

## The Impact of Cervical Spine Ailments and Dysfunctions on the Quality of Life of Professionally Active Nurses

### Wpływ dolegliwości i dysfunkcji kręgosłupa szyjnego na jakość życia czynnych zawodowo pielęgniarek i pielęgniarzy

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#### Abstract

**Introduction.** In the era of contemporary changes and evolution of the nursing profession, changing work standards and ergonomics, the professional group of people suffering from cervical spine problems is growing. So far, little research has been conducted on the occurrence of spine problems and their impact on the quality of life of professionally active nurses.

**Aim.** The aim of the study was to analyse and assess the impact of cervical spine complaints on the quality of life of professionally active nurses.

**Material and Methods.** The research was conducted among nursing staff employed in the surgical and preventive departments of the Specialist Municipal Hospital of Nicolaus Copernicus in Toruń. The study group consisted of 100 people, women and men, of whom 80 were qualified for further stages of the study. The prospective studies used survey techniques as well as observation and measurement. In the assessment of dysfunctions related to spinal problems, the Polish version of the questionnaire, the indicator of disability caused by pain in the cervical spine — Neck Disability Index (NDI), was used.

**Results.** The analysis of the conducted research shows that the majority of respondents significantly experience increased pain resulting from work-related stress. Statistical analysis showed that the demographic factors influencing the occurrence of pain are: age ( $p=0.001$ ), work experience of the respondents ( $p=0.003$ ) and work system ( $p=0.026$ ). There was no relationship between gender ( $p=0.726$ ), marital status ( $p=0.528$ ) and education of the respondents ( $p=0.507$ ) and the occurrence of pain.

**Conclusions.** 1. Work-related stress significantly increases the incidence of cervical spine problems among nurses and worsens their quality of life. 2. The most common complaints among professionally active nurses are headaches and tingling and numbness in the limbs. 3. The occurrence of ailments is determined by demographic factors. 4. Professionally active nurses describe their quality of life as average. 5. The nursing team does not consult a doctor before implementing pharmacological treatment. (JNNN 2023;12(3):127–133)

**Key Words:** Neck Disability Index, nurse, quality of life, spine problems

#### Streszczenie

**Wstęp.** W dobie współczesnych zmian i ewolucji zawodu pielęgniarki, zmieniających się standardów pracy i jej ergonomii wzrasta grupa zawodowa osób odczuwających występowanie dolegliwości ze strony odcinka szyjnego kręgosłupa. Dotychczas przeprowadzono niewiele badań na temat występowania dolegliwości kręgosłupa i ich wpływu na jakość życia czynnych zawodowo pielęgniarek.

**Cel.** Celem pracy była analiza i ocena wpływu dolegliwości ze strony odcinka szyjnego kręgosłupa na jakość życia czynnych zawodowo pielęgniarek i pielęgniarzy.

**Materiał i metody.** Badania przeprowadzono wśród personelu pielęgniarskiego zatrudnionego w oddziałach zabiegowych i zachowawczych, Specjalistycznego Szpitala Miejskiego im. Mikołaja Kopernika w Toruniu. Badana grupa stanowiła 100 osób, kobiet i mężczyzn, z których 80 zostało zakwalifikowanych do dalszych etapów badania. W perspektywnych

badaniach posłużono się techniką ankietową oraz obserwacją i pomiarem. W ocenie dysfunkcji związanych z niedomogą kręgosłupa wykorzystano polską wersję kwestionariusza, wskaźnika niesprawności spowodowanej dolegliwościami bólowymi części szyjnej kręgosłupa — Neck Disability Index (NDI).

**Wyniki.** Z analizy przeprowadzonych badań wynika, że większość badanych znacząco odczuwa nasilenie dolegliwości bólowych będących wynikiem stresu związanego z pracą. Analiza statystyczna wykazała, że czynnikami demograficznymi wpływającymi na występowanie dolegliwości bólowych są: wiek ( $p=0,001$ ), staż pracy badanych ( $p=0,003$ ) i system pracy ( $p=0,026$ ). Nie wykazano zależności pomiędzy płcią ( $p=0,726$ ), stanem cywilnym ( $p=0,528$ ) i wykształceniem badanych ( $p=0,507$ ) a występowaniem dolegliwości bólowych.

