



Analysis of work-related ailments affecting physiotherapists

Agnieszka Buczaj^{1,A-D,F}, Anna Pecyna^{1,A-F}, Monika Krzywicka^{1,C-E}, Zbigniew Kobus^{1,E}, Piotr Choina^{2,D-F}, Małgorzata Goździewska^{2,E-F}

¹ Department of Technology Fundamentals, University of Life Sciences in Lublin, Poland

² Institute of Rural Health, Lublin, Poland

A – Research concept and design, B – Collection and/or assembly of data, C – Data analysis and interpretation, D – Writing the article, E – Critical revision of the article, F – Final approval of the article

Buczaj A, Pecyna A, Krzywicka M, Kobus Z, Choina P, Goździewska M. Analysis of work-related ailments affecting physiotherapists. *Ann Agric Environ Med.* 2024; 31(3): 417–425. doi: 10.26444/aaem/186214

Abstract

Introduction and Objective. The profession of a physiotherapist is associated with various risks related to manual work, repetitive activities, an uncomfortable prolonged position of joints in some body postures forced by the work, and the standing position, which all impose considerable load on the upper and lower extremities and the spine. The aim of the study was to analyse ailments reported by physiotherapists in relation to their age, gender, seniority, the number of working hours per day, and body position during work.

Materials and Method. The study involved 120 physiotherapists working in various types of employment. The research was carried out using an author-design questionnaire based on the Nordic Musculoskeletal Questionnaire. The occurrence of the ailments was analysed in relation to respondents' age, gender, seniority, number of working hours per day, and body position during work. An analysis of the relationships between the variables was carried out. The analysis of qualitative variables was performed using the χ^2 test.

Results. The results showed that the majority of physiotherapists complained of fatigue (78.8%), leg pain (61.9%), spine pain (60.2%), headache (59.3%), and shoulder pain (52.5%). It was shown that such symptoms as fatigue, dizziness, leg pain, finger pain, headache, wrist pain, drowsiness, and numbness, were correlated with age.

Conclusions. The pain symptoms reported by the surveyed physiotherapists affected different parts of the body and appeared with different frequency and intensity. The majority of the physiotherapists declared problems with the lower spine, neck, wrists, hands, upper spine, and shoulders. High pain was the most commonly reported symptom, whereas neck pain was reported the least frequently. The lower spine and ankles were indicated as body areas with the most severe and the weakest pain, respectively.

Key words

physiotherapists, ailments, MSD, relation with work

INTRODUCTION

Musculoskeletal disorders (MSD) are the most common work-related health problem. The percentage of workers reporting various musculoskeletal disorders was 58% in the EU in 2015 [1] and 53.9% in the USA in 2012 [2]. The prevalence of MSDs in the general population varies significantly depending on country, occupational sector, socio-demographic [1, 3] and individual factors [4]. Work-related musculoskeletal disorders (WRMD) are defined as damage to the musculoskeletal system caused by work-related events. They are one of the most common causes of chronic pain and physical disorders in today's workers. WRMDs cause loss of working time, reduction of duties or transfer to another job, loss of qualified employees and a significant increase in economic costs [5]. Health care workers are at the higher risk of WMSD and experience more work-related health problems than any other occupational group [6, 7]. The incidence of WMSD is particularly high among healthcare employees who work manually or care for patients, such as nurses, dentists, occupational therapists and

physiotherapists. Work-related musculoskeletal diseases can significantly impact workers' quality of life [8–11].

Healthcare workers are also at risk of persistent musculoskeletal disorders in their workplace related to their routine work [12], i.e. carrying patients, assisting patients with mat exercises, lifting and uncomfortable equipment [13]. They also have too little space in the treatment room or incorrect body position while working [14, 15]. Research by Ganiyu et al. [16] confirmed a significantly higher incidence of WMSD among physiotherapists and nurses than among doctors and dentists [1, 14, 15, 17–19].

The most common diseases related to the profession of a physiotherapist include those involving the musculoskeletal system – infections and ailments caused by overload of the musculoskeletal system (degeneration of the upper limbs, joints, spine) [20]. In addition, a physiotherapist may be exposed to electric shock, burns, frostbite or electromagnetic field hazards associated with the use of specialized physiotherapy devices. Physiotherapists, through constant contact with patients, are also exposed to various infections and viral diseases. Constantly working under time pressure, emotional burden, excess responsibilities, rushed activities, or working with so-called 'difficult patients' is associated with exposure of the physiotherapist to stress [21]. In addition, interpersonal conflicts and aggressive behaviour

✉ Anna Pecyna, Department of Technology Fundamentals, University of Life Sciences in Lublin, 28 Głęboka Str., 20-612 Lublin, Poland
E-mail: anna.pecyna@up.lublin.pl

Received: 12.12.2023; accepted: 18.03.2024; first published: 05.04.2024

of the patient may occur, including: unconditioned reflexes in response to fear, pain or aggression [21 – 23].

The greater exposure of physiotherapists to WMSD is associated with high physical stress, as well as psychosocial risks, such as time pressure and poor work control. Physiotherapists are also particularly susceptible to WRMD due to the specific nature of their work, which is often repetitive, labour-intensive, requiring direct contact with the patient [13, 14]. Risk factors for MSD among physiotherapists also include age, professional status, working time, the number of services provided per day to the patient, treatment protocol and work-related stress or lack of experience [16, 24]. The work of a physiotherapist is associated with various risks related to physical work, repetitive activities, uncomfortable, long-lasting position of joints in certain body positions forced by work, and standing positions, which all cause a significant load on the upper and lower limbs and spine [25 – 27]. During treatment, physiotherapists often have to lift patients and repeatedly bend, stoop, twist and turn the body, or stand for long periods of time [28]. Workers who performed manual techniques/exercises, lifted/transferred patients, and maintained uncomfortable postures were 5–7 times more likely to have WMSD of the neck and lower back than those who did not [29].

