

## Health Behaviours and Spine Pain among Nursing Staff

### Zachowania zdrowotne a ból kręgosłupa wśród personelu pielęgniarskiego

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#### Abstract

**Introduction.** Diseases of the musculoskeletal system are often caused by long-term and often simultaneous influence of the work environment and individual physical factors of each human being. Healthcare workers are most at risk of suffering from musculoskeletal pain.

**Aim.** Assessment of health behaviours and back pain among professionally active nursing team.

**Material and Methods.** 123 active nurses participated in the study. The method of diagnostic survey was used, using standardized research tools: VAS pain scales, Oswestry questionnaire, IZZ questionnaire.

**Results.** According to the conducted analysis, 79.7% of people experience pain; 17.1% reported ailments on an average level. The highest results were obtained by the respondents in terms of questions concerning a positive mental attitude (average value:  $3.45 \pm 0.59$ ), and the lowest in terms of health practices (average value:  $2.89 \pm 0.64$ ). In the case of questions about preventive behaviours, women had statistically significantly ( $p=0.010$ ) higher results than men.

**Conclusions.** Pain in the spine concerns the majority of the surveyed nurses. In terms of their own health behaviours, the respondents paid the least attention to proper health habits. There was no correlation in pain, functional capacity and personal health behaviour. (JNNN 2021;10(4):135–143)

**Key Words:** health behaviour, pain, spine

#### Streszczenie

**Wstęp.** Schorzenia układu mięśniowo-szkieletowego są często spowodowane długotrwałym i często jednoczesnym wpływem środowiska pracy oraz indywidualnymi czynnikami fizycznymi każdego człowieka. Najbardziej narażeni na ból związany z układem mięśniowo-szkieletowym są pracownicy sektorów opieki zdrowotnej.

**Cel.** Ocena zachowań zdrowotnych oraz bólu kręgosłupa wśród aktywnego zawodowo zespołu pielęgniarskiego.

**Materiał i metody.** W badaniu uczestniczyły 123 pielęgniarki(arze), aktywni zawodowo. Zastosowano metodę sondażu diagnostycznego, wykorzystując standaryzowane narzędzia badawcze: skale bólu VAS, kwestionariusz Oswestry, kwestionariusz IZZ.

**Wyniki.** Według przeprowadzonej analizy 79,7% osób odczuwa dolegliwości bólowe; 17,1% deklarowało dolegliwości na poziomie średnim. Najwyższe rezultaty ankietowani uzyskali w zakresie pytań dotyczących pozytywnego nastawienia psychicznego (wartość średnia:  $3,45 \pm 0,59$ ), a najniższe w zakresie praktyk zdrowotnych (wartość średnia:  $2,89 \pm 0,64$ ). W przypadku pytań o zachowania profilaktyczne kobiety miały istotnie statystycznie ( $p=0,010$ ) wyższe wyniki niż mężczyźni.

**Wnioski.** Dolegliwości bólowe kręgosłupa dotyczą większości badanych pielęgniarzek. W zakresie własnych zachowań zdrowotnych badani najmniej uwagi poświęcali prawidłowym nawykom zdrowotnym. Nie wykazano korelacji w zakresie bólu, wydolności funkcjonalnej i własnych zachowań zdrowotnych. (PNN 2021;10(4):135–143)

**Słowa kluczowe:** zachowania zdrowotne, ból, kręgosłup

## Introduction

Health behaviours are an important part of human life activity. The knowledge of the types of behaviours that are conducive to health, as well as the possibility of their modification, should improve the health of an individual [1]. The formation of health habits is influenced by many individual and environmental factors. In common opinion, care for health is important, however, Poles' declarations about taking care of their health do not have a significant relationship with the improvement of health behaviour [1].

Health behaviour or lifestyle is difficult to define because there are many meanings behind this term. The method of measuring this factor becomes problematic. The method of measuring this factor becomes problematic. Healthy lifestyles are broad and potentially unobservable orientations that organize patterns of behaviour and are derived from knowledge and norms about what constitutes healthy, relaxing or enjoyable behaviour [2]. A healthy lifestyle perspective emphasizes that individual choices about health behaviours are influenced by social, cultural and economic forces that shape and limit individual choices [2,3].

A healthy lifestyle is composed of sets of related health behaviours, rooted in group identities and shaped by the social structure and human agency [3].

Diseases of the musculoskeletal system are often caused by long-term and often simultaneous influence of the work environment and individual physical factors of each human being. The literature shows that health care workers are the most exposed to pain associated with the musculoskeletal system [4].

