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Assessment of Limitations in Everyday Functioning of People with Chronic Spinal Pain: A Pilot Study

Ocena ograniczeń w codziennym funkcjonowaniu osób z przewlekłymi
dolegliwościami bólowymi kręgosłupa

Abstract

Introduction. Back pain is one of the most common health issues, significantly affecting daily functioning, quality of life, and work capacity.

Aim. The aim of this study was to assess the limitations in daily functioning among individuals with chronic back pain. It is estimated that this condition affects a large portion of the population, regardless of age or gender, and is one of the leading causes of reduced physical activity, work absenteeism, and decreased quality of life. Chronic back pain can lead to substantial functional impairment, influencing not only the ability to perform basic daily activities but also impacting patients' mental well-being.

Materials and Methods. The study involved 30 patients (11 men and 19 women) undergoing rehabilitation at the „Centrum Zdrowego Kręgosłupa” in Bydgoszcz. Participants were selected based on the presence of chronic back pain. Individuals over the age of 60 accounted for 46.7% of the total sample, while 53.3% were younger than 60. To assess pain intensity and limitations in daily functioning, the following research tools were used: the Numeric Rating Scale (NRS), the Oswestry Disability Index (ODI), and a custom-designed questionnaire aimed at collecting data on lifestyle, physical activity levels, and the impact of pain on various aspects of everyday life.

Results. Physical activity significantly influenced the subjective assessment of physiotherapy effectiveness—physically active individuals rated it higher ($p = 0.0101$). A correlation was also found between age and disability level—older patients reported more limitations ($p = 0.0109$). No associations were found between pain severity and disability, gender, or sleep duration. The findings emphasize the importance of physical activity and age in physiotherapy planning. Further studies on larger and more diverse populations are recommended.

Conclusions. The analysis showed that physical activity over 5 hours per week significantly improves

physiotherapy outcomes and pain perception, while age over 60 is linked to greater disability (ODI score). Promoting an active lifestyle and tailoring therapy to the patient's age is recommended. Future research should explore the type and intensity of activity across age groups. These findings are important for assessing functional limitations in people with chronic spinal pain.

Keywords: back pain, disability, physical activity, physiotherapy, treatment effectiveness

Streszczenie

Wstęp. Ból pleców jest jednym z najczęstszych problemów zdrowotnych, znacząco wpływającym na codzienne funkcjonowanie, jakość życia oraz zdolność do pracy.

Cel pracy. Celem badania była ocena ograniczeń w codziennym funkcjonowaniu u osób z przewlekłym bólem pleców. Szacuje się, że dolegliwość ta dotyka dużą część populacji, niezależnie od wieku i płci, i stanowi jedną z głównych przyczyn ograniczenia aktywności fizycznej, absencji w pracy oraz obniżenia jakości życia. Przewlekły ból pleców może prowadzić do znacznych ograniczeń funkcjonalnych, wpływając nie tylko na zdolność wykonywania podstawowych czynności dnia codziennego, ale także na dobrostan psychiczny pacjentów.

Materiał i metody. Badaniem objęto 30 pacjentów (11 mężczyzn i 19 kobiet) poddawanych rehabilitacji w „Centrum Zdrowego Kręgosłupa” w Bydgoszczy. Kryterium włączenia do badania był przewlekły ból pleców. Osoby powyżej 60. roku życia stanowiły 46,7% całej grupy, a 53,3% uczestników było w wieku poniżej 60 lat. Do oceny nasilenia bólu i ograniczeń w codziennym funkcjonowaniu zastosowano: Skalę Numeryczną (NRS), Wskaźnik Niepełnosprawności Oswestry (ODI) oraz autorski kwestionariusz dotyczący stylu życia, poziomu aktywności fizycznej oraz wpływu bólu na różne aspekty życia codziennego.

Wyniki. Aktywność fizyczna miała istotny wpływ na subiektywną ocenę skuteczności fizjoterapii — osoby aktywne fizycznie oceniały ją wyżej ($p = 0,0101$). Stwierdzono również korelację pomiędzy wiekiem a poziomem niepełnosprawności — starsi pacjenci zgłaszali większe ograniczenia ($p = 0,0109$). Nie wykazano zależności pomiędzy nasileniem bólu a poziomem niepełnosprawności, płcią ani długością snu. Wyniki podkreślają znaczenie aktywności fizycznej i wieku pacjenta w planowaniu fizjoterapii. Zalecane są dalsze badania na większych i bardziej zróżnicowanych populacjach.