Work-related musculoskeletal disorders most often affect the lower spine, neck, upper spine, wrists/hands, arms, knees [4, 9, 15 – 18, 29 – 34] and thumbs [35]. Studies [28, 29] showed that most respondents experienced work-related pain in more than one part of the body. Every sixth physiotherapist either changed the specialization or resigned due to pain or injury [26].

OBJECTIVE

The aim of the study was to analyse ailments reported by physiotherapists in relation to their age, gender, and job seniority, as well as the number of working hours per day and body position during work.

MATERIALS AND METHOD

In 2018, a non-random, voluntary selection was carried out on 120 physiotherapists involved in various forms of employment in Lublin, eastern Poland. The analysis was based on an author-designed, anonymous questionnaire containing a total of 28 closed, semi-open, and open-ended questions. The questions concerned such work activities as duration of work, body position during work, type, location, and frequency of ailments, as well as demographic data about respondents' age, gender, education, and job seniority.

The next part of the survey included a question about the ailments experienced by physiotherapists, frequency of pain in various areas of the musculoskeletal system, and the degree of pain experienced. The primary aim of this part of the survey was to answer the question: 'Do the surveyed physiotherapists suffer from musculoskeletal problems, and if so, in what part(s) of the body are they located?' The question was developed by selecting the areas of pain from the Nordic Musculoskeletal Questionnaire [36] resulting from the way physiotherapists perform their work. The question about pain felt in individual parts of the musculoskeletal system

concerned their location (upper limbs, neck, shoulders, elbows, wrists and hands, upper and lower part of the spine, hips, thighs, knees, ankles and feet), the degree of pain felt on a scale numerical scale from 0 – 10: 0 – no pain at all, 5 – moderate pain, and 10 – the worst (strongest) pain imaginable, and the frequency experienced: 1 – every day, 2 – often, several times a week, 3 – once a week, 4 – once a month.

The basic descriptive statistics, i.e. numerical and percentage summaries of individual variables, were used. A Kruskal Wallis test was carried out and analysis of the relationships between the variables conducted. Analysis of qualitative variables was performed by using the χ^2 test. It was checked whether an indicated fatigue symptom or pain depended on age, gender, job seniority and strength used during a treatment, working time, and body position, at the level of significance $\alpha = 0.05$. A value of $p < 0.05$ indicated that the symptom depended on age, gender, job seniority, force used during a treatment, working time, and body position. Statistical analysis was performed using software STATISTICA v. 13.1 (StatSoft, Poland).

Characteristics of the study group. The survey was conducted in a group of 120 physiotherapists usually employed on the basis of a labour contract, an order contract, a combined labour and order contract, or self-employed. The youngest and oldest respondents were 20 and 57 years old, respectively. The average age of the respondents was 32 years 4 months (standard deviation: 10 years 6 months); median age – 29 years. Females represented 74.2% of the respondents and males accounted for 25.8%. Most of the respondents had a university degree (59.1%). The shortest job seniority was one year and the longest 35 years; job seniority median – 6 years, mean job seniority – 9.4 years, standard deviation – 9.7 years (Table 1 shows the characteristics of the surveyed group).

The vast majority of the physiotherapists (70%, $N = 84$), had attended occupational training courses, indicating the following courses: pro-prioceptive neuromuscular facilitation (PNF), manual therapy, functional massage, muscle stretching, functional physiotherapy for patients with focal brain injuries, Cyriax, orthopaedic medicine, Mulligan therapy, Thera Band, X-ray analysis, structural osteopathy, oedema therapy concept, deep tissue massage, geriatric care, modern soft tissue techniques, kinesiotaping, sports massage, and trigger-point therapy.

RESULTS

Work-related activities, duration of work, and body position at work. The work activities performed by the respondents are presented in Figure 1. As declared, 36.7% of the respondents ($N=44$) performed from 1–3 activities, 46.7% ($N=56$) performed 4–6 activities, and 16.6% ($N=20$) were engaged in 7–9 activities.

The working time of 89.7% of the respondents ($N=105$) was constant at an average of 7 h 36 min (standard deviation – 1 h 42 min). The remaining respondents (10.3%, $N=12$) declared a variable working time of, on average, 8 h 48 min (standard deviation – 12 min). The mean working time of all respondents ($N=117$) was 7 h 42 min (standard deviation – 1 h 42 min). Preparation of the workplace for treatments was stated as taking, an average, 4 min 12 s (standard deviation

Table 1. Characteristics of the study group

Characteristics	N	%	
Age (years)	20-29	62	51.7
	30-39	35	29.2
	40-49	5	4.1
	50+	18	15.0
	Total	120	100
Gender	Females	89	74.2
	Males	31	25.8
	Total	120	100
Education	Vocational school	14	11.7
	Technical secondary school	2	1.7
	Secondary school	24	20.0
	Postsecondary	9	7.5
	Higher education	71	59.1
	Total	120	100
Job seniority (years)	1-9	75	64.1
	10-19	21	17.9
	20-29	7	6.0
	≥ 30	14	12.0
	Total	117	100
Forms of employment	labour contract	74	62.7
	order contract	37	31.4
	labour contract and order contract	2	1.7
	self-employment	5	4.2
	Total	118	100

– 3 min 18 s). The shortest time was 1 min and the longest time – 15 min. The mean time of preparation of a patient for the treatment was 3 min 48 s (standard deviation – 2 min 6 s). Spinal massage of a single patient was shown to take an average of 22 minutes 24 seconds (standard deviation – 6 minutes 30 seconds). Table 2 shows the types of massage performed by the rehabilitators.

