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URBAN-RURAL DIFFERENCES IN REGARD TO LOW BACK PAIN-RELATED DISABILITY

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SUMMARY

Introduction and aim

The aim of this study is to examine the potential differences between the duration and intensity of low back pain (LBP) and how everyday activities are performed, taking into account detailed clinical and socio-demographic patient characteristics, in both urban and rural patients.

Material and methods

Rural (N = 21) and urban (N = 45) patients who reported LBP lasting for at least 3 months, aged from 18 to 60 years, treated operatively due to discopathy and degenerative changes in the lumbosacral spine, were asked to complete VAS scale, the Quebec Back Pain Disability Scale (QDS), and the Revised Oswestry Disability Index (RODI).

RÓŻNICE W ZAKRESIE NIEPEŁNOSPRAWNOŚCI BĘDĄCEJ NASTĘPSTWEM BÓLU W KRĘGOSŁUPIE LĘDŹWIOWO-KRZYŻOWYM W ŚRODOWISKACH MIEJSKICH I WIEJSKICH

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STRESZCZENIE

Wprowadzenie i cel

Celem pracy jest zbadanie potencjalnych różnic pomiędzy czasem trwania i natężeniem bólu krzyża (LBP), oraz jak przeprowadzane są czynności życia codziennego, biorąc pod uwagę szczegółowe badania kliniczne i socjo-demograficzne u chorych w środowisku miejskim i wiejskim.

Materiał i metody

Chorzy ze środowiska wiejskiego (N = 21) i miejskiego (N = 45), którzy donosili o bólach krzyża w kręgosłupie lędźwiowo–krzyżowym, trwającym przynajmniej trzy miesiące, w wieku od 18 do 60 lat, leczeni operacyjnie z powodu dyskopatii oraz zmian zwyrodnieniowych w kręgosłupie lędźwiowo-krzyżowym, zostali przebadani za pomocą formularzy Oceny Intensywności Bólu w skali VAS, Skali Niepełnosprawności Bólowej Kręgosłupa Quebec (QDS) oraz Zmodyfikowanej Skali Niepełnosprawności Oswestry (RODI).

Results
Mean disability scores obtained from the RODI were 49,51% (SD 8,10) for the urban and 51,43% (SD 16,16) for the rural groups. Mean total QDS scores were 47,78 (SD 20,55) for the urban population and 49,33 (SD 17,17) for the rural group. Urban and rural samples do not differ in regard to LBP-intensity (p = 0,086) and duration (p = 0,640). The sub-groups are not significantly statistically different in the total score of the QDS and RODI (p = 0,815 and p = 0,746, respectively).

Conclusions
Urban and rural residents do not differ in terms of back pain intensity and duration, advancement of degenerative disease, radiating pain, discopathy levels and self-reported disability. There is evidence of a link between LBP and loss of functionality or the advancement of degenerative disease in the urban group. The rural group displays a correlation between LBP intensity and radiating pain; there is also a relation between loss of functionality and the Modic Scale in this group.

Keywords: rural/urban environment, low back pain, disability, Modic Scale

Wyniki
Uśrednione wyniki oceny niepełnosprawności otrzymane z skali RODI wyniosły 49,51% (SD 8,10) dla grupy chorych ze środowiska miejskiego i 51,43% (SD 16,16) dla grupy chorych ze środowiska wiejskiego. Uśrednione wyniki całkowite skali QDS wyniosły 47,78 (SD 20,55) dla populacji chorych ze środowiska miejskiego i 49,33 (SD 17,17) dla populacji chorych ze środowiska wiejskiego. Próby wykonane wśród populacji badanych reprezentujących środowisko miejskie i wiejskie nie różniły się w odniesieniu do intensywności LBP (p = 0,640) i czasu trwania (p = 0,640). Obie grupy nie różniły się w sposób istotny statystycznie w ogólnym wyniku skal QDS i RODI (kolejno p = 0,815 i p = 0,746).

