Analysis of pain complaints including occupational injuries among physiotherapists in Poland: a cross-sectional study

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Abstract

Background: Physiotherapists perform manual tasks using methods and techniques that require physical effort, often in a prolonged, constrained position in a non-working environment. Manual handling is the most common workplace risk factor for injury and work-related musculoskeletal disorders (WRMDs). When working in poor conditions, there is a risk that the physiotherapist will become the patient, which could have a negative impact on the existing shortage of health professionals.

Aims: This study aimed to identify and analyse a broad professional population of physiotherapists and their work-related health problems, including injuries.

Material and methods: A questionnaire was developed and distributed by e-mail. A total of 3,746 physical therapists participated in the study.

Results: Almost ¾ of the physiotherapists reported pain. The most common site of pain was the lumbosacral spine (58% of respondents). Occupational injuries were reported by more than one in three physiotherapists. The most common injuries were to the upper limb or lumbar spine (more than 15%). The level of mental and physical fatigue caused by work, the risk of infection with COVID, HIV or other infectious disease, and the fear of potential legal claims were considered to be the most detrimental.

Conclusions: There is a need for further research; it would be interesting to conduct a statistical analysis of the data collected by the Social Insurance Institution (ZUS).

Key words

occupational health, return to work, occupational injuries, musculoskeletal diseases, work related.

Introduction

The most common occupational diseases and health problems reported in Europe include cancer, cardiovascular diseases, musculoskeletal injuries and disorders, and psychosocial disorders [1]. In Poland, musculoskeletal injuries and diseases account for more than 30% of occupational mortality and morbidity, expressed in disability-adjusted life years (DALYs) per 100,000 workers [2]. This is equal to the number of work-related cancers and more than twice the number of work-related cardiovascular diseases. In addition, data from the Social Insurance Institution (in Polish: *Zakład Ubezpieczeń Społecznych*, ZUS) show that musculoskeletal diseases are the second most common cause of sickness absence (15%) and account for 13.4% of all costs due to incapacity to work [3]. Healthcare workers are a particularly vulnerable group to injuries and work-related musculoskeletal disorders (WRMDs) [4].

Physiotherapists work manually using methods and techniques that require physical effort, often remaining in a prolonged, forced position, such as working with a patient on a mat or conducting home visits in a non-working environment. Forced and prolonged postures, repetitive activities, especially manual work, and manual handling are the most common risk factors for workplace injuries and WRMDs. When working in poor conditions, there is a risk that the physiotherapist becomes a patient, which could have a negative impact on the existing shortage of medical staff. Due to the diverse working model of physiotherapists in Poland and the possible influence of working conditions on the occurrence of injuries and health problems, the focus was also on defining the characteristics of professional work.

The purpose of the following study was to identify and analyse a broad professional population of physiotherapists and their work-related health problems, including injuries. An additional aim of the study was to assess the factors related to physiotherapists' work that influence the complaints they experience.

Materials and methods

A proprietary questionnaire was developed and distributed as a link via e-mail addresses collected in cooperation with the Polish Chamber of Physiotherapists. The survey was conducted using Computer Assisted Web Interview (CAWI) and was sent to 2,951 respondents (about 80%); it included questions about working conditions, attention to safety and health at work, and meeting physiotherapists' needs and expectations regarding work comfort. In addition, a Computer-Assisted Telephone Interview (CATI) was conducted with a further 795 respondents. A total of 3,746 physical therapists participated in the study. All respondents (3,746) took part in the primary survey, with almost half – 1,799 respondents – taking part in the extended version of the questionnaire, which included additional questions. Therefore, the figures presented only include forms that were completed in full and correctly.

Results

Study group characteristics

Approximately ¾ of the participants were women, and almost every second respondent was in the age group up to 35 years (**Figure 1**); in addition, more than ⅔ had a Master's degree. The largest sample of physiotherapists resided in Mazowsze, Małopolskie and Śląskie voivodships.

Professional work characteristics

The characteristics of a physiotherapist's work include: seniority, form of physiotherapy practice, formal and legal nature of the professional activity, type of place of employment (hospital) and workplaces.

Almost a third of the sample were physiotherapists who had worked in the profession for five years or less; about one in four had worked for 6 to 10 years or 11 to 19 years, while one in five had worked for less than 20 years. Nearly 80% of physiotherapists do not run a physiotherapy clinic; the remainder run a general physiotherapy practice (7.4%), an in-

dependent practice in a treatment facility (8.1%) or an independent practice during home visits (7%).

Respondents were most likely to work in institutions providing physiotherapy services both under contract to the National Health Service (in Polish: *Narodowy Fundusz Zdrowia*, NFZ) and commercially (38%). Almost a quarter of physiotherapists work exclusively in settings without a contract with the NHS.

