

Selected risk factors and the occurrence of back pain in nurses

Wybrane czynniki ryzyka a występowanie dolegliwości bólowych kręgosłupa u pielęgniarek

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Pielęgniarstwo i Zdrowie Publiczne, ISSN 2082-9876 (print), ISSN 2451-1870 (online)

Piel Zdr Publ. 2019;9(4):265–271

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Funding sources

None declared

Conflict of interest

None declared

Received on December 17, 2018

Reviewed on February 19, 2019

Accepted on April 7, 2019

Abstract

Background. Spinal diseases among healthcare workers have recently become one of the leading public health problems. Diseases of muscular, skeletal and spinal system are often caused by perennial influence of work environment or factors not connected with profession, e.g., age, sex or job seniority.

Objectives. The aim of this work was to analyze selected risk factors that influence the occurrence of pain complaints among nurses.

Material and methods. Three hundred and forty-five nurses participated in the survey. The questionnaire consisted of an original survey form and standardized research tools such as the efficiency index in lower and upper back pain (ODI, NDI) and the Satisfaction With Life Scale (SWLS).

Results. Nurses at the age from 41 to 50 years were the most populous age group. The largest group was the employees with 21–30 years of professional experience. Most of the respondents worked at treatment wards. More than half of the respondents over the age of 50 complained of back pain. There is no correlation between the degree of disability (taking into account job seniority) and satisfaction with life.

Conclusions. Age had a very significant impact on the occurrence of back pain in the surveyed group of nurses. A statistically significant relationship was found between the occurrence of spinal pain and job seniority in nurses. Respondents' place of employment did not show a statistically significant dependence on the occurrence of spinal pain. The degree of disability and the severity of spinal pain did not have a statistically significant impact on satisfaction with life among nurses.

Key words: risk factors, nurses, spinal pain

This is a translated article.

Please cite the original

Polish-language version as

Gałczyk M, Kułak W. Wybrane czynniki ryzyka
a występowanie dolegliwości bólowych kręgosłupa
u pielęgniarek. *Piel Zdr Publ.* 2019;9(4):265–271.
doi:10.17219/pzp/106214

DOI

10.17219/pzp/106214

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Streszczenie

Wprowadzenie. Choroby kręgosłupa wśród pracowników ochrony zdrowia stają się w ostatnim czasie jednym z wiodących problemów zdrowia publicznego. Schorzenia układu mięśniowo-szkieletowego kręgosłupa są często skutkiem wieloletniego wpływu środowiska pracy czy też czynników związanych z życiem pozazawodowym, jak wiek, płeć czy staż pracy.

Cel pracy. Analiza wybranych czynników ryzyka, które wpływają na występowanie dolegliwości bólowych u pielęgniarek.

Materiał i metody. W badaniu wzięło udział 345 pielęgniarek, które wyraziły chęć wypełnienia ankiety. Ankieta składała się z autorskiego kwestionariusza oraz ze standaryzowanych narzędzi badawczych, takich jak: wskaźnik sprawności w bólach dolnej i górnej części kręgosłupa (ODI, NDI) oraz SWLS.

Wyniki. Najliczniejszą grupę stanowiły pielęgniarki w wieku 41–50 lat. Biorąc pod uwagę staż pracy, największą grupą były osoby wykonujące ten zawód 21–30 lat. Najwięcej ankietowanych pracowało na oddziałach zabiegowych. Ponad połowa respondentek w wieku >50 lat skarżyła się na ból kręgosłupa. Nie wykazano zależności między poziomem niepełnosprawności uwzględniającym staż pracy w zawodzie a satysfakcją z życia.

Wnioski. W badanej grupie pielęgniarek wiek miał bardzo istotny wpływ na występowanie dolegliwości bólowych kręgosłupa. Zaobserwowano istotną statystycznie zależność między występowaniem dolegliwości bólowych kręgosłupa a stażem pracy pielęgniarek. Miejsce pracy badanych nie wykazało natomiast takiej zależności. Stopień niepełnosprawności oraz nasilenie dolegliwości bólowych ze strony kręgosłupa nie wpływały w sposób statystycznie istotny na odczuwanie satysfakcji z życia przez pielęgniarki.