Wnioski
Przedstawiciele populacji miejskiej i wiejskiej nie wykazują różnic w intensywności bólu kręgosłupa lędźwiowo-krzyżowego i czasu trwania dolegliwości, zaawansowania choroby degeneracyjnej, promieniowania bólu, poziomu dyskopatii i niepełnosprawności w ocenie własnej. Istnieje dowód na powiązanie pomiędzy LBP i utratą funkcjonalności lub zaawansowaniem choroby degeneracyjnej w populacji chorych ze środowiska miejskiego. W grupie chorych ze środowiska wiejskiego wskazano na korelację pomiędzy intensywnością LBP a promieniowaniem bólu; istnieje także korelacja pomiędzy utratą funkcjonalności a wynikiem skali Modic w tej grupie.

Słowa kluczowe: środowisko wiejskie/miejskie, ból pleców, inwalidztwo, skala Modic

Introduction

Low back pain (LBP) has been extensively studied across general and rural/industrial populations because of its high prevalence and associated disability (Barrero *et al.* 2006). Lifetime prevalence of LBP estimates range from 54% to over 80% in the general population (Woolf and Pfleger 2003). Most published studies on the epidemiology of back pain are from North America, Northern and Western Europe (Volinn 1997). Unfortunately, little is known about the prevalence and determinants of LBP in populations from different living environments in developing countries, such as in Eastern Europe (Barrero *et al.* 2006).

Violinn indicated that within low-income countries, rates of LBP are generally higher among urban populations than rural populations (Volinn 1997). He pointed out the higher rates in urban low-income populations compared to rates in rural low-income populations and the sharply increased rates among laborers in low-income countries, suggesting a disturbing trend: low back pain prevalence may be on the rise among vast numbers of workers as urbanization and rapid industrialization proceed (Volinn 1997). However, Björck reported that LBP seems to be associated with physical activity at work and in leisure time, as well as certain lifestyle factors and demographic characteristics, such as living in smaller communities (Björck-van Dijken *et al.* 2008).

Although the prevalence of LBP has been investigated in numerous studies, little is known about the association between chronic LBP-related disability and patient living environments in developing countries in Eastern Europe, taking into account detailed clinical characteristics of patients with degenerative disorders and discopathies.

As mentioned above, there is evidence of a clear association between LBP and agricultural work in developing areas, whereas other researchers report that populations from developing rural areas might have lower prevalence of LBP than urban patients (Deyo 1997; Volinn 1997; Omokhodion 2002; Björck-van Dijken *et al.* 2008). Pennebaker's attention theory may play a significant role in understanding the relation between living environment and self-reported, LBP-related disability (Pennebaker 2000). He indicated that people who engage in non-stimulating tasks or living or working in socially isolated environments, are more likely to focus their attention inward. It seems likely that rural patients may be less distracted by external cues in their surrounding environment than those living in urban areas, leading them to become more attuned to LBP signals (Pennebaker 2000).

Social support may also influence the experience of chronic pain in urban and rural populations. The amount of support has been associated with coping ability and reduced stress in chronic pain patients (Hoffman *et al.* 2002). This factor may be less available for rural individuals because they are likely to live in more isolated environments. Accordingly, quality of life for rural people with chronic pain may be affected by a lack of social support or by reduced access to health services (Hoffman *et al.* 2002).

Previous reports suggest that there are significant differences in back pain prevalence and intensity between populations from urban and rural areas (Volinn 1997; Björck van Dijken *et al.* 2008). The aim of this study is to examine the potential differences in duration and intensity of LBP in patients with degenerative and discopathic disorders, taking into account detailed clinical and socio-demographic characteristics of patients, from both the urban and rural environments. We hypothesize, in accordance with the social support (Hoffman *et al.* 2002) and the role of attention theory (Pennebaker 2000), that Polish patients from developing rural areas may have higher intensity or duration of LBP than urban patients. As the subjective evaluation of pain intensity and how it affects the ability to perform everyday activities is becoming more significant, we will explore the potential differences in performing activities such as personal care, lifting heavy objects, walking, sitting, rising/standing, sleeping/resting and social life between patients from different living areas.

