (27.1%)	
Severe	91 (13.3%)	49 (53.8%)	42 (46.2%)	
Extremely severe	95 (13.9%)	28 (29.5%)	67 (70.5%)	
Anxiety, according to DASS-21				
None	253 (36.9%)	218 (86.2%)	35 (13.8%)	
Mild	69 (10.1%)	53 (76.8%)	16 (23.2%)	$P<0.001$
Moderate	198 (28.9%)	133 (67.2%)	65 (32.8%)	
Severe	67 (9.8%)	33 (49.3%)	34 (50.7%)	
Extremely severe	98 (14.3%)	40 (40.8%)	58 (59.2%)	

* SBQ-R - The Suicidal Behaviors Questionnaire-Revised

Table 2 Work-related stress factors associated with high suicide risk in Lithuanian medical doctors and residents

Variable	Overall population	SBQ-*R** Score		*P*
		< 7(low suicide risk)	≥ 7 (high suicide risk)	
Work-related stressors				
Poor working conditions				
Yes	282 (41.2%)	182 (64.5%)	100 (35.5%)	$P=0.015$
No	403 (58.8%)	295 (73.2%)	108 (26.8%)	
High workload				
Yes	465 (67.9%)	313 (67.3%)	152 (32.7%)	$P=0.055$
No	220 (32.1%)	164 (74.5%)	56 (25.5%)	
Direct contact with patients				
Yes	243 (35.5%)	142 (64.8%)	77 (35.2%)	$P=0.034$
No	442 (64.5%)	335 (71.9%)	131 (28.1%)	
Lack of professional development				
Yes	219 (32%)	156 (71.2%)	63 (28.8%)	$P=0.061$
No	466 (68%)	363 (77.9%)	103 (22.1%)	
Lack of career perspectives				
Yes	188 (27.4%)	120 (63.8%)	68 (36.2%)	$P=0.042$
No	497 (72.6%)	357 (71.8%)	140 (28.2%)	
Managers				
Yes	222 (32.4%)	144 (64.9%)	78 (35.1%)	$P=0.06$
No	463 (67.6%)	333 (71.9%)	130 (28.1%)	
Mobbing				
Yes	185 (27%)	109 (58.9%)	76 (41.1%)	$P<0.001$
No	500 (73%)	368 (73.6%)	132 (26.4%)	
Exhaustion				
Yes	521 (76.1%)	345 (66.2%)	176 (33.8%)	$P=0.001$
No	164 (23.9%)	132 (80.5%)	32 (19.5%)	

*SBQ-R - The Suicidal Behaviors Questionnaire-Revised

students, suicidal ideation reached 19.9% [21]. Suicidal ideation among physicians in two-volume meta-analyses reaches 17–17.4% [4, 22], while suicidal attempts reach 1.8% in lifetime [22]. These results are comparable to ours, and they are much higher than the general prevalence of suicidal ideation among the general population, which ranges through different investigations from 4.6 to 10.72% [23–25]. A high-volume meta-analysis pooled

Table 3 Multivariate analysis of predictors for high suicide risk in Lithuanian physician and residents population ($N = 685$)

		Odds Ratio	95.0% C.I. for Odds Ratio		*P*
			Lower	Upper	
Step 1	Gender (male)	1.2	0.79	1.82	0.37
	Age	1.025	1.01	1.04	**0.001**
Step 2	Gender (male)	0.88	0.54	1.44	0.61
	Age	1.01	0.93	1.08	0.92
	Relationship status (no relationship)	2.71	1.63	4.48	**< 0.000**
	Having children	1.33	0.83	2.13	0.24
	Work experience	0.98	0.92	1.05	0.64
	Career change ideation	3.47	2.13	5.65	**< 0.000**
Step 3	Gender (male)	1.12	0.72	1.99	0.48
	Age	0.99	0.92	1.07	0.82
	Relationship status (no relationship)	2.71	1.62	4.53	**< 0.000**
	Having children	0.81	0.49	1.31	0.38
	Work experience	0.99	0.93	1.07	0.9
	Career change ideation	2.63	1.57	4.42	**< 0.000**
	Poor working conditions	1.11	0.73	1.7	0.63
	Direct contact with patients	1.22	0.81	1.85	0.33
	Lack of career perspectives	1.18	0.75	1.86	0.46
	Mobbing	1.66	1.04	2.63	**0.03**
	Exhaustion	1.56	0.93	2.62	0.08
Step 4	Gender (male)	0.77	0.45	1.34	0.36
	Age	0.99	0.91	1.08	0.87
	Relationship status (no relationship)	2.48	1.42	4.32	**0.001**
	Having children	0.92	0.55	1.55	0.75
	Career change ideation	1.58	0.91	2.76	0.1
	Poor working conditions	1.01	0.64	1.58	0.98
	Direct contact with patients	1.11	0.71	1.71	0.67
	Lack of career perspectives	0.93	0.57	1.53	0.78
	Mobbing	1.14	0.69	1.89	0.61
	Exhaustion	1.19	0.68	2.08	0.54
	Depression				
	Normal	1	0.68	3.13	0.33
	Mild	1.46	0.91	3.49	0.09
	Moderate	1.77	1.48	7.66	**0.004**
	Severe	3.38	3.01	16.67	**< 0.001**
	Extremely severe	7.09			
	Anxiety				
	Normal	1			
	Mild	0.91	0.39	2.1	0.82
	Moderate	1.68	0.93	3.04	0.083
	Severe	2.94	1.32	6.56	**0.008**
	Extremely severe	2.19	1.01	4.73	**0.047**

Note CI – confidence interval

the prevalence of suicidal ideation for the general population at 12.1% [26]. A systematic review by García-Iglesias showed that during the COVID-19 pandemic, healthcare professionals reported increased suicidal ideation ranging from 2.4 to 21.7%, and 0.5–3.5% reported recent suicide attempts [27].