Słowa kluczowe: czynniki ryzyka, pielęgniarki, ból kręgosłupa

Background

Currently, there is a significant increase in the number of people suffering from various spinal pains. These diseases have become one of the leading public health problems. Therefore, they are the reason for a large number of patients visiting health centers. One of the components of the healthcare system are its employees. Among the occupations where pain in the cervical or lumbar spine is quite common, are the medical professions.^{1–3}

Musculoskeletal disorders are often the result of a long-term influence of working environment, factors related to non-professional life and covariates such as gender, age, job seniority, or physical prowess. They cause limitations in both professional and family life. Pain is not just suffering. It often has a negative impact on our lives, e.g., it causes a decrease in self-esteem.^{4,5}

Most of the tasks belonging to nurses are carried out in a position of body forward inclination, and their duration even exceeds 15 min; often, during care activities, there is a need to work in combined positions, in which a forward bend, rotation and lateral bend must be performed simultaneously. Such positions often lead to increased spinal muscle tension.^{6–8}

Pain in the spine mainly affects the cervical and lumbar-sacral sections. There is no clear cause for the spinal pain, but the factors that affect its occurrence may appear individually or overlap.⁹ The spinal pain is usually the result of everyday mistakes that are not perceived and corrected. These undoubtedly include: having an incorrect, forced body posture, lack of physical activity, inappropriate shoes, inappropriate mattresses and beds, and overweight due to poor nutrition or lack of exer-

cises. Spinal pain syndromes, due to their prevalence, are quite a serious health problem for modern people, especially in highly developed countries. It is estimated that more than half of the population in Poland has experienced pain in the spine at least once in their life.^{10,11}

The main aim of the study was to analyze selected risk factors that affect the occurrence of back pain in the professional group of nurses employed in the Mazovian Specialist Hospital in Ostrołęka, Poland, and to indicate the proper treatment aimed at relieving the spinal pain. The implementation of the main assumption was based on seeking answers to the following research questions, which were also specific objectives:

1. Does age have a significant impact on the occurrence of spinal pain in nurses?
2. Is there a correlation between nurses' spinal pain and job seniority?
3. Is there a correlation between the occurrence of spinal pain in nurses and the workplace?
4. Is there a correlation between the nurses' life satisfaction and the severity of their spinal pain?

Material and methods

In order to achieve the objectives, a diagnostic survey method was implemented, using standardized research tools and a proprietary questionnaire.

In order to perform the research, the Oswestry Disability Index (ODI) and Neck Disability Index (NDI) were used. The ODI questionnaire is a reliable, globally accepted criterion for assessing the disability of people with different spinal pain. It contains 10 questions about important, everyday activities such as: pain inten-

sity, self-service, carrying, walking, sitting, standing, sleeping, social life, travelling, and work. Each answer is scored as follows: A – 0 points, B – 1 point, C – 2 points, D – 3 points, E – 4 points, F – 5 points. Then the points are added up (the maximum number is 50) and the degree of disability is determined. The scale of disability assessment is as follows:

- 0–4 points – no disability,
- 5–14 points – mild disability,
- 15–24 points – moderate disability,
- 25–34 points – severe disability,
- >35 points – total disability.^{12,13}

The Satisfaction With Life Scale (SWLS) was created by Diener, Emmons, Larsen, and Griffin. Juczyński is the author of the Polish adaptation. The scale consists of 5 statements in which respondents assesses the extent to which each question relates to their current life. The opinion of the person surveyed: “I completely disagree” is assigned number 1, “I do not agree” – 2, “I rather disagree” – 3, “I neither agree nor disagree” – 4, “I rather agree” – 5, “I agree” – 6, “I completely agree” – 7. The result is a general indicator of the satisfaction with life. The higher the score, the greater the satisfaction of life.¹⁴

In addition, a proprietary questionnaire was developed to determine: gender, age, education, occupation, workplace, and seniority. The main part of the questionnaire contained questions about spinal pains occurring due to occupational reasons. These were questions about the frequency of pain, the degree of reduced prowess caused by back pain, and the spine part affected by pain. The survey also included questions about pain treatment and prevention, e.g., what measures are taken, in which position the pain occurs most often, what are the ways of preventing spinal pain, and whether there is interest in further education in spinal pain prevention.