Material and methods

The entire study group consisted of 66 adult patients of both sexes, aged from 18 to 60 years, who reported chronic LBP lasting for at least 3 months. All study participants were treated operatively due to discopathy and degenerative changes in the lumbosacral spine. In our study we determined the clinical state before surgery. Patients were selected consecutively.

Demographic variables and the previous history of disease were taken from all of the patients. All patients underwent MRI scan. We evaluated the degenerative changes in the lumbar spine according to the Modic scale (Modic and Ross 1991). Our analysis did not include pregnant woman and patients suffering from spinal tumors, vertebral traumatic fractures, neurological and psychiatric disorders, infections, and patients who had undergone previous surgery on the spine.

The data were collected to allow a cross-sectional analysis. The study group was divided into two subgroups: rural ($N = 21$), and urban ($N = 45$) patient samples, based on the information provided in the questionnaire (see Table 1 for detailed demographic and clinical characteristics of urban and rural patients). The two groups of patients do not differ significantly in regard to analyzed variables ($p < 0{,}05$).

This study received ethical approval from the Bioethics Commission and written informed consent was obtained from all participants. The examined patients received in-depth information on the aim of the study and were guaranteed anonymity.

To assess LBP level, all patients completed the 100 mm Visual Analogue Scale (VAS). To assess LBP-related disability, patients were asked to complete the Polish versions of the Quebec Back Pain Disability Scale (QDS) and the Revised Oswestry Low Back Pain Disability Index (RODI). Excellent values of test-retest reliability and validity of the QDS and RODI have been previously confirmed and subsequent reports published (Kopec *et al.* 1995; Zeng *et al.* 2004; Misterska *et al.* 2011).

The QDS measures functional disability in patients with back pain. The patient indicates the perceived difficulty associated with completing 20 physical activities. Activity domains affected by back pain measured by scale are as follows: sleep/rest; sitting/rising; walking; moving; bending/squatting; lifting heavy objects (Kopec *et al.* 1995). The responses are marked on a scale of 0–5 where 0 corresponds to no limitations and 5 refers to maximum restrictions to everyday activities. The total score varies between 0 (no worsening of spine function) to 100 (maximum restrictions on functional status). The higher the score the greater the disability are (Kopec *et al.* 1995).

The RODI focuses on subjective evaluation of pain intensity and the degree to which everyday activities such as personal care, lifting, walking, sitting, rising/standing, sleep, social life, travelling and also changes in pain intensity are affected. The answers are marked on a six-point scale (from 0 to 5), where 0 corresponds to no limitations on functional status, and 5 indicates maximum restrictions on everyday activities. In order to present the general result in percentage values, reflecting the extent to which the ability to carry out everyday activities is restricted, the total score is divided by 50 and then multiplied by 100 (Fritz and Irrgang 2001; Misterska *et al.* 2011). The scoring interpretation is as follows: 0% to 20% as minimal disability, 21%–40% as moderate disability, 41%–60% as severe disability, 61%–80% indicating crippled patients and 81%–100% indicating patients that are either bed-bound or exaggerating their symptoms (Fritz and Irrgang 2001).

Table I. Demographic and clinical characteristics of urban and rural patients (Misterska *et al.* 2011)

