

## BACK PAIN CHARACTERISTICS IN PHYSICAL AND OFFICE WORKERS

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**Abstract.** *The aim of our study was to characterize back pain according to the occupation comprising physical and office work. Accordingly questionnaires from 100 physical workers (PW) and 100 office workers (OW) were collected. This dedicated questionnaire included 19 questions, of which 7 concerned demographic, work and stature features and 12 concerned back pain. Collected data showed that lower back pain was more common in PW but cervical pain in OW ( $p < 0.001$ ). Most common aetiology of back pain was spinal osteoarthritis, sciatica and scoliosis but of different spread in two groups ( $p < 0.001$ ).*

*The history of back pain was most often above 5 years and there were significant differences in frequency, intensity and pain handling methods between groups ( $p < 0.005$ ). Back pain prophylaxis was well acknowledged in both groups (85 % in OW, 91 % in PW). Regular physical activity was considered the main prophylaxis method (67 % in PW, 89 % in OW) and similarly incorporated in both groups ( $p = 0.691$ ) however OW more often performed physical exercises ( $p < 0.001$ ). Physical therapy was used in both groups (PW 100 %, OW 92 %,  $p = 0.004$ ) but with variable efficacy according to responders. To conclude there were multiple differences between both groups in terms of the pain characteristic but with similar awareness and incorporated prophylaxis.*

**Keywords:** *back pain, occupation, prophylaxis, therapy.*

## **Introduction**

Low back and neck pain were the third leading cause of disability worldwide behind ischemic heart disease and cerebrovascular disease (GBP 2016 DALYs and HALE Collaborators, 2017). Musculoskeletal disorders are the biggest single cause of incapacity to work (Bevan et al., 2009). Mechanical stress from occupational activities such as heavy lifting and repetitive movements as well as strained posture are the main back pain risk factors however there may well be other important risk factors such as age, gender or length of employment, awareness of prevention techniques and treatment compliance.

This has led to the hypothesis that there are differences in back pain characteristics dependant on the type of work performed. Recognizing such differences may be helpful in developing appropriate strategy for prevention. Preventive techniques may reduce physical stress that can trigger symptoms and bad habits at work and promote or exaggerate the risk of back pain. Along with this there may be different targets for prevention according to the occupation. Physical workers (PW) and office workers (OW) may well differ in back pain characteristics and risk factors. Another reason for differences might be the level of awareness of risk factors and preventive techniques. Finally, there might be differences in assessment of pain and treatment efficacy as well as compliance with prevention recommendations. Identifying the differences might be helpful to undertake more specific treatment and preventive measures in both groups.

Therefore our study aim was to show differences in the back pain character in working population in regards to the type of occupation.

## **Methods and Materials**

One hundred PW (22 women, 78 men) and 100 OW (62 women, 38 men) suffering from back pain were included in the study. They were all patients of SP ZOZ in Glubczyce. The Bioethics Committee of Public Higher Medical School in Opole has approved the protocol of the study (Approval No 309/216). Study was conducted in December 2016 and January 2017 with the use of the dedicated questionnaire that included 19 questions, of which 7 were concerned with demographics (gender, age, work, height, body mass). The Body Mass Index was calculated. Further multiple-choice questions concerned back pain were asked as listed below:

- localization of back pain
- diagnosed conditions related to back pain
- duration of back pain symptoms
- frequency of back pain
- intensity of pain with Visual Analog Scale (VAS)

- back pain symptoms management
- awareness of back pain prevention methods
- adherence to back pain prevention
- physical activity
- mode of physical activity – stretching or muscle enhancement
- prior physiotherapy
- effectiveness of physiotherapy.

Collected data was analysed with a chi-square statistics to demonstrate inter-groups differences. Statistically significance was accepted at  $p < 0.05$ .

