

UDC 614.2:331.101.3:616-057.1
IRSTI 76.29.03
DOI: 10.53065/kaznmu.2025.73.2.004

Поступил в редакцию: 18.04.2025
Принято к публикации: 20.06.2025

RISK FACTORS FOR TEMPORARY DISABILITY AMONG HEALTHCARE WORKERS: ANALYSIS OF PROFESSIONAL AND BEHAVIORAL CHARACTERISTICS

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Abstract

Introduction. The morbidity of healthcare workers and associated days of temporary disability have a significant impact on workforce stability and the overall efficiency of the healthcare system.

Objective. The aim of this study was to assess the influence of professional, socio-demographic, and behavioral factors on the frequency of temporary disability among healthcare workers.

Methods. A cross-sectional study was conducted involving 1211 healthcare professionals. Gender, age, work experience, work schedule, unhealthy habits, and the number of disability days over the past year were assessed. Descriptive statistics, t-test, ANOVA, and multiple linear regression were applied.

Results. The mean number of disability days was 3.51 per year (SD = 1.72). Comparative analysis revealed a statistically significant increase in disability days with longer work experience ($p = 0.0027$) and the presence of unhealthy habits ($p < 0.0001$). Gender and night shifts had no statistically significant effect. In the regression model, work experience ($\beta = 0.14$; $p = 0.0001$) and unhealthy habits ($\beta = 0.19$; $p < 0.0001$) maintained an independent association with the number of disability days.

Conclusion. The results show that among the factors studied, work experience and unhealthy habits make the most significant contribution to the formation of temporary disability among healthcare workers. These findings may be considered in the development of preventive and organizational measures for occupational health among medical personnel.

Keywords: healthcare workers, temporary disability, work experience, unhealthy habits, regression analysis

Introduction. Temporary incapacity for work among medical personnel has a significant impact on both the staffing capacity of the healthcare system and the quality of medical services provided [1]. The specific nature of professional activity in the healthcare sector is associated with high physical and psycho-emotional stress, irregular work schedules, night shifts, as well as constant contact with patients and infectious agents [2]. These factors collectively increase

the risk of disease development and contribute to a considerable level of morbidity among healthcare workers [3].

In addition to professional factors, the frequency of temporary incapacity for work may also be influenced by socio-demographic characteristics of employees, including age, gender, marital status, and housing conditions [4, 5]. Behavioral risk factors play a particularly important role — such as smoking, alcohol abuse, as well as dietary habits and overall lifestyle patterns [6–8]. A number of studies indicate that the combination of occupational stress and unhealthy lifestyle may significantly increase the level of temporary incapacity for work among medical personnel [9].

Despite the relevance of the issue, such studies remain limited in certain regions and professional groups. In particular, there is a need for a comprehensive assessment of the relationships between professional, social, and behavioral characteristics and the indicators of temporary incapacity for work among healthcare workers [10, 11].

The aim of this study was to assess the impact of work experience, working conditions, harmful habits, and a range of socio-demographic factors on the frequency of temporary incapacity for work among medical personnel.

Materials and methods

Study design and participants

A nationwide cross-sectional survey was conducted among healthcare professionals employed in psychiatric hospitals across the Republic of Kazakhstan between 2021 and 2023. The total study sample consisted of n=1211 participants-medical workers, including both psychiatrists and psychiatric nursing staff.

Participant selection was carried out across all 14 administrative regions of Kazakhstan and the three cities of national significance: Almaty, Astana (formerly Nur-Sultan), and Shymkent, ensuring broad territorial representation of the mental health workforce.

Eligibility Criteria

Inclusion criteria for participation were as follows: current employment as medical worker hospitals of Kazakhstan; Active engagement in professional duties during the period of study data collection; Provision of written informed consent confirming voluntary participation and awareness of study objectives.

Ethical Approval

The study protocol was reviewed and approved by the Local Ethics Committee of the Kazakh Medical University of Continuing Education, Republic of Kazakhstan (Protocol No. 77 dated 05.02.2020). All participants provided written informed consent prior to participation. Anonymity and confidentiality were strictly maintained throughout the data collection and analysis processes.