Variable	Urban subgroup			Rural subgroup			P value
	mean (SD)*	range*	N (%) **	mean (SD)*	range*	N (%) **	
GENDER							
Male	–	–	30 (33,3)	–	–	12 (57,10)	0,457
Female	–	–	15 (33,7)	–	–	9 (43,86)	
Age	40,1 (11,6)	21,0–60,0	–	42.8 (10.85)	26,0–56,0	–	0,425
Body Mass Index	26,5 (3,6)	21,0–35,8	–	26,28 (10,85)	20,71–33,9	–	0,809
Visual Analogue Scale (mm)	50,3 (19,3)	2–90	–	60,0 (18,94)	27,0–90,0	–	0,086
Pain duration (months)	41,3 (45,8)	3–180	–	46,0 (55,16)	4–180	–	0,640
SYMPTOMS							
Lumbalgia	–	–	8 (17,8)	–	–	2 (9,52)	0,387
Ischalgia	–	–	26 (57,8)	–	–	13 (61,90)	0,752
Lumbalgia and neurological deficit	–	–	8 (17,8)	–	–	6 (28,57)	0,332
Ischalgia and neurological deficit	–	–	3 (6,7)	–	–	0 (0)	0,230
NUMBER OF DISCOPATHY LEVELS							
1 level	–	–	22 (48,9)	–	–	12 (57,10)	0,534
2 or more levels	–	–	23 (51,1)	–	–	9 (42,85)	0,980
MODIC CLASSIFICATION							
Type I	–	–	17 (37,8)	–	–	8 (38,10)	0,980
Type II	–	–	4 (8,9)	–	–	0	0,163
Type III	–	–	24 (53,4)	–	–	13 (61,90)	0,516

* Mean (SD) and Range (min–max) for continuous data
** N (%) for categorical data

Statistical analyses were made for certain items (RODI), domains (QDS) and for the total scores. For continuous variables we calculated the means and standard deviation, minimal and maximal values and the 95% confidence intervals. In the range of characteristics of quality, the number of units belonging to certain categories of a given characteristic was provided, along with their related percentage values. Calculations were made both for the rural and for the urban patient subgroups.

As the majority of considered features and results were not normally distributed, we used non-parametric tests to verify the hypothesis. To establish relations between quantitative features, we used Spearman's rank correlation (marked as rs). The Mann-Whitney test was applied to determine dependency between quantitative and qualitative characteristics and to compare the 2 groups in respect to a quantitative feature. We took $p = 0,05$ as the limit of statistical significance. Test outcomes higher than this value were disregarded as statistically insignificant.

Results

Table 1 presents minimum, maximum, mean results and standard deviations of LBP intensity, as measured by the Visual Analogue Scale, for the urban (50,3 SD 19,3) and rural (60,0 SD 18,94) subgroups.

Table 2 contains minimum, maximum and mean scores and 95% confidence interval ranges obtained from the RODI. Mean disability scores obtained from the RODI were 49,51% (SD 8,10) for the urban and 51,43% (SD 16,16) for the rural group, which is interpreted as severe disability, in both samples. Detailed analysis of individual items of the RODI, for both analyzed subgroups, are shown in Table 2. Table 3 summarizes the total score and results in individual domains of the QDS for patients from different living areas. Mean total QDS scores were 47,78 (SD 20,55) for urban sample and 49,33 (SD 17,17) for rural group.

items (for the RODI), and for the total score and particular domains (for the QDS) was performed. This analysis revealed the following differences between both analysed subgroups of study participants (Table 4). The only statistically significant correlations in the urban group were identified between the changes in the pain intensity

Table II. Distribution of the Revised Oswestry Low Back Pain Disability Index results (Misterska *et al.* 2011)

