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Health Status and Work Ability among Nurses

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Abstract

Introduction. Nurses are considered to be an integral part of health care system. Exposure to high level of occupational stress and various psychological problems can have direct impact on nurses' work ability and their health.

Aim. To identify health problems that affect nursing professionals in the acute care hospital and the related factors, especially WAI.

Methods. The data were collected from December 2017 to June 2018 at the Sisters of Mercy University Hospital Center in Zagreb, Croatia. The study included 713 nurses. The data were collected using socio-demographic, health- and work-related questions and the Work Ability Index Questionnaire.

Results. Nurses' self-rated health is considered good, but out of 51 health difficulties and diseases offered, 10 different problems are present in more than 10% respondents, which seems very worrying. The most common are disorder of the lower back (38.7%), disorder of the upper back or cervical spine (38.1%), back injury (22.7%), gastritis or duodenal irritation (17.4%), sciatica (16.7%), and hypertension (15.1%). Out of 51 health problems, a significant difference in self-rated health was found in 45, and in 29 for current work ability. Higher age, female gender, secondary education, none or too much physical activity, less overtime hours, and commuting longer than 60 minutes are connected with different health problems, mostly musculoskeletal disorders.

Conclusion. It is necessary to focus more on the nurses' health condition, both in the research and practical sense, and undertake various preventive and curative procedures that will reduce the incidence of numerous health problems present in this population.

Introduction

The concept of work ability (WA) is a comprehensive approach optimising health and productivity in the workplace. It was developed by Tuomi and Ilmarinen, at the Finnish Institute of Occupational Health (1,2). The model encompasses the resources of the individual, the external factors related to their work, the environment outside of their work and how these factors relate to an individual's work ability (3). The Work Ability Index Questionnaire is an instrument widely used in occupational health and research to identify workers at risk of reduced work performance and work-related disability (4). The Work Ability Index (WAI) is a summary measure obtained by summing up the scores of responses to all items in the WAI questionnaire (1,2). According to Ilmarinen and von Bonsdorff (2015), WAI has been found to be a valid indicator of sickness absence from work, work disability, and early retirement from the labour market (5).

Nurses are the largest group of healthcare professionals in healthcare system (6) devoted to the patient's well-being and obliged to provide high quality, patient-centered and safe nursing care (7). Nurses play a critical role in health promotion, disease prevention and delivering primary and community care (8). According to Schaller et al. (2021), nursing profession is accompanied by great physical and mental health burdens (9). Nursing is a demanding job and includes various occupational hazards, and work stresses can have negative effects on nurses' health and quality of life (10). Evidence from the literature points to some stressors that are common in nursing profession such as: conflict with co-worker(s), job dissatisfaction, health disorders, decreased professional satisfaction, reduced correct and timely decision-making, experiences of violence (9,11). All of the above can have a negative effect on nurses' health causing occupational diseases and/or work accidents (11). Thus, it can also have direct impact on delivery of safe and quality care of patients (10,12). According to Fischer and Martinez (2013), WA among nurses is related to individual characteristics, working conditions, and a health-related work outcome (13). A significant negative correlation between the WAI score and nurses' age, years in current job, and number of reported diagnoses was reported (14). Research findings have shown an association between intensity of biomechanical hazards and a reduction in WA among nurses (15), also between higher perceived exposure to work stressors and impaired WA among nurses (16). According to Donovan et al. (2013), maintaining and supporting nurses' health is vital to ensure their WA (17).

In Croatia, we can find extensive literature that deals with the mental health of nurses, but research that deal with their physical health is extremely rare. Also, the application of the WAI to the nursing population for research purposes is only sporadic, therefore we considered it important to examine the health status of nurses in one of the largest hospitals in Croatia. Therefore, the aim of the present study is to identify health problems that affect nursing professionals in the acute care hospital and the related factors. We focused on the third question in WAI questionnaire *The number of current diseases diagnosed by a physician* (51 medical problems) which provides three response options, relating respectively to an absence of disease, a presence of self-diagnosed disease, and disease certified by a doctor (18).