Measures

Sociodemographic and Professional Variables

A comprehensive sociodemographic and professional questionnaire was administered to collect data on:

Demographic factors: age, gender, marital status, housing conditions;

Professional characteristics: job profile, total years of medical experience, work schedule, workload intensity, night shifts;

Lifestyle-related factors: smoking status, number of cigarettes per day, alcohol consumption frequency, dietary patterns, physical activity level;

Socioeconomic indicators: salary level;

Health outcome: number of sick-leave days (temporary incapacity for work) during the previous 12 months.

Data Collection

Data were initially collected through paper-based questionnaires administered at participating psychiatric facilities. Completed paper forms were subsequently digitized into an electronic database for statistical analysis.

Statistical Analysis

Data analysis was performed using SPSS version 22 (IBM Corp., Armonk, NY, USA) and Python-based analytical packages (SciPy, StatsModels). Descriptive statistics were used to summarize participant characteristics. Continuous variables were presented as means \pm standard deviations (SD) or medians with interquartile ranges where appropriate. Categorical variables were presented as frequencies and valid percentages.

Group differences in temporary incapacity days were evaluated using independent-sample t-tests (for binary comparisons, e.g., gender, night shifts) and one-way analysis of variance (ANOVA) for multiple group comparisons (e.g., work experience groups, levels of harmful habits). To assess independent predictors of sick-leave days, multiple linear regression analysis was performed, adjusting for gender, work experience, harmful habits, and night shift status. A two-tailed p-value <0.05 was considered statistically significant.

Results. The study included data from 1211 medical workers. The age composition of the sample, taking into account gender, is characterized by a significant predominance of women across all age groups, with 1,019 (83.9%) women and 192 (15.8%) men (Figure 1). The smallest proportion consisted of participants under the age of 25 — only 60 individuals (4.9%). The 26–30 age group included 145 individuals (11.9%), of whom 36 (3.0%) were men and 109 (9.0%) were women. The largest number of respondents belonged to the 31–35 and 36–40 age groups — 267 (22.0%) and 315 individuals (25.9%), respectively. In the 41–45 age group, 243 individuals (20.0%) were recorded — 24 men (2.0%) and 219 women (18.0%). In the 46–50 age group, there were 121 individuals (10.0%), including 12 men (1.0%) and 109 women (9.0%). The least represented older age category included participants over 50 years old: 60 individuals (4.9%), of whom 12 (1.0%) were men and 48 (4.0%) were women.