Secondly, we identified that relationship status, career change ideation, mobbing and exhaustion were associated with suicidality in our sample. Social isolation has strong links with suicide [28]. Additionally, the interpersonal theory of suicide suggests that thwarted belongingness, perceived burdensomeness [29] and loneliness [26] are associated with suicidal ideation. Career change ideation is a factor associated with burnout [30]. Burnout is prevalent among physicians [30–32]. If not addressed, burnout can be one of the factors increasing the risk of suicide [31]. Mobbing is a common risk factor in the workplace, even though it should be a strict taboo in any

organisation. A study from Turkey evaluating mobbing experience by nurses found that 10% of participants were considering suicide [33]. Exhaustion was also proved to be a risk factor for suicidal risk in previous studies [26].

In our study, depression and anxiety were among the factors that had the largest prediction values for high suicide risk in the regression analysis in our sample. A meta-analysis published by Ribeiro et al. [34] found that depression and hopelessness were associated with a 1.96 increased risk for suicide ideation, 1.63 for suicide attempt, and 1.33 for death from suicide. However, the authors of this study admitted that some methodical constraints limited the expected effect of depression on suicidal behaviour. The Diagnostic and Statistical Manual of Mental Disorders 5th edition states that one of the main features of major depression is thoughts about death and suicide [35]. Furthermore, underlying anxiety can additionally increase suicide risk [36, 37]. A study by the World Health Organisation by Bertolote concluded that 98% of death by suicide had links with mental disorders and 30.2% with mood disorders [38]. Depression is associated heavily with physicians' and residents' lives. It starts in medical school, where it is shown that after medical school, depression symptoms increase by 13.5% [39]. Residents have a high prevalence of depression, which varies from 23.2 to 28% [40–42] and even 43% for frontline workers [41].

Regarding the limitations of this study, it is essential to note that study participants were self-referred and not randomly selected. This can lead to a selection bias, and results can show the state of the more active part of the medical doctor population in Lithuania, or those having higher mental health issues might have been more inclined to fill in the survey. Another limitation is that it is not a longitudinal study, so it is hard to determine how suicide risk changes over time. The study design did not allow us to evaluate the effects of the COVID-19 pandemic on the study findings. Our data collection was conducted in December 2021 and January 2022. At that time, Lithuania already dealt with two COVID-19 waves and successfully dealt with them [43]. In addition, vaccination was at the highest pace [44] and it was much more known how to deal with this disease. World Health Organisation prepared and extended guidelines [45] and personal protective equipment was available and accessible. The study data was collected when most medical doctors were vaccinated for COVID-19 in Lithuania. Lastly, the COVID-19 pandemic did not end, and the disease is a huge part of everyday doctors lives [46].

Conclusions

This is the first empirical study to report suicidality in a large sample of the Lithuanian medical doctors and residents using the SBQ-R. The lifetime suicide risk was found in 30.4% of respondents. Moreover, 11.4% of respondents had suicidal planning ideation in their lifetime, and 2.5% reported previous suicide attempts. Multivariate binary regression showed that having no long-term relationships, higher depression and anxiety were significant suicide risk factors in medical doctors and residents. The results of the study can help to develop prevention strategies by identifying populations that may be at high risk of developing mental health symptoms and conditions and supporting experts in implementing specific interventions to address mental health problems and prevent suicide.

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Author contributions
PK served as the primary investigator, responsible for data collection, instrument preparation, statistical analysis, and the initial draft of the manuscript. EK was responsible for ensuring the correct methodology, preparation, and finalization of the psychological tools used in the study. Additionally, he served as the lead consultant for the study and significantly contributed to the manuscript preparation. GS led the study, developed the study's concept, coordinated all assignments, and significantly contributed to the manuscript preparation. All authors read and approved the final manuscript.

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Data availability
No datasets were generated or analysed during the current study.

Declarations

Ethics approval and consent to participate
The Vilnius Regional Bioethics Committee's (ID: 2021/5-1350-826) ethical standards guided all procedures in studies involving human participants. All participants were adults and gave informed consent to participate in the questionnaire before starting the survey.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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Psychological distress, suicidality and resilience of Lithuanian nurses

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Abstract

Background Nurses, like other healthcare workers, are prone to poorer mental health, increased burnout, and may have an increased risk of suicide.

Purpose This study aimed to evaluate mental health problems among Lithuanian nurses and explore factors associated with them.

Method The survey was completed by 533 nurses. Mental health was assessed using the Depression, Anxiety, and Stress Scale—21, and suicidal ideation was measured with the Suicidal Behaviours Questionnaire—Revised (SBQ-R).

Findings A large proportion of nurses in the study had high psychological distress, with 18% having high depression, 29.3% - high anxiety, and 17.1% - high stress. 21.2% of the sample had an increased suicide risk. 64.9% of nurses considered changing their careers to a non-medical profession in the last 12 months.

Discussion Addressing mental health issues in the national healthcare system is critical to avoiding the loss of valued medical community members and ensuring that patients do not lose their critical caretakers.

Keywords Mental health, Depression, Lithuania, Nurses, Suicide risk

Background

Nursing specialists are vital in providing healthcare services [1]. Even though physicians usually lead the medical care team, nurses are leading figures in caring for the patient, being the first person, the patient interacts with during healthcare provision. In recent years, more tasks have been shifted to the nurses [2]. Even though those additional responsibilities are to cope with the shortage of doctors and to provide better care to the patients [2], it can also contribute to staff burnout [3]. Furthermore, workers whose job essence is frequent and intensive interactions with others are at higher risk of experiencing emotional exhaustion, lack of interest in work, problems with interpersonal communication and deteriorating physical health [4].