### Results

There were more men than women in analysed group, 84 women (22 PW and 62 OW) and 116 men (78 PW and 38 OW) ( $p < 0.001$ ). PW were younger ( $42.33 \pm 10.9$  years vs.  $46.69 \pm 9.4$  years –  $p = 0.003$ ). There were significant differences between PW and OW in such somatic features as height ( $177.12 \pm 6.63$  cm;  $171.15 \pm 6.32$  cm –  $p < 0.001$ ) and BMI ( $24.74 \pm 3.55$  kg/m<sup>2</sup>;  $25.75 \pm 2.81$  kg/ m<sup>2</sup> –  $p = 0.025$ ) but there was no difference in body mass ( $77.33 \pm 9.75$  kg;  $75.44 \pm 9.08$  kg –  $p = 0.155$ ). More patients were living in urban areas than rural (126 vs. 74,  $p = 0.017$ ). Most responders in both groups PW and OW had work experience longer than 15 years (54 % and 48 % accordingly,  $p = 0.272$ ).

The localization of the back pain is showed in Figure 1. In PW group the most frequent localisation was the lumbar segment (66 %) whereas in OW in the cervical segment (51 %). The statistical analysis showed significant differences in pain localisation between groups ( $p < 0.001$ ).

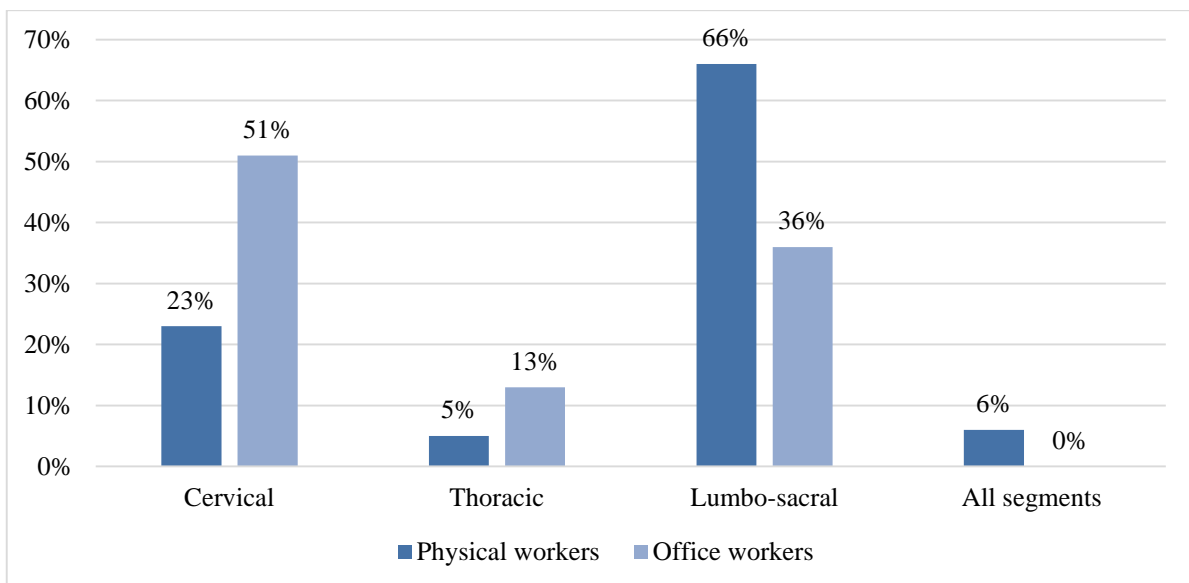


Figure 1. The pain localisation in the spine

The most common conditions diagnosed in responders were spinal osteoarthritis, sciatica and scoliosis but with different spread in the studied groups ( $p < 0.001$ ) (Figure 2).