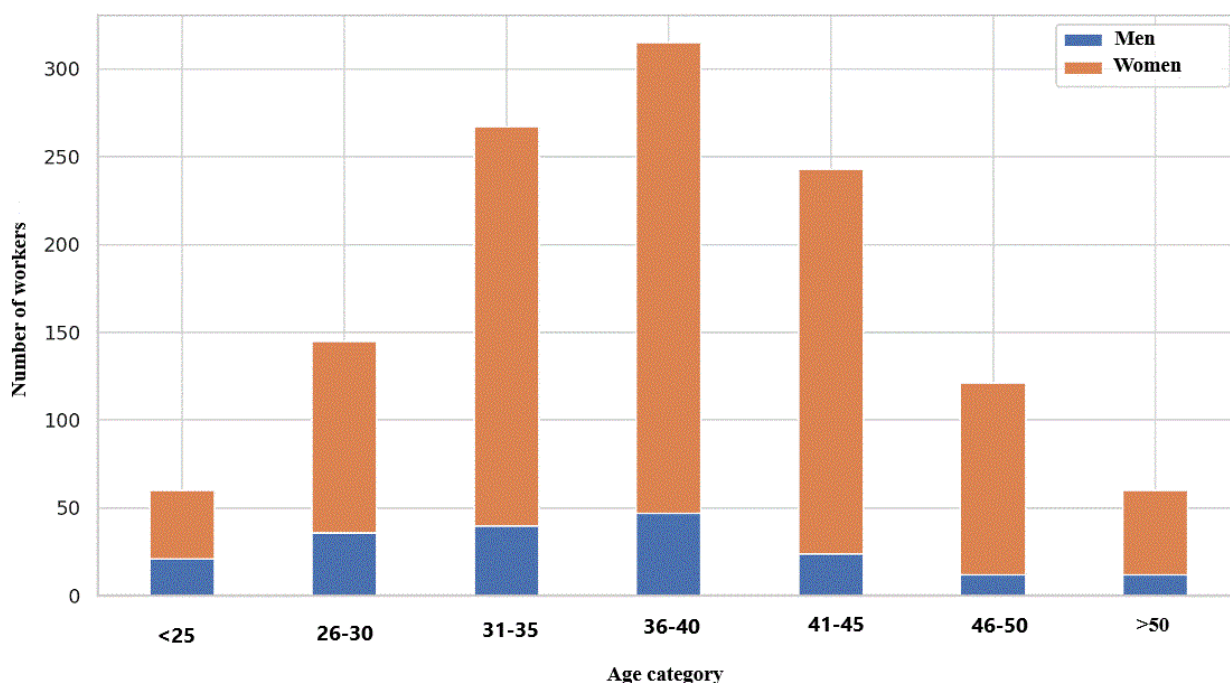


Figure 1. Age distribution of medical workers by sex

The distribution of medical workers by length of service is presented in Table 1. According to the results, the largest proportion of medical workers had more than 15 years of work experience — 503 employees (41.4%). This group also recorded the highest level of temporary incapacity for work: an average of 3.72 ± 1.67 days. In the group with 11 to 15 years of experience, the number of individuals was 283 (23.3%), with an average number of incapacity days of 3.46 ± 1.73 . In the group with 6 to 10 years of experience — 189 individuals (15.6%) — the average figure was 3.39 ± 1.73 days. Respondents with 3 to 5 years of experience ($n = 122$, 10.0%) showed a somewhat lower frequency of temporary incapacity — 3.15 ± 1.81 days. The lowest level of temporary incapacity for work was observed among medical workers with less than 3 years of experience — 118 individuals (9.7%) with an indicator of 3.28 ± 1.76 days.

Table 1. Distribution of medical workers by length of service

Work experience	Number (n)	Percentage of Sample (%)	Mean Number of Sick Leave Days \pm SD
up to 3 years	118	9.7	3.28 ± 1.76
3–5 years	122	10.0	3.15 ± 1.81
6–10 years	189	15.6	3.39 ± 1.73
11–15 years	283	23.3	3.46 ± 1.73
more than 15 years	503	41.4	3.72 ± 1.67

Among the surveyed medical workers, 21.8% ($n = 265$) did not have night shifts, while 78.2% ($n = 950$) worked night shifts. The average number of days of temporary incapacity for work in the group without night shifts was 3.31 ± 1.65 days. In the group with night shifts, this indicator was higher — 4.28 ± 1.03 days (Table 2).

Table 2. Distribution of employees by presence of night shifts

Night shifts (group)	Number (n)	Share of the sample (%)	Mean number of sick leave days \pm SD
Without night shifts	265	21.8	3.31 ± 1.65
With night shifts	950	78.2	4.28 ± 1.65

In the studied sample comprising 1,211 medical workers, the majority of participants ($n=775$; 64.0%) reported having no harmful habits. Among them were 116 men (9.6% of the total sample) and 659 women (54.4%). Regular smoking was reported by 218 respondents (18.0%), with a significantly higher proportion among men: 131 individuals (10.8%), compared to 87 women (7.2%). Alcohol consumption as the only harmful habit was recorded in 48 individuals (4.0%), including 31 men (2.6%) and 17 women (1.4%). A combination of smoking and alcohol use was observed in 73 participants (6.0%), predominantly among men ($n=55$; 4.5%), while among women, such cases accounted for 18 (1.5%). The group with irregular, unspecified, or other harmful habits included 97 individuals (8.0%), consisting of 39 men (3.2%) and 58 women (4.8%) (Table 3).