Methods

Study design

A cross-sectional study was carried out from December 2017 to June 2018 at the Sisters of Mercy University Hospital Centre (SMUHC) in Zagreb, Croatia.

Participants

A total population of 1465 nurses of different profiles (registered nurses, Bachelor of Nursing, Master of Science in Nursing) working at SMUHC was considered for inclusion in the study. Due to nurses' sick, annual or study leave, it was possible to deliver the questionnaire to 1300 nurses. Finally, a total of 713/1300 nurses participated in the study.

Instruments

The sociodemographic, health-related, and work-related questionnaire

The sociodemographic questionnaire items were gender, age, marital status, educational level. The second group consisted of health-related factors: self-rated health with answers from 1 - *great*, to 5 - *poor*, number of cigarettes per day, and the level of physical activity. The third group consisted of work-related factors: work length, overtime, and commute time (≤60 minutes, >60 minutes).

Work Ability Index Questionnaire

Finnish Institute of Occupational Health (FIOH) researchers Tuomi et al. (1998) developed the Work Ability Index Questionnaire (WAIQ) (1). The WAIQ has already been translated into Croatian within the framework of a research project entitled Health at work and healthy environment, led by Andrija Stampar School of Public Health, School of Medicine, University of Zagreb.

The WAIQ consists of 7 groups: 1 – current WA compared to the lifetime best (answers from 0 - *completely unable to work* to 10 - *the best possible WA*), 2 – WA in relation to the job demands (two questions: How do you rate your current work ability with respect to the physical demands of your work?; How do you rate your current work ability with respect to the mental demands of your work?), 3 – 51 type of different diseases or health problems which can be diagnosed by a physician or by themselves, 4 – estimated work impairment due to diseases, 5 – sick leave during the past year, 6 – personal prognosis of WA after 2 years, and 7 – mental resources referring to the worker's life in general, both at work and during leisure time (three questions: Have you recently been able to enjoy your regular daily activities?; Have you recently been active and alert?; Have you recently felt yourself to be full of hope for the future?) (2). The results in a total WAI score can range from 7 (unable to work) to 49 (full work ability). Based on this score, an individual is classified into standard work ability categories of excellent (WAI 44–49), good (WAI 37–43), moderate (WAI 28–36), and poor (WAI ≤27) (18). In the present study the Croatian version of a WAIQ (WAIQ-CRO) was used with Cronbach's α=0.71 (19).

Procedure

After obtaining the approval of the Ethics Committee of SMUHC, the principal investigator organized a meeting with the head nurses of each clinic at the SMUHC and presented them with the aim and objectives of the research and the research protocol. The total population of nurses working at SMUHC was considered for inclusion in the study. The study questionnaires were distributed to hospital departments in sealed envelopes. All questionnaires were returned anonymously in sealed envelopes to protect nurses' privacy.

Ethics

The study was carried out in accordance with the ethical principles of the Helsinki Declaration. All respondents gave their informed consent to participate in the study, which was approved by the SMUHC (code EP-7811/16-19).

Statistics

In the statistical analysis, standard descriptive statistics was first performed and reported as frequencies, percentages, means, medians and standard deviation. Although the Kolmogorov-Smirnov test showed a statistically significant difference from normal distribution for all observed quantitative variables, the additional verification of skewness and kurtosis does not exceed the recommended values for the application of parametric statistics. The only exception is the number of cigarettes per day where the skewness is 1.443, so we will use non-parametric procedures in inferential statistics to check the differences. The relationship between WAI and sociodemographic, health- and work-related factors was assessed using t-test or chi-square test. A data analysis was performed using IBM SPSS Statistics for Windows (Version 21.0. SPSS Inc. Chicago. IL. USA).

Results

The group consisted of 630 women and 83 men. The mean age was 38.4±12.5 years (range: 19-65 years) and the mean work length was 17.48 years (SD 12.8, range 0-45).

Average number of cigarettes per day is 4.96 (SD=7,51), with median 0, and range 0-40 cigarettes. The answers offered to the self-rated health question ranged from 1 – *bad* to 5 – *perfect*. Average result is 3.08, median is 3, which indicates good health (SD=1.034, and range 1-5). Average hours of overtime per month is 7.33 (SD=10.51), median is 0, and range from 0 to 57 hours.