Studies in various countries reveal challenging work conditions and poor mental health among nursing staff. A national survey in Canada identified that depression was significantly more prevalent among nurses than among other professionals [5]. The prevalence of depression among nurses varies from 25.1 to 35.8% [6, 7]. Nurses are frontline workers with a high workload and often work every day of the week for prolonged hours. However, night shifts negatively affect mental health, causing more frequent depression and worsening of circadian and sleep [8]. Burnout is a common problem among healthcare workers. A study in the U.S. showed that the main reason

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for nurses leaving their work is burnout [9]. In addition, staff reported a stressful environment and inadequate staffing [9] as crucial factors for leaving their work. The profile of a nurse who is at risk for burnout is a single person with multiple jobs, high workload, and low work experience [3]. However, all nursing specialists can be exposed to burnout, and it does not depend on the position held [10]. Lastly, resilience is important in coping with work challenges and life stressors, as resilience is the process and outcome of successful adaptation to difficult situations through mental, emotional or behavioural flexibility [11]. Resilience may be viewed as a personality trait or feature. However, it may also be conceptualized as a skill which can be developed. A Cochrane meta-analysis demonstrated that resilience training improved resilience, lowered depression levels, and reduced stress levels or stress perception [4].

In Lithuania, there are more than 25,000 nurses [12]. However, according to the experts, there is a 16% lack of nursing specialists in the country. A study from 2009 showed that 23% of nurses had mental distress, with low social support being the most important risk factor [13]. However, the study was conducted 15 years ago, and responders were from a single district community, so they do not reflect the whole of Lithuania. Another previous study showed that 12.9% of nurses experienced bullying in their workplace, but this was conducted in only part of the country [14]. To our knowledge, no other published peer-reviewed articles have analysed this issue. There is a serious lack of well-designed and well-conducted studies that adequately reflect the current mental health situation of Lithuanian nurses. Due to the lack of empirical data on Lithuanian nurses' mental health, the current study aimed to evaluate mental health, more specifically, anxiety, depression, suicidality, and factors associated with mental health among the nursing specialists in Lithuania.

Methods

Participants and procedure

The current study was a part of a broader project of the national healthcare workers' mental health evaluation in Lithuania. The data was collected from December 2021 to January 2022 using the online survey platform. The invitation to participate in the study was distributed through various professional unions and associations, internal hospital networks, and Lithuanian healthcare workers' social networks throughout the country. All national and regional healthcare professional organizations and professional unions registered in Lithuania and whose contact information can be acquired were invited to participate. In addition, social network groups of healthcare workers were asked to share invitations to participate in the study for a more comprehensive reach of the medical community in Lithuania nationally. Two additional reminders were sent to healthcare workers to participate in the survey after the release of the initial invitation. In total, 2354 responders opened the online survey, and 1653 completed the questionnaire. After excluding non-medical personnel, the total sample of 1618 licenced healthcare workers finished the survey and met the inclusion criteria for the study. Data from 533 nurses extracted from the larger study working across various regions of Lithuania were included in the study.

Sociodemographic data and work-related stressors

Sociodemographic data was collected, including gender, age, relationship status (being in a long-term relationship or single), type of work (working in an inpatient, outpatient setting, rehabilitation, palliative care or nursing homes, emergency department or intensive care unit), level of medical service provision (primary, secondary, tertiary), primary work location (size of the city, where responder work), workload and work experience after completion of training. Participants were screened for factors negatively affecting healthcare workers' mental health extracted from the previously published meta-analyses [15–19]. These factors included poor working conditions, high workload, work with patients, lack of professional development, lack of career perspectives, manager behaviours, mobbing (bullying in the workplace), and exhaustion. Additionally, responders were asked what positive factors are in their workplace: salary (adequate salary to support your life), satisfaction with work, professional development, patients' gratitude, and support from colleagues. Respondents were asked to indicate if any of those factors affected their daily lives by responding with a binary "yes/no" answer to the items listing these factors.

Psychological distress and resilience

The Depression, Anxiety and Stress Scale −21 (DASS-21) was used for the assessment of depression and anxiety [20]. The DASS-21 is a widely used self-report measure that includes three subscales, measuring emotional states of depression, anxiety and stress levels. Each subscale consists of seven items measured on a 4-point Likert scale ranging from 0 ("did not apply to me at all") to 3 ("applied to me most of the time"). Each DASS-21 subscale provides a score, a sum of responses to each subscale question, with a higher score indicating higher levels of depression, anxiety or stress. The severity of each component was graded by its score: depression (normal/mild <7; moderate 7–10; severe >11), anxiety (normal/mild <6; moderate 6–7; severe >8), stress (normal/mild <10; moderate 10–12; severe >13). The Cronbach alpha for depression, anxiety and stress scales were 0.88, 0.80 and 0,85, respectively.