Table 3. Distribution by harmful habits with indication of number and proportion

Group of Harmful Habits	Total (n)	Men (n)	Women (n)
No harmful habits	775 (64.0%)	116 (9.6%)	659 (54.4%)
Smoking	218 (18.0%)	131 (10.8%)	87 (7.2%)
Alcohol consumption	48 (4.0%)	31 (2.6%)	17 (1.4%)

Smoking and alcohol	73 (6.0%)	55 (4.5%)	18 (1.5%)
Other (occasional habits)	97 (8.0%)	39 (3.2%)	58 (4.8%)

The analysis of the distribution of temporary disability by gender and work experience among medical workers reveals a number of moderately expressed differences, especially in the higher experience categories (Figure 2). In the group with work experience of up to 3 years ($n = 60$; 5.0%), men were a minority with 21 individuals (1.7%), while women accounted for 39 (3.2%). The average duration of temporary disability was 3.18 ± 1.66 days for men and 3.35 ± 1.79 days for women. Among workers with 3–5 years of experience ($n = 145$; 12.0%), the distribution was as follows: men — 36 individuals (3.0%), women — 109 (9.0%). The average duration of disability was 3.22 ± 1.69 days for men and 3.31 ± 1.78 days for women. In the 6–10 years of experience category ($n = 267$; 22.0%), there were 40 men (3.3%) and 227 women (18.7%). The average duration of temporary disability was 3.31 ± 1.72 days for men and 3.45 ± 1.75 days for women. In the 11–15 years of experience category ($n = 315$; 26.0%), there were 47 men (3.9%) and 268 women (22.1%). The duration of temporary disability was 3.4 ± 1.7 days for men and 3.6 ± 1.78 days for women. In the group with more than 15 years of experience ($n = 424$; 35.0%), men accounted for 48 (4.0%), and women — 376 (31.0%). In this group, the average duration of disability was 3.54 ± 1.72 days for men and 3.6 ± 1.76 days for women.