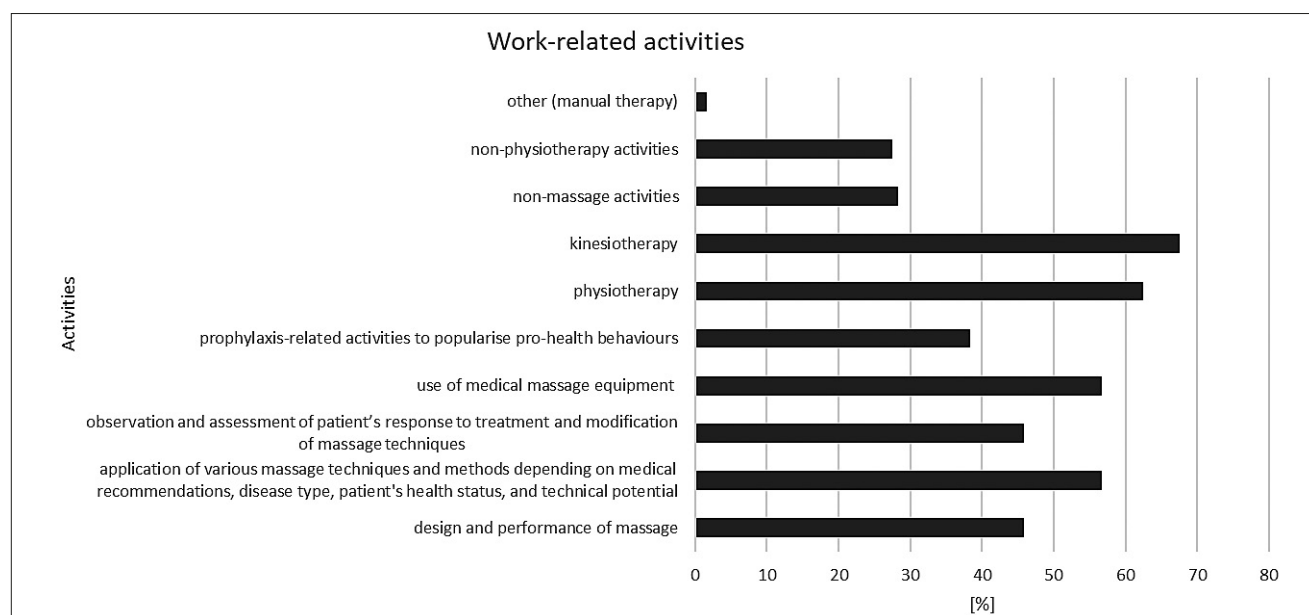
Table 2. Types of massage performed by the rehabilitators

Elements of massage	Mean No. of working hours per day	Standard deviation	No. of rehabilitators performing the massage types	
			N=84	%
classical massage	3 h 24 min	1 h 42 min	67	79.8
segmental massage	1 h 36 min	1 h 42 min	18	21.4
lymphatic drainage	1 h 12 min	36 min	22	26.2
isometric massage	54 min	24 min	8	9.5
water massage	1 h 30 min	-	1	1.2
relaxation massage	1 h 48 min	42 min	26	31.0
sports massage	1 h 24 min	30 min	13	15.5
cosmetic massage	1 h 6 min	18 min	14	16.7
manual therapy	4 h 36 min	3 h 18	44	52.4

The physiotherapists declared performing, on average, 2.5 massages a day (standard deviation – 1.5) with most of them (79.8%, N=67) performing 1–3 massages, 15.4% (N=13) performed 4–6 massages, and 4.8% performed 7–9 massages (N=4).

Figure 2 shows the most frequent positions of the rehabilitators' bodies during work. The mean number of the body positions was 6.7 (standard deviation – 2.6). The majority of respondents (58.1%, N=68) declared working in 6–10 positions, whereas 34.2% (N=40) and 7.7% (N=9) indicated 6 and over 10 body positions, respectively. The respondents most frequently declared working in a position with the torso bent forward, with both arms below level of the shoulder joint, walking, or sitting. Among the respondents, 14.3% (N=17) applied weak force to patients during therapeutic activities. Moderate and strong force was declared by 46.2% (N=55) and 36.1% (N=43), respectively. In turn, 3.4% (N=4) of the physiotherapists assessed the force applied as 'variable'.

Analysis of the prevalence of health problems in physiotherapists. The work of a physiotherapist induces