**Wnioski.** 1. Stres związany z pracą znacząco nasila występowanie dolegliwości ze strony odcinka szyjnego kręgosłupa wśród pielęgniarek/pielęgniarzy i pogarsza ich jakość życia. 2. Najczęstszymi dolegliwościami wśród czynnych zawodowo pielęgniarek/pielęgniarzy są bóle głowy oraz mrowienia i drętwienia kończyn. 3. Występowanie dolegliwości jest uwarunkowane czynnikami demograficznymi. 4. Czynne zawodowo pielęgniarki określają swoją jakość życia jako przeciętną. 5. Zespół pielęgniarski nie korzysta z konsultacji lekarskiej przed wdrożeniem leczenia farmakologicznego. (PNN 2023;12(3):127–133)

**Słowa kluczowe:** Neck Disability Index, pielęgniarka, jakość życia, dolegliwości kręgosłupa

## Introduction

The quality of life should be understood as an individual sense of well-being, a subjective perception of living conditions and satisfaction with performing daily activities. It can also be treated as categories expressing the self-realization of human functioning from a holistic perspective, taking into account both the physical, mental and social dimensions of an individual's functioning. An important element influencing the assessment of quality of life is the absence or presence of deficits in the most important areas of life [1].

A breakthrough moment for quality of life researchers in medicine was the change in the definition of health by the WHO, which says that health is comprehensive physical, mental and spiritual well-being, not only the absence of disease or ailments [2]. Looking from this perspective allows us to notice that the researcher should not only focus on the disease and its effects, but should assess the patient's functioning in other areas of life, because people with health deficits do not always evaluate their quality of life negatively. High adaptability, determined by an individual's adaptability, influences the assessment of well-being, which, according to WHO, is a determinant of health and a happy life.

Undoubtedly, one of the determinants influencing self-esteem and the assessment of the quality of life is the occurrence of dysfunctions in the area of the musculoskeletal system, including the spine. The presence of pain of various types and limitations in functioning have a significant impact on everyday life. Pain syndromes in the cervical spine associated with dysfunction of this musculoskeletal system constitute a major economic and social problem. The cervical spine, due to its specific anatomical structure, poses problems in determining the nomenclature of the various stages of degenerative spine disease. The most common terms include: disc disease, discopathy, cervical spondylosis, osteochondrosis, spondyloarthropathy or osteoarthropathy. Degenerative

spine disease (morbus degenerativus columnae vertebralis) involves the progressive wear and degeneration of the tissues that make up the spine (bones, muscles, ligaments, joints, blood vessels) along with anatomical remodelling of the spine and changes in the spinal canal. It is one of the most common nosological units. Degenerative changes in the spine develop from the age of 18 and progress throughout life [3–6].

Taking into account the specificity of a nurse's work and the average age of this professional group, it should be noted that cervical dysfunctions are undoubtedly a common problem. The professional group of nurses, due to the work system and many risk factors, is exposed to this type of ailments, which may have a significant impact on the assessment of the quality of life of this professional group.

The aim of the study was to analyse and assess the impact of cervical spine complaints on the quality of life of professionally active male and female nurses.

Based on the main objective, research problems were formulated:

1. To what extent does work-related stress increase the occurrence of ailments related to cervical spine dysfunction in professionally active nurses?
2. Which ailments related to cervical spine dysfunction are most common among professionally active nurses?
3. Do demographic factors influence the frequency of cervical spine complaints among professionally active nurses?
4. How do professionally active nurses with cervical spine dysfunction determine the quality of their lives?
5. Do professionally active nursing staff who experience discomfort caused by cervical spine problems seek medical advice before implementing pharmacological treatment?

## Material and Methods

### Material

The research was conducted among nursing staff employed in the surgical and conservative departments of the Specialist Municipal Hospital of Nicolaus Copernicus in Toruń. The study group consisted of 100 people, women and men, of whom 80 were qualified for further stages of the study. The criteria for selecting people for the study were: current employment in preventive or surgical departments; working in a single or double shift system and consenting to participate in the study.