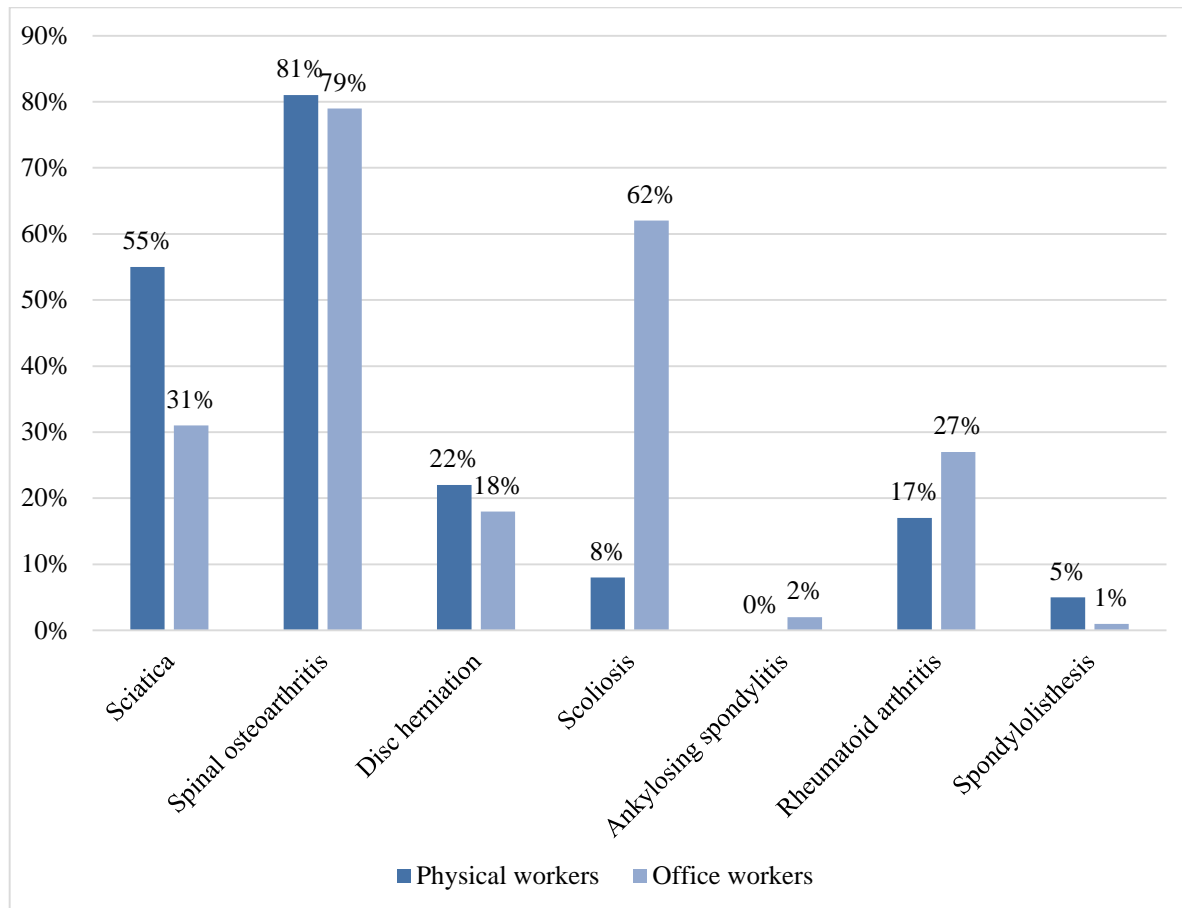


Figure 2. The back pain aetiology

In most responders' back pain lasted more than 5 years (67 % of PW, 59 % of OW) and variability of duration of back pain was similar in both groups ( $p = 0.593$ ). Most PW suffered back pain less than once per month (61 % vs. 31 %) whereas most OW suffered frequent back pain 3-5 times per week (41 % vs. 13 %). Other occurrences, 1-2 per month and 1-2 per week were less common in both groups. Both groups differed significantly in terms of back pain frequency ( $p < 0.001$ ). OW most frequently assessed pain intensity as 5 out of 10 in VAS (57 %) while PW as 9 out of 10 (46 %) (Figure 3). There were significant differences in pain intensity reported by PW and OW ( $p < 0.001$ ). The most frequent back pain management reported by patients was pharmacotherapy, body positioning or manoeuvres to alleviate pain and physician consultation (Figure 4). There were significant differences between groups in back pain management ( $p < 0.001$ ). At the same time the awareness of back pain prevention was similar in both groups (85 % in PW and 91 % in OW) ( $p = 0.193$ ).