The analysis was carried out using appropriate statistical tests to verify the statistical significance of the considered correlations. Depending on the nature of compared variables, appropriate statistical techniques were used:

- for 2 nominal (textual) features, the so-called quota table showing the percentage distribution of the value of one of the variables relative to the other and the significance of the relationship between them was assessed with the use of the χ^2 independence test;
- for 2 numerical features, Spearman’s rank correlation analysis was used;
- in addition to the typical descriptive statistics, the table also presents a 95% confidence interval (95% CI) for ODI/NDI values in age groups;
- p – the test probability value was calculated by means of the analysis of a variance test (ANOVA).

The study was conducted after obtaining the consent of the Bioethics Committee of the Medical University of Białystok No. R-I-002/13/2016.

The study group consisted of nurses (345 persons in total) working at the Mazovian Specialist Hospital. The

respondents were 25–60 years old. The survey was carried out in various departments and clinics. Before the study, the respondents were informed about the purpose and the methods used. All of them voluntarily expressed their willingness to participate in the survey.

Results

The most numerous group in terms of age were nurses aged 41–50 (52.2%). Every 4th respondent was >50 years old (27.2%), and every 5th respondent was 31–40 years old (15.4%). The smallest group were persons aged 25–30 (Table 1).

Considering their job seniority, the largest number of nurses worked in the profession for 21–30 years (45.5%), and over 24% for more than 30 years. Job seniority of 11–20 years was declared by 17% of respondents. The smallest group consisted of respondents with the shortest job seniority – 1–10 years (Table 2).

The structure of the study group by workplace is shown below. The most numerous group consisted of nurses working in surgical departments (45.2%), while the second numerous – in non-surgical departments (44.6%). The lowest number of respondents work at health centers and clinics (10.1%) – Table 3.

Table 4 presents information on selected descriptive statistics characterizing the distribution of the ODI/NDI scores in age groups. The significance of differences between the groups was also assessed using ANOVA. It is evident that older nurses suffer much more from spinal disorders (Table 4).

Age is a very important ($p = 0.0000$) factor affecting nurses’ spinal pain. More than half of the respondents aged >50 complain about everyday spinal pain. For comparison, this percentage in the youngest group is 11% (Table 5).

The nature of the relationship between seniority and ODI/NDI is very similar to that of age. The differences between the groups are statistically significant and there is a tendency to intensify the pain as the length of service increases (Table 6).

The workplace almost does not differentiate between the degree of back pain in the nurses surveyed (Table 7).

The correlation between severity of pain (ODI/NDI) and life satisfaction (SWLS) was also studied. Since the level of pain is clearly influenced by the seniority, the analysis of relations between these indices was carried out considering the division into 4 groups with different length of service. The results are presented in Table 8.

Only in the group of people working for the shortest time (up to 10 years), ODI/NDI level affects SWLS ($R = 0.38$; $p = 0.0103^*$). However, the direction of this correlation is surprising – the level of life satisfaction increases with the intensity of pain (Table 8).

Table 1. Respondents by age**Tabela 1.** Charakterystyka wieku badanych

Age [years]	<i>n</i>	%
25–30	18	5.2
31–40	53	15.4
41–50	180	52.2
>50	94	27.2

n – number of the analyzed characteristic in the sample.

Table 2. Respondents by job seniority**Tabela 2.** Staż pracy badanych

Job seniority [years]	<i>n</i>	%
1–10	45	13.0
11–20	59	17.1
21–30	156	45.2
>30	85	24.6

Table 3. Respondents by workplace**Tabela 3.** Struktura miejsca pracy badanych

Workplace	<i>n</i>	%
Treatment department	156	45.2
Non-specialised department	154	44.6
Clinic	35	10.1

Table 4. Average values of the degree of disability by age**Tabela 4.** Średnie wartości stopnia niepełnosprawności w odniesieniu do wieku

Age [years]	Level of disability (ODI/NDI)					<i>p</i> -value
	<i>n</i>	<i>M</i>	95% CI	<i>Me</i>	<i>SD</i>	
25–30	18	6.0	(3.6; 8.4)	5.5	4.8	0.0000***
31–40	53	9.5	(7.4; 11.7)	8	7.7	
41–50	180	12.6	(11.6; 13.6)	12.5	6.8	
>50	94	14.3	(12.8; 15.8)	12.5	7.3	

p – statistical significance level; *SD* – standard deviation; *Me* – median; *M* – mean; 95% CI – 95% confidence interval.