Table 1 Sociodemographic characteristics of the sample ($N = 533$)

Variable	Prevalence (%)
Gender	
Male	12 (2.3)
Female	521 (97.7)
Age *M* (*SD*)	43.13 (12.32)
Relationships	
Not in a long-term relationship	112 (21)
In a long-term relationship	421 (79)
Having kids	
No kids	171 (32.1)
Having kids	362 (67.9)
Type of work	
Outpatient	199 (37.3)
Inpatient	246 (46.2)
Rehabilitation	15 (2.8)
Palliative care or nursing homes	119 (22.3)
Emergency department	90 (16.9)
Intensive care unit	60 (11.3)
Level of medical service provision	
Primary	212 (39.8)
Secondary	223 (41.8)
Tertiary	184 (34.5)
Primary workplace location	
One of the five biggest cities	377 (70.7)
Another smaller city	125 (23.5)
Township/rural area	31 (5.8)
Workload (Full-Time equivalent)	
<1 FTE	22 (4.1)
1 FTE	269 (50.5)
>1 FTE	242 (45.4)
Average work experience after finished training (years) *M* (*SD*)	20.17 (13.23)

The Resilience Scale 11 (RS-11) [21] was used to measure psychological resilience. The RS-11 is a unidimensional measure containing 11 items. Each RS-11 item was rated on a 7-point Likert scale ranging from 1 ("do not agree") to 7 ("agree"). The total RS-11 score ranges from 11 to 77, with a higher score indicating a higher level of resilience. The Cronbach alpha for the RS-11 scale was 0.85.

The Suicidal Behaviors Questionnaire-Revised (SBQ-R) was used to evaluate suicidality in the sample [22]. The SBQ-R comprises four items, each covering a different dimension of suicidality: lifetime suicidal ideation and attempts, the frequency of suicidal ideation over the preceding 12 months, the threat of suicide attempts, and self-reported probability of suicidal behaviour in the future. The four SBQ-R items are rated on Likert scales of varying lengths, resulting in a total score between 3 and 18. Each of them is evaluated with a different number of points. A sum of points of the SBQ-R with a cut-off of ≥7 indicates an increased risk for suicide for general population studies. The Cronbach alpha for this scale was 0.81.

Table 2 Negative and positive factors related to the work among nurses ($N = 533$)

Variable	Prevalence (%)
Negative factors	
Poor working conditions	209 (39.2)
High workload	322 (60.4)
Work with patients	124 (23.3)
Lack of professional development	78 (14.6)
Lack of career perspectives	118 (22.1)
Managers	214 (40.2)
Mobbing	193 (36.2)
Exhaustion	356 (66.8)
Positive factors	
Adequate salary	163 (30.6)
Satisfaction with work	258 (48.4)
Professional development	134 (25.1)
Patients' gratitude	335 (62.9)
Support from colleagues	305 (57.2)

Data analysis

Statistical analysis was performed using IBM SPSS 26.0. A one-way ANOVA test was used to evaluate the association between resilience and psychological distress. Chi-square and Student-t tests were used for univariate analysis to identify statistically significant risk factors for suicidal ideation. Multivariate binary logistic regression was used to assess risk factors for high suicide risk. A dependent variable was a binary variable of high suicide risk (SBQ-R score ≥ 7). Normal values were used as a reference for assessing the role of depression and anxiety in the analysis. Results were held statistically significant when $p < 0.05$.

Results

Characteristics of the sample

A total of 533 nurses participated in the study, with a mean age of 43.13 years and an age range of 20 to 69 years. Work experience ranged from 1 to 46 years, with a mean work experience of 20.17 years. In the past 12 months, 64.9% (346) of nurses considered switching to a non-medical profession. The sample was predominantly female, comprising 97.7% of the sample. Table 1 presents the detailed descriptive characteristics of the study sample. The study identified exhaustion and high workload as the primary negative factors, and patients' gratitude and colleagues' support as the primary positive factors associated with the nursing job. Table 2 represents the detailed negative and positive factors associated with work.

Resilience and mental health

The average resilience score in the sample was 58.68 (SD ± 9.89), ranging from 22 to 77. Statistically significantly, nurses with high suicide risk had the lower RS-11 scores, which were 59.98 (±9.52) for the population

without suicide risk and 53.85 (±9.75) for the population with high suicide risk. Spearman's non-parametric correlation showed a low positive correlation between age and RS-11 score of 0.24 ($p<0.001$). A positive correlation was found between work experience and the RS-11 score of 0.22 ($p<0.001$). A one-way ANOVA test was applied to compare resilience across the subsamples having various levels of anxiety and depression levels identified using the DASS-21. The analysis indicated that higher severity of depression and anxiety was significantly associated with lower levels of resilience at $p<0.001$ (see Table 3).

Factors associated with psychological distress

In the sample, 62 (11.6%) and 34 (3.4%) nurses were identified as having severe and extremely severe levels of depression, respectively. Additionally, 72 (13.5%) and 84 (15.8%) had severe and extremely severe anxiety, and 76 (14.3%) and 15 (2.8%) severe and extremely severe stress, respectively. Univariate analysis for severe and extremely severe depression and anxiety (see Table 4) showed that work in an Outpatient setting was associated with higher levels of depression, and work in an Inpatient was associated with higher levels of anxiety. Career change ideation, poor working conditions, lack of career perspectives, managers, mobbing and exhaustion were associated with high levels of depression among nurses. However, satisfaction with work, professional development and support from colleagues were protective factors associated with lower depression rates (see Table 4). Career change ideation, poor working conditions, managers, mobbing, exhaustion, high workload and working with patients were associated with more frequent anxiety disorders. Meanwhile, satisfaction with your work was associated with lower anxiety levels (see Table 4).