Physiotherapists in Poland most often provide their services by accepting so-called "outpatients" (almost ⅔ of respondents), including work in outpatient clinics (more than 20% of respondents), private clinics, day rehabilitation units (10-20% of respondents) or in educational institutions (6.7%). About half (42.4%) of physical therapists work in inpatient facilities, i.e. hospitals (19.4%), nursing homes or similar institutions, inpatient rehabilitation units, sanatoriums and hospices (5-10% of respondents). One in four physiotherapists provides services at the patient's home, mainly in the context of so-called reimbursable home/home physiotherapy (21.5%) or home/home rehabilitation (6%). About 30% of physiotherapists work in 2 or 3 different types of facilities.

Working conditions

Workstation

In order to identify the workplace, physical therapists were asked to indicate the places where they carry out their professional duties. The results show that they most often provide services at the therapy table (57% of respondents), followed by the physiotherapy room (49%), on the floor, mat, mattress (48%) or at the patient's bedside (47%). Other places of service delivery were reported by almost ¼ of respondents (**Figure 2**). However, the physiotherapist's workplace is not only located in one place, as about 70% work in at least two such places, while almost 40% work in at least three.

Figure 1. Gender and age distribution of the study sample and physiotherapists in Poland.

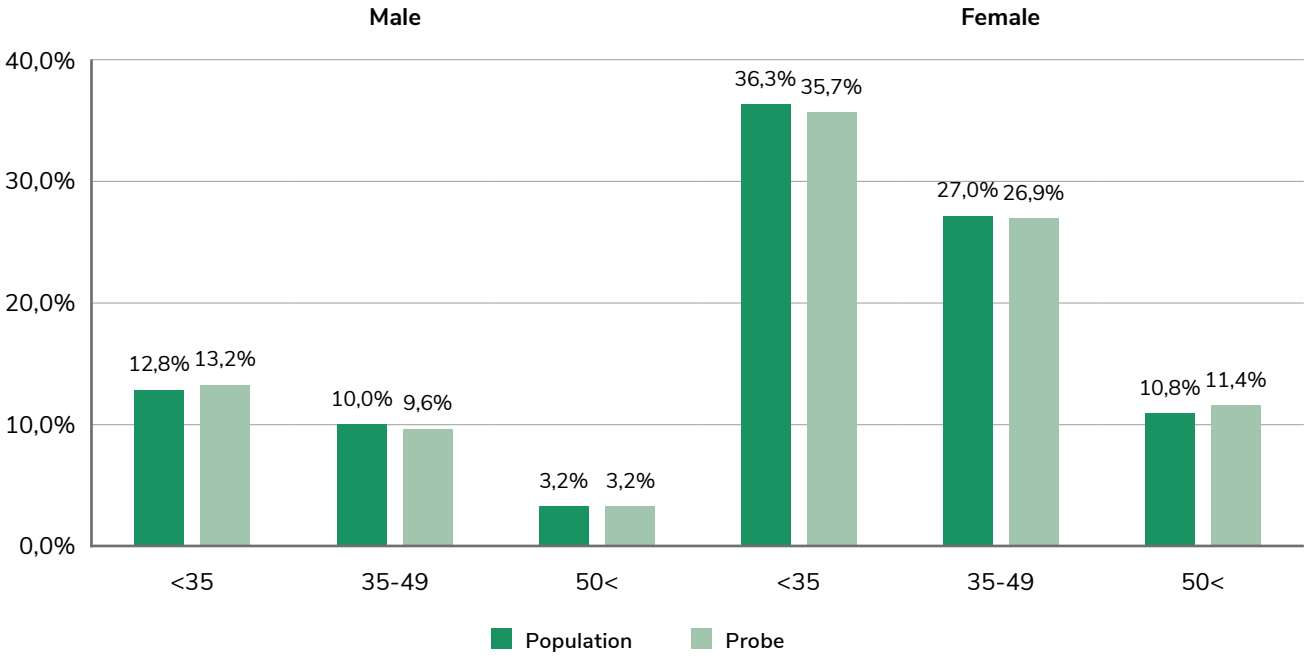
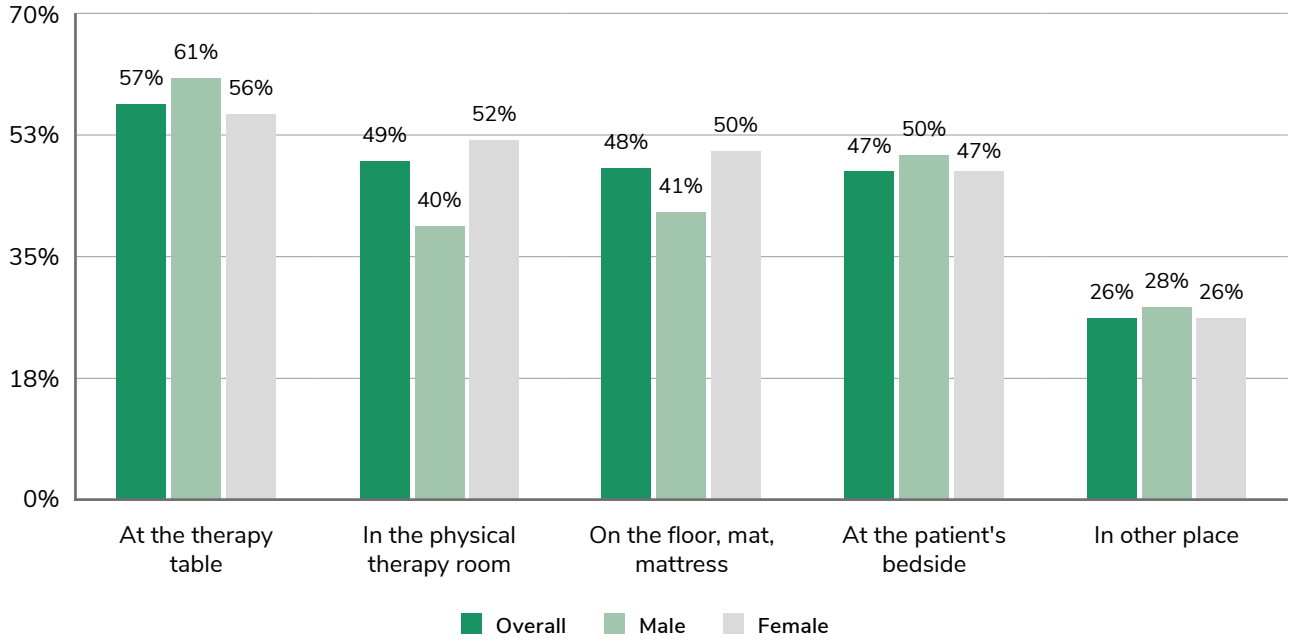