Table 1. **Socio-demographic characteristics and health related factors among Croatian nurses (n=713)**

Variable	Categories	f	%
Marriage status	married	371	52.1
	divorced	48	6.7
	widowed	18	2.5
	single	186	26.1
	extra-marital union	89	12.5
Level of education	secondary education	429	60.2
	Bachelor of Nursing	256	35.9
	Master of Nursing	28	3.9
Physical activity	none	101	14.2
	once a week	163	22.9
	two times a week	145	20.4
	three times a week	123	17.3
	every day	180	25.3

It can be seen that more than half of the sample consists of married people, followed by singles (about a quarter of the sample). The majority are high school nurses, up to 60%. Regarding physical activity, the answers are quite variable: the fewest are those who do not exercise at all (14%), and the most are those who exercise daily - a quarter of the sample.

In this paper, we were interested which health problems occur in nurses and technicians working at the hospital system, examined by the WAI questionnaire. The mean value of the total WAI score was 40.5±5.6 points. The largest number of respondents belongs to the category 'good WAI' (304-44%), followed by 'excellent WAI' with 238 respondents (34.4%), 'moderate' 132 respondents (19.1%), and 'poor' only 17 (2.5%).

In the following table, the frequencies and percentages for certain health problems are presented, regardless of whether they are expressed as an official medical diagnosis, or whether they are the assessment of the respondents themselves, because given that they are health professionals, we consider their opinion to be credible. Also, some health problems, such as repeated pain in the upper back, or back injury, are not even formal diagnoses, but rather a symptom, so the diagnosis of such a condition by a physician can be a problem. In the table, the difficulties are ordered from the most frequent to the least frequent.

In each of 51 categories of various health difficulties and diseases offered, there is at least one respondent. The percentage of patients with a single problem goes as high as 38.7% for disorder of the lower back, repeated instances of pain. As many as 10 different problems appear in nurses and technicians with a share of more than 10%.

The number of diagnoses given by respondents ranges from 0 for 153 respondents (21.5%), one diagnosis is given by 15.3% of people, two or 3 diagnoses are given by 13.9 or 13% of respondents, and even up to 19 or 20 diagnoses are stated by one person each. The median is two diagnoses, the mode is 0, while M is 3.26 (with SD 3.351). Due to the extreme deviation from the normal distribution, we can consider the median as the most representative average. For more frequent health problems, which appear in more than 10% of respondents, comparisons were made according to certain characteristics of respondents. For quantitative variables, comparisons were made using t-test.

Table 2. **Frequencies and percentages for different health problems among nurses and technicians working in a hospital (n=713)**

		f	%
1.	Disorder of the lower back, repeated instances of pain	276	38.7
2.	Disorder of the upper back or cervical spine, repeated instances of pain	272	38.1
3.	Back injury	162	22.7
4.	Gastritis or duodenal irritation	124	17.4
5.	(Sciatica) pain radiating from the back into the leg	119	16.7
6.	Hypertension (high blood pressure)	108	15.1
7.	Musculoskeletal disorder affecting the limbs (hands, feet), repeated instances of pain	98	13.7
8.	Slight mental disorder or problem (for example, slight depression, tension, anxiety, insomnia)	89	12.5
9.	Leg/foot injury	82	11.5
10.	Repeated infections of the respiratory tract (also tonsillitis, acute sinusitis, acute bronchitis)	75	10.5
11.	Goiter or others thyroid disease	66	9.3
12.	Anemia	65	9.1
13.	Obesity	63	8.8
14.	Arm/hand injury	59	8.3
15.	Urinary tract infection	55	7.7
16.	Allergic rash, eczema	44	6.2
17.	Chronic sinusitis	39	5.5
18.	Visual disease or injury (other than refractive error)	39	5.5
19.	Benign tumour	36	5.0
20.	Rheumatoid arthritis	36	5.0
21.	Gallstones or disease	31	4.3
22.	Neurological disease (for example stroke, neuralgia, migraine, epilepsy)	29	4.1
23.	Bronchial asthma	28	3.9
24.	Injury of other part of the body	28	3.9
25.	Other cardiovascular disease	26	3.6
26.	Chronic bronchitis	21	2.9