Table 3 Resilience in various levels of depression, anxiety, and stress in the sample

Variable	Prevalence (%)	Resilience M(SD)
Depression		
Normal	181 (34)	63.12 (7.75)
Mild	97 (18.2)	60.43 (9.13)
Moderate	159 (29.8)	56.41 (9.45)
Severe	62 (11.6)	52.22 (10.75)
Extremely severe	34 (6.4)	52.41 (10.2)
Anxiety		
Normal	155 (29.1)	62.83 (8.84)
Mild	47 (8.8)	60.29 (10.54)
Moderate	175 (32.8)	58.38 (8.61)
Severe	72 (13.5)	56.12 (9.51)
Extremely severe	84 (15.8)	52.92 (10.7)
Stress		
Normal	226 (42.4)	62.93 (8.27)
Mild	101 (18.9)	58.09 (9.77)
Moderate	115 (21.6)	54.74 (9.67)
Severe	76 (14.3)	55 (9.13)
Extremely severe	15 (2.8)	47.4 (9.81)

Suicidality among the nurse population

In the sample, 113 nurses (21.2%) scored≥7 on the SBQ-R questionnaire, indicating an increased risk for suicide. Additionally, 27 nurses (5.1%) reported having a suicide plan, and 8 nurses (1.5%) reported previous suicide attempts. Univariate analysis showed that having no children, ideation to change work, poor working conditions, lack of professional development, lack of career perspectives, managers, exhaustion and low satisfaction with work were significantly associated with high suicide risk. Table 5 presents the detailed results of the univariate analysis of the factors related to suicidality.

Predictors of suicide risk

Multivariable binary logistic regression was conducted to evaluate the role of suicide risk factors, including sociodemographic characteristics, work-related stressors, depression and anxiety, and resilience. The entire model containing all predictors was statistically significant, χ^2 [12]=116.16, $P<0.001$. The model explained between 20.4% (Cox and Snell R^2) and 31.7% (Nagelkerke R^2) of the variance in suicidality and correctly classified 81.1% of cases. Managers were a negative work-related factor with OR=0.54 ($p=0.025$), and extremely severe depression and anxiety were significant risk factors with OR of 3.8 and 7.6 ($p<0.001$) for higher suicide risk, respectively. Lower resilience was an important predictor for high suicide risk OR=0.97 ($p=0.027$). Detailed analysis is presented in Table 6.

Discussion

This study is the first attempt to evaluate the mental health among Lithuanian nurses in a national survey. We found out that 18% of nurses reported severe and extremally severe levels of depression symptoms, 29.3% - anxiety, and 17.1% stress. Around one-fifth of the sample (21.2%) had a high lifetime suicide risk, and 1.5% reported a previous suicide attempt.

A meta-analysis by Huang et al. [7] showed that among nurses in the intensive care unit, depression prevalence was almost 25%. Another meta-analysis [23] showed that 22% of nurses had depression. The data in our study was collected during the COVID-19 pandemic, which might have impacted the mental health of the sample. At the time of data collection in Lithuania, all healthcare employees were vaccinated against COVID-19, and more than half had booster vaccines. However, the pandemic was associated with a high workload and work-related stressors in healthcare systems. We found higher levels of depression in comparison to previous studies, with 18% of nurses having severe and highly severe depressive

Table 4 Variables associated with severe and extremely severe depression and anxiety

Variable	Depression (%)		*p*	Anxiety (%)		*p*
	Normal and moderate	**Extreme and extremely severe**		**Normal and moderate**	**Extreme and extremely severe**	
Gender						
Male	12 (100%)	0 (0%)	0.101	11 (91.7%)	1 (8.3%)	0.107
Female	425 (81.6%)	96 (18.4%)		366 (70.2%)	155 (29.8%)	
Age *M* (*SD*) [a]	43.6 (± 12.26)	40.94 (± 12.37)	0.054	43.69 (± 12.26)	41.77 (± 12.36)	0.102
Relationships						
Not in a long-term relationship	348 (82.7%)	73 (17.3%)	0.434	302 (71.7%)	119 (28.3%)	0.324
In a long-term relationship	89 (79.5%)	23 (20.5%)		75 (67%)	37 (33%)	
Having kids						
No kids	136 (79.5%)	35 (20.5%)	0.312	113 (66.1%)	58 (33.9%)	0.105
Having kids	301 (83.1%)	61 (16.9%)		264 (72.9%)	98 (27.1%)	
Type of work [b]						
Outpatient	167 (83.9%)	32 (16.1%)	0.373	130 (65.3%)	69 (34.7%)	**0.034**
Inpatient	189 (76.8%)	57 (23.2%)	**0.004**	174 (70.7%)	72 (29.3%)	1
Rehabilitation	15 (100%)	0 (0%)	0.081	100 (84%)	19 (16%)	0.517
Palliative care or nursing homes	100 (84%)	19 (16%)	0.510	85 (71.4%)	34 (28.6%)	0.855
Emergency department	72 (80%)	18 (20%)	0.591	62 (68.9%)	28 (31.1%)	0.674
Intensive care unit	45 (75%)	15 (25%)	0.135	44 (73.3%)	16 (26.7%)	0.638
Level of medical service provision*						
Primary	179 (84.4%)	33 (15.6%)	0.233	142 (67%)	70 (33%)	0.122
Secondary	178 (79.8%)	45 (20.2%)	0.269	156 (70%)	67 (30%)	0.738
Tertiary	149 (81%)	35 (19%)	0.659	138 (75%)	46 (25%)	0.116
Primary workplace location						
One of the five biggest cities	305 (80.9%)	72 (19.1%)	0.486	261 (69.2%)	116 (30.8%)	0.496
Another smaller city	107 (85.6%)	18 (14.4%)		93 (74.4%)	32 (25.6%)	
Township/rural area	25 (80.6%)	6 (19.4%)		23 (74.2%)	8 (25.8%)	
Workload (Full-Time equivalent)						
< 1 FTE	21 (95.5%)	1 (4.5%)	0.193	18 (81.8%)	4 (18.2%)	0.051
1 FTE	216 (80.3%)	53 (19.7%)		178 (66.2%)	91 (33.8%)	
> 1 FTE	200 (82.6%)	42 (17.4%)		181 (74.8%)	61 (25.2%)	
Average work experience after finished training (years) *M* (*SD*) [a]	20.66 (± 13.21)	17.98 (± 13.32)	0.074	20.79 (± 13.11)	18.68 (± 13.52)	0.100
Career change ideation						
Yes	259 (74.9%)	87 (25.1%)	**< 0.001**	217 (62.7%)	129 (37.3%)	**< 0.001**
No	178 (95.2%)	9 (4.8%)		160 (85.6%)	27 (14.4%)	
Poor working conditions						
Yes	148 (70.8%)	61 (29.2%)	**< 0.001**	127 (60.8%)	82 (39.2%)	**< 0.001**
No	289 (89.2%)	35 (10.8%)		250 (77.2%)	74 (22.8%)	
High workload						
Yes	257 (79.8%)	65 (20.2%)	0.106	211 (65.5%)	111 (34.5%)	**0.001**
No	180 (85.3%)	31 (14.7%)		166 (78.7%)	45 (21.3%)	
Work with patients						
Yes	97 (78.2%)	27 (21.8%)	0.213	77 (62.1%)	47 (37.9%)	**0.016**
No	340 (83.1%)	69 (16.9%)		300 (73.7%)	109 (26.7%)	
Lack of professional development						
Yes	60 (76.9%)	18 (23.1%)	0.208	50 (64.1%)	28 (35.9%)	0.164
No	377 (82.9%)	78 (17.1%)		327 (71.9%)	128 (28.1%)	
Lack of career perspectives						
Yes	83 (70.3%)	35 (29.7%)	**< 0.001**	78 (66.1%)	40 (33.9%)	0.213
No	354 (85.3%)	61 (14.7%)		299 (72%)	116 (28%)	
Managers						
Yes	161 (75.2%)	53 (24.8%)	**< 0.001**	137 (64%)	77 (36%)	**0.005**
No	264 (87.7%)	37 (12.3%)		227 (75.4%)	74 (24.6%)	
Mobbing						
Yes	141 (73.1%)	52 (26.9%)	**< 0.001**	117 (60.6%)	76 (39.4%)	**< 0.001**
No	296 (87.1%)	44 (12.9%)		260 (76.5%)	80 (23.5%)	