Table 5. Distribution of pain frequency depending on age**Tabela 5.** Rozkład częstości występowania dolegliwości bólowych w zależności od wieku

Pain frequency	Age [years]									p-value
	25–30		31–40		41–50		>50		total n	
	n	%	n	%	n	%	n	%		
Every day	2	11.1	13	24.5	75	41.7	56	59.6	146	0.0000***
Twice a week	9	50.0	14	26.4	47	26.1	17	18.1	87	
Several times a month	1	5.6	13	24.5	46	25.6	15	16.0	75	
Rarely	6	33.3	13	24.5	12	6.7	6	6.4	37	
Total	18	100	53	100	180	100	94	100	345	

Table 6. Average values of the degree of disability depending on job seniority**Tabela 6.** Średnie wartości stopnia niepełnosprawności w zależności od stażu pracy

Job seniority [years]	Level of disability (ODI/NDI)					<i>p</i> -value
	<i>n</i>	<i>M</i>	95% CI	<i>Me</i>	<i>SD</i>	
1–10	45	7.4	(5.6; 9.2)	7	5.9	0.0000***
11–20	59	11.0	(9.0; 13.0)	12	7.7	
21–30	156	12.9	(11.8; 13.9)	13	6.5	
>30	85	14.6	(12.9; 16.3)	12	7.8	

Table 7. Average values of the degree of disability in relation to the place of employment**Tabela 7.** Średnie wartości stopnia niepełnosprawności w odniesieniu do miejsca pracy

Workplace	Level of disability (ODI/NDI)					<i>p</i> -value
	<i>n</i>	<i>M</i>	95% CI	<i>Me</i>	<i>SD</i>	
Treatment department	156	12.3	(11.0; 13.5)	11	8.0	0.9824
Non-specialised department	154	12.3	(11.2; 13.3)	12	6.6	
Clinic	35	12.0	(9.5; 14.5)	12	7.3	

Table 8. Dependence of the degree of disability in terms of job seniority and satisfaction with life**Tabela 8.** Zależność stopnia niepełnosprawności przy uwzględnieniu stażu pracy w powiązaniu z satysfakcją z życia

Level of disability (ODI/NDI)	Job seniority [years]				
	1–10	11–40	21–30	>30	total
	SWLS				
	0.38 $p = 0.0103^*$	–0.08 $p = 0.5394$	0.05 $p = 0.5158$	0.05 $p = 0.6646$	0.05 $p = 0.3769$

Discussion

The research carried out among nurses indicates that the occurrence of spinal pain was mostly influenced by length of service and age. Studies conducted by other authors available in the literature on spinal pains in nurses may provide grounds for comparison with the considerations presented in this paper.

The results on seniority presented in the article are largely consistent with those of other authors.^{15,16} Maciuk et al. conducted research among nurses working at the hospital in Biała Podlaska. Most of the respondents were of 21–30 years of job seniority.¹⁵ Also in the research work of Przychodzka et al., the average seniority in the profession was 20 years.¹⁶ In the results of Juraszek et al., the correlation between the incidence of spinal pain and job seniority was also noted on the example of nurses from the Kujawsko-Pomorskie voivodeship.¹⁷ Similarly, in our own research, the most numerous group of respondents were those with 21–30 years of experience in the profession.

Analyzing the average values of standardized NDI and ODI questionnaires, it was found that the degree of disability due to spinal pain was mild. Among the respondents, the correlation between age and the incidence of spinal pain was studied. It turned out that age has a statistically significant influence on the occurrence of spinal disorders. Persons aged 41–50 years and >50 years were much more likely to complain about everyday pain. An average assessment of the severity of pain increased with age; however, both people aged 25–30 years and older declared that spinal pains caused a slight degree of impairment. Similarly, Pop et al. proved that the degree of disability caused by back pain increased with age.¹⁸

To sum up, it can be concluded that the degree of disability of the surveyed employees increases with age.