### Methods

The prospective studies used survey techniques as well as observation and measurement. In the assessment of dysfunctions related to spinal problems, the Polish version of the questionnaire, an indicator of disability caused by pain in the cervical spine — Neck Disability Index (NDI) was used [7]. The questionnaire consists of 10 parts regarding: pain intensity, care, lifting objects, reading, headache, concentration, work, driving, sleeping and rest. Each part has six possible answers. The respondent marked the answer most relevant to his or her situation and could obtain from 0 to 5 points. The degree of disability of the examined person is assessed on a point scale from 0 to 50 points or as a percentage (from 0% to 100%). The values obtained on the basis of the completed questionnaire allowed the result to be classified into one of five disability groups. A number from 0 to 4 points characterizes a group of people in which disability does not occur or is minimal. A number from 5 to 14 points indicates mild disability. Moderate disability included people with scores ranging from 15 to 24 points. Severe disability is characterized by a score of 25 to 34 points. A score of 35 to 50 points indicates extreme suffering and disability [7–9].

The data was supplemented with demographic indicators characterizing the respondents using an original survey questionnaire.

### Ethical Considerations

Written consent from the Hospital Director and the Bioethics Committee at the State Vocational University in Włocławek were obtained to conduct the study. The study was conducted in accordance with the ethical principles and requirements of the Declaration of Helsinki, and the study participants were familiarized with the study conditions and gave their informed consent to participate.

## Data Analysis

The results were processed using Microsoft Excel and STATISTICA version 21.0 programs. The statistical study used quantitative statistics and statistical description methods: location measure — arithmetic mean (M), median — (Me), diversity measure — standard deviation (SD), minimum value (Min), maximum value (Max). Appropriate correlation tests and studies of the relationships between the analysed features were also used. A probability value of  $p < 0.05$  was considered statistically significant.

## Results

### Work-related Stress and the Occurrence of Ailments Related to Cervical Spine Dysfunction

The analysis of the conducted research shows that the majority of respondents significantly experience increased pain resulting from work-related stress (44 people — 55%). Moderate severity of pain is experienced by 27.5% (22 people), and according to 17.5% (14 people) work-related stress does not worsen pain. Statistical analysis showed a significant relationship ( $p = 0.001$ ) between the respondents' experience of cervical spine pain and their opinion whether work-related stress intensifies pain (Table 1).

**Table 1.** Analysis of the relationship between the occurrence of spine problems and stress

Do you think that work-related stress worsens pain?	Have you experienced any cervical spine problems?				Total	
	Yes		No			
	N	%	N	%	N	%
Yes significantly	44	61.1	0	0.0	44	55.0
Yes moderately	22	30.6	0	0.0	22	27.5
It does not	6	8.3	8	100.0	14	17.5
Total	72	100.0	8	100.0	80	100.0
$\chi^2$	50.37					
p	0.001					

N — number of observations; % — percent;  $\chi^2$  — Pearson's chi-squared test; p — test probability

### Frequency of the Pain Symptoms

Own research has shown that the most common ailments experienced by respondents are headaches and neck pain (44 people — 55%). Pain in the limbs, numbness and tingling in the hands and fingers

were reported by 22.5% (18 people). 10% (8 people) experience dizziness and 2.5% (2 people) experience fainting. Ten percent (10% — 8 people) of respondents do not experience any of the above-mentioned ailments (Table 2).

**Table 2.** Frequency of the pain symptoms

Which of the following symptoms do you experience the most often?	N	%
Headache, neck pain	44	55
Dizziness	8	10
Fainting	2	2.5
Pain in limbs, numbness in hands and fingers	18	22.5
None of the above	8	10
Total	80	100.0

N — number of observations; % — percent

### Demographic Factors and the Frequency of Cervical Spine Complaints

Statistical analysis showed (Table 3) that the demographic factors influencing the occurrence of pain are: age (p=0.001), work experience of the respondents (p=0.003) and work system (p=0.026). Over 93% of respondents aged 41–50 admit that they experience cervical spine problems. However, 50% of respondents aged 24–35 do not experience any cervical spine problems. More than 10% of respondents with 20–30 years of work experience admit that they experience