Table 4 (continued)

Variable	Depression (%)		p	Anxiety (%)		p
	Normal and moderate	Extreme and extremely severe		Normal and moderate	Extreme and extremely severe	
Exhaustion						
Yes	275 (77.2%)	81 (22.8%)	**< 0.001**	232 (65.2%)	124 (34.8%)	**< 0.001**
No	149 (90.9%)	15 (9.1%)		133 (81.1%)	31 (18.9%)	
Adequate salary						
Yes	136 (83.4%)	27 (16.6%)	0.564	112 (68.7%)	51 (31.3%)	0.496
No	301 (81.4%)	69 (18.6%)		265 (71.6%)	105 (28.4%)	
Satisfaction with work						
Yes	222 (86%)	36 (14%)	**0.018**	198 (76.7%)	60 (23.3%)	**0.003**
No	215 (78.2%)	60 (21.8%)		179 (65.1%)	96 (64.9%)	
Professional development						
Yes	121 (90.3%)	13 (9.7%)	**0.004**	100 (74.6%)	34 (25.4%)	0.252
No	316 (79.2%)	83 (20.8%)		277 (69.4%)	122 30.6%)	
Patients' gratitude						
Yes	279 (83.3%)	56 (16.7%)	0.312	231 (69%)	104 (31%)	0.241
No	158 (79.8%)	40 (20.2%)		146 (73.7%)	52 (26.3%)	
Support from colleagues						
Yes	259 (84.9%)	46 (15.1%)	**0.042**	224 (73.4%)	81 (26.6%)	0.112
No	178 (78.1%)	50 (21.9%)		153 (67.1%)	75 (32.9%)	

Note. Chi-Square was used for all univariate tests, except if indicated - [a] Student t-test was used as a statistical model for comparison

[b] responders could choose more than one response option

symptoms, and in addition to this, 29.8% had moderate depression symptoms. It is more than two times higher than the general population, with an average prevalence of 7.2% [24], according to epidemiological studies.

Anxiety and anxiety disorders are significant for healthcare workers. In our study, 32% of nurses had moderate anxiety symptoms, and 29.3% had severe and extremely severe anxiety symptoms. The prevalence of anxiety disorders ranged from 23.2 to 37% [23, 25, 26] based on several published metanalyses of healthcare staff in other studies. Prolonged mental problems can cause lower motivation, leading to poorer care for patients [27], major depression, risk of cardiac events, worsened quality of life and relationships [28], and lastly, severe anxiety can be associated with increased suicide risk [28, 29].

We identified that low resilience was associated with poor mental health, and lower resilience was significantly related to high suicide risk in logistic binary regression. Resilience is the ability to adapt to stress and adverse situations [30]. Yu et al. showed that stress, burnout, post-traumatic stress disorder and bullying were associated with poorer resilience [31]. A high-volume meta-analysis from Cochrane showed that resilience training might positively affect healthcare workers. However, the evidence for resilience training is uncertain [4]. Therefore, promoting mental health in nurses should focus on several directions: addressing work conditions, reducing work-related stressors, and providing resilience training.

Using the SBQ-R questionnaire, we identified that 21.2% of our study participants had a high suicide risk. Suicidal ideation differs from country to country and the specific populations, and it ranges among nurses from 5.2 to 62% [32–35]. High variability of suicide risk prevalence is associated with the methodology used in these studies. However, our study indicates worrying numbers of suicide risk among nursing staff in Lithuania. The binary logistic regression identified that depression and anxiety were significant risk factors increasing suicide risk up to 3.8 and 7.6 times. The findings are in line with previous studies, which revealed that depression and hopelessness can increase the death risk by suicide up to 1.9 to 2.2 times [36, 37]. In addition, anxiety is also a proven risk factor, contributing to increased suicide risk in previous studies [29, 37].