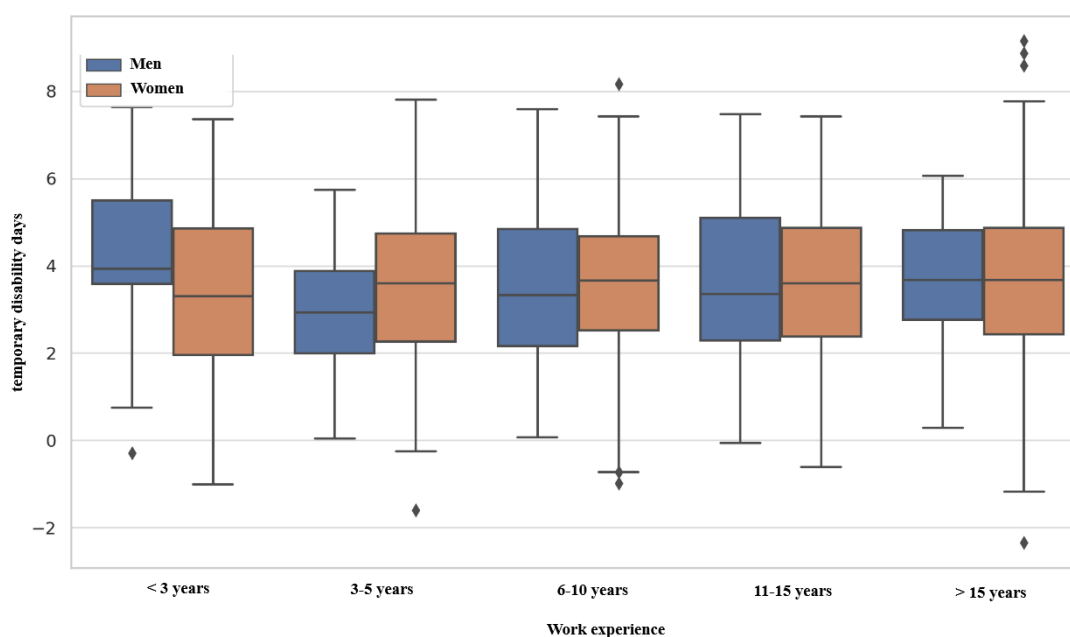


Figure 2. Incapacity indicators by sex and work experience of study participants

In the conducted analysis of factors potentially influencing the number of days of temporary incapacity for work among medical workers, a t-test and analysis of variance (ANOVA) were used. The results are presented below as a summarized description. The sex of the worker did not show a statistically significant effect on the level of incapacity ($t = -0.20$; $p = 0.8437$). In contrast, the indicator of professional experience demonstrated a significant effect (ANOVA: $F = 4.09$; $p = 0.0027$). The factor of harmful habits (smoking, alcohol consumption, etc.) proved to be the most significant among those studied: ANOVA revealed a high degree of differences between groups ($F = 12.88$; $p < 0.0001$). This confirms the presence of a strong association between behavioral characteristics and the level of temporary incapacity. The presence of night shifts also did not have a significant effect ($t = -0.31$; $p = 0.7591$) (Table 4).

Table 4. Analysis of Factors Influencing Incapacity for Work

Factor	Statistic	p-value
Gender (t-test)	-0.20	0.8437
Work experience (ANOVA)	4.09	0.0027
Harmful habits (ANOVA)	12.88	<0.0001
Night shifts (t-test)	-0.31	0.7591

The results of the multiple linear regression presented in Table 5 allow for the identification of independent predictors of the number of days of temporary incapacity for work among medical personnel. According to the model, the value of the constant is 2.5 (standard error — 0.31, $t = 8.06$, $p < 0.001$), which reflects the conditional baseline number of days of incapacity when all included predictors are set to zero. According to the results, gender did not have a statistically significant impact on the level of temporary incapacity ($\beta = 0.12$; standard error = 0.10; $t = 1.2$; $p = 0.231$), indicating the absence of differences between men and women in this indicator after adjusting for other factors. At the same time, work experience, expressed in a point-based system, was a statistically significant predictor ($\beta = 0.22$; standard error = 0.06; $t = 3.67$; $p < 0.001$), indicating that an increase in experience is associated with a rise in the number of incapacity days. The presence of harmful habits showed the most pronounced effect on the incapacity indicator ($\beta = 0.68$; standard error = 0.11; $t = 6.18$; $p < 0.001$). This result emphasizes the importance of behavioral factors and confirms their potential modifiability within preventive programs. The factor of night shifts was also significant ($\beta = 0.45$; standard error = 0.09; $t = 5.0$; $p < 0.001$), indicating a direct impact of disrupted work-rest regimes on the health and work capacity of medical staff.

Table 5. Multiple Linear Regression: Factors Affecting Temporary Disability

Variable	Coefficient β	Standard Error	t-value	p-value
Constant	2.5	0.31	8.06	<0.001
Gender	0.12	0.1	1.2	0.231
Work experience (points)	0.22	0.06	3.67	<0.001
Harmful habits	0.68	0.11	6.18	<0.001
Night shifts	0.45	0.09	5.0	<0.001

The results of the analysis of variance with interaction terms indicate that both individual factors (harmful habits, work experience, night shifts) and their combinations have a statistically significant impact on the number of days of incapacity for work. A significant interaction between sex and harmful habits ($p=0.041$) was observed, suggesting that the effect of harmful habits on incapacity may differ between men and women. Similarly, a significant interaction between work experience and night shifts ($p=0.019$) indicates that the impact of night shifts depends on professional experience. This underscores the importance of considering combinations of factors when analyzing work capacity indicators among medical personnel (Table 6).

Table 6. ANOVA with interaction of factors

Factors	F-value	p-value
Sex	1.12	0.291
Harmful habits	11.45	<0.001

Sex × Harmful habits	4.22	0.041
Work experience	6.34	<0.001
Night shifts	8.97	<0.001
Work experience × Night shifts	5.41	0.019

Discussion. The aim of this study was to assess the relationship between socio-demographic, professional, and behavioral factors and temporary incapacity for work among medical personnel of psychiatric institutions in Kazakhstan. The results obtained showed that both work experience and the presence of harmful habits were significantly associated with the number of days of temporary incapacity for work. At the same time, gender and working night shifts did not demonstrate an independent effect after adjustment for other factors.