**Table 3.** Demographic factors and the experience of spine pain

Variable	Feeling pain in the spine			$\chi^2$	p
	Yes N (%)	No N (%)	Total N (%)		
1	2	3	4	5	6
<b>Gender</b>					
Women	69 (89.6)	8 (10.4)	77 (100.0)	0.346	0.726
Men	3 (100.0)	0 (0.0)	3 (100.0)		
<b>Age</b>					
24–35 years	4 (50.0)	4 (50.0)	8 (100.0)	16.4	0.001
36–40 years	14 (100.0)	0 (0.0)	14 (100.0)		
41–50 years	28 (93.3)	2 (6.7)	30 (100.0)		
Over 50 years	26 (92.9)	2 (7.1)	28 (100.0)		

**Table 3.** Continued

	1	2	3	4	5	6
<b>Employment experience</b>						
Up to 10 year		6 (60.0)	4 (40.0)	10 (100.0)	13.65	0.003
10–20 years		12 (85.7)	2 (14.3)	14 (100.0)		
20–30 years		28 (100.0)	0 (0.0)	28 (100.0)		
Over 30 years		26 (92.9)	2 (7.1)	28 (100.0)		
<b>Marital status</b>						
Married (she)		44 (91.7)	4 (8.3)	48 (100.0)	2.22	0.528
Married (he)		2 (100.0)	0 (0.0)	2 (100.0)		
Widow/ Widower		6 (100.0)	0 (0.0)	6 (100.0)		
Single		2 (33.3)	4 (66.7)	6 (100.0)		
<b>Work system</b>						
One-shift		28 (100.0)	0 (0.0)	28 (100.0)	4.78	0.026
Two-shift		44 (84.6)	8 (15.4)	52 (100.0)		
<b>Education</b>						
Secondary		20 (90.9)	2 (9.1)	22 (100.0)	1.35	0.507
Bachelor in nursing		30 (93.8)	2 (6.2)	32 (100.0)		
Master's degree in nursing		22 (84.6)	4 (15.4)	26 (100.0)		

N — number of observations; % — percent;  $\chi^2$  — Pearson's chi-squared test; p — test probability

cervical spine problems. However, 40% of respondents with up to 10 years of work experience do not experience any cervical spine problems. 100% of respondents working in a single-shift system admit that they experience cervical spine problems. However, over 15% of respondents working in a two-shift system do not experience any cervical spine problems. There was no relationship between gender (p=0.726), marital status (p=0.528) and education of the respondents (p=0.507) and the occurrence of pain.

### Quality of Life Assessment

The analysis of the conducted research shows that most respondents assess the quality of their life as good (30 people — 37.5%), then the respondents assessed

**Table 4.** Analysis of the relationship between spine problems and quality of life

How do you assess the quality of your life?	Which of the following ailments do you experience most often?											
	Headache, neck pain		Dizziness		Fainting		Pain in limbs, numbness in hands and fingers		None of the above		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Very good	2	4.5	0	0.0	0	0.0	2	11.1	0	0.0	4	5.0
Good	16	36.4	2	25.0	0	0.0	6	33.3	6	75.0	30	37.5
Average	14	31.8	2	25.0	2	100.0	8	44.5	2	25.0	28	35.0
Bad	12	27.3	4	50.0	0	0.00	2	11.1	0	0.0	18	22.5
Total	44	100.0	8	100.0	2	100.0	18	100.0	8	100.0	80	100.0
$\chi^2$							16.32					
p							0.177					

N — number of observations; % — percent;  $\chi^2$  — Pearson's chi-squared test; p — test probability

the quality of life as average (30 people — 35%). The group of people who assessed their quality of life poorly included 18 respondents, which constitutes 22.5%. The least numerous group are respondents who assess their quality of life as very good (4 people — 5%). There was no significant relationship between the ailments respondents most often experience and how they assess their quality of life ( $p=0.177$ ) (Table 4).

The analysis of the conducted research shows that the majority of respondents took medications for pain caused by cervical spine dysfunctions (52 people — 65%). Unfortunately, in the last six months most respondents did not seek medical consultation (52 people — 65%). Statistical analysis did not show a significant relationship between whether the respondents experience spine problems and whether they consulted a doctor for cervical spine problems in the last six months ( $p=0.26$ ) (Table 5).