Wnioski. Analiza wykazała, że aktywność fizyczna przekraczająca 5 godzin tygodniowo znacząco poprawia efekty fizjoterapii oraz wpływa na postrzeganie bólu, natomiast wiek powyżej 60 lat wiąże się z większym poziomem niepełnosprawności (według wskaźnika ODI). Zaleca się promowanie aktywnego stylu życia oraz dostosowywanie terapii do wieku pacjenta. Przyszłe badania powinny uwzględniać rodzaj i intensywność aktywności fizycznej w różnych grupach wiekowych. Uzyskane wyniki są istotne dla oceny ograniczeń funkcjonalnych u osób z przewlekłym bólem kręgosłupa.

Słowa kluczowe: ból pleców, niepełnosprawność, aktywność fizyczna, fizjoterapia, skuteczność leczenia

Introduction

Back pain is one of the most common health problems in today's world [1,2]. Although it is not life-threatening in itself, it can significantly impair daily functioning and poses a major challenge for modern medicine [3]. Its prevalence exceeds that of cardiovascular diseases and hypertension [4,5]. Back pain can result from a variety of causes, ranging from degenerative changes in spinal structures to dysfunctions in muscles and joints. For this reason, it is often referred to as “spinal overload disease” [6,7].

These pains can occur at different levels of the spine, but most commonly affect the lumbosacral region commonly known as the lower back [8]. As many as 70% of people under the age of 40 have experienced this type of pain at least once. Neck pain is also widespread, with nearly every second person reporting it annually [9].

The most commonly diagnosed type is nonspecific back pain, meaning it cannot be attributed to a single identifiable cause. Although it usually does not indicate a serious illness and may resolve on its own, it tends to recur. Back pain can be classified as acute (lasting 4–6 weeks), subacute (lasting more than 6 weeks but less than 3 months), chronic (lasting more than 3 months), or recurrent (returning after a symptom-free period) [10,11].

Aim

The aim of this study was to analyse and assess the limitations in everyday functioning of individuals with chronic spinal pain. In particular, the study sought to determine the level of disability associated with back pain using the standardized Oswestry Disability Index (ODI). The research also aimed to examine the relationship between pain intensity and limitations in daily life, evaluate the impact of physical activity on pain levels and patient functioning, and determine whether sleep duration, age, and gender significantly influence pain severity and disability level. An additional objective was to assess the effectiveness of physiotherapy in alleviating pain symptoms and improving the quality of life of the participants.

Materials and Method

This study employed a survey-based method using standardized and validated tools for functional assessment. One of the main instruments was the Oswestry Disability Index (ODI), used to assess the degree of functional disability resulting from lower back pain [12].

Additionally, the Numerical Rating Scale (NRS) was utilized, allowing patients to subjectively rate their pain intensity on a scale from 0 to 10. The study was supplemented with a custom-designed questionnaire developed specifically for this research. The questionnaire consisted of 20 questions, including 4 demographic items and 16 items related to health status and everyday functioning.

The collected data were statistically analyzed using STATISTICA software version 7.0 (StatSoft Polska). Relationships between selected variables were assessed using Pearson's chi-square test. A p-value of <0.05 was considered statistically significant. Results were also presented graphically using bar charts created in Microsoft Excel. The study received approval from the Bioethics Committee (approval number KB 432/2024). Participants were adult patients experiencing back pain for at least three months and

undergoing rehabilitation treatments at the „Centrum Zdrowego Kręgosłupa”, located at Kruszyńska Street 17, Bydgoszcz.

A total of 30 individuals participated in the study, including 63.3% women (n = 19) and 36.7% men (n = 11). Most respondents were over the age of 60 (46.7%, n = 14), while 30.0% (n = 9) were aged 51–60. A smaller percentage were aged 41–50 (13.3%, n = 4) and 40 or younger (10.0%, n = 3). The most frequently reported condition was lumbosacral pain syndrome, affecting 46.7% of participants (n = 14). Discopathy and sciatica were each diagnosed in 26.7% of cases (n = 8). Regarding occupational status, 33.3% (n = 10) were retired, and the same percentage reported mixed (physical and mental) work. Office work was reported by 20.0% (n = 6), while 13.3% (n = 4) were engaged in physical labor (Table 1).

Table 1. Characteristics of the Study Group

Variable	N	%
Gender		
Male	11	36.7%
Female	19	63.3%
Age		
40 years or younger	3	10.0%
41–50 years	4	13.3%
51–60 years	9	30.0%
Over 60 years	14	46.7%
Diagnosis		
Discopathy	8	26.7%
Sciatica	8	26.7%
Lumbosacral pain syndrome	14	46.7%
Occupational status		
Retired	10	33.3%
Mixed work (physical & mental)	10	33.3%
Office work	6	20.0%
Physical labor	4	13.3%

Results

The study revealed that individuals engaging in more weekly physical activity (>5 hours) reported greater effectiveness of physiotherapy in alleviating spinal pain symptoms. Furthermore, patient age was found to significantly influence the level of disability—older participants exhibited greater limitations in functional ability.