The association between increased work experience and the rise in temporary incapacity for work is likely due to the cumulative effect of professional stressors [12]. Prolonged exposure to stressful factors such as high workload, emotional demands, and shift schedules may lead to physical and psychological exhaustion, reducing resistance to illness and increasing the frequency of incapacity [13]. Similar patterns have been described in several studies among healthcare personnel, noting the growing influence of work experience on morbidity and loss of working capacity [14].

Behavioral risk factors acquired particular significance in this study [6]. The presence of harmful habits (smoking, alcohol consumption, poor diet) showed a strong independent association with the number of days of temporary incapacity for work. These behavioral risks may contribute both to the development of somatic illnesses (e.g., respiratory and cardiovascular diseases) and to a reduced overall resilience to occupational stressors [15, 16]. This finding underscores the need to develop and implement health promotion and risk prevention programs targeting harmful habits among healthcare personnel [13]. Previous studies have also indicated that even among healthcare workers, the prevalence of unhealthy lifestyles remains high, despite professional awareness of the associated risks [17].

Unlike a number of other studies [18], our research found that gender and night shift work did not exert a statistically significant independent influence on the level of temporary incapacity for work after controlling for other variables. Although night shifts are traditionally associated with sleep disturbances, increased cardiovascular risks, and the development of burnout syndrome, their direct impact on the duration of incapacity is apparently mediated by more complex mechanisms — such as the level of organizational support, coping strategies, and individual adaptation [19]. Similarly, differences between men and women in incapacity levels may reflect complex sociocultural and organizational factors that were not captured in the current analysis [20].

Conclusion. The results demonstrate that among the studied factors, professional experience and the presence of harmful habits make the most significant contribution to the formation of temporary incapacity for work among medical personnel. The obtained data may be taken into account in the development of preventive and organizational measures in the field of occupational health for medical staff.

Further research should be directed towards studying the interaction between occupational stress, behavioral factors, and the health of personnel in psychiatric institutions using longitudinal models. The development and testing of preventive programs aimed at modifiable behavioral risks may contribute to reducing the level of temporary incapacity for work and increasing workforce stability in psychiatric care services.

Conflict of interest

We declare no conflict of interest.

Authors' contribution

Concept Development – A. Ibrayeva, D. A. Ospanova, K. Saduakasova. Execution – A. Ibrayeva, D. A. Ospanova, K. Saduakasova. Data collection and analysis – A. Ibrayeva, D. A. Ospanova, K. Saduakasova, E. Zhussupova, R. Suleimenova, D.E. Gizat. Interpretation of Results – A. Ibrayeva, D. A. Ospanova, K. Saduakasova, E. Zhussupova, R. Suleimenova, D.E. Gizat. Manuscript Writing – A. Ibrayeva, D. A. Ospanova, K. Saduakasova, E. Zhussupova, R. Suleimenova, D.E. Gizat. We declare that this material has not been previously published and is not under consideration by other publishers.

Funding: None.

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ФАКТОРЫ РИСКА ВРЕМЕННОЙ НЕТРУДОСПОСОБНОСТИ СРЕДИ МЕДИЦИНСКИХ РАБОТНИКОВ: АНАЛИЗ ПРОФЕССИОНАЛЬНЫХ И ПОВЕДЕНЧЕСКИХ ХАРАКТЕРИСТИК

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Аннотация

Введение. Заболеваемость медицинских работников и связанные с ней дни временной нетрудоспособности оказывают значительное влияние на кадровую устойчивость и эффективность здравоохранения.

Цель. Целью исследования являлась оценка влияния профессиональных, социально-демографических и поведенческих факторов на частоту временной нетрудоспособности среди медицинских работников.