Feeling pain is individual, different for each person. It depends, among others, on genetic factors, age, gender, hormonal status, cultural and social factors, the level of stress, the site of damage or the type of pain stimulation [5]. Long-term pain causes changes in the emotional sphere and disturbances in the daily functioning of a human being, therefore it can be described as an independent disease entity [5]. The result of the presence of back pain is temporary or long-term disability [6]. People suffering from low back pain complain more often about physical and mental problems compared to people who do not feel it [6,7]. Currently, back pain is classified as a civilization disease [7]. Pain syndromes of the low back pain (LBP) concern approximately 80% of the world's population [8].

LBP is considered to be the main disease of the musculoskeletal disorders (MSD) [9]. Sweden, Germany, the United States and the International Labour Organization (ILO) confirmed that LBP falls within the scope of an occupational disability, and the cost of LBP treatment is estimated at over 100 billion annually in the United States [9,10].

The most common form of low back pain is non-specific and affects almost all age groups [9]. One of the mechanisms determining these ailments is a mechanical factors causing functional abnormalities [7,8,11]. However, in a variety of work environments, repetitive spinal bending by workers, frequent weight lifting, manual handling of materials, and awkward body postures are still important factors causing MSD [9,12]. It is believed that the presence force on the spine causes back pain and injuries, especially the L5/S1 intervertebral disc [9]. Frequent lifting of heavy objects, uncomfortable postures and manual lifting are commonly observed in workers in the construction, mining and shipbuilding industries [9,13], but also in the health sector [4], including nurses [14].

The aim of the study was to evaluate health behaviours and back pain among the professionally active nursing team.

## Material and Methods

The study was conducted among nurses working in one of the University hospitals in Bydgoszcz. The respondents who have the current right to practice and are professionally active were qualified to participate in it. Participation in the study was anonymous.

123 people participated in the study, including 81.3% women. In terms of the place of residence, city dwellers dominated (85.4%). 48% of the group had higher education of the second degree, and 24.4% of the respondents had the first degree. The median age was 29 years, mean  $31.87 \pm 7.412$  years. The youngest of the respondents was 22 years old and the oldest 51 years old. Most of the respondents were between 25 and 30 years old (N=61). Detailed data is presented in Table 1.

The diagnostic survey method was used, using standardized research tools:

1. VAS scale — a visual pain assessment scale [15]. The subject means the pain level on a scale of 0–10 at the given time.

**Table 1.** Socio-demographic characteristics of the respondents (N=123)

Variable	N	%
<b>Gender</b>		
Women	100	81.3
Men	23	18.7
<b>Age*</b>		
20–25 years	12	9.75
26–30 years	61	49.6
31–35 years	16	13
36–40 years	14	11.4
41–45 years	9	7.3
46–50 years	10	8.1
51–55 years	1	0.8
<b>Place of residence</b>		
Village	18	14.6
City up to 50,000 inhabitants	21	17.1
City over 50,000 inhabitants	84	68.3
<b>Education</b>		
Higher first degree	30	24.4
Higher first degree, specialization	13	10.6
Higher second degree	59	48.0
Higher second degree, specialization	21	17.1

\*Shapiro–Wilk test (Min 22, Max 51, Median 29, Standard deviation 7.41, Mean 31.87)

- Oswestry Disability Index (ODI) — is a scale that assesses the degree of disability associated with pain in the lower spine [16]. The obtained results allow to distinguish five disability groups.
- IZZ questionnaire — is a questionnaire by Zygfryd Juczyński intended for the study of healthy and sick adults [17]. It assesses health behaviour. It consists of 24 statements that describe various types of health-related behaviour. This allows the study of health-promoting activities and the severity of these behaviours. Four categories are taken into account: proper eating habits, preventive behaviour, health practices and a positive mental attitude. The responses marked by the respondent were counted in order to obtain a general indicator of the severity of health-related behaviours. The respondents could get from 24 to 120 points. The higher the result was obtained by the respondents, the more often they displayed a healthy lifestyle. The obtained results are converted into a standardized sten scale proposed by the author of the questionnaire:
  - sten 1–4 — low results,
  - sten 5–6 — average results,
  - sten 7–10 — high results.