Coping with the COVID-19 pandemic puts additional strain on all healthcare workers' psychological well-being and increases the burden of existing mental health problems [38]. In the early stages of the COVID-19 outbreak in Wuhan, frontline workers especially female nurses suffered the most due to depression, anxiety, insomnia and distress [39]. Additionally, Cai et al. [40] indicated that nurses experienced higher anxiety and nervousness relative to other healthcare professionals. Lastly, some reviews hypothesized that the COVID-19 pandemic can be an independent risk factor for worsened mental health [41]. However, we need not forget that the COVID-19 pandemic may not be the last; as shown in the 2015 MERS outbreak [42], frontline workers had the highest risk for post-traumatic stress disorder symptoms during the pandemic. Such outbreaks and pandemics will be a

Table 5 Univariate analysis of factors associated with suicidality

Variable	Suicide risk		***p***
	Low suicide risk (SBQ-*R* < 7) (*N* = 412)	**High suicide risk (SBQ-*R* ≥ 7) (*N* = 113)**	
Gender			
Male	8 (66.7%)	4 (33.3%)	0.298
Female	412 (719%)	109 (20.9%)	
Age *M* (*SD*) [a]	43.64 (± 12.28)	41.22 (± 12.31)	0.064
Relationships			
Not in a long-term relationship	326 (82.7%)	95 (22.6%)	0.135
In a long-term relationship	94 (83.9%)	18 (16.1%)	
Having kids			
No kids	126 (73.7%)	45 (26.3%)	**0.047**
Having kids	294 (81.2%)	68 (18.8%)	
Type of work [b]			
Outpatient	157 (78.9%)	42 (21.1%)	0.973
Inpatient	189 (76.8%)	57 (23.2%)	0.324
Rehabilitation	14 (93.3%)	1 (6.7%)	0.162
Palliative care or nursing homes	92 (77.3%)	27 (22.7%)	0.650
Emergency department	72 (80%)	18 (20%)	0.764
Intensive care unit	50 (83.3%)	10 (16.7%)	0.362
Level of medical service provision*			
Primary	168 (79.2%)	44 (20.8%)	0.838
Secondary	175 (78.5.8%)	48 (21.5%)	0.877
Tertiary	142 (77.2%)	42 (22.8%)	0.505
Primary workplace location			
One of the five biggest cities	298 (79%)	79 (21%)	0.811
Another smaller city	97 (77.6%)	28 (22.4%)	
Township/rural area	25 (80.6%)	6 (19.4%)	
Workload (Full-Time equivalent)			
< 1 FTE	16 (72.7%)	6 (27.3%)	0.086
1 FTE	203 (75.5%)	66 (24.5%)	
> 1 FTE	201 (83.1%)	41 (16.9%)	
Average work experience after finished training (years) *M* (*SD*) [a]	20.65 (± 13.29)	18.34 (± 13.04)	0.107
Career change ideation			
Yes	253 (73.1%)	93 (26.9%)	**< 0.001**
No	167 (89.3%)	20 (10.7%)	
Poor working conditions			
Yes	152 (72.7%)	57 (27.3%)	**0.006**
No	268 (82.7%)	56 (17.3%)	
High workload			
Yes	256 (79.5%)	66 (20.5%)	0.624
No	164 (77.7%)	47 (22.3%)	
Work with patients			
Yes	95 (76.6%)	29 (23.4%)	0.497
No	325 (79.5%)	84 (20.5%)	
Lack of professional development			
Yes	54 (69.2%)	24 (30.8%)	**0.025**
No	366 (80.4%)	19.6 (19.6%)	
Lack of career perspectives			
Yes	79 (66.9%)	39 (33.1%)	**< 0.001**
No	341 (82.2%)	74 (17.8%)	
Managers			
Yes	149 (69.6%)	65 (30.4%)	**< 0.001**
No	257 (85.4%)	44 (14.6%)	
Mobbing			
Yes	132 (68.4%)	61 (31.6%)	**< 0.001**
No	288 (84.7%)	52 (15.3%)	

Table 5 (continued)

Variable	Suicide risk		*p*
	Low suicide risk (SBQ-*R* < 7) (*N* = 412)	High suicide risk (SBQ-*R* ≥ 7) (*N* = 113)	
Exhaustion			
Yes	270 (75.8%)	86 (24.2%)	**0.021**
No	139 (84.8%)	25 (15.2%)	
Adequate salary			
Yes	130 (79.8%)	33 (20.2%)	0.729
No	290 (78.4%)	80 (21.6%)	
Satisfaction with work			
Yes	213 (82.6%)	45 (17.4%)	**0.018**
No	207 (75.3%)	68 (24.7%)	
Professional development			
Yes	121 (90.3%)	13 (9.7%)	**0.041**
No	316 (79.2%)	83 (20.8%)	
Patients' gratitude			
Yes	102 (76.1%)	32 (23.9%)	0.387
No	318 (79.7%)	81 (20.%)	
Support from colleagues			
Yes	264 (78.8%)	71 (21.2%)	0.996
No	156 (78.8%)	42 (21.2%)	

Note. Chi-Square was used for all univariate tests, except if indicated - [a] Student t-test was used as a statistical model for comparison

[b] responders could choose more than one response option

Table 6 Multivariate analysis of risk factors associated with high suicide risk among nurses