	Urban subgroup						Rural subgroup						P value
	min	max	mean value	95% confidence interval		SD	min	max	mean value	95% confidence interval		SD	
				from	to					from	to		
Total score in %	4,0	360	49,51	44,64	54,38	8,10	30,00	74,00	51,43	44,07	58,79	16,16	0,746
Pain intensity	0,0	5,00	3,16	2,75	3,57	1,36	2,00	5,00	3,19	2,64	3,74	1,21	0,820
Personal care	0,0	4,00	2,00	1,70	2,31	1,02	0,00	4,00	2,24	1,83	2,64	0,89	0,461
Lifting	0,0	5,00	3,18	2,76	3,60	1,40	1,00	5,00	3,57	2,95	4,19	1,36	0,325
Walking	0,0	5,00	1,64	1,25	2,04	1,32	0,00	4,00	1,62	1,07	2,17	1,20	0,989
Sitting	0,0	5,00	2,44	2,11	2,78	1,12	1,00	4,00	2,47	2,11	2,85	0,81	0,989
Standing	0,0	5,00	2,91	2,46	3,36	1,49	1,00	5,00	3,00	2,41	3,59	1,30	0,912
Sleeping	0,0	4,00	1,82	1,52	2,12	1,01	0,00	4,00	1,76	1,23	2,30	1,18	0,810
Social life	0,0	5,00	2,49	2,13	2,85	1,20	1,00	5,00	2,57	2,10	3,04	1,03	0,973
Travelling	0,0	5,00	2,33	1,95	2,71	1,26	1,00	5,00	2,39	1,96	2,80	0,93	0,934
Changes in pain intensity	0,0	5,00	2,78	2,42	3,13	1,18	1,00	5,00	2,90	2,23	3,58	1,48	0,794

Urban and rural samples do not differ in regard to LBP-intensity (the Mann-Whitney test, $p = 0{,}086$) and duration (the Mann-Whitney test, $p = 0{,}640$).

The sub-groups are not significantly statistically different in the total score of the QDS and RODI (Mann-Whitney test, $p = 0{,}815$ and $p = 0{,}746$, respectively). Taking into account individual items of the RODI and particular domains of the QDS, patients from urban and rural environments do not differ significantly in regards to the level of self-reported disability, connected with performing everyday activities (see Table 2 and Table 3).

The analysis of the relationship between selected clinical characteristics of the patients, and the results of the disability scales, both for the general result and the individual item (from the RODI) and low back pain duration ($rs = 0{,}31$ $p = 0{,}040$) and between the personal care item (from the RODI) and VAS scale ($rs = 0{,}33$ $p = 0{,}027$).

In the rural group (Table 5) we found correlations between the Modic scale and the RODI pain intensity item ($rs = 0{,}44$ $p = 0{,}044$), the RODI standing item ($rs = 0{,}55$ $p = 0{,}010$) and moving domain from the QDS ($rs = 0{,}44$ $p = 0{,}046$). We also identified correlations between radiating pain and the personal care item (from the RODI) and the sleeping/resting domain (from the QDS), ($rs = 0{,}45$ $p = 0{,}040$; $rs = 0{,}52$ $p = 0{,}015$, respectively).

We did not identify any correlation between age, Body Mass Index, number of discopathy levels and self-reported LBP-disability, measured by RODI and QDS.

Table III. Distribution of the The Quebec Back Pain Disability Scale results (Misterska *et al.* 2011)

	Urban subgroup						Rural subgroup						P value
	min	max	mean value	95% confidence interval		SD	min	max	mean value	95% confidence interval		SD	
				from	to					from	to		
Total score	6,00	89,00	47,78	41,60	54,00	20,55	21,00	81,00	49,33	41,47	57,20	17,27	0,815
Sleeping/resting	0,00	4,00	2,21	1,90	2,53	1,05	0,66	3,67	2,28	1,85	2,72	0,96	0,912
Sitting/rising	0,00	4,67	2,29	1,91	2,67	1,26	0,67	4,00	2,28	1,83	2,71	0,96	0,995
Walking	0,00	4,50	1,91	1,57	2,25	1,14	0,50	4,00	1,96	1,50	2,43	1,01	0,778
Moving	0,33	4,67	2,69	2,38	2,99	1,01	1,00	4,67	2,81	2,29	3,33	1,15	0,705
Leaning/squatting	0,33	4,66	2,74	2,41	3,07	1,09	1,00	4,00	2,84	2,45	3,23	0,86	0,670
Lifting	0,50	4,50	2,58	2,25	2,92	1,12	1,00	4,50	2,71	2,28	3,15	0,96	0,670