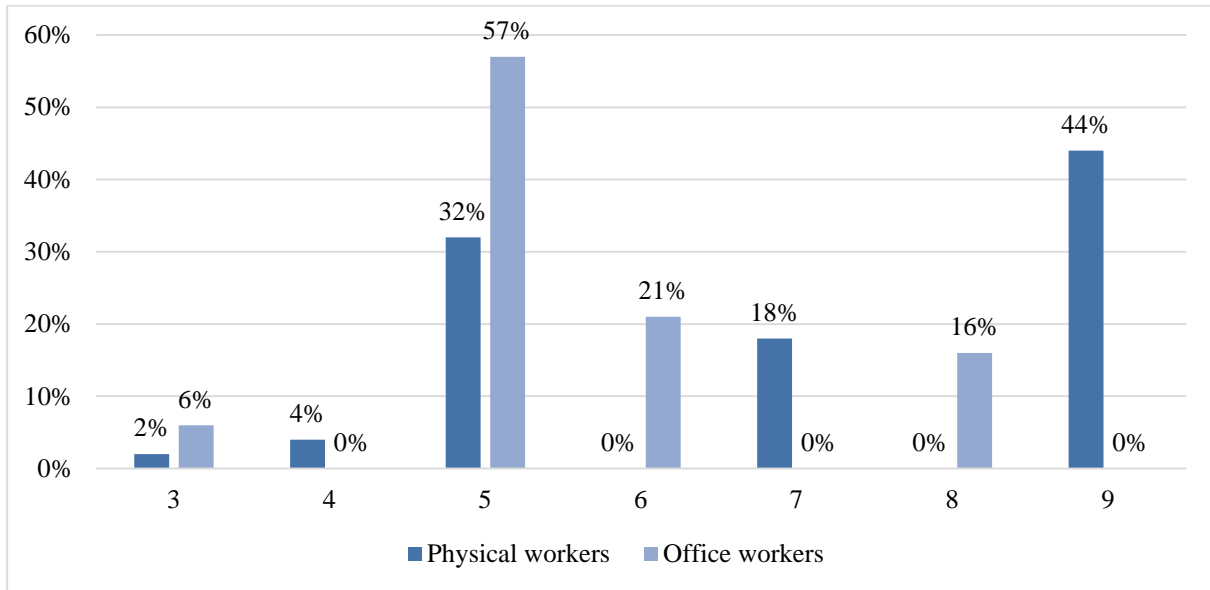


Figure 3. Pain intensity according to Visual Analog Scale (VAS)