Table 2. **Frequencies and percentages for different health problems among nurses and technicians working in a hospital (n=713)**

		f	%
27.	Other musculoskeletal disorder	21	2.9
28.	Other endocrine or metabolic disease	20	2.8
29.	Problems or injury to hearing	19	2.7
30.	Diabetes	19	2.7
31.	Gastric or duodenal ulcer	17	2.4
32.	Kidney disease	17	2.4
33.	Other digestive disease	15	2.1
34.	Other rush	14	2.0
35.	Other skin disease	14	2.0
36.	Liver or pancreatic disease	11	1.5
37.	Colonic irritation, colitis	11	1.5
38.	Genitals disease (for example fallopian tube infection in women or prostatic infection in men)	11	1.5
39.	Other genitourinary disease	11	1.5
40.	Coronary heart disease, chest pains during exercise (angina pectoris)	10	1.4
41.	Mental disease or severe mental health problem (for example, severe depression, mental disturbance)	10	1.4
42.	Malignant tumour (cancer)	9	1.2
43.	Other respiratory disease	6	0.8
44.	Other blood disorder	5	0.7
45.	Other neurological or sensory disease	4	0.6
46.	Cardiac insufficiency	4	0.6
47.	Coronary thrombosis, myocardial infarction	3	0.4
48.	Pulmonary tuberculosis	2	0.3
49.	Emphysema	1	0.1
50.	Birth defect	1	0.1
51.	Other disorder or disease	1	0.1

Table 3. **Means and significant differences for more frequent health problems of nurses and technicians working in a hospital (N=713)**

	Health difficulty or disease characteristics of people with a certain problem	Health problem	Self-rated health			Current work ability		
			M	t	*p*	M	t	*p*
1.	**Disorder of the lower back, repeated instances of pain** worse assessment of health and work ability	yes	2.80	5.831	**0.000**	7.95	4.963	**0.000**
		no	3.25			8.60		
2.	**Disorder of the upper back or cervical spine, repeated instances of pain** worse assessment of health and work ability	yes	2.81	5.477	**0.000**	7.96	4.672	**0.000**
		no	3.24			8.58		
3.	**Back injury** worse assessment of health and work ability	yes	2.73	4.892	**0.000**	7.93	3.127	**0.002**
		no	3.18			8.47		
4.	**Gastritis or duodenal irritation** worse assessment of health and work ability	yes	2.87	2.468	**0.014**	8.03	2.236	**0.026**
		no	3.12			8.41		
5.	**(Sciatica) pain radiating from the back into the leg** worse assessment of health	yes	2.63	5.277	**0.000**	7.78	3.949	**0.000**
		no	3.17			8.46		
6.	**Hypertension (high blood pressure)** worse assessment of health and work ability	yes	2.52	6.271	**0.000**	7.66	4.562	**0.000**
		no	3.18			8.47		
7.	**Musculoskeletal disorder affecting the limbs (hands, feet), repeated instances of pain** worse assessment of health and work ability, less overtime	yes	2.39	8.758	**0.000**	7.47	4.932	**0.000**
		no	3.19			8.49		
8.	**Slight mental disorder or problem** worse assessment of health and work ability	yes	2.65	4.211	**0.000**	7.35	5.077	**0.000**
		no	3.14			8.49		
9.	**Leg/foot injury** worse assessment of health and work ability	yes	2.62	4.298	**0.000**	7.87	2.687	**0.007**
		no	3.14			8.41		
10.	**Repeated infections of the respiratory tract** worse assessment of health and work ability	yes	2.75	2.954	**0.003**	7.77	3.055	**0.002**
		no	3.12			8.41		

Groups with any of the 10 most common health problems rate their health significantly worse. The situation is identical in terms of current working ability. It should be mentioned that out of 51 health problems, a significant difference in self-rated health was found in 45. The difference is not significant only for coronary thrombosis/myocardial infarction, emphysema, colonic irritation/colitis, urinary tract infection, other rush, and other skin diseases. Respondents with any of the other 45 health complaints statistically significantly rate their health as worse. The current work ability is significantly different for 29 diseases.