We also established that there was a correlation between duration and pain intensity, and selected clinical patient characteristics. In the urban group we confirmed a relation between the duration of LBP and age (rs = 0,30 p = 0,044) or the Modic Classification (rs = 0,383 p = 0,009). In the rural group there is a relation between back pain intensity (measured by the VAS scale) and radiating pain (rs = 0,60 p = 0,004)

Discussion

Many authors underline the necessity of the analysis of geographical, physical, psychosocial, and individual risk factors of LBP. Recently published literature suggests that there are significant differences in LBP between populations from different living environments (Volinn 1997; Björck van Dijken *et al.* 2008). Although the prevalence of back pain has been investigated in

Table IV. Correlation between patient characteristics and Revised Oswestry Low Back Pain Disability Index for urban patient subgroup

	Urban subgroup				
	BMI	radiating pain	modic classifications	LBP duration	LBP intensity
Total score	rs = 0,02 P = 0,829	rs = 0,09 p = 0,551	rs = 0,12 p = 0,415	rs = −0,02 p = 0,876	rs = 0,13 P = 0,393
Pain intensity	rs = 0,10 p = 0,505	rs = 0,02 p = 0,881	rs = 0,00 p = 0,964	rs = −0,14 p = 0,352	rs = 0,12 P = 0,413
Personal care	rs = −0,13 p = 0,203	rs = −0,04 p = 0,796	rs = 0,14 p = 0,356	rs = −0,06 p = 0,684	rs = 0,33 p = 0,027
Lifting	rs = 0,20 p = 0,169	rs = 0,26 p = 0,078	rs = 0,09 p = 0,535	rs = −0,01 0,910	rs = 0,07 p = 0,631
Walking	rs = 0,15 p = 0,306	rs = 0,08 p = 0,567	rs = 0,26 p = 0,079	rs = −0,05 p = 0,739	rs = 0,11 p = 0,466
Sitting	rs = −0,03 p = 0,801	rs = −0,20 p = 0,173	rs = 0,073 p = 0,632	rs = −0,07 p = 0,615	rs = −0,03 p = 0,816
Standing	rs = −0,10 p = 0,480	rs = 0,26 p = 0,084	rs = 0,27 p = 0,073	rs = 0,11 p = 0,460	rs = 0,02 p = 0,865
Sleeping	rs = 0,10 p = 0,501	rs = 0,24 p = 0,099	rs = −0,04 p = 0,775	rs = 0,19 p = 0,194	rs = 0,05 p = 0,733
Social life	rs = −0,00 p = 0,993	rs = −0,09 p = 0,524	rs = 0,18 p = 0,216	rs = 0,00 p = 0,990	rs = −0,10 p = 0,482
Travelling	rs = −0,03 p = 0,847	rs = −0,22 p = 0,137	rs = 0,01 p = 0,911	rs = −0,05 p = 0,716	rs = 0,09 p = 0,535
Changes in pain intensity	rs = −0,00 p = 0,997	rs = 0,07 p = 0,642	rs = 0,05 p = 0,730	rs = 0,07 p = 0,040	rs = 0,22 p = 0,147

Table V. Correlation between patient characteristics and Revised Oswestry Low Back Pain Disability Index for rural patient subgroup