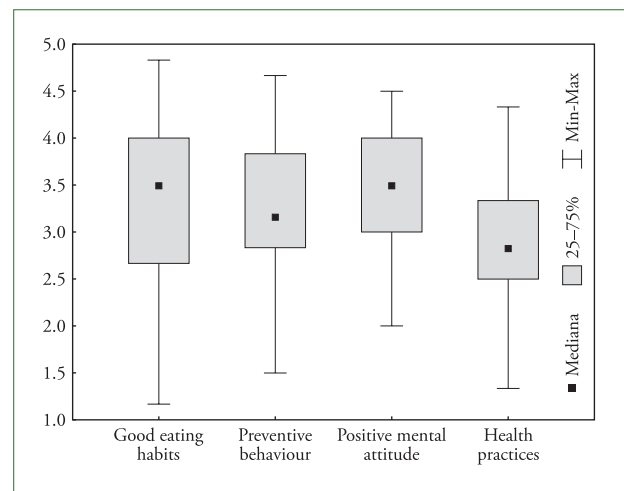
The questionnaire was accessed through the psychological testing laboratory of the Polish Psychological Association.

The condition for the research was to obtain a positive opinion from the Bioethics Committee at Collegium Medicum in Bydgoszcz regarding the concept of the presented work (KB 285/2018).

Statistical analysis was carried out in the STATISTICA 13 package. The distribution of the analysed data was determined using the Shapiro–Wilk, Mann–Whitney U test. When verifying all analyses, a significance coefficient at the level of  $\alpha=0.05$  was used, which allowed to consider statistically significant variables at  $p<0.05$ .

## Results

Among the people participating in the study, 62.6% experienced mild pain, 20.3% did not feel any pain, 17.1% reported moderate symptoms, while none of the people reported very severe pain. Figure 1 shows the distribution of the results obtained for the assessment of pain in the VAS scale; the mean score was 1.87 with the median value of 2 points. The maximum level of pain in the respondents was 6 points.



**Figure 1.** The value of the medians determined for the analysed areas of the IZZ questionnaire for the entire group

We developed the distribution of the percentage results obtained by individual respondents in the OSWESTRY questionnaire. Most of the respondents achieved a result between 0% and 10% of the points possible to be obtained in the questionnaire. The mean value for the studied population was also in this range — it amounted to  $12.2 \pm 10.4\%$  of points. The median for this parameters was slightly lower than the mean value and amounted to 10%. The lowest of the recorded results was 0% and the highest 40%.

The study population, in accordance with the commonly accepted interpretation of the results for the

questionnaire used, represented the minimum level of disability. Most of them were people with a minimal (71%) and moderate (28%) level of disability.

The IZZ questionnaire includes four groups of questions concerning, respectively, correct eating habits, preventive behaviours, positive mental attitude and health practices. The results obtained for all of them were quite similar.

The highest results were obtained by the respondents in terms of questions concerning a positive mental attitude (average value:  $3.45 \pm 0.59$ ), and the lowest in terms of health practices (average value:  $2.89 \pm 0.64$ ). Figure 1 presents a graphical representation of the median values for the categories from the IZZ questionnaire.

The distribution of the sten values obtained after the transformation of the individual results of the examined persons was developed. On a 10-point scale, the mean

value for the sten was  $4.699 \pm 1.788$ , while the median was 5 points. The lowest of the recorded sten values was 1, and the highest was 10. The highest number of respondents (31 people) obtained a result of 5 points.

Interpretation of the sten values of individual respondents showed that 44% of the studied population (54 people) achieved a low level sten. On the other hand, 41% (51 people) and 15% (18 people) of the respondents achieved an average and high sten result, respectively.

Table 2 presents the results obtained by women and men for four domains of health-related behaviours assessed with the use of the IZZ questionnaire. Significant differences occurred in the case of correct eating habits and preventive behaviours. The average results achieved by women in the case of the block of questions assessing the correctness of eating habits were significantly higher ( $p=0.012$ ) than those recorded in the group of men.