Pain intensity (NRS) and disability level (ODI)

Data showed variations in the level of disability depending on the reported pain intensity. Among participants who reported no current pain, a significant proportion still exhibited a notable level of functional disability (50.0%), which may suggest lingering limitations despite the absence of pain at the time of the study. In the group with mild pain, minimal disability was most common (58.3%). Among patients with moderate pain, responses most frequently indicated moderate (42.9%) and severe (28.6%) disability. However, the chi-square test ($\chi^2 = 11.85$, $p = 0.2218$) did not show statistically significant differences, suggesting no significant relationship between pain intensity and the level of disability (Table 2).

Table 2. Relationship between Pain Intensity (NRS) and Disability Level (ODI)

Pain Intensity (NRS)	Minimal Disability	Moderate Disability	Severe Disability	Very Severe Disability	Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>
No pain	3	30.0%	1	10.0%	5
Mild pain	7	58.3%	4	33.3%	1
Moderate pain	1	14.3%	3	42.9%	2
Severe pain	0	0.0%	1	100.0%	0
Total	11	36.7%	9	30.0%	8

Chi-square test of independence: $\chi^2 = 11.85$, $p = 0.2218$

Time Spent on Physical Activity Influences the Perceived Effectiveness of Physiotherapy in Pain Relief

The results indicate a clear relationship between the level of physical activity and the perceived effectiveness of physiotherapy. Patients who exercised more than 5 hours per week most frequently rated the impact of physiotherapy as strong (86.7%). A similar result was observed among those who were active for 2–3 hours per week (85.7%). The chi-square test ($\chi^2 = 11.32$, $p = 0.0101$) showed statistically significant differences, suggesting that a higher level of physical activity contributes to a more favorable perception of physiotherapy outcomes (Table 3).

Table 3. Relationship Between Level of Physical Activity and Subjective Assessment of Physiotherapy Effectiveness

Physical Activity	Moderate Effect	Strong Effect	Total
	<i>n</i>	%	<i>n</i>
< 2 h/week	2	100.0%	0
2–3 h/week	1	14.3%	6
4–5 h/week	4	66.7%	2
> 5 h/week	2	13.3%	13
Total	9	30.0%	21

Chi-square test of independence: $\chi^2 = 11.32$, $p = 0.0101$

Time Spent on Physical Activity and Its Influence on Pain Intensity (NRS)

The highest proportion of individuals reporting no pain was observed among patients exercising more than 5 hours per week (46.7%). In less active groups, higher levels of pain predominated. However, the chi-square test ($\chi^2 = 14.25$, $p = 0.1137$) did not reveal statistically significant differences (Table 4).

Table 4. Relationship Between Age and Disability Level (ODI)

Age	Minimal Disability	Moderate Disability	Severe Disability	Very Severe Disability	Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>
40 years and under	2	66.7%	0	0.0%	1
41–50 years	1	25.0%	3	75.0%	0
51–60 years	3	33.3%	6	66.7%	0
Over 60 years	5	35.7%	0	0.0%	7
Total	11	36.7%	9	30.0%	8

Chi-square test of independence: $\chi^2 = 21.41$, $p = 0.0109$

Sex and Its Influence on Disability Level According to the ODI Scale

The results do not indicate significant differences in the distribution of disability levels between women and men. Among women, severe disability was observed in 31.6% of cases, while among men, minimal disability was most frequently reported

(45.5%). The chi-square test ($\chi^2 = 2.23$, $p = 0.5266$) showed no statistically significant differences (Table 5).

Table 5. Relationship Between Sex and Disability Level (ODI)

Sex	Minimal Disability	Moderate Disability	Severe Disability	Very Severe Disability	Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>
Female (K)	6	31.6%	5	26.3%	6
Male (M)	5	45.5%	4	36.4%	2
Total	11	36.7%	9	30.0%	8

Chi-square test of independence: $\chi^2 = 2.23$, $p = 0.5266$

Sleep Duration and Its Influence on Pain Intensity According to the NRS Scale

The data analysis did not reveal significant differences in pain intensity depending on sleep duration. Among individuals sleeping less than 7 hours, mild pain was most frequently reported (45.5%), while respondents sleeping 7–8 hours most often reported no pain (38.5%). In the group sleeping more than 8 hours, mild pain was most commonly declared (50.0%). The chi-square test ($\chi^2 = 5.69$, $p = 0.4588$) showed no statistically significant differences, suggesting no association between sleep duration and pain intensity (Table 6).

Table 6. Influence of sleep duration on pain intensity (NRS).