	Rural subgroup				
	BMI	radiating pain	modic classifications	LBP duration	LBP intensity
Total score	rs = 0,16 P = 0,465	rs = 0,33 p = 0,142	rs = 0,28 p = 0,212	rs = 0,13 p = 0,556	rs = 0,19 P = 0,406
Pain intensity	rs = 0,36 p = 0,100	rs = 0,18 p = 0,413	rs = 0,44 p = 0,044	rs = 0,19 p = 0,390	rs = 0,19 P = 0,388
Personal care	rs = −0,08 p = 0,705	rs = 0,45 p = 0,040	rs = 0,28 p = 0,204	rs = −0,04 p = 0,850	rs = 0,29 p = 0,190
Lifting	rs = 0,06 p = 0,793	rs = 0,21 p = 0,353	rs = 0,34 p = 0,124	rs = 0,40 p = 0,071	rs = 0,17 p = 0,447
Walking	rs = 0,00 p = 0,988	rs = −0,08 p = 0,713	rs = −0,02 p = 0,914	rs = 0,33 p = 0,144	rs = −0,09 p = 0,669
Sitting	rs = 0,19 p = 0,396	rs = 0,15 p = 0,508	rs = 0,24 p = 0,285	rs = 0,09 p = 0,692	rs = −0,12 p = 0,591
Standing	rs = 0,20 p = 0,371	rs = 0,32 p = 0,0156	rs = 0,54 p = 0,010	rs = 0,33 p = 0,134	rs = 0,07 p = 0,763
Sleeping	rs = 0,41 p = 0,059	rs = −0,06 p = 0,797	rs = 0,08 p = 0,718	rs = 0,20 p = 0,381	rs = 0,17 p = 0,438
Social life	rs = 0,03 p = 0,895	rs = −0,04 p = 0,862	rs = −0,07 p = 0,742	rs = 0,09 p = 0,677	rs = 0,05 p = 0,818
Travelling	rs = 0,25 p = 0,265	rs = 0,37 p = 0,097	rs = 0,24 p = 0,287	rs = −0,27 p = 0,225	rs = 0,13 p = 0,059
Changes in pain intensity	rs = 0,27 p = 0,224	rs = 0,39 p = 0,075	rs = 0,35 p = 0,114	rs = 0,03 p = 0,881	rs = 0,24 p = 0,277

numerous studies (Volinn 1997; Woolf and Pfleger 2003; Barrero *et al.* 2006; Björck van Dijken *et al.* 2008), little is known about the association between chronic LBP-related disability and patient living environment in developing countries in Eastern Europe. What is more, recently published reports did not perform an analysis taking into account detailed clinical characteristics of patients with degenerative and discopathic disorders, such as degenerative changes in the bone marrow, according to the Modic classification, or the number of discopathy levels. Moreover, apart from objective clinical tests, our study design takes the subjective evaluation of LBP-related disability and how it affects the ability to perform everyday activities such as personal care, walking, sitting, rising/standing, sleeping/resting, travelling and social life, in subgroups of patients from different living areas into consideration.

The relatively small sample of patients was taken into account. However, the cause of lumbosacral spine pain in our study group was strictly diagnosed. Study participants were treated due to discopathy and degenerative changes in the lumbosacral spine. Patients who demonstrated the correlation between changes in MRI studies and clinical examination underwent spinal surgery. The state of the patients was analyzed thoroughly, including a neurological examination and subjective assessment of pain and disability. The diagnosis was confirmed by MRI examination. We evaluated the degenerative changes in the lumbar spine according to the Modic scale. Patients suffering from spinal tumors, vertebral traumatic fractures, neurological and psychiatric disorders, infections, and patient who underwent previous surgery on the spine were excluded, as were patients over 60 years old.

As mentioned above, there is evidence of a clear association between higher LBP intensity in agricultural environments, whereas other researchers report that populations from rural developing areas might have lower prevalence of LBP than urban patients (Deyo 1997; Omokhodion 2002).

The study conducted by Zeng *et al*. confirms that the prevalence of lumbar pain is substantially lower in urban South China than in the rural North, where rates are closer to those in Western populations (Zeng *et al.* 2004).

Hoffmann *et al.* found significant differences in the responses of rural and urban chronic pain sufferers. He indicated that more rural than urban individuals reported chronic pain. Moreover, he tested whether there was a disproportionate number of blue collar occupations (in which on-the-job injuries could be more prevalent) among rural and urban participants who reported chronic pain (Hoffman *et al.* 2002). However, this analysis found no significant difference between the frequency of blue and white collar occupations among patients from rural and urban areas. In addition, no significant differences were found between rural and urban chronic pain participants for average annual income (Hoffman *et al.* 2002).