**Table 2.** Parameters of the IZZ questionnaire and selected factors

Variable	N	$\bar{x}$	SD	Test result*	p-value
1	2	3	4	5	6
IZZ — Proper eating habits					
Men	23	2.88	0.92	-2.504	0.012
Women	100	3.39	0.88		
City	105	3.33	0.90	0.801	0.423
Village	18	3.14	0.90		
Back pain YES	96	3.28	0.95	0.196	0.845
Back pain NO	27	3.36	0.70		
Physical activity YES	88	3.53	0.83	4.484	<0.001
Physical activity NO	35	2.72	0.83		
IZZ — Preventive behaviour					
Men	23	2.96	0.62	-2.575	0.010
Women	100	3.32	0.72		
City	105	3.21	0.72	-1.832	0.067
Village	18	3.49	0.60		
Back pain YES	96	3.28	0.68	0.629	0.529
Back pain NO	27	3.14	0.82		
Physical activity YES	88	3.37	0.72	2.904	0.004
Physical activity NO	35	2.96	0.61		
IZZ — Positive mental attitude					
Men	23	3.59	0.56	1.122	0.262
Women	100	3.42	0.59		
City	105	3.47	0.60	0.859	0.391
Village	18	3.35	0.55		
Back pain YES	96	3.49	0.57	1.033	0.302
Back pain NO	27	3.33	0.64		
Physical activity YES	88	3.55	0.60	3.024	0.002
Physical activity NO	35	3.22	0.50		

**Table 2.** Continued

	1	2	3	4	5	6
IZZ — Health practices						
Men		23	2.71	0.71		
Women		100	2.93	0.62	-1.401	0.161
City		105	2.88	0.64		
Village		18	2.94	0.61	-0.275	0.783
Back pain YES		96	2.84	0.63		
Back pain NO		27	3.08	0.65	-1.500	0.134
Physical activity YES		88	2.91	0.63		
Physical activity NO		35	2.84	0.66	0.642	0.521

\*Mann–Whitney U test

The mean results were  $3.39 \pm 0.88$  in the group of women and  $2.88 \pm 0.92$  in the group of men. In turn, the value of the medians was 3.7 and 2.8, respectively. In the case of questions about preventive behaviours, women had statistically significantly ( $p=0.010$ ) higher results than men. The mean results were  $3.32 \pm 0.72$  in the group of women and  $2.96 \pm 0.62$  in the group of men. In turn, the value of the medians was 3.3 and 3.2, respectively.

In terms of the place of residence, it was not found that for any of the assessed parameters there were statistically significant differences in the obtained results between the studied groups ( $p$  values from 0.067 to 0.783). Similarly, in terms of pain reported, no statistically significant differences were found in any of the comparisons;  $p$  values ranged from 0.134 to 0.845 (Table 2).

The average results achieved by people practicing physical activity in the case of the block of questions assessing the correctness of eating habits were significantly higher ( $p < 0.001$ ) than those recorded in the groups of people who were not physically active. The mean results were  $3.53 \pm 0.83$  in the first group and  $2.72 \pm 0.83$  in the second group. In turn, the value of the medians was 3.7 and 2.7, respectively. In the case of the block of questions assessing preventive behaviour, physically active people had statistically significantly higher preventive behaviours

( $p=0.004$ ). The mean results for physically active people were  $3.37 \pm 0.83$  and the median was 3.3. People who did not lead an active lifestyle obtained the mean at the level of  $2.96 \pm 0.83$  and the median equal to 3. In the domain of positive mental attitude, significantly higher values were achieved by active physical persons ( $p=0.002$ ). The mean results for physically active people were  $3.55 \pm 0.60$  and the median was 3.7. People who did not lead an active lifestyle achieved an average of  $3.22 \pm 0.50$ , and a median of 3.2. It was not found that in the case of the domain of health practices, there were statistically significant differences in the achieved results between the studied groups ( $p=0.521$ ) (Table 2).

Another analysis carried out consisted in the assessment of the differences in the results of the symptoms assessed in the OSWESTRY questionnaire. In this case, in the group of women, the mean result was  $12\% \pm 10\%$ , and the median value was 8%. In turn, the mean result in the group of men was  $13\% \pm 10\%$ , and the median was 14. The difference between the results obtained by both groups was statistically significant ( $p=0.579$ ) (Table 3).

The comparison showed no statistically significant differences between the gender groups and the VAS scale;  $p$ -value=0.529 (Table 3).

**Table 3.** Results of IZZ stens, Oswestry and VAS scales and selected factors

Variable	N	$\bar{x}$	SD	Test result*	p-value
1	2	3	4	5	6
IZZ sten					
Men	23	4.74	1.98		
Women	100	4.69	1.75	-0.321	0.748
City	105	4.70	1.83		
Village	18	4.67	1.53	0.075	0.940
Physical activity YES	88	5.13	1.80		
Physical activity NO	35	3.63	1.24	4.266	<0.001