**Figure 1.** Work-related activities

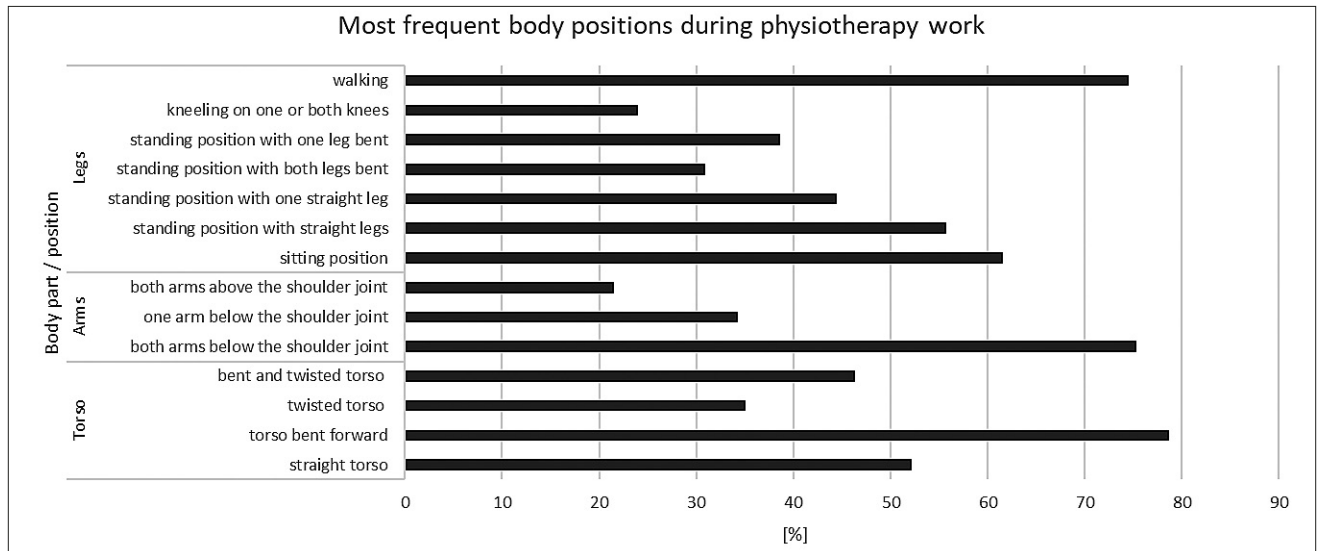


Figure 2. Most frequent body positions during physiotherapy work

the occurrence of various ailments. More than half of the respondents complained of fatigue (78.8%), leg pain (61.9%), spine pain (60.2%), headache (59.3%), and shoulder pain (52.5%) (Tab. 3). The declaration of feeling tired was associated with female physiotherapists aged 40–49 with 20–29 years of work experience. Leg pain and headache were most often declared by women aged 50+ and with the longest work experience. Back pain was more often declared by men aged 20–29 and with the shortest work experience. Shoulder pain was mainly reported by women aged 30–39 with 10–19 years of work experience.

The average number of ailments declared by the respondents was 5.6, with a standard deviation of 3.1. Most physiotherapists reported the presence of up to 5 ailments (60.1%, N=71). From 6–10 ailments were reported by 28%

of the respondents (N=33), and from 11–15 were indicated by 11.9% of the respondents (N=14). The prevalence of the ailments was analysed in relation to age, gender, job seniority, force applied during physiotherapy, number of working hours per day, and body position during work. Table 4 shows the values of the p-level for the χ^2 test. As revealed by the χ^2 test, the occurrence of such symptoms as fatigue, dizziness, leg pain, finger pain, headache, wrist pain, drowsiness, and numbness depended on age ($p < 0.05$). In terms of the age groups, the follow findings of the occurrence of the ailments were obtained:

- fatigue and finger pain were declared by most respondents from the group of the 40- 49-year-olds (100% each);
- dizziness, leg pain, headache, wrist pain, and numbness were declared by most respondents from the 50+ age group

Table 3. Work-related ailments

		Fatigue	Dizziness	Leg pain	Finger pain	Shoulder pain	Poor concentration	Irritation	Headache	Spine pain	Wrist pain	Hand tremor	Drowsiness	Low mood	Numbness	
Age	20-29	%	66.1	19.4	43.5	33.9	53.2	16.1	24.2	43.5	67.7	46.8	19.4	17.7	22.6	21.0
		N	41	12	27	21	33	10	15	27	42	29	12	11	14	13
30-39	%	93.9	9.1	78.8	42.4	60.6	21.2	39.4	69.7	51.5	39.4	12.1	42.4	12.1	12.1	
	N	31	3	26	14	20	7	13	23	17	13	4	14	4	4	
40-49	%	100.0	0.0	80.0	100.0	0.0	0.0	40.0	80.0	60.0	0.0	20.0	0.0	20.0	0.0	
	N	5	0	4	5	0	0	2	4	3	0	1	0	1	0	
50+	%	88.9	38.9	88.9	61.1	50.0	38.9	22.2	88.9	50.0	88.9	0.0	38.9	0.0	50.0	
	N	16	7	16	11	9	7	4	16	9	16	0	7	0	9	
Gender	Females	%	82.8	14.9	67.8	42.5	54.0	16.1	27.6	63.2	50.6	48.3	12.6	33.3	5.7	23.0
		N	72	13	59	37	47	14	24	55	44	42	11	29	5	20
Males	%	67.7	29.0	45.2	45.2	48.4	32.3	32.3	48.4	87.1	51.6	19.4	9.7	45.2	19.4	
	N	21	9	14	14	15	10	10	15	27	16	6	3	14	6	
Job seniority	1-9	%	70.7	17.3	48.0	32.0	49.3	20.0	24.0	45.3	62.7	44.0	18.7	20.0	21.3	20.0
		N	53	13	36	24	37	15	18	34	47	33	14	15	16	15
10-19	%	90.0	10.0	85.0	55.0	75.0	10.0	50.0	75.0	55.0	45.0	10.0	50.0	10.0	10.0	
	N	18	2	17	11	15	2	10	15	11	9	2	10	2	2	
20-29	%	100.0	14.3	85.7	85.7	14.3	14.3	28.6	85.7	57.1	28.6	14.3	14.3	14.3	14.3	
	N	7	1	6	6	1	1	2	6	4	2	1	1	1	1	
≥ 30	%	85.7	42.9	100.0	57.1	57.1	42.9	14.3	100.0	57.1	100.0	0.0	42.9	0.0	57.1	
	N	15	6	15	10	10	15	2	15	15	15	0	6	0	15	

Table 4. Analysis of the relationships of age, gender, job seniority, applied force, number of working hours per day, body position with the occurrence of ailments