Our data did not lead to the confirmation of significant differences between our study samples in the duration or intensity of chronic LBP, as measured by the Visual Analogue Scale. Nevertheless our analysis did not include occupation or average annual income, we focused on the detailed analysis of potential LBP-related limitation of execution of everyday activities and indicated that urban and rural patients do not differ in the level of self-reported functional disability. However, we observed the differences between both analysed subgroups of study participants regarding the associations between selected patient clinical characteristics, and the results of disability scales.

Similarly, as Hoffmann *et al.* (2002), we focused on the theory of the role of attention in LBP symptoms, as reported by Pennebaker (2000). According to this concept and to our assumption, the rural patient subgroup, may have reported a higher prevalence of chronic back pain, than the urban sample because of their differing physical and social environments (Pennebaker 2000; Hoffman *et al.* 2002). Rural individuals may be more socially isolated and live or work in an non-stimulating environment, allowing them more time to monitor their physical symptoms, whereas those living in urban areas are likely to have more external distractions in their environment such as traffic, co-workers, and social activities, which may distract their attention (Pennebaker 2000). Our report did not confirm relevance of this concept for patient urban and rural populations from Eastern Europe. Moreover, the lack of differences in LBP intensity in our rural and urban patient sample may question Pennebaker's theory (Pennebaker 2000).

Some researchers believe that the urban/rural environment is an essential component of a health care access (Fiedler 1981; Hick 1981; Norton and McManus 1989). Rurality is generally perceived as a barrier to such access. Fiedler concluded that rural residents use fewer health care resources because they are deprived access to those resources (Fiedler 1981). What is more, Norton and MCManus found rural population to be older, poorer and less likely to have a regular source of health care. Rural patients had worse self-reported health status and higher rates of chronic illness (Norton and McManus 1989). Our study did not confirm this model: the rural sample did not report more intense back pain. Moreover, reported LBP duration in the rural group was not significantly higher than in the urban group of patients.

Furthermore, Björck-van Dijken *et al.* (2008) indicated that individuals with LBP reported lower education, high unemployment rate, predominantly blue-collar work, few opportunities to change jobs, and were more likely to live in sparsely populated areas.

However, the correlation analysis we performed for both samples revealed some disparities between patient subgroups. For example, a significant positive relation was found between the frequency of chronic back pain and the advancement of degenerative disease in the lumbar spine, according to the Modic Classification, in the urban sample. Moreover, in this group we found a relation between the ability to wash or dress and pain intensity.

Meanwhile, in the rural group there is a correlation between pain intensity and radiating pain. We confirmed that the advancement of degenerative disease is related to pain intensity and the ability to perform everyday activities, such as standing and moving. Moreover, we identified that radiating pain affects washing, dressing, sleeping and resting. We did not distinguish any correlation between the age, Body Mass Index, the number of discopathy levels and self-reported LBP-disability.

There is no simple explanation for our findings. We hypothesized that Polish patients from rural developing areas may have higher prevalence of LBP than urban patients. However, in general, we did not identify significant differences in chronic back pain intensity or restrictions in performing everyday activities. As mentioned earlier and as reported by Volinn *et al.* (1997), we must also take into consideration the disturbing trend in low-income urban populations compared with rates in low-income rural populations. Low back pain prevalence may be, surprisingly, on the increase among vast numbers of workers as urbanization and rapid industrialization proceed. Further understanding of the characteristics and risk factors of LBP in rural and urban areas from developing countries in Eastern Europe are needed.

Conclusions

Patients with degenerative and discopathic disorders from urban and rural samples reported severe disability. Urban and rural residents do not differ in terms of back pain intensity and duration, advancement of degenerative disease, radiating pain, discopathy levels and self-reported disability. There is evidence of a link between LBP and loss of functionality or the advancement of degenerative disease in the urban group. In the rural group there is a relation between LBP intensity and radiating pain; we also identified a correlation between loss of functionality and the Modic Scale in this group.

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