## Discussion

The research aimed to analyse and assess the impact of pain in the cervical spine on the quality of life of professionally active male and female nurses.

Work-related stress significantly increases the occurrence of cervical spine problems and worsens the quality of life of professionally active nurses. This is also confirmed by research conducted among nurses working in preventive wards at the Regional Specialist Hospital of Dr W. Biegański in Grudziądz [10], where 78.1% of respondents believe that the stressful nature of a nurse's work occurs often. Research conducted among professionally active nurses in Lublin and Krosno studying at state universities and academic universities showed that over 95% of nurses considered their profession to be definitely stressful, a similar percentage of respondents declared that they were exposed to stress at work. In turn, research conducted among nurses

**Table 5.** Analysis of the relationship between spine problems and the use of specialist consultation

Have you consulted a doctor for cervical spine problems in the last six months?	Have you experienced any cervical spine problems?				Total	
	Yes		No			
	N	%	N	%	N	%
Yes	28	38.9	0	0.0	28	35.0
No	44	61.1	8	100.0	52	65.0
Total	72	100.0	8	100.0	80	100.0
$\chi^2$	4.78					
p	0.26					

N — number of observations; % — percent;  $\chi^2$  — Pearson's chi-squared test; p — test probability

employed in Lublin hospitals showed that 73.6% of respondents were exposed to stress at work [11,12]. Research conducted among nursing staff employed in paediatric departments of the Upper Silesian Children's Health Centre in Katowice [13] showed that almost one third of the respondents have health problems, and just over half of the respondents (54%) declared that the stress associated with their work contributed to their exacerbation of headaches, and insomnia worsened in 46%.

Dysfunctions of the cervical spine have a diverse course and are characterized by various clinical symptoms. Among the surveyed nurses, the most common symptoms were headaches of varying severity. Similar results were obtained by Tworek [14], who analysed research conducted on a group of 123 nurses employed in hospitals in the Łódź Voivodeship in preventive and surgical departments. The largest group of surveyed nurses described back pain as moderate — 60.2%. 32.5%

of nurses experienced cervical spine problems, including headaches. In a study conducted by Kociuba-Adamczuk [15] in Kraśnik, covering a group of 101 male and female nurses working in a hospital on preventive and surgical wards, it was found that back pain, especially in the cervical section, is the cause of headaches. Every third nurse declared that they had moderately severe headaches, which occurred quite rarely. A small group of nurses, 12.87%, experience moderate headaches that occur frequently, while 1.98% experience constant headaches.

The analysis of the conducted research shows that there is no significant relationship between the gender of the respondents and their assessment of spine pain. However, it is worth noting that the female gender is more often predisposed to cervical spine problems. Statistically significant demographic factors influencing the occurrence of spine problems included age, work experience of the respondents and the work system. Over 93% of respondents aged 41–50 admit that they experience cervical spine problems. However, 50% of respondents aged 24–35 do not experience any cervical spine problems. Similar results and conclusions are confirmed by other researchers [10,15,16].

Own research has shown that nursing staff suffering from dysfunction and pain in the cervical spine consult a doctor before implementing pharmacological treatment. The analysis of the studies shows that the majority of respondents took medications due to pain caused by cervical spine dysfunctions (65% — 52 people) compared to respondents who did not take medications for this reason (35% — 28 people). However, in the last six months, the majority of respondents did not seek medical consultation (65% — 52 people) due to cervical spine problems, compared to people who did seek such consultation (35% — 28 people). In studies by Tworek [14], the majority of surveyed nurses feeling pain take oral painkillers every day (63.4%). Other methods of reducing pain are relaxation exercises (48% of respondents) and the use of local anti-inflammatory gels (38.7% of respondents).

## Conclusions

1. Work-related stress significantly increases the incidence of cervical spine problems among male and female nurses and worsens their quality of life.
2. The most common complaints among professionally active nurses are headaches and tingling and numbness in the limbs.
3. The occurrence of ailments is determined by demographic factors.
4. Professionally active nurses describe their quality of life as average.