Figure 2. Place of physiotherapy services by gender.



The reported number of hours per day spent at a particular place of work shows that half of the respondents who provide services at the therapy table spend at least 3 hours there, half of the respondents who provide services in the physiotherapy clinic, at the patient's bedside, on the floor, mat or mattress spend at least 2 hours there, while half of the participants who provide services in another place spend at least 1 hour there.

The percentage of men working at the therapy table is significantly higher than that of women ($p = 0.0028$ for the Wald test for proportions), while women are more likely than men to provide services in the physiotherapy clinic ($p < 0.0001$) and on the floor ($p < 0.0001$).

Work break

Participants were asked if they were allowed to take a break after how long of continuous work, and if so, after how long. The responses showed that almost one in five did not take a break at all, almost one in four took a break after 1-2 hours and 45% of participants took a break after 3-4 hours. In summary, the results of the analyses show that half of the physiotherapists are able to take a break after at least 3 hours of continuous work (**Figure 3**).

Pain complaints

Almost ¾ of physical therapists reported that they had seen pain (**Figure 4**). The most commonly reported areas of pain are the lumbosacral spine (58% of respondents) and the cervical and thoracic spine (45%). In addition, one in three respondents experienced pain in the upper extremities, one in four in the lower extremities, and one in four physiotherapists also suffered from headaches at work.

Women were significantly more likely to report complaints than men ($p < 0.0001$ for the Wald test for proportions). As expected, older physiotherapists were more likely to report complaints than younger ones.

Figure 3. A number of working hours followed by a break.