As can be seen in Table 4, out of 10 health problems, for 7 of them a statistically significant difference was obtained by age, always in such a way that the group with the disease is statistically significantly older. For this same seven health problems, a significant difference was also obtained for the length of service, therefore the service was not shown separately in the table. Only back injury, repeated infections of the respiratory tract and gastritis are not significantly related to age.

For number of cigarettes, no statistically significant difference for 10 most frequent health problems was found. The number of overtime hours in the previous month is relevant only for musculoskeletal disorder affecting the limbs: people with this difficulty have statistically significantly fewer overtime hours (t=3.490; p=0.001). The average of the group without this difficulty is 7.7 overtime hours, and for the persons with the difficulty is 4.8 overtime hours.

Table 4. **Means and significant differences in age for more frequent health problems of nurses and technicians working in a hospital (N=713)**

	Health difficulty or disease characteristics of people with a certain problem	Health problem	Age		
			M	t	*p*
1.	Disorder of the lower back, repeated instances of pain	yes	41.1	-4.539	**0.000**
		no	36.8		
2.	Disorder of the upper back or cervical spine, repeated instances of pain	yes	41.7	-5.366	**0.000**
		no	36.5		
3.	(Sciatica) pain radiating from the back into the leg	yes	44,2	-5.620	**0.000**
		no	37.3		
4.	Hypertension (high blood pressure)	yes	51.8	-15.309	**0.000**
		no	36.1		
5.	Musculoskeletal disorder affecting the limbs (hands, feet), repeated instances of pain	yes	47.2	-8.330	**0.000**
		no	37.1		
6.	Slight mental disorder or problem	yes	42.9	-3.655	**0.000**
		no	37.8		
7.	Leg/foot injury	yes	44.3	-3.866	**0.000**
		no	37.7		

For qualitative and ordinal variables, differences were checked using the chi-square test. A statistically significant difference by gender was found for disorder of the upper back or cervical spine, (χ^2=16.004; df=1; p=0.0001), and for musculoskeletal disorder affecting the limbs (χ^2=4.723; df=1; p=0.0001). In both cases, women suffer significantly more. Considering that the male gender is present with only 11.6% in our sample, these results should be taken with a certain reserve.

For more transparent analyses, we divided education into two categories: the group with secondary education (60.2%), and the other with tertiary education (39.8%). Significant differences were obtained for musculoskeletal disorder affecting the limbs (χ^2=9.723; df=1; p=0.002), hypertension (χ=16.469; df=1; p=0.0001), and gastritis or duodenitis (χ^2=4.398; df=1; p=0.036). Significantly more people with a secondary education have those health problems.

For shift work, a significant difference was obtained for back injury (χ^2=9.839; df=2; p=0.007) and musculoskeletal disorder affecting the limbs (χ^2=6.717; df=2; p=0.035), however, as comparison was made for three types of shift work, we additionally checked which pairs of groups have a significant difference. It was shown that respondents who work in three eight-hour shifts suffer significantly more from back injuries (40.4%) than those who work only in the morning shift (23.7%) (χ^2=5.6967; df=1; p=0.017), as well as from those working in 12/24 shifts (20.3%) (χ^2=9.8241; df=1; p=0.0017). For musculoskeletal disorders affecting the limbs, only the morning shift (17.9% of patients) differs significantly from 12/24 shifts (11%); in the latter there are significantly fewer persons with the mentioned disorder (χ^2=6.3676; df=1; p=0.011).