Sleep Duration	No Pain	Mild Pain	Moderate Pain	Severe Pain	Total
	<i>n</i>	%	<i>n</i>	%	<i>n</i>
<7 hours	4	36.4%	5	45.5%	2
7–8 hours	5	38.5%	4	30.8%	4
>8 hours	1	16.7%	3	50.0%	1
Total	10	33.3%	12	40.0%	7

Chi-square test: $X^2 = 5.69$, $p = 0.4588$

Discussion

The aim of this study was to determine the relationships between pain intensity, level of disability, physical activity, and the subjective assessment of physiotherapy effectiveness. The results showed some differences in disability levels depending on pain intensity; however, the lack of statistical significance suggests that factors other than pain itself may play a greater role in shaping functional limitations. This may indicate the influence of psychosocial factors [13–16], biomechanical factors [17], type of work performed [18–19], use of analgesic medications [20–22], chronicity of the condition, or patients' previous experiences with pain and treatment [10, 23–24].

A significant relationship was confirmed between the level of physical activity and the assessment of physiotherapy effectiveness. Patients who were more physically active (over 5 hours per week) more frequently reported noticeable benefits from the therapy. This finding is consistent with previous studies indicating that regular physical activity improves musculoskeletal system efficiency and enhances regenerative processes [25–27]. It helps manage chronic diseases such as coronary artery disease, hypertension, obesity, hypercholesterolemia, and osteoporosis [4, 28]. In seniors with musculoskeletal complaints, exercise may alleviate pain [27–29]. Physical training also increases insulin sensitivity, improves glucose tolerance, and reduces the risk of diabetes. Systematic activity is associated with a lower risk of infections, reduces medication use, and supports maintaining cognitive function [30–31].

Age proved to be a significant factor influencing the level of disability according to the ODI scale [32]. Older individuals more often exhibited higher degrees of disability [33–37], which underscores the need to tailor physiotherapy programs to patients' individual needs depending on their age.

No statistically significant differences were found between sex and the level of disability, suggesting that sex was not a differentiating factor in patient functioning in this sample. However, it should be noted that the sample size was limited, which may have affected the statistical power of the analyses.

It is also worth noting that despite the lack of statistical significance, more physically active individuals reported lower levels of pain intensity [29, 35, 38]. Regular physical activity alleviates musculoskeletal pain [39], reduces the risk of infections, improves cognitive function, and may reduce the need for medication [25]. Although this trend was not confirmed by statistical tests, it may have clinical relevance and should be considered in future studies involving larger patient groups.

No statistically significant association was found between sleep duration and pain intensity measured by the NRS scale ($p = 0.4588$). This result suggests that sleep duration alone does not have a clear impact on pain intensity among the studied individuals. While the group sleeping 7–8 hours most often reported no pain, and those sleeping less than 7 or more than 8 hours more frequently reported mild pain, these differences were not statistically significant.

Scientific literature reports indicate that sleep deprivation may exacerbate pain perception, especially chronic pain, through mechanisms related to nervous system hypersensitivity and impaired regeneration. It has been shown that pain significantly limited or even prevented sleep among patients [28, 40–43]. However, the present study's results do not confirm these relationships, possibly due to the limited sample size or the subjective nature of pain assessment.

A limitation of the study was the relatively small sample size and its heterogeneity in terms of age and activity level. Future research should consider analyses on a larger and more diverse study population.

Conclusions

In summary, the conducted analysis showed that physical activity exceeding 5 hours per week has a significant impact on the effectiveness of physiotherapy and pain perception, while age over 60 years is associated with a higher level of disability according to the ODI questionnaire. Therefore, promoting an active lifestyle and adopting an individualized therapy approach that takes the patient's age into account is recommended. Future research should investigate the influence of the type and intensity of physical activity across different age groups to better tailor treatment methods. The findings of this study are important for assessing functional limitations in daily life among individuals with chronic spinal pain, as they highlight specific factors affecting the level of disability and the effectiveness of rehabilitation.

Recommendations for nursing practice

1. **Promote Physical Activity**Nurses should encourage patients to engage in regular physical activity, as it improves physiotherapy outcomes and reduces pain perception.
2. **Individualize Care Based on Age**Nursing interventions should be tailored to the patient's age, especially for those over 60, who tend to experience greater disability.
3. **Use Standardized Assessment Tools**It is recommended to use tools such as the NRS and ODI in daily practice to monitor pain levels and functional limitations.
4. **Provide Health Education**Nurses should educate patients about lifestyle factors, sleep hygiene, and psychosocial influences on pain and daily functioning.
5. **Foster Interdisciplinary Collaboration**Effective care requires close cooperation with the therapeutic team to ensure comprehensive and personalized support.

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