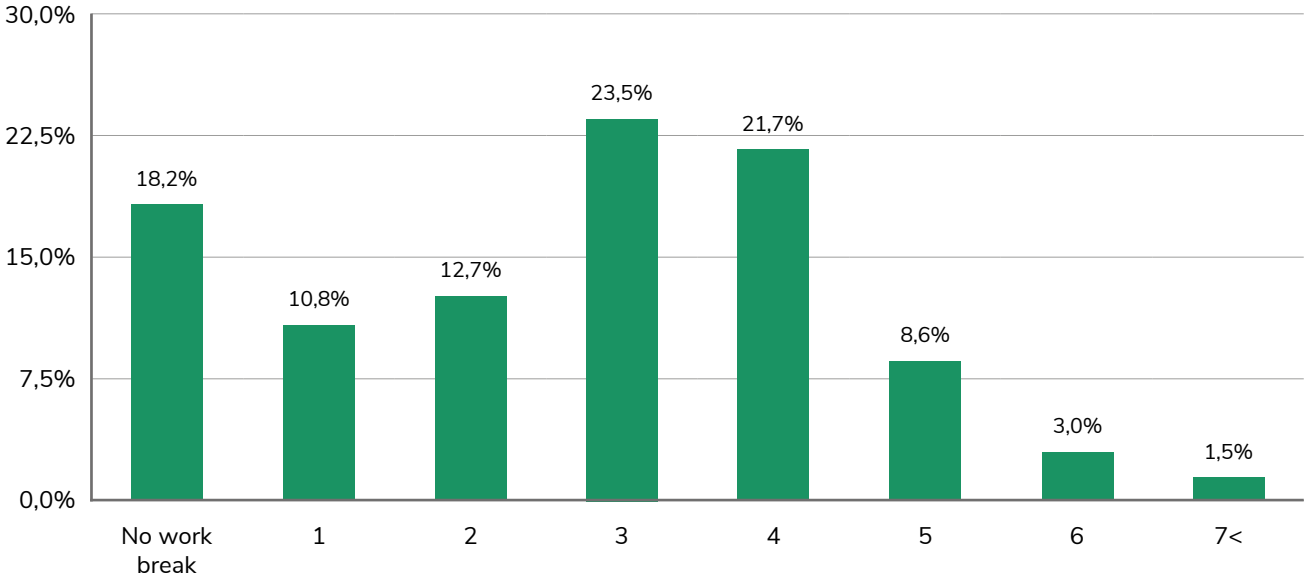
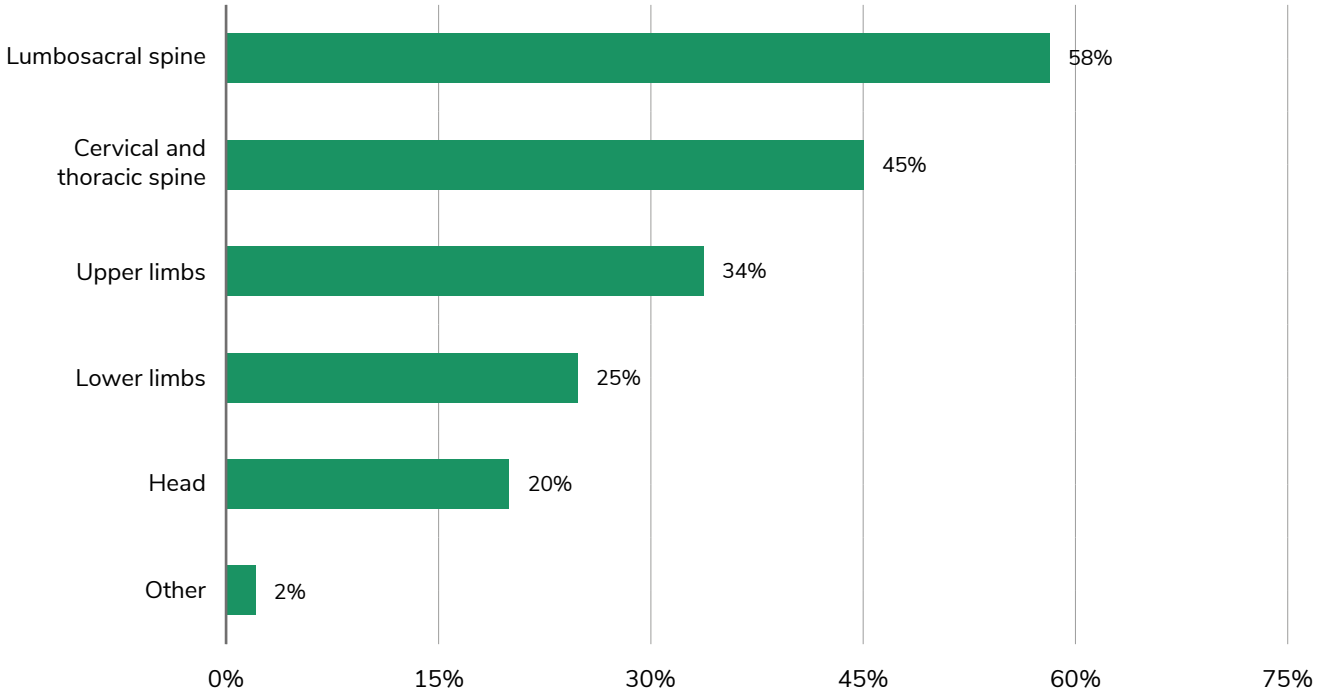
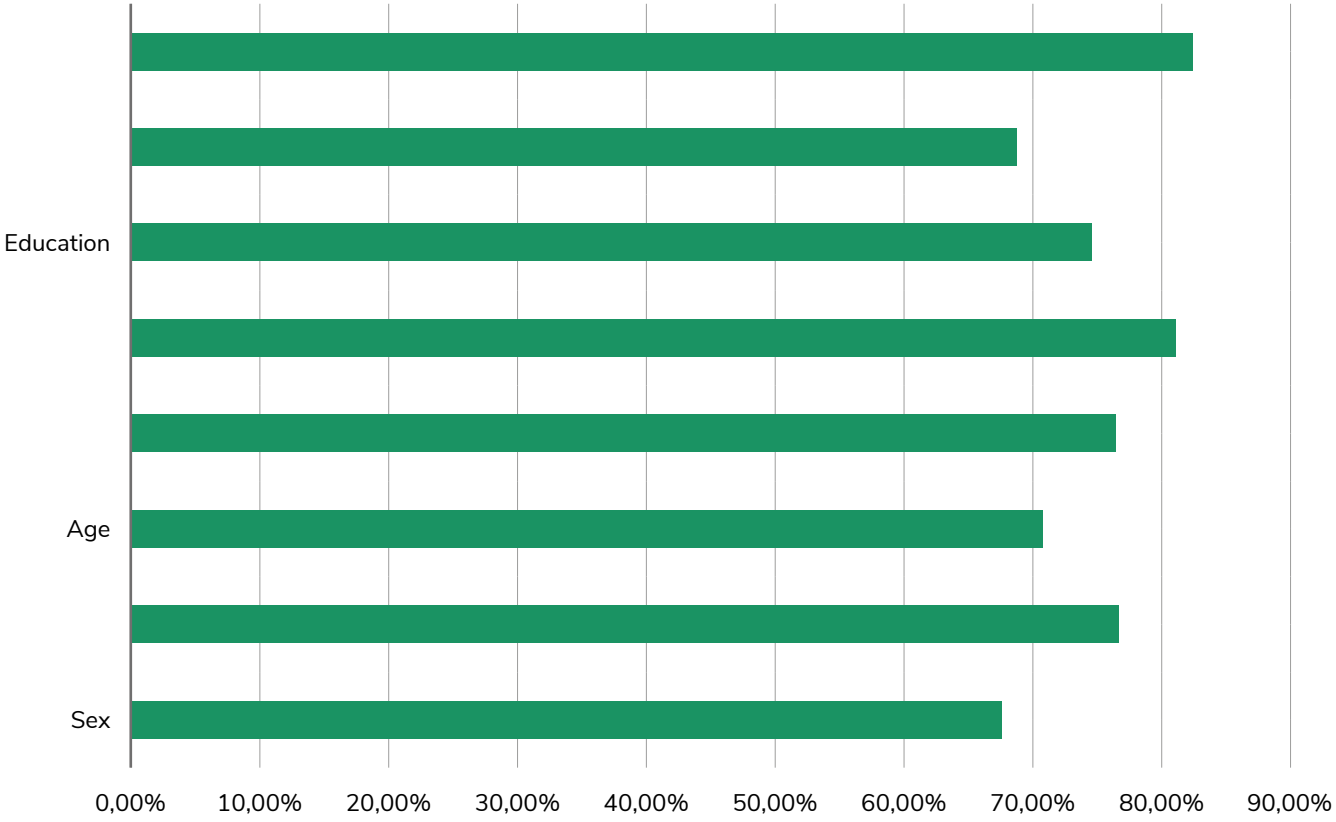