**Table 3.** Continued

	1	2	3	4	5	6
Oswestry scale						
Men		23	13%	10%	0.555	0.579
Women		100	12%	10%		
City		105	11%	10%	-2.479	0.013
Village		18	18%	11%		
Physical activity YES		88	11%	10%	-1.396	0.163
Physical activity NO		35	15%	11%		
VAS scale						
Men		23	2.04	1.58	0.629	0.529
Women		100	1.83	1.54		
City		105	1.81	1.58	-1.420	0.155
Village		18	2.22	1.31		
Physical activity YES		88	1.84	1.57	-0.535	0.592
Physical activity NO		35	1.94	1.47		

\*Mann–Whitney U test

Pain was found to be higher among people living in the countryside. In this case, in the group of people living in the city, the result was  $11 \pm 10\%$ , and the median was 8%. In turn, the average result in the group of people living in the countryside was  $18 \pm 11\%$ , and the median was 17. The difference between the results obtained by both groups was statistically significant ( $p=0.013$ ) (Table 3).

There were no statistically significant differences between the place of residence and the VAS scale;  $p$ -value=0.155 (Table 3).

The comparison of the sten indices determined from the results of the IZZ questionnaire for physically active and not physically active people indicates the existence of statistically significant differences ( $p<0.001$ ). The average value for the IZZ sten in the group of physically active people is  $5.13 \pm 1.8$ , and for people who declared lack of physical activity, it is  $3.36 \pm 1.24$ . The median value was 5 and 3 points, respectively (Table 3).

## Discussion

Diseases of the musculoskeletal system are often caused by long-term and simultaneous influence of the work environment. The literature shows that healthcare workers are most at risk of suffering from musculoskeletal pain; they are mainly employees of hospitals or care and treatment facilities or nursing and care facilities, in particular nurses [4].

A review of studies showed that LBP problems in nurses have a point incidence of about 17%, an annual incidence of 40–50% and a lifetime incidence of 35–80%

[14]. According to the US Bureau of Labour Statistics, nurses' injury and illness rates are among the highest in all occupations, including most manufacturing, construction and agriculture sectors; e.g. in New Zealand, the prevalence of back pain among nurses is estimated at 74% [14].

High rates of pain and trauma experienced by nurses contribute to their absenteeism, inadequate work quality of nurses and high turnover [14]. Of course, this carries the corresponding costs. Estimates using mainly US data suggest that the cost of one nurse replacement could range from \$10,098 to \$88,000 [14,18]. In New Zealand, the cost of replacing a registered nurse is approximately half the average nurse's salary, with the largest expense relating to the temporary costs of filling a vacancy, followed by training new staff and loss of productivity [14,19].

Manual handling of patients has been identified as a key factor contributing to musculoskeletal injuries and pain among nurses [14], but also poor working conditions, including non-compliance with the ergonomic requirements of the room, equipment, furniture, work in a forced position, time work habits and habits of nursing staff, as well as general health behaviour [4,20]. According to Gajewska et al. [21], 90% of nurses indicate the presence of strenuous physical work, among others defined as weight lifting, as a factor present in their daily work. These factors also include unpredictable working hours and fatigue [22], but studies also highlight the role of personal factors such as age, smoking, physical activity, stress levels, coping, and endurance of the muscular system [14].

The conducted research shows that a significant proportion — 81.3% — of the respondents are women, with a master's degree, aged 25–30. According to the data presented by the Supreme Chamber of Nurses and Midwives, the majority of the nursing staff are women, but with secondary medical education [23]. The incidence of LBP is more significant among nurses and their carers than among women in the same age group in the general population [24]. In addition, other studies show that health professionals rate their own health and safety at work lower than the rest of the working population across the EU [25,26].

According to the conducted analysis 79.7% of people experience pain. A high prevalence of LBP was found among nurses in continental Europe: 85.9% in Slovenia (N=1744) [27]; 85% in the Czech Republic (N=569) [25] and 75% in Greece (N=351) [28]. A significantly lower rate was found for nurses in Portugal (60.9%; N=1396) [29]. Studies on prevalence rates in non-European regions include, for example, Taiwan (72.0%; N=567) [30].

Among the respondents there are people who describe their pain as mild — 62.6% and moderate 17.1%, while 20.3% do not feel any pain. The mean value on the VAS scale was 1.87 with the median value equal to 2. The low level of pain may be related to the characteristics of the studied group, because, as previously mentioned, most of the respondents are between 25–30 years of age and have little work experience.

The results of the Trojan's research indicate a close relationship between the occurrence of pain and its intensity, and the work experience [31]. In the studies by Maciuk et al. [4] it was shown that pain in the lower spine appeared at the earliest about 12 years after starting work, while pain in the cervical spine appeared after about 8 years. In the present study it has been noticed that much younger people with shorter work experience feel back pain, however, it is pain of low intensity.