The physical activity level was found to be significant for musculoskeletal disorders affecting the limbs. Since five answer categories were offered (not at all; once; twice, three times a week; every day), we combined the groups that exercise once and twice a week, and the chi-square is 12.497 (df=3; p=0.006). Subsequent matching showed that those who do not exercise at all have statistically significantly more musculoskeletal disorders in the limbs, compared to people who exercise once or twice a week (χ^2=5.3872; df=1; p=0.0203), and three times a week (χ^2=12.084; df=1; p=0.00051). The group that exercises daily also has significantly more musculoskeletal problems in the limbs compared to those who exercise three times a week (χ^2=5.1623; df=1; p=0.0231). Those who exercise three times a week

have the fewest mentioned difficulties -6.9%, followed by the group that exercises once or twice a week -13%, then those who exercise daily -15%, and finally those who do not exercise at all -22.5 %.

In the case of the painful disorder of the lower back, a significant difference in the physical activity level was also shown: the group that exercises three times a week has a statistically significantly lower proportion of people with lower back pain, compared to all other groups, while in the comparison to other groups significant difference was not found. Significant chi-squares range from 5.516 to 6.6432, with a *p* of 0.02 to 0.01.

Given that five possible answers were offered on an ordinal scale for the duration of commuting, based on different combinations of matching categories for easier analysis, we expressed the duration in two categories: those who travel to work up to 60 minutes (N=526), and longer than 60 minutes (N=184). Significant differences were obtained for injured back (χ^2=4.180; df=1; p=0.041), injured leg or foot (χ^2=10.263; df=1; p=0.001), and for musculoskeletal disorder in limbs with recurrent pain (χ^2=4.563; df = 1; p=0.033): all three difficulties are significantly more common in the group that commutes longer than 60 minutes.

Discussion

In the present study, we assessed the prevalence of health problems that affect nursing professionals in the acute care hospital, and the related factors. The results of our study show that all the diseases that were listed in the third question of the WAIQ are represented in our sample of respondents. This indicates that nurses have a lot of health problems and therefore the health status of these professionals needs to be carefully examined, and where necessary, prevented or treated (20,21). The average of self-rated health is in the middle of the scale, which means that nurses' health is good (not very good or excellent!). Only one fifth of the sample is completely healthy, and these are people who were at their workplace at the time. We do not know the number of nurses and technicians who were on sick leave during the research period, but the number of people with health issues would certainly be even higher if we included people who were on sick leave. However, it certainly sounds worrying that people with 5, 10, 15 or even 20 simultaneous diagnoses work in such demanding workplaces. On the other hand, health care is at their fingertips (since they work in hospital), and yet they are in such a worrying state. The nursing profession continues to face problems involving poor working conditions (22); exposure to various occupational hazards such as biological, chemical, physical, biomechanical, psychological; global nursing shortage and ageing of this workforce (21).

All of the above can affect both work ability and intention to leave the profession. Most of the respondents has good WAI -44%, followed by excellent WAI with 34% respondents (34.4%), moderate with 19% respondents (19.1%), and poor with only 17 (2.5%). At first glance, the situation does not seem so worrisome. However, we should be aware that people with moderate or good work ability are actually not completely healthy, and that maybe "good WAI" is not good enough, especially not for the workplace of hospital nurses. We can assume that people with poor WAI should not be at work at all, but on sick leave, and it should also be considered that the research did not include people who were on sick leave at the time.

Lower back pain with recurring pain is the most frequent health problem among nurses in the present study. More than 38% of respondents mentioned this health problem, which we consider to be an extremely high percentage. Namely, we can assume that low back syndrome pretty much affects nurses' work ability because a significant difference in the self-assessment of WA between those who have and those who do not have this difficulty was found. Having almost 40% of nurses with less than 100% work ability due to a single diagnosis in a demanding hospital system is really a situation that requires additional attention and intervention. Similar was reported in a study among nurses in Switzerland (23). Some of the factors associated with lower back pain among the nurses include lifting patients and high levels of workload. These are also biomechanical hazards related to the nursing profession (24). Therefore, workplace health-promoting measures to manage ergonomic risk factors are very important for nurses' health. Out of the 10 most common difficulties, as many as six relate to musculoskeletal problems that can be prevented with appropriate exercises.