Figure 4. Location of work-related pain complaints.



Perception of work-related pain in relation to gender, age and physiotherapist education.



Univariate analysis showed that the occurrence of complaints depended on whether the physiotherapist worked in the physiotherapy clinic ($p = 0.0001$ for the independence test) and at the patient's bedside ($p = 0.0214$) for longer than the average working time of the physiotherapist (**Table 1**). In addition, significance tests for proportions, i.e. the proportion of physiotherapists providing services in different locations and experiencing complaints, revealed the following conclusions.

Approximately 80% of physiotherapists experience significantly more pain when working at the bedside ($p = 0.0107$ for Wald test for proportions) and in the physiotherapy clinic ($p < 0.0001$ for Wald test for proportions) for more than 2 hours a day. Proportionally, 64.2% of those working at the bedside have lumbosacral spine complaints and 49.4% of those working in the physiotherapy clinic have cervical and thoracic spine complaints. Physiotherapists (26%) who spend more than 2 hours a day in a physiotherapy studio are significantly more likely to have work-related headaches ($p < 0.0001$ for the Wald test for proportions). Nearly 50% of physical therapists who spend more than 3 hours a day at a physiotherapy table are significantly more likely to have work-related cervical and thoracic spine pain ($p = 0.0033$ for the Wald test for proportions) and upper extremity pain ($p < 0.0001$ for the Wald test for proportions).

Statistical analysis showed a strong (statistically significant) relationship between the propensity/ability to take breaks and pain perception (**Table 2**). Physiotherapists who take breaks after at least 5 hours of continuous work, or who do not take breaks at all, are more likely to experience discomfort than those who take breaks after 1-4 hours. This conclusion holds true for all highlighted pain areas.

Table 1. Perception and location of pain in individuals working longer hours than the median by the workplace.