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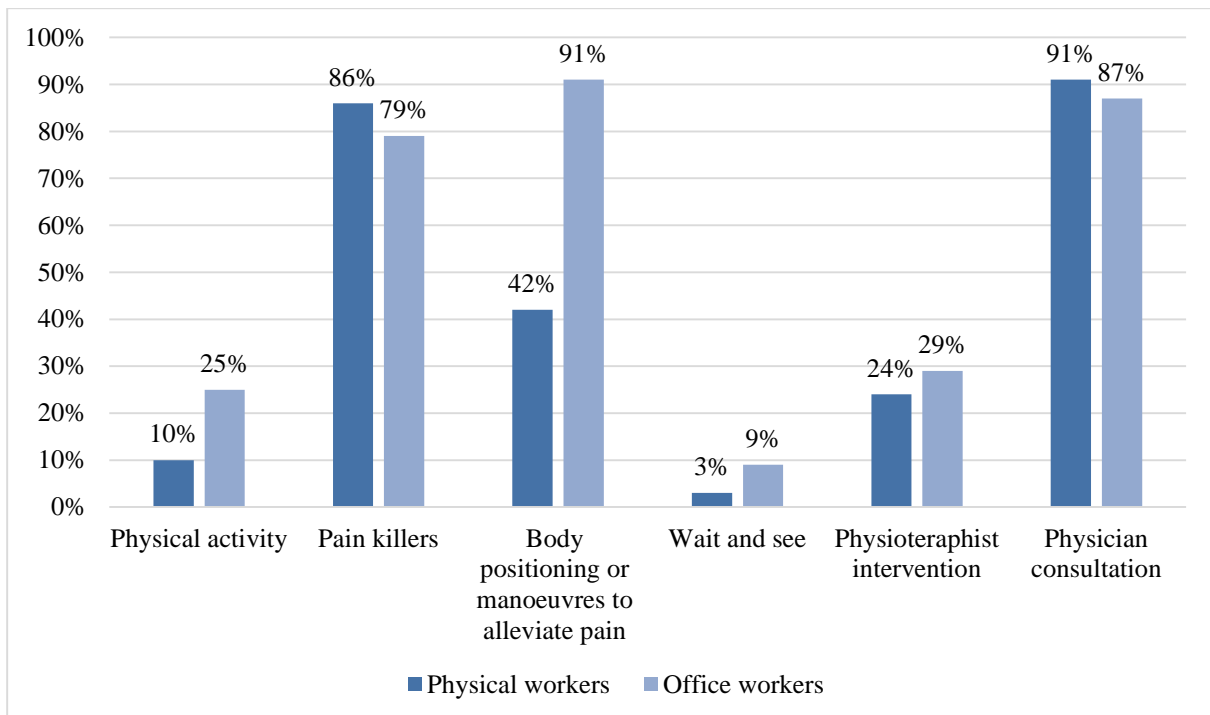


Figure 4. Back pain management reported by responders

The most recognized technique by PW were regular physical activity (67 %), evading long positioning in strained position (83 %) and correct body posture (79 %) whereas OW pointed regular physical activity (89 %), correct mattress (65 %) and evading long positioning in the strained position (51 %) (Figure 5).