Variable	Odds ratio	95.0% CI for Odds Ratio Lower	Upper	p
Not having kids	1.4	0.84	2.35	0.191
Career change ideation	1.3	0.69	2.48	0.413
Poor working conditions	1.26	0.72	2.22	0.415
Lack of professional development	0.74	0.38	1.45	0.384
Lack of career perspectives	0.73	0.39	1.35	0.318
Managers	0.54	0.31	0.92	**0.025**
Mobbing	0.74	0.44	1.26	0.364
Exhaustion	0.9	0.5	1.62	0.739
Satisfaction with work	1.09	0.66	1.81	0.735
Depression				
Normal*	1	-	-	-
Mild	1.02	0.4	2.58	0.963
Moderate	1.71	0.78	3.75	0.182
Severe	2.3	0.88	6.05	0.091
Extremely severe	3.79	1.26	11.36	**0.017**
Anxiety				
Normal*	1	-	-	**-**
Mild	2.79	0.88	8.78	**0.071**
Moderate	3.6	1.46	8.87	**0.005**
Severe	2.26	0.79	6.44	0.127
Extremely severe	7.61	2.77	20.85	**< 0.001**
Resilience	0.97	0.94	0.99	**0.027**

* - Normal value was used as a reference in a comparison

huge burden for all medical staff in the future, especially those who are closely involved with patients, especially nurses.

Our study had some limitations. First, this was a cross-sectional study, and we did not use a longitudinal design; therefore, future longitudinal studies could provide more information on the role of various risk factors on mental health changes in Lithuanian nurses. Second, while we aimed to conduct a large-scale national study of healthcare workers' mental health, the recruitment of the study participants was not random and included self-referred participants willing to respond to our survey. Lastly, COVID-19 might have had an impact on the study findings. At the time of data collection, the COVID-19 pandemic was ongoing, and patients and healthcare workers were still exposed to its dangers. However, the data collection coincided with the third wave of the COVID-19 pandemic. There were enough protection measures in hospitals, the Lithuanian Ministry of Health had issued sufficient information and guidelines on how to deal with patients, and there was an experience of how to deal with patients because the country has already been living with the COVID-19 pandemic for more than one and a half years. In addition, all health workers (including nurses) were vaccinated on a priority basis and had already received 2 or more vaccines [43]. Due to these factors and the lack of sufficient baseline data, we are unable to determine the extent of the COVID pandemic's impact on our nursing staff. Lastly, COVID-19 has not disappeared; revaccination is ongoing every year, and the virus

has become a part of life in societies [44]. The mental health of the medical community has always been a huge concern. Since nurses and other medical practitioners play a vital role in society, it is essential to conduct periodic investigations and evaluations of this community to understand their challenges. Our investigation into this population revealed that nurses require improved mental health care to reduce depression and anxiety and prevent suicides. Secondly, our multivariate analysis showed that improving healthcare management could lead to mental health promotion in nurses. While significant structural changes in healthcare services and institutions are challenging and time-consuming, our study reveals that resilience training can enhance stress control, potentially reduce psychological distress, improve mental health, and potentially reduce suicidality. Finally, for mental health promotion in nurses, it is essential to target and reduce exhaustion, increase satisfaction with work, improve working conditions, reduce the workload, and, most importantly, eliminate mobbing.

Conclusion

We evaluated a significant part of the Lithuanian nurse population to delineate mental health problems. We found that a substantial proportion of nurses in Lithuania had high levels of depression and anxiety problems. In addition to this, 21.2% had increased suicide risk. It is essential to address these problems in the national health care system to prevent the medical community and society from losing its valuable members and patients from losing essential caretakers.

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Author contributions
Povilas Kavaliauskas - Investigation, Methodology, Data curation, Original draft, Formal analysis, Reviewing and Editing. Evaldas Kazlauskas – Conceptualization, Methodology, Formal analysis, Validation, Reviewing and Editing. Giedre Smailyte – Investigation, Conceptualization, Validation, Reviewing and Editing.

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Data availability
The datasets generated and/or analysed during the current study are not publicly available due sensitive origin but may be available from the corresponding author on reasonable request and with permission of Vilnius university, Faculty of Medicine.

Declarations

Ethics approval and consent to participate
This study was conducted in accordance with the Declaration of Helsinki and was reviewed and approved by the Vilnius Regional Bioethics. Reference number: 2021/5-1350-826. Informed consent to participate was obtained from all of the participants in the study. No identification data was collected.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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LIST OF PRESENTATIONS:

1. 2022.08.24-27, Vilnius, Lithuania. 22nd EAA Congress, 15th ISGA Congress, 5th International Conference of Evolutionary Medicine. Differences in cause-specific mortality between healthcare workers and all other employees in Lithuania, 2011-2019. Povilas Kavaliauskas, Domantas Jasilionis, Evaldas Kazlauskas, Giedrė Smailytė
2. 2023.09.14-17, Ljubljana, Slovenia. 11th European Conference on Mental Health. Depression, Anxiety and Stress among healthcare workers in Lithuania. Povilas Kavaliauskas, prof. dr. Evaldas Kazlauskas, doc. dr. Giedrė Smailytė.
3. 2023.12.21, Vilnius, Lithuania. Annual Vilnius Surgeon Association conference. Depresiškumas ir suicidiškumas tarp Lietuvos medikų. Povilas Kavaliauskas, prof. dr. Evaldas Kazlauskas, doc. dr. Giedrė Smailytė.
4. 2023.10. 18. Investigators Grand Prix 2023, Vilnius, Lithuania. Medicinos personalo patiriamas stresas, profesinis išsekimas ir savižudybių rizika. Povilas Kavaliauskas.

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