Workplace	At the therapy table	In the physical therapy room	On the floor on a mat, mattress	At the patient's bedside
Perceived ailments	0.3928	0.0001	0.4276	0.0214
Location of the ailment				
Head	0.0771	0.0001	0.3791	0.2654
Cervical and thoracic spine	0.0072	0.0012	0.8432	0.7858
Lumbosacral spine	0.0167	0.0086	0.0701	<0.0001
Upper limbs	<0.0001	0.8207	0.2486	0.4808
Lower limbs	0.0014	0.0009	0.0016	0.6931

* *the p-value in chi-square independence tests.*

Table 2. Pain perception and breaks in the work of physiotherapists.

Work brakes	After 1-2 hrs.	After 3-4 hrs.	After at least 5 hours or not at all	p-value
Perceived ailments	65.0%	73.8%	80.8%	<0.0001
Location of the ailment				
Head	16.5%	18.6%	23.9%	<0.0001
Cervical and thoracic spine	33.9%	44.7%	52.0%	<0.0001
Lumbosacral spine	51.9%	56.9%	63.1%	<0.0001
Upper limbs	26.6%	33.4%	38.6%	<0.0001
Lower limbs	19.8%	25.3%	27.9%	0.0001

Occupational injuries

This was the case for more than one in three physiotherapists. The results of the questionnaire showed that the most common injuries were to the upper limb or lumbar spine (more than 15%) and cuts, wounds or injuries to the lower limb (around 10% of respondents), while injuries to the cervical or thoracic spine were less common (less than 4% of respondents), see **Figure 5**.

Men were significantly more likely to report injuries than women ($p = 0.0056$ for the Wald test for proportions), and their injuries were significantly more frequent in the upper limbs, thoracic spine and lumbar spine.

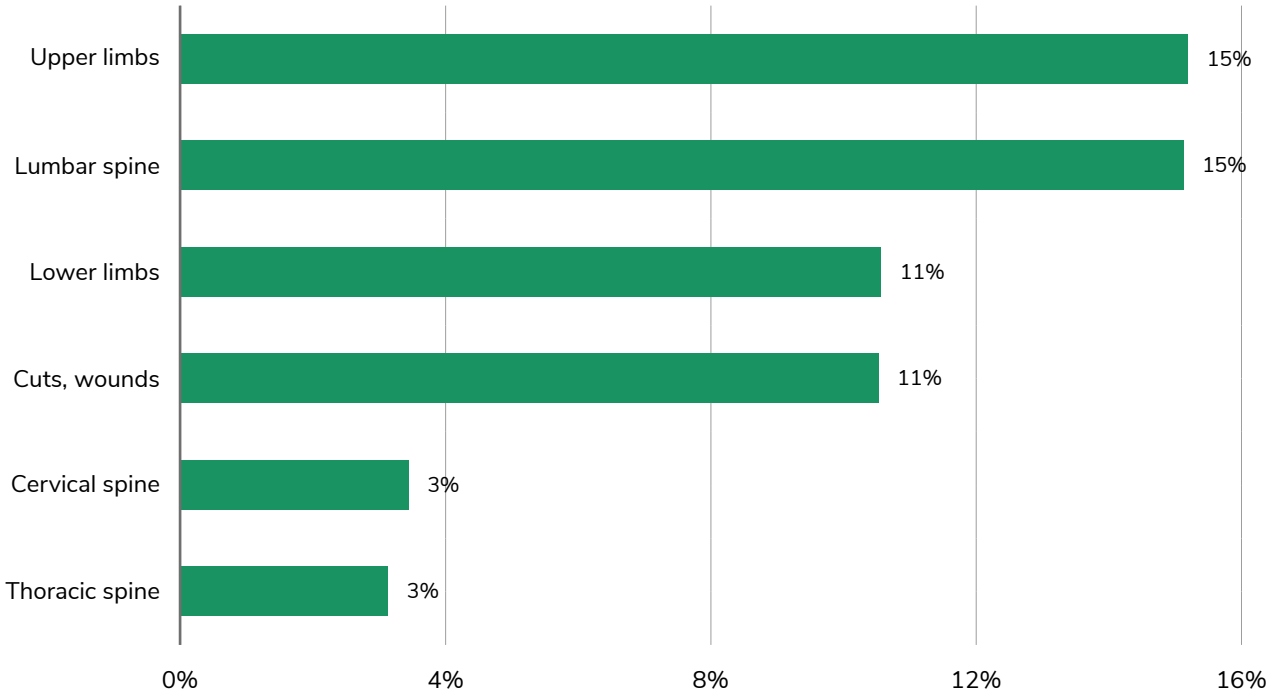
Factors contributing to pain

Evaluating the average level of harm that physiotherapists in Poland reported for each factor, they considered the level of mental and physical fatigue caused by their work to be the most harmful (on a scale of 0 to 10, 7.1 +/- 2.5 and 7.1 +/- 2.4, respectively), followed by the risk of infection with COVID, HIV or other infectious disease (6.2 +/- 2.9) and the fear of possible legal claims from the patient (5.2 +/- 2.8). The lowest level of harm was attributed to the possibility of abnormal lighting in the workplace (3.9 +/- 2.7), while harm from other factors such as the possibility of being struck or falling, abnormal temperature, excessive noise, excessive humidity or chemical exposure was moderately low (4.2 to 4.9).