We consider it necessary to mention that obesity, although it is not in the first 10 most frequent health difficulties, appears with 8.8%, which is also considered to be a large proportion because this problem can mostly be completely solved with healthy habits. In addition, this percentage is worryingly high because obesity itself can be the cause of other serious health problems such as hypertension, high cholesterol, diabetes, atherosclerosis, etc. This finding is also surprising because the nurses' job in hospital conditions is not sedentary, it is physically demanding and includes a lot of movement and other physical activities (turning patients and caring for them). On the other hand, obesity is not a rare phenomenon in our environment. Thus, the Croatian Institute for Public Health warns that in 2019, 35% of children aged 8 were obese. Men in Croatia 'lead' in terms of obesity in Europe with 87.6% with excessive obesity in the group over the age of 18 (25).

The current work ability is significantly different in terms of 'only' 29 diseases. Therefore, some health problems are not perceived by the respondents as affecting their current work ability. The reasons for this can be different: the patients have been suffering from a disease for a long time (e.g. chronic bronchitis) and have adapted their work to the limitations that the disease brings with it. Another reason may be that if the difficulty is present, it does not interfere with the ability to work (e.g. various rashes).

Women suffer significantly more from the upper back or cervical spine disorder, and from musculoskeletal disorder affecting the limbs. In general, women experience more pronounced pain in the neck area, and one possible explanation lays in anatomical gender differences in cervical vertebrae (26).

In terms of impact the age has on the prevalence of health problems that affect nursing professionals, age was found to be significant for the 10 most frequent health problems, except for back injury, repeated infections of the respiratory tract and gastrointestinal tract diseases. The reason could be found in a reduction of functional capacity of the nurses due to the aging process. It was suggested that older nurses can experience pain associated with musculoskeletal disorders and reduction in strength and flexibility which may result in reduced work performance (27). For respiratory infections, it is expected that they are not related to age, because they affect people throughout the entire lifespan. In contrast, we did not expect that gastrointestinal and lower back problems would not be related to age. This may indicate that some other factors play a greater role in the occurrence of these difficulties, such as daily physical effort at the workplace and/or intense stress.

The results of the present research revealed that nurses with secondary education have more health problems than the nurses with a bachelor's and master's degree in nursing. Evidence from the literature stated that lower level of education was a predictor for low level of work ability among nurses (28). The reason for that can lie in the fact that nurses with lower levels of educational status commonly take on work involving more physical labour than those with higher education. According to Golubic et al (2009), nurses with secondary education perceived hazards at workplace and shift work as statistically significantly more stressful than nurses with a college degree (29). It is possible that nurses with higher education during their studies had the opportunity to better educate themselves about different stress management strategies.

In the current study, the results revealed that nurses who do not exercise are more likely to suffer from musculoskeletal diseases related to limbs and lower back. Also, nurses who exercise daily were more likely to suffer from diseases of the musculoskeletal system in comparison with those who exercise once, twice or three times per week. For our respondents, it turned out to be optimal to exercise three times a week because that group had the fewest musculoskeletal problems. From this we can conclude that moderation is very important. Literature suggests that work-related musculoskeletal diseases have a greater negative impact on nurses' physical and mental health (30). Physical activity has many health benefits, such as improved cardiorespiratory fitness, muscular fitness, and bone health (31), but without overdoing it.

The results of the present research revealed that participants who spent 60 minutes or more time traveling to work had more health problems. This could be explained by the fact that a long commute can be stressful and exhausting for hospital nurses and can therefore be a risk factor for development of health problems. Turchi et al. (2019), showed that a longer commute time had a negative influence on hospital nurses' psychological well-being (32).

Study limitations

A participant's motivation to respond is a limitation of the present research. It is unknown whether the nurses who participated in the research had the same level WAI as the nurses who did not participate in the research. Although the data was collected a while ago, the findings point out severe problems in hospital system. It is certainly a condition that requires continuous assessment and intervention aimed at improvements at the individual and organizational level.

Study strengths

This research provided additional and important information and knowledge about the WAI and the prevalence of health problems that affect nursing professionals in the acute care hospital and the related factors.