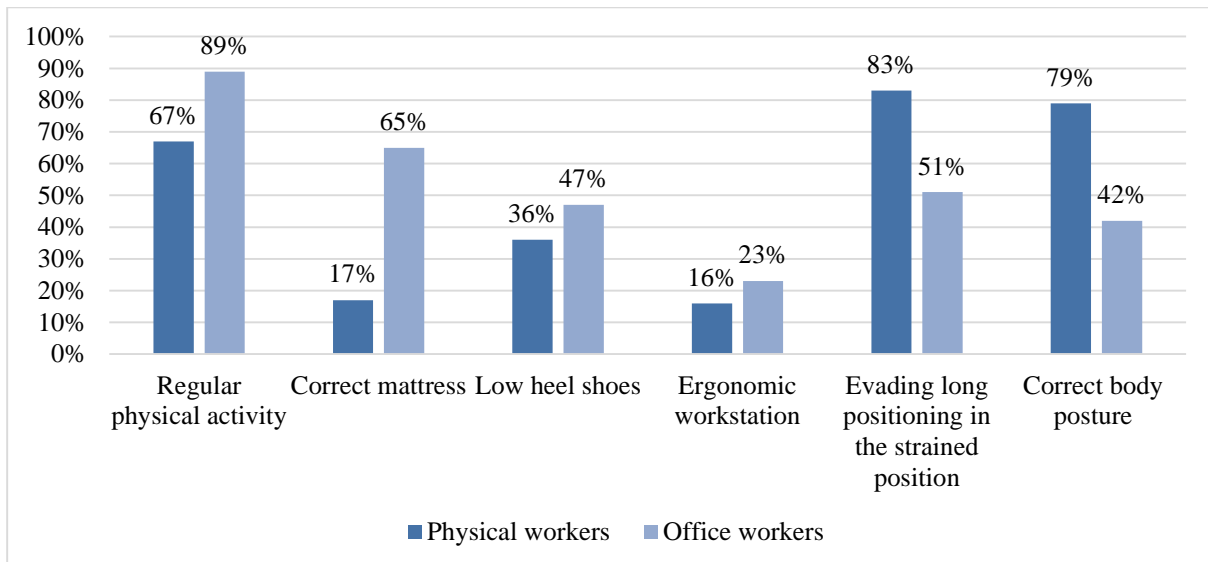


Figure 5. Preventive techniques recognised by responders

The preventive techniques reported by both groups differed statistically ( $p < 0.001$ ). The adherence to back pain prevention was similar in both groups ( $p = 0.691$ ). Preventive techniques were followed regularly by PW and OW in 6 % and 9 %, sporadically in 81 % and 77 % and were not followed in 6 % and 13 % respectively. The most common frequency of any mode of physical activity was less than once a month in PW group (61 %) and 3-5 times per week in OW group (41 %) (Figure 6). Both groups differed statistically in terms of the frequency of physical activity ( $p < 0.001$ ). The most popular form of physical activity was muscle enhancement, 63 % in PW and 59 % in OW with no difference between groups ( $p = 0.563$ ). All PW already had physiotherapy sessions in the past (100 %) but only 92 % of OW ( $p = 0.004$ ).

PW and OW disagreed according to the evaluation of efficacy of physiotherapy sessions as complete recovery was reported accordingly by 13 % vs. 52 %, partial recovery by 46 % vs. 30 %, minor recovery by 28 % vs. 3 % and no recovery by 13 % vs. 7 % respectively ( $p < 0.001$ ).

## Discussion

There were important differences found in our study between PW and OW according to the kind of back pain reported. Most important seems to be the pain localization. PW mostly reported pain in lower back while OW in the neck. Job

status, working hours per day as well as standing hours per day were found the strongest risk factors influencing on lower back pain (LBP) (Mendelek et al., 2011) whereas sitting position is not associated with higher risk of LBP (Hartvigsen et al., 2000). Neck pain was similarly found more often in OW (Oha K et al., 2014). Higher risk of LBP in PW when compared to OW was also found in the prospective cohort study in Norway (Heuch et al., 2017). Probable explanation may be a different pattern of back strain in compared groups. PW are mostly exposed to dynamic strain while OW to static strain. The dynamic strain e.g. heavy workload, lifting, bending, twisting comprise structural changes in joints and spine and lumbar spine is the most exposed segment (Heneweer et al., 2011). Higher prevalence of sciatica in PW found in our study may well be the explained with higher exposition to the dynamic strain. The most frequent aetiology of sciatica is sciatic nerve root compression in spinal canal caused by disc herniation. The impact of dynamic strain is the highest in lower spine where sciatica nerve roots exit the spinal canal. There was no difference in disc herniation according to reported diagnoses however in the questionnaire the exact localization of disc herniation – cervical or lumbar - was not specified.

OW more often reported scoliosis and that could explain higher frequency of neck pain in this group. Neck pain is mostly related to chronic muscle strain caused by sustained body position at work with limited physical activity (Klussmann et al., 2008). The most frequent neck pain aetiology is overloaded musculoskeletal system and spinal muscle strain. Interestingly OW more frequently reported complete recovery after physiotherapy what may support the musculoskeletal aetiology of their symptoms. This condition is more prone to improve after physiotherapy than structural lesions of the spine and joints.