Discussion

The experience of work-related pain was reported by 75% of the physiotherapists in the questionnaire. Similar values for WRMDs are reported in the literature from England (74%) [6] and the USA (80%) [7], and slightly lower values are reported in research from Turkey (58%) [8] and Australia (59%) [9]. The most common area of pain reported by Polish physiotherapists was the lumbosacral spine (58%) – low back pain (LBP). It should be emphasised that the current study includes the largest group of respondents among the

Figure 5. The location of the injury/trauma while performing physical therapy.



aforementioned studies, more than 3,700 physiotherapists from Poland. The group of UK participants (n=3661) included a similar number, but also included physiotherapy assistants and students.

These results are also consistent with other studies on the subject mentioned above. Milhem et al. [10] (narrative review) indicated that the prevalence of LBP among physiotherapists ranged from 26% to 80% of individuals. Work-related cervical, thoracic and shoulder pain were the next most common health problems in the above study [10]. These findings were similar to those of the current study, where cervical and thoracic spine pain was reported by 45% of respondents and one in three experienced pain in the upper extremities. Research by Mroczek et al. [11], which included nurses and paramedics, confirmed the highest prevalence of lumbar spine pain (73%) in these occupational groups, while also showing the lowest prevalence of cervical and thoracic spine pain (38% and 32% respectively). The study presented by Brattig et al. [12] was interesting. The authors reported that skin diseases (occurring in 73%, 897 people) were the most common occupational diseases among physical therapists. Furthermore, in this study, lumbar pain was the second most common occupational disease, affecting only 7% of the subjects (85 people). This discrepancy may be due to the fact that this study only analysed physiotherapists on sick leave with an occupational disease diagnosed by an occupational physician.

In the current study, complaints were reported significantly more often by women and older physiotherapists, which was also supported by the research of Adegoke et al. [13]. In addition, Nordin et al. [14] showed a statistically significant difference in the higher prevalence of WRMDs in physiotherapists with BMI >25 kg/m^2 (p=0.003) compared to physiotherapists with BMI 18-25 kg/m^2 (p=0.006). This parameter was not assessed in the Polish study. Bratting et al. [12] showed statistical significance for physiotherapists with a BMI > 30 kg/m^2.

Researchers Mierzejewski and Kumar [15] indicated that the first incidents of LBP were most common in a group of physiotherapists under 30 years of age within the first 5 years of practice. This is supported by the research of Adegoke et al. [13], which indicated that 62% of WRMDs occur in physiotherapists under 30 years of age within the first 5 years of practice, although LBP was not mentioned. In the study by Vieira et al. [16], half of the respondents experienced their first incident of LBP during their first years of work. In our study, WRMDs were significantly more common among older physiotherapists, although only ⅓ of participants reported up to 5 years of work experience. In England, the study by Glover et al. [6] showed that physiotherapists were on average 31.2 years old when they experienced their first incident of work-related pain.

In the present study, duration and location of work were found to be significant factors in physiotherapists' perception of pain. Lumbosacral (64%), cervical and thoracic (49%) and headaches (26%) are significantly more common when working more than 2 hours, and the longer the duration of work, the higher the percentage of people with complaints. The above applies to both bedside and clinic-based physiotherapists. Working more than 3 hours was associated with additional pain in the upper extremities. In addition, statistical analysis showed a statistically significant relationship between the tendency to take breaks and perceived pain. Physiotherapists who take a break after 5 hours or more of continuous work, or never take a break, experience pain more often than those who take a break after 1 to 4 hours. This conclusion holds true for all highlighted pain areas. Brattig et al. [12] showed that 76% of physiotherapists identified the ability to take breaks independently as a positive resource for increasing work motivation. Other sources reported that the overload of seeing more patients during the working day was associated with a risk of WRMDs in 83.5% of physiotherapists [16]. Edgar stated that the higher incidence of WRMDs

affects physiotherapists working in hospitals, which is consistent with the results of the current study. Bork et al. [7] reported that working as a physiotherapist in a hospital was associated with a higher incidence of WRMDs in all areas of the body except the hands/wrist and hips compared to those working outside the hospital. However, in a study by Milhem et al. [10], a higher percentage of physiotherapists working in rehabilitation centres (75%) experienced LBP compared to physiotherapists working in a hospital (63%). Interestingly, the current study found that almost 30% of physiotherapists worked in 2 or 3 different types of settings.