Conclusion

Work ability index in our sample of hospital nurses is considered good (M=40.5), and self-rated health is also considered good, but only one fifth of the sample is considered completely healthy. Out of 51 health problems, a significant difference in self-rated health was found in 45, and in 29 for current work ability. Ten different problems are present in more than 10% respondents: disorder of the lower back, repeated instances of pain (38.7%), disorder of the upper back or cervical spine, repeated instances of pain (38.1%), back injury (22.7%), gastritis or duodenal irritation (17.4%), sciatica (16.7%), hypertension (15.1%), musculoskeletal disorder affecting the limbs (13.7%), slight mental disorder or problem (12.5%), leg/foot injury (11.5%), and repeated infections of the respiratory tract (10.5%). Higher age is connected to seven of these health problems (except back injury, respiratory tract infection, and gastritis), less overtime hours with only one (musculoskeletal disorder affecting the limbs). Women suffer significantly more from disorder of the upper back or cervical spine, and musculoskeletal disorder affecting the limbs. Significantly more people with secondary education suffer from musculoskeletal disorder affecting the limbs, hypertension, and gastritis or duodenitis.

Those who do not exercise at all have statistically significantly more musculoskeletal disorders relating to the limbs, compared to people who exercise once or twice, and three times a week. The group that exercises daily also has significantly more musculoskeletal problems in the limbs compared to those who exercise three times a week. Respondents who exercise three times a week have a significantly lower proportion of lower back pain, compared to all other groups. Injured back, injured leg or foot, and musculoskeletal disorder in limbs are significantly more common in the group that commutes longer than 60 minutes.

It is necessary to focus more on the nurses' health condition, both in the research and practical sense, and undertake various preventive and curative procedures that will reduce the incidence of numerous health problems present in this population.

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ZDRAVSTVENO STANJE I RADNA SPOSOBNOST MEDICINSKIH SESTARA

Sažetak

Uvod. Medicinske sestre smatraju se sastavnim dijelom zdravstvenog sustava. Izloženost visokoj razini profesionalnog stresa i raznim psihološkim problemima može biti povezana s radnom sposobnošću medicinskih sestara i njihovim zdravljem.

Cilj. Identificirati zdravstvene probleme kod medicinskih sestara i tehničara zaposlenih u bolničkom sustavu i čimbenike koji su povezani s tim, posebice radnu sposobnost.

Metode. Podaci su prikupljeni od prosinca 2017. do lipnja 2018. u KBC-u Sestre milosrdnice u Zagrebu u Hrvatskoj. U istraživanju je sudjelovalo 713 medicinskih sestara i tehničara. Podaci su prikupljeni upitnikom o sociodemografskim, zdravstvenim i radnim čimbenicima te upitnikom za određivanje indeksa radne sposobnosti (WAI).

Rezultati. Samoprocjena je zdravstvenog stanja medicinskih sestara dobra, ali od 51 ponuđene kategorije raznih zdravstvenih poteškoća i bolesti, 10 različitih problema javlja se kod više od 10 % ispitanika, što se čini vrlo zabrinjavajućim. Najčešće su poteškoće i bolesti poremećaj donjeg dijela leđa (38,7 %), poremećaji gornjeg dijela leđa ili vratne kralježnice (38,1 %), ozljeda leđa (22,7 %), gastritis ili upala dvanaestnika (17,4 %), išijas (16,7 %) i hipertenzija (15,1 %). Od 51 zdravstvenog problema, znatna razlika u samoprocjeni zdravlja utvrđena je kod 45, a kod 29 za trenutačnu radnu sposobnost. Viša dob, ženski spol, srednjoškolsko obrazovanje, nikakva ili prevelika tjelesna aktivnost, manje prekovremenih sati i putovanje na posao duže od 60 minuta povezani su s različitim zdravstvenim problemima, ponajviše s poremećajima mišićno-koštanog sustava.

Zaključak. Zdravstvenom stanju medicinskih sestara potrebno je posvetiti više pažnje, kako u istraživačkom tako i u praktičnom smislu, te poduzimati različite preventivne i kurativne postupke koji će umanjiti smanjenje broja zdravstvenih problema prisutnih u ovoj populaciji.

Ključne riječi: medicinske sestre, radna sposobnost, samoprocjena zdravlja, WAI