Empirical data also show that length of service as a nurse differentiates the level of spine pain. People working in their learned profession for more than 20 years estimated that they have a slightly limited physical prowess due to pain. The longer the job seniority, the more severe the pain was. The results obtained showed that the assessment of the degree of disability increased very significantly with the years of work. There are studies in the literature on the relationship between age and length of service and the degree of spine disability.^{19,20}

Results obtained by Baumgart et al. show that the degree of disability of the examined group of the nursing staff was moderate. The analysis showed that spinal pain was already present in employees working for 0–10 years, and that this pain increased in subsequent years of work.¹⁹ Similarly, Tworek found that the longer the job seniority of healthcare workers, the higher the degree of disability caused by spinal disorders.²⁰

Respondents to the survey also commented on the impact of increased pain on their life satisfaction and the degree of disability resulting from it. Life satisfaction is a concept that consists of many factors, such as: personality traits, various life events and mood.^{21,22} In the case of nurses, life satisfaction may concern: job satisfaction; relationships within the team, with patients, their relatives; remuneration; professional experience; personal achievements; age; marital status. It is undoubtedly related to job satisfaction.^{21,22} Our own research has shown that the impact of increased spinal pain and the degree of disability do not significantly affect life satisfaction. There is little data on these relationships in the literature. In the work of Wysokiński et al. on life satisfaction of Polish nurses, it was found that it is affected by the following factors: age, gender, job satisfaction, type of provided services, level of education and income, and marital status. However, no correlation between work experience and life satisfaction was proved.²³ Results of other authors indicate that work experience correlates poorly with the feeling of pleasure from work.²⁴

The data collected and the results obtained indicate that the work of nurses exposes them to situations that have a negative impact on spine. Increasing life expectancy contributes to prolonging professional activity. However, this activity is dependent on the appropriate health status. The basis of therapeutic activities is prophylaxis, which is very important in inhibiting the progress of this disease. The main task of prophylaxis is to make the patient aware of the consequences resulting from the lack of knowledge about pro-healthy behaviors concerning this problem. Properly selected rehabilitation and, above all, kinesiotherapeutic exercises are an important element in the prevention of pain. In case of spinal dysfunction, the balance between different muscle groups is disturbed. This results in secondary abnormal distribution of forces within the spine, changes in the range of its mobility and increased overload

of the passive apparatus. When systematic performance of exercises strengthening the paraspinal muscles is concerned, the so-called Master therapy is reliable. It is a deep stabilizing muscle training that the patient can do at home without any additional rehabilitation equipment. These exercises involve pulling in the lower part of the abdomen (below the navel), avoiding the activation of the straight and oblique abdomen muscles. Next, the tension should be maintained for 5–10 s, and then it is recommended to breathe using the diaphragm. Over time this reduces pain, strengthens the paraspinal muscles and reduces the risk of another pain incident. Another form of prevention of spinal pain syndromes are autoneuromobilization exercises, which can also be practiced on our own. Exercises involve stretching ischiocrural muscles and the sciatic nerve, which is often irritated. It is important to remember that one of the key elements is to have the right sitting or lying position and to choose the right seat. It is also important to perform work and daily activities properly and to learn how to lift objects from the ground without straining the spine. However, let us not forget about the most important thing, which is systematic physical activity adjusted to the patient's current state of health. Unsatisfactory health condition, especially among healthcare workers, can lead to a decrease in productivity. In view of the above, it seems necessary to examine the health of nurses more often and to apply prophylaxis of spinal pain, which will allow them to maintain their professional activity, and improve their health and quality of life.²⁵

Conclusions

In the group of surveyed nurses, their age had a very significant impact on the occurrence of spinal pain.

A statistically significant correlation was observed between the occurrence of spinal pain and nurses' job seniority.

The workplace of the respondents did not show any statistically significant relation to the occurrence of spine pain.

The degree of disability and severity of spine pain did not have a statistically significant effect on the nurses' satisfaction with life.

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