Ailment	p level (age)	p level (gender)	p level (job seniority)	p level (force)	p level (No. of hours)	p level (position)
fatigue	0.005	0.079	0.094	0.280	0.210	0.952
dizziness	0.046	0.084	0.091	0.001	0.006	0.927
leg pain	0	0.026	0	0.162	0.366	0.381
finger pain	0.011	0.799	0.010	0.003	0.529	0.186
shoulder pain	0.091	0.589	0.035	0.010	0.192	0.030
poor concentration	0.122	0.055	0.123	0.004	0.022	0.760
irritation	0.372	0.622	0.080	0.300	0.011	0
headache	0.002	0.149	0	0.001	0.283	0.583
spine pain	0.349	0	0.919	0.174	0.001	0.316
wrist pain	0	0.750	0.001	0.001	0.754	0.658
hand tremor	0.210	0.361	0.294	0.336	0.146	0.391
drowsiness	0.020	0.011	0.024	0.950	0.144	0
low mood	0.120	0	0.195	0.091	0.002	0.011
numbness	0.009	0.675	0.007	0.006	0.210	0.019

(38.9%, 88.9%, 88.9%, 88.9%, and 50%, respectively);

- drowsiness was declared by most respondents from the 30–39-year -old age group (42.4%).

A correlation was found between the respondents' gender and the presence of such ailments as leg pain, spine pain, drowsiness, and low mood ($p < 0.05$). The occurrence of leg pain and drowsiness was declared more often by females (67.8% and 33.3%, respectively), whereas spine pain and low mood was declared more often by males (87.1% and 45.2%, respectively).

The occurrence of such ailments as leg pain, finger pain, shoulder pain, headache, wrist pain, drowsiness, and numbness was correlated with job seniority ($p < 0.05$). The following results were obtained from the respondents' seniority groups:

- leg pain, headache, wrist pain, and numbness were declared by the highest number of respondents from the 30-year-old seniority group (100%, 100%, 100%, and 57.1%, respectively);

- finger pain was declared by the highest number of respondents from the 20–29-year – old seniority group (85.7%);
- shoulder pain and drowsiness were declared by the highest number of respondents from the 10–19-year-old seniority group (75% and 50%, respectively).

In turn, the force applied by the physiotherapist to the patient was correlated with dizziness, finger pain, shoulder pain, poor concentration, headache, wrist pain, and numbness ($p < 0.05$). The occurrence of all ailments was declared by the highest number of physiotherapists who applied strong force: dizziness (34.9%), finger pain (62.8%), shoulder pain (60.5%), poor concentration (34.9%), headache (74.4%), wrist pain (65.1%), and numbness (34.9%).

The number of working hours per day was associated with the occurrence of dizziness, poor concentration, irritability, spine pain, and low mood ($p < 0.05$). The occurrence of dizziness, poor concentration, irritability, and low mood was declared by the largest group of respondents working overtime (36.4%, 36.4%, 40.9%, and 40.9%, respectively), while spine pain was reported by the largest number of physiotherapists working less than full-time (87%).

The ailments not only affected different parts of the body but also appeared with varying frequency (1 – every day, 2 – often, several times a week, 3 – once a week, 4 – once a month), and with varying severity on a scale from 0–10, where 0 = no pain at all, 5 = moderate pain, and 10 = the strongest pain imaginable. The majority of respondents reported problems with the lower spine 86.6% (N=103), neck 85.7% (N=102), wrists or hands 71.4% (N=85), upper spine 70.6% (N=84), and shoulders 60.5% (N=72). The most commonly reported symptoms involved the thighs, with neck complaints declared with the lowest frequency. The lower spine was an area associated with the most severe pain, whereas the ankles were reported to present the lowest degree of pain (Tab. 5).

The Kruskal-Wallis test was performed to check whether the frequency and intensity of the ailments differed between the different areas of the body:

- 1) lower extremities: hips, thighs, knees, ankles, feet;
- 2) upper extremities: shoulders, elbows, wrists;
- 3) spine: upper spine, lower spine, neck.

Table 5. Body parts affected by the work-related ailments

No.	Ailment-affected parts of the body	Mean frequency	Standard deviation	Mean degree of pain severity	Standard deviation	No. of respondents declaring ailments	
						N = 119	%
1.	neck	2.4	1.1	5.4	2.3	102	85.7
2.	shoulders	2.8	1.4	4.9	2.4	72	60.5
3.	elbows	2.9	1.1	4.9	2.4	57	47.9
4.	wrists or hands	2.6	1.2	5.4	2.7	85	71.4
5.	upper spine	2.5	1.1	5.6	2.7	84	70.6
6.	lower spine	2.8	1.2	5.7	2.5	103	86.6
7.	hips	3.0	1.2	5.4	2.8	41	34.5
8.	thighs	3.5	0.8	4.3	2.0	42	35.3
9.	knees	3.0	1.1	4.6	2.5	57	47.9
10.	ankles	3.4	1.0	3.7	1.5	32	26.9
11.	feet	2.5	1.3	5.2	2.5	56	47.1
12.	other	2.8	1.3	5.6	3.1	13	10.9

The test showed no differences in the frequency of ailments between the individual parts of the body ($p=0.072$). The median test can be interpreted similarly ($p=0.079$).

The Kruskal-Wallis test also demonstrated differences in the intensity of symptoms between the individual body areas ($p = 0.037$). Since $p < \alpha$, a multiple comparison of the mean ranks for all samples was performed. There were significant differences between the spine and the lower extremities ($p=0.031$ for multiple comparisons; $p=0.079$ for the median test). A correlation was found between the frequency of pain perception and pain intensity. The value of the correlation coefficient was $R=0.827$. The coefficient of determination was 0.683, which means that 68.3% of the variation in pain intensity was explained by variation in the frequency.