In the Polish questionnaire, more than one in three physiotherapists had experienced an injury at work. The results of the research showed that the most common injuries were to the upper limb or lumbar spine (more than 15%) and cuts, wounds or injuries to the lower limb (around 10% of respondents), while injuries to the cervical or thoracic spine were less common (less than 4% of respondents). In the study, which analysed data from 2007 to 2011, Brattig et al. [12] reported that 4,796 physiotherapists experienced a workplace injury during that time. The most common injuries were closed fractures (12.7%), wounds (7%) and sprains (5%), with injuries to the knee (5.5%), ankle and foot (5%), forearm and wrist (4.5%) and shoulder and elbow (4%). Glover et al [6] found that injuries to the lumbar spine, wrist and hand were most common among physiotherapists [17].

In order to identify risk factors for occupational pain and injury, participants were asked which factors should be considered the most dangerous. Respondents rated the level of mental and physical fatigue caused by work as the most critical. Brattig et al. [12] reported that more than half of the physiotherapists felt exhausted by the demands of the job and many felt that they experienced excessive work-related emotional stress; in addition, 1 in 4 physiotherapists reported that the pace of work was too fast. An interesting conclusion was reached by Okhiria et al. [18] in a study assessing professional exhaustion among physiotherapists in Poland and its impact on treatment decisions. The researchers showed that physiotherapists' work overload had a negative effect on their activity level, motivation and physical strength. The accuracy of diagnosis and physiotherapy planning deteriorated after a full day's work, leading to the conclusion that the profession of physiotherapy should be classified as mentally demanding [18].

In a study by Mierzejewski and Kumar [15], being overwhelmed by an excessive number of patients in a single working day was reported by the majority of participants (83.5%) as the most common factor influencing the occurrence of WRMDs. Sharan and Ajeesh [19], who conducted a scientific review of injury prevention among physiotherapists, presented the most common risk factors for injuries and WRMDs as: number of working hours per day, repetitive activities, lifting and carrying loads, prolonged static postures, manual work, working in bent and twisted positions, lack of adequate breaks at work, workload with excessive number of patients, peripheral hypermobility spectrum disorder (P-HSD) limited to hand and foot joints. Most of the risk factors listed overlap with most OSH studies. Many studies confirm manual work, lifting and carrying heavy loads as the most influential risk factors for work-related injuries and disorders in physical therapists [12,14,16].

Studies that differentiate the incidence of WRMDs in physiotherapists according to work specialisation are interesting. WRMDs are most common in physiotherapists working with children [10,14], which may be related to working in forced positions on a mat. The current study showed no statistically significant effect of working on a mat on pain complaints. However, women were significantly more likely to report work-related pain and women were also significantly more likely to work on a mat than men. Another detrimental factor identified by the participants in the workplace was the risk of infection with COVID,

HIV or any other infectious disease. Brattig et al. [12] found eleven cases of work-related infectious diseases among physiotherapists in a study conducted between 2007 and 2011, including six cases of active tuberculosis, one case of latent tuberculosis, one case of hepatitis B, one case of hepatitis C and two cases of non-specific infections. However, the study covered the period before the COVID-19 pandemic.

In the case of a profession such as physiotherapy, which involves considerable physical and mental strain, it is all the more necessary to detail and update the incidence of health problems in this profession and the risk factors affecting health at work. Understanding the complaints will help to outline the necessary support and implement important health promotion measures. Prevention of pain incidents is important in this case, as the literature shows that the first pain incident most often occurs in the first 5 years of work experience and in people of a young age. As the health sector is suffering from a shortage of health professionals and the population is ageing, it is even more important to pay attention to the quality of young staff and to counteract their absenteeism. It is estimated that 1 in 6 physiotherapists will have to change specialty or leave the profession because of musculoskeletal disorders [17].

Study limitations

The study has potential limitations that need to be discussed. There is a lack of previous research studies describing work-related physical disorders among Polish physiotherapists. The data collected were mostly based on subjective opinions about the respondents' health. There is a need to extend the study by analysing medical records in the field of occupational health.

Conclusions

Nowadays, a lot of attention is paid to the health of employees, both mental and physical. Physiotherapists are a professional group that promotes a healthy lifestyle and educates in the field of health prevention, so one should wonder why so many of them complain about health problems. They are also valuable members of the medical team, of which we currently have a shortage. Therefore, it seems important and reasonable to promote healthy working habits among physiotherapists, especially by educating the employers who employ them. There is a need for further research; it would be interesting to carry out a statistical analysis of the data collected by the Social Insurance Institution (ZUS).

Declarations

Ethical Considerations: The study was designed and conducted in accordance with the Declaration of Helsinki (1964) and Good Clinical Practice (GCP) guidelines.

Clinical Trials: This study was not registered as a clinical trial as it did not involve investigational products or interventions that would classify it under clinical trial regulations.

Conflict of Interest: The authors declare no conflict of interest. The study was conducted independently and without any influence from external organizations or entities.

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