Among the studied group, the pain in the spine most often concerned the lumbosacral (59%), then the cervical (12%) and the thoracic (9%) section. The above data is consistent with the information presented in the publication of Trojan et al [31]. In a study by Moreira et al. [32], the most common areas of the body with pain in the last 12 months were the lumbar spine, shoulders and neck, followed by the thoracic spine, and the ankle and foot areas.

With the help of the IZZ questionnaire, information on health behaviours presented by nursing staff was collected. The highest scores were obtained for questions about a positive mental attitude, and the lowest for health practices. The literature shows how important a positive mental attitude is in the fight against pain [33]. Anxiety and stress lead to inner tension, and hence to increase pain, as well as physical and mental exhaustion.

People who use active ways of coping with stress have a significant sense of pain control, higher self-esteem and are characterized by a rational way of thinking [33].

The conducted research shows that some sociodemographic data have an impact on the assessment of health behaviour and functional efficiency. Samaei et al. [34] found that the following factors — age, body mass index, gender, number of working hours per week, shift work and length of employment — were statistically significant for the prevalence of LBP among nurses. The results of studies by Gilchrist et al. [25] found no such associations.

Serranheira et al. [29] investigated the impact of nursing interventions and found that invasive procedures, assistance in feeding, hygiene and patient care turned out to be a very significant occupational hazard that largely contributes to LBP in nurses [25]. In another study by Skela-Savič et al. [27] it was shown that low satisfaction with earnings, regularity of practicing sports and the level of education turned out to be negatively related to the occurrence of LBP in nurses [25]. In addition, the existing literature clearly shows that working long hours and a short recovery period between shifts lead to fatigue in nurses, which in turn contributes to a slower reaction time, loss of critical judgement and reduced motivation to adhere to organizational rules and health, and to non-compliance with safety requirements in the workplace [25,35]. Shieh et al. [30] calculated that the risk of back pain in nurses increases by 35% for each hour of a 9-hour shift [25].

Taking into account the present study, it can be noticed that nurses represent a higher level of disability than nurses. Moreover, people living in the countryside achieve higher results in the Oswestry questionnaire, and therefore represent a higher degree of disability than respondents living in the city. In the study by Moreira et al. [32], women had a 30% higher chance of developing symptoms of cervical spine pain than men.

A relationship between health behaviours and age has been noticed. It turned out that the level of health behaviours was inversely proportional to age. Older people less often cared for proper health behaviour than young people.

In the authors' own research, the relationship between the age of the respondents and the results obtained in the Oswestry questionnaire was directly proportional. This means that the level of disability increased with age, which is consistent with the data from the literature [8–10,36]. Moreover, there is a relationship between physical activity and proper eating habits — people who train more often pay attention to a healthy diet and obtain higher results in terms of preventive behaviours [36].

When analysing the responses of the studied group, no relationship between pain, functional capacity and health behaviour of the respondents was proved.

## Conclusions

1. Back pain concerns most of the surveyed nurses; 64% of respondents experience mild back pain, 17% — at an average level.
2. In terms of their own health behaviours, the respondents cared most about a positive mental attitude, while the least attention was paid to correct health habits.
3. Women more often cared about proper eating habits and preventive behaviour than men, who in turn had higher results in the questionnaire describing the degree of disability. The incidence of health behaviours was inversely proportional to age. Physically active people cared more about proper eating and preventive habits as well as positive mental attitude.
4. There was no correlation in pain, functional capacity and personal health behaviours.

## Implications for Nursing Practice


Backache is a problem of modern society, including health care workers. In the presented studies, the average age of nurses was 32 years, and still more than half of the group complained about this ailment. Currently, the Polish nurse is on average 53 years old and less likely to care for proper health behaviour compared to younger people. This is a very disturbing signal that requires immediate system changes. Nursing LBP and MSD pain prevention strategies should include education, enforcement of policies and procedures for the use of equipment and manual patient transfer techniques, and promotion of physical fitness and general health.

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**Conflict of Interest:** None**Funding:** None**Author Contributions:** Renata Jabłońska<sup>A-H</sup>,  
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A — Concept and design of research, B — Collection and/or compilation of data,  
C — Analysis and interpretation of data, D — Statistical analysis, E — Writing  
an article, F — Search of the literature, G — Critical article analysis, H — Approval  
of the final version of the article

**Received:** 6.05.2021**Accepted:** 29.06.2021