Методы. Проведено кросс-секционное исследование, включившее 1211 медицинских работников. Оценивались пол, возраст, стаж, режим работы, вредные привычки и количество дней нетрудоспособности за последний год. Использованы методы описательной статистики, t-тест, ANOVA и множественная линейная регрессия.

Результаты. Среднее число дней нетрудоспособности составило 3,51 дня в год (SD=1,72). В сравнительном анализе выявлено статистически значимое увеличение дней нетрудоспособности при росте стажа ($p=0,0027$) и наличии вредных привычек ($p<0,0001$). Пол и ночные дежурства статистически значимого влияния не оказывали. В регрессионной модели стаж ($\beta=0,14$; $p=0,0001$) и вредные привычки ($\beta=0,19$; $p<0,0001$) сохраняли независимую ассоциацию с числом дней нетрудоспособности.

Заключение. Результаты демонстрируют, что среди изученных факторов наиболее значимый вклад в формирование временной нетрудоспособности у медицинских работников вносят профессиональный стаж и наличие вредных привычек. Полученные данные могут быть учтены при разработке профилактических и организационных мероприятий в сфере охраны труда медицинского персонала.

Ключевые слова: медицинские работники, временная нетрудоспособность, стаж, вредные привычки, регрессионный анализ.

МЕДИЦИНАЛЫҚ ҚЫЗМЕТКЕРЛЕРДІҢ УАҚЫТША ЕҢБЕК ЖАРАМСЫЗДЫҒЫ ФАКТОРЛАРЫ: КӘСІБИ ЖӘНЕ МІНЕЗ-ҚҰЛЫҚ ЕРЕКШЕЛІКТЕРІН ТАЛДАУ

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Түйіндеме

Кіріспе. Медициналық қызметкерлердің аурушандығы мен оған байланысты уақытша еңбекке жарамсыздық күндері денсаулық сақтау жүйесінің кадрлық тұрақтылығы мен тиімділігіне елеулі әсер етеді.

Мақсаты. Бұл зерттеудің мақсаты – кәсіби, әлеуметтік-демографиялық және мінез-құлықтық факторлардың медициналық қызметкерлер арасындағы уақытша еңбекке жарамсыздық жиілігіне әсерін бағалау.

Әдістері. Кросс-секциялық зерттеуге 1211 медициналық қызметкер қатысты. Жынысы, жасы, еңбек өтілі, жұмыс тәртібі, зиянды әдеттердің болуы және соңғы бір жылдағы еңбекке жарамсыздық күндерінің саны бағаланды. Сипаттамалық статистика, t-тест, ANOVA және көптік сызықтық регрессия әдістері қолданылды.

Нәтижелер. Еңбекке жарамсыздық күндерінің орташа саны жылына 3,51 күнді құрады ($SD=1,72$). Салыстырмалы талдауда еңбек өтілі артқан сайын ($p=0,0027$) және зиянды әдеттері бар қызметкерлер арасында ($p<0,0001$) еңбекке жарамсыздық күндерінің санының статистикалық тұрғыдан айтарлықтай өсуі байқалды. Қызметкерлердің жынысы және түнгі кезекшіліктердің әсері статистикалық тұрғыдан маңызды болмады. Регрессиялық модельде еңбек өтілі ($\beta=0,14$; $p=0,0001$) және зиянды әдеттер ($\beta=0,19$; $p<0,0001$) еңбекке жарамсыздық күндерінің санына тәуелсіз әсер етуші факторлар ретінде қалды.

Қорытынды. Зерттеу нәтижелері бойынша медициналық қызметкерлердің уақытша еңбекке жарамсыздығына ең елеулі әсер ететін факторлар – кәсіби еңбек өтілі мен зиянды әдеттердің болуы. Алынған деректер медицина қызметкерлерінің еңбек қауіпсіздігін қамтамасыз етуге бағытталған алдын алу және ұйымдастырушылық шараларды әзірлеу кезінде ескерілгені жөн.

Түйінді сөздер: медициналық қызметкерлер, уақытша еңбекке жарамсыздық, еңбек өтілі, зиянды әдеттер, регрессиялық талдау