Interruption of re-treatment procedures was declared by 26.7% of the physiotherapists ($N=32$), and the reasons for interruption of the procedure was given by 18 respondents, and can be divided into three groups:

1. related to the patient, e.g. distress, need for help, intensification of pain, appearance of contraindications), reported by 61.1% of the respondents ($N=11$);
2. related to the physiotherapist (spine pain), reported by 22.2% of respondents ($N=4$), including 3 respondents who reported interruption in the middle of a massage treatment;
3. related to organisational issues (e.g. work with several patients), reported by 16.7% of respondents ($N=3$).

DISCUSSION

Of the respondents, 49.1% reported wrist pain and 43.2% reported finger pain. Gorce and Jacquier-Bret [35] indicated that 18.1% of physiotherapists suffer from pain in the wrists and hands. Abu-Taleb et al. [31] indicate that wrist/hand pain is one of the most common ailments and affects 39.1% of physiotherapists. Research in Slovakia shows that due to the years of work, respondents most often reported symptoms of functional impairment of the wrist/hand – pain (70.1%), decreased muscle strength (45.8%), joint stiffness (35.5%) and joint swelling (28.0%) [37]. A study in the USA (2019), confirmed a 75% annual prevalence of hand/wrist pain in 962 physiotherapists, identified as risk factors: old age, lower level of work experience, female gender, more working hours at manual therapy, and working more than 40 hours a week [38]. In the study, wrist pain was most frequently reported in the 50+ age group, and finger pain in the 40–49 age group, although these ailments were reported more often by men. In 59.1% of respondents, the complaints involved spine pain, which is consistent with the results obtained by Le et al. [29] who reported about 57.3%. Khairy et al. [34] indicated that lower back pain affected 68.8% of physiotherapists. Ezzatvar et al. [24] obtained significantly lower results, indicating that 49% of respondents suffered from back pain. Gorce and Jacquier-Bret [35] indicated that 17.7% of physiotherapists suffer from upper back pain, 14.9% – mid back, and 40.1% – lower back. Shoulder pain affected 51.6% of respondents. Similar results were obtained by Abu-Taleb et al. [31], who report a value of 47.7%. These results differ significantly from the value reported by Gorce and Jacquier-Bret [35], who reported 20.8% of physiotherapists. Leg pain affected 60.2% of respondents. These results also differ significantly from the figure reported by Gorce and Jacquier-Bret [35],

who analyzed 20 articles and showed that, on average, 13% of physiotherapists (values from 1.1- 42.9%) suffer from leg pain. The differences in the obtained results may be due to the heterogeneous sample sizes in the meta-analysis, from 37–2,688 physiotherapists.

In the current study, the mean number of declared ailments was 5.6. Similar results were obtained by Cromie et al. [9], who showed that all 4 workload risk factors were associated with increased risk of WMSDs in up to 5 different body areas. Repetitive activities were associated with an increased risk of neck, shoulder, elbow, wrist, hand, and thumb pain. Physiotherapists worldwide are prone to suffering from work-related musculoskeletal disorders (WMSDs), primarily affecting their lower back, followed by the neck and upper back, shoulder, wrist, knee, thumb and fingers, hip, elbow, and legs and toes [38–40].

Studies involving mainly young healthcare workers at the beginning of their careers show that the incidence of low back pain and neck and shoulder pain is alarmingly high [41]. This may be due to the lack of experience, therefore additional training in good practices and ergonomic organization of the workplace, and the use of appropriate equipment is a good solution. The present study shows that the occurrence of such symptoms as fatigue, dizziness, leg pain, finger pain, headache, wrist pain, drowsiness and numbness was correlated with the age of respondents. The highest number of ailments correlated with age was declared by the highest number of physiotherapists in the 50+ age group. A study by Kakaraparthi's et al. [42] shows that the frequency of ailments depended on age – younger therapists were more frequently affected by ailments in the arms, lower back, than those who were older. Age was identified as a WMSD risk factor in several studies conducted by Anderson et al. [8], who showed that younger workers had higher risk of development of work-related musculoskeletal disorders (WMSDs). Le et al. [29] also showed that workers under 29 years of age are at greater risk of WMSD.

Numerous studies have shown that physiotherapists aged over 50 had the lowest rates of work-related ailments. The first symptoms most often appeared before the age of 30, with over half of these episodes occurring within 5 years of graduation [9, 12, 43, 44]. A study conducted among Slovenian physiotherapists showed a correlation between WMSDs and age in the case of the shoulder and ankle/foot areas. However, no correlation was found between WMSDs and gender, BMI, workplace, job satisfaction, or physical activity [14]. In comparison with older colleagues who most frequently suffered from spine and neck pain, the younger respondents were more likely to complain of pain in other parts of the body, e.g. shoulders, knees, feet, and hands [28]. Cromie et al. [9] reported that younger therapists suffered from more ailments of the neck, upper spine, lower spine, and thumbs than older therapists. Knee pain was the only problem correlated with the physiotherapist age. The increased incidence of ailments in younger therapists was attributed to various factors, e.g. the reluctance of younger physiotherapists to seek help with physically strenuous tasks, or their inexperience [9].

The current study shows that the occurrence of leg pain, spine pain, drowsiness, and low mood was correlated with gender. The occurrence of leg pain and drowsiness was more often declared by females (67.8% and 33.3%, respectively), whereas spine pain and low mood were more often declared

by male respondents (87.1% and 45.2%, respectively). A study by Kakaraparthi et al. [42] shows a similar relationship between the frequency of symptoms and gender: women were more often affected by physical ailments than men, especially the neck, shoulders and lower back. An analysis of literature studies carried out by Anderson [8] indicates that gender has varied importance in the risk of WMSDs: some studies describe increased risk of symptoms in some body areas, but no such correlations have been found in other studies. Chen et al. reported that in people aged ≤ 30 years, the incidence of WMSD was higher in women than in men, while the opposite was true in people aged 31–40 years. A study conducted in a group of Greek physiotherapists demonstrated that there was no significant difference in the ailment rate between males and females, even though the males were shown to work longer hours in the standing position [43]. In turn, studies on physiotherapists from Delhi in India reported that the duration and location of WRMDs were related to the gender of the therapist – duration of the pain sensation in females was longer than in males. The majority of the male therapists complained of lower spine, neck, and shoulder pain. In the female group, the same problems were reported together with pain of the hand and knee areas [28]. Different results were reported by Cromie et al. [9] who found that the incidence of pain symptoms in most body areas did not differ between male and female therapists. The male physiotherapists reported higher prevalence of neck, wrist, hand, and thumb pain than the female rehabilitators. The increased prevalence of ailments reported by the male therapists may be associated with the more frequent use of mobilisation and manipulation techniques [9].