High frequency of scoliosis reported in OW is not supported by epidemiological studies as idiopathic scoliosis is found in up to 5 % of general population. The explanation might be unclear terminology and/or misunderstanding the diagnosis given to patients. However we are not able to compare to the frequency of scoliosis in our group to the general population. Our group consisted of patients already referred for treatment due to back pain.

Observed differences may well be biased by different characteristics of compared groups. PW were mostly men while OW were mostly woman. Woman are more prone to back pain than man regardless of the type of work performed (Ekman et al., 2000). PW were younger and had lower BMI. Sciatica was more frequent in man and scoliosis in woman. Slightly higher prevalence of sciatica in man was found in population based study in Tunisia (Younes et al., 2006) and most of published studies report higher prevalence of neck pain in woman (Fejer et al., 2016; Sarquis et al., 2016). To explain this fact one may consider different pattern of back strain in man and woman. Men are mostly exposed to dynamic injury while women to static strain. Heavy workload was found to be an important

risk factor for chronic lower back pain (Heuch et al., 2017). Type of work, gender as well as age are all independent risk factors influencing prevalence of back pain (Coggon et al., 2013). Apart from this there are non work-related factors influencing the prevalence of back pain for example physiological differences, such as different body size or body mass or endocrine functions, and differences in the willingness to report or seek medical care for pain or discomfort (Punnett & Bergqvist, 1997).

Higher BMI in OW suggest indirectly lower physical activity, which is a risk factor for musculoskeletal symptoms often coexisting with scoliosis. This seems to be contrary to reported knowledge regarding preventive techniques as well as usage of these techniques. OW more often reported the importance of regular physical activity as a preventive technique and declared more regular physical activity as well. At the same time OW rarely reported evading long positioning in strained position and correct body posture as a preventive technique. These risk factors play important role in prevention of neck pain which is mostly related to static strain and that was previously discussed in regards to pain localization.

PW more often reported the pain as severe and very severe while OW more often as moderate. Pain assessment is a subjective measure what makes the comparison difficult however one may try to explain this finding. Pain caused by direct neural injury what is observed in sciatica may be more severe than musculoskeletal pain. PW more often had sciatica diagnosed when compared to OW. The treatment of sciatica is often prolonged and complete recovery is more difficult to achieve what may explain the differences in assessment of treatment outcome. PW rarely reported complete recovery and more often reported lack of improvement.

Our patient questionnaire study was focused on pain characteristic in regards to job status and was performed in determined time span what resulted in several limitations. Differences found between groups are in line with specific risk factors related to job character. Interpretation was hindered due to imprecise questioning of disc herniation localization and type of physiotherapy methods employed in the treatment. Length and type of physiotherapy methods may influence the efficacy and therefore patients' assessment. Similar problem appears in most studies dealing with physiotherapy effectiveness apart from the subjective character of pain and efficacy assessment and lack of objective outcome measures.

The main conclusion arising from our results is the need of differentiation the treatment and preventive methods in regards to job character. Teaching proper body posture and preventive techniques at worksite should begin at very beginning to avoid inappropriate habits resulting in back strain. It is well recognized that risk of back pain increases with length of employment and structural changes in spine especially spinal osteoarthritis and disc herniation are irreversible. In the OW group it should be stressed out that proper workstation



alignment has essential role together with stretching exercises during office breaks to improve spine mobility and avoid back pain. It seems that in both groups stretching exercises should be preferred for back pain prevention. Awareness of the need of regular physical activity should be enhanced as it has positive effect not only on musculoskeletal system but also on cardio-vascular system. It has been found that walking or cycling to work lowers the risk of hospitalisation due to sciatica by 30 % (Shiri et al., 2017). Despite physical activity is every day routine in PW there is high risk of overload of musculoskeletal system due to unvarying character of activity. Lower back pain is particularly vulnerable what results in irreversible structural changes leading to disc herniation and sciatica.

New employees should be acquainted with the long-term health risk emerging from job characteristics related to worksite and appropriate preventive techniques should be acknowledged.

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