5. The nursing team does not consult a doctor before implementing pharmacological treatment.

## Implications for Nursing Practice

The conducted research has shown that ailments that are a symptom of cervical spine dysfunction have an impact on the quality of life of professionally active nurses in the Specialist Municipal Hospital in Toruń. Taking the above into account, in everyday clinical practice, special attention should be paid to work ergonomics and the implementation of extensive preventive measures to reduce the risk of spine-related ailments.

## References

- [1] Dugiel G., Kęcka K., Jasińska M. Jakość życia pielęgniarów — badanie wstępne. *Med Og Nauk Zdr.* 2015;21(4): 398–401.
- [2] Trzebiatowski J. Jakość życia w perspektywie nauk społecznych i medycznych — systematyzacja ujęć definicyjnych. *Hygeia Public Health.* 2011;46(1):25–31.
- [3] Boos N., Aebi M. (Red.), *Choroby kręgosłupa*. P. Jarmużek (Red. nauk. wyd. polskiego), Wyd. Medipage, Warszawa 2016.
- [4] Kiwerski J. (Red.), *Schorzenia i urazy kręgosłupa*. PZWL, Warszawa 2022.
- [5] Adams M., Bogduk N., Burton K., Dolan P. *Biomechanika bólu kręgosłupa*. Wyd. DB Publishing, Warszawa 2010.
- [6] Kondratiuk A. *Bóle kręgosłupa szyjnego. Skuteczna pomoc w nagłych przypadkach*. Oficyna Wydawnicza ABA, Warszawa 2023.
- [7] Misterska E., Jankowski R., Glowacki M. Cross-cultural adaptation of the Neck Disability Index and Copenhagen Neck Functional Disability Scale for patients with neck pain due to degenerative and discopathic disorders. Psychometric properties of the Polish versions. *BMC Musculoskelet Disord.* 2011;12:84.
- [8] Vernon H., Mior S. The Neck Disability Index: a study of reliability and validity. *J Manipulative Physiol Ther.* 1991;14(7):409–415.
- [9] McCarthy M.J., Grevitt M.P., Silcocks P., Hobbs G. The reliability of the Vernon and Mior neck disability index, and its validity compared with the short form-36 health survey questionnaire. *Eur Spine J.* 2007;16(12):2111–2117.
- [10] Siemianowska T., Podsiadły D., Ślusarz R. Reakcje na sytuacje stresowe w opinii pielęgniarów zatrudnionych w oddziałach zachowawczych. *Innowacje w Pielęgniarstwie i Naukach o Zdrowiu.* 2018;4(3):9–23.
- [11] Modzelewska T., Kulik T.B. Stres zawodowy jako nieodłączny element zawodów profesjonalnego pomagania — sposoby radzenia sobie ze stresem w opinii pielęgniarów. *Ann UMCS Sect D.* 2000;58(8):312–316.

- [12] Pietraszek A., Charzyńska-Gula M., Łuczyk M., Szadowska-Szlachetka Z., Kachaniuk H., Kwiatkowska J. Analiza przyczyn stresu zawodowego w opinii pielęgniarek. *J Educ Health Sport*. 2016;6(9):643–652.
- [13] Stępień M., Szmigiel M. Stres personelu pielęgniarskiego związany z pracą na oddziałach pediatrycznych. *Pielęg Pol*. 2017;1(63):62–68.
- [14] Tworek K. Praca zawodowa a bóle kręgosłupa u pielęgniarek pracujących w szpitalach. *Wsp Piel Ochr Zdr*. 2017;6(1): 19–22.
- [15] Kociuba-Adamczuk K. Satysfakcja pielęgniarek/pielęgniarzy z pracy zawodowej. W: Turowski K. (Red.), *Profilaktyka i edukacja zdrowotna*. Wydawnictwo Naukowe NeuroCentrum, Lublin 2017;123–140.
- [16] Przychodzka E., Lorencowicz R., Grądek E., Turowski K., Jasik J. Problem bólu kręgosłupa u czynnych zawodowo pielęgniarek. W: Turowski K., Markocka-Mączka K. (Red.), *Zdrowie i dobrostan*. Wydawnictwo Naukowe NeuroCentrum, Lublin 2013;135–147.

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