The present study shows that the occurrence of such ailments as leg pain, finger pain, shoulder pain, headache, wrist pain, drowsiness, and numbness, is correlated with job seniority. The highest number of ailments was declared by the greatest number of physiotherapists from the longest seniority group, i.e. over 30 years employment; they reported leg pain, headache, wrist pain, and numbness (100%, 100%, 100%, and 57.1%, respectively). Finger pain was declared by the highest number of respondents in the 20–29-year seniority group (85.7%), whereas shoulder pain and drowsiness were reported by the greatest number of physiotherapists from the 10–19-year job seniority group (75% and 50%, respectively).

In a study of a group of Greek physiotherapists, a strong positive correlation was found between musculoskeletal disorders (MSDs) and job seniority [43]. The increasing tendency towards musculoskeletal injuries seems to be associated with job seniority. As suggested by Anyfantis et al. [43], a significant change in this trend can be observed in physiotherapists with over 15-year job seniority, with the frequency and severity of MSDs increasing rapidly during the first 5 years of work [17, 43]. This may be related to the apparent inexperience of therapists; hence, additional training is required to solve this problem [33]. The first symptoms of WMSDs in Slovenian physiotherapists were not reported in the first 5 years of practice, as demonstrated in other studies, which was explained by the authors by the high level of relevant education of young physiotherapists [14]. Respondents with over 5-year job seniority reported a higher frequency of WRMDs than those with shorter seniority [16].

It was emphasised in the present study that the number of working hours per day was associated with the occurrence of such ailments as dizziness, poor concentration, irritability,

spine pain, and low mood. Spine pain was reported by the highest number of physiotherapists employed on a less than full-time labour contract (87%). The other problems were most often reported by employees working overtime (36.4%, 36.4%, 40.9%, and 40.9%, respectively).

Physiotherapists who perform manual techniques for a prolonged time (manipulation or mobilisation) and treat a large number of patients per day are more susceptible to the effect of musculoskeletal pain (MP) in thumbs, hands, and wrists [9, 24]. In turn, an insufficient amount of breaks from work during the day is associated with an increased risk of symptoms in the neck, shoulder, upper spine, elbows, wrists, and hands [9].

In Saudi Arabia, musculoskeletal disorders reported by rehabilitation personnel were strongly associated with the levels of over-work. The work-related complaints differed between the gender, age, and type of hospital. The main work-related ailments were spine, neck, and shoulder pain, as well as muscle pain in various body parts in 25% of the staff. The complaints were significantly correlated with the result of over-commitment and the number of patients treated in the event of absenteeism. The incidence of musculoskeletal problems was higher among males and in private training and rehabilitation units [46].

The current study shows that the occurrence of such symptoms as shoulder pain, irritability, drowsiness, low mood, and numbness were correlated with body position. The following observations were made in the body position-related groups of respondents:

- shoulder pain and low mood were declared by the greatest number of respondents working in the standing position, with legs bent (69.4% and 33.3%, respectively);
- irritability was declared by the greatest number of respondents working in the standing straight position (46.7%);
- drowsiness was declared by the greatest number of respondents working with one arm below the level of the shoulder joint (40%);
- numbness was declared by the greatest number of respondents working with the torso twisted torso (36.6%).

Repeated performance of the same task is associated with the occurrence of a variety of symptoms; therefore, physiotherapists should change their body position during work, and change work techniques to place variable loads on different anatomical areas and thus reduce the risk of trauma disorders [9]. The analysis of the literature performed by Anderson showed that work in an uncomfortable body position, work in the same position, bending or twisting the body, lifting and carrying patients, performing monotonous tasks, repetitive activities, large numbers of patients to treat, and work without breaks, were indicated by physiotherapists as factors inducing the development of WMSDs [8]. Other authors reported that long-lasting work in the same position, i.e. sitting, bending in the standing position, lifting or carrying a patient, strong physical effort, reaching forward, working in a bent forward position, and bending the neck by more than 20 degrees, i.e. the most frequently reported ergonomic risks, significantly contributed to the development of work-related symptoms [9, 16, 46].

The risk factors related to the body position were associated with increased risk of spine pain. Work in uncomfortable positions was found to increase the risk of lower spine

problems. Leaning forward in combination with lifting was associated with increased risk of chronic spine pain in healthcare professionals who had not reported prior spine ailments [47]. Patient handling tasks which involved reaching, pushing and pulling, were also reported to increase the risk of neck and shoulder pain [48]. However, in comparison, working with a straight back does not seem to be a risk factor for lumbar pain [47]. Prolonged work in the same position was related to increased risk of pain of the upper spine, lower spine, and neck. Bending or twisting the spine was related to increased risk of lower spine symptoms [9].

CONCLUSIONS

The most frequently reported ailment among surveyed physiotherapists was fatigue. More than half of the respondents complained about problems with the musculoskeletal system: pain in the legs, back, head and arms. The occurrence of selected ailments depended on age, gender, length of service, and the number of hours worked. Most often, women declared leg pain, while most men suffered from spine pain. All physiotherapists in the 40–49 age group experienced advanced sensation and pain in the fingers. In the 50+ age group, the majority of physiotherapists complained of leg pain, headaches and wrist pain. All physiotherapists with at least 30 years of experience, reported leg pain, headache and wrist pain. The only musculoskeletal disorders related to working time was back pain, which was reported by the majority of part-time physiotherapists.

As the musculoskeletal ailment is so common among physiotherapists, it should be included in future research, to include analysis of co-morbidities, physical activity, body mass index (BMI), use of rehabilitation by physiotherapists, and analysis of psycho-emotional factors.

REFERENCES

- Kok J, Vroonhof P, Snijders J, et al. Work-Related Musculoskeletal Disorders – Prevalence, Costs and Demographics in the EU. Publications Office; 2019. doi:https://doi.org/doi/10.2802/66947
- Yelin E, Weinstein S, King T. The burden of musculoskeletal diseases in the United States. *Semin Arthritis Rheum*. 2016;46(3):259–260. doi:10.1016/j.semarthrit.2016.07.013
- Parno A, Sayehmiri K, Parno M, et al. The prevalence of occupational musculoskeletal disorders in Iran: A meta-analysis study. *Work*. 2017;58(2):203–214. doi:https://doi.org/10.3233/wor-172619
- Soares CO, Pereira BF, Gomes MVP, Marcondes LP, Gomes F de C, Neto JS de M -. Preventive Factors against work-related Musculoskeletal disorders: Narrative Review. *Revista Brasileira de Medicina do Trabalho*. 2019;17(3):415–430. doi:https://doi.org/10.5327/z1679443520190360
- World Health Organization (WHO). Occupational health: Health Workers. Who.int. Published November 7, 2022. Accessed February 15, 2024. https://www.who.int/news-room/fact-sheets/detail/occupational-health%2D%2Dhealth-workers
- Oakman J, Macdonald W, Wells Y. Developing a Comprehensive Approach to Risk Management of Musculoskeletal Disorders in non-nursing Health Care Sector Employees. *Applied Ergon*. 2014;45(6):1634–1640. doi:https://doi.org/10.1016/j.apergo.2014.05.016
- Shahmohammadi A, Soroush A, Shamsi M, Izadi N, Heydarpour B, Samadzadeh S. Musculoskeletal Disorders as Common Problems among Iranian Nurses: a Systematic Review and Meta-analysis Study. *Inter J Preventive Med*. 2018;9(1):27. doi:https://doi.org/10.4103/ijpvm.ijpvm_235_16
- Anderson SP, Oakman J. Allied Health Professionals and Work-Related Musculoskeletal Disorders: a Systematic Review. *Safety and Health at Work*. 2016;7(4):259–267. doi:https://doi.org/10.1016/j.shaw.2016.04.001
- Cromie JE, Robertson VJ, Best MO. Occupational Health and Safety in physiotherapy: Guidelines for Practice. *Austr J Physiother*. 2001;47(1):43–51. doi:https://doi.org/10.1016/s0004-9514(14)60297-x
- Zhang R, Huang M. A Quick Capture Evaluation System for the Automatic Assessment of Work-Related Musculoskeletal Disorders for Sanitation Workers. *Applied Sci*. 2024;14(4):1542–1542. doi:https://doi.org/10.3390/app14041542
- Thuy NV, Kesornthong S, Homkham N. Work-related Musculoskeletal Disorders among Healthcare Workers in a General Provincial Hospital in Vietnam. *Soisuda Kesornthong & Nontiya Homkham International Journal of Ergonomics (IJEG)*. 2020;10(1):18–26.
- Adegoke BO, Akodu AK, Oyeyemi AL. Work-related Musculoskeletal Disorders among Nigerian Physiotherapists. *BMC Musculoskeletal Dis*. 2008;9(1). doi:https://doi.org/10.1186/1471-2474-9-112
- European Agency for Safety and Health at Work, IKEI, Panteia, et al. Work-Related Musculoskeletal Disorders: Prevalence, Costs and Demographics in the EU. Publications Office of the European Union; 2019. Accessed February 15, 2024. https://op.europa.eu/en/publication-detail/-/publication/5819be4f-0393-11eb-a511-01aa75ed71a1/language-en
- Meh J, Bizovičar N, Kos N, Jakovljević M. Work-related Musculoskeletal Disorders among Slovenian Physiotherapists. *J Health Sci*. 2020;10(2). doi:https://doi.org/10.17532/jhsci.2020.880
- Mondal A, Mehedi MMH. Work Related Musculoskeletal Disorders among Physiotherapists in Dhaka City. *Bone Muscle* 2019;2(1):001–004.
- Ganiyu S, Muhammad I, Olabode J, Stanley M. Patterns of Occurrence of work-related Musculoskeletal Disorders and Its Correlation with Ergonomic Hazards among Health Care Professionals. *Nigerian J Experimental Clin Biosci*. 2015;3(1):18. doi:https://doi.org/10.4103/2348-0149.158153
- Nasir A, Rehman A, Tariq R, Sarfraz N, Sadiq MU. Frequency of Work Related Musculoskeletal Disorders and Its Associated Factors among Physical Therapists of Faisalabad. *Rawal Med J*. 2020;10(2):392–395.
- Mierzejewski M, Kumar S. Prevalence of Low Back Pain among Physical Therapists in Edmonton, Canada. *Disability Rehabil*. 1997;19(8):309–317. doi:https://doi.org/10.3109/09638289709166544
- Vieira ER, Schneider P, Guidera C, Gadotti IC, Brunt D. Work-related Musculoskeletal Disorders among Physical therapists: a Systematic Review. *J Back Musculoskeletal Rehabil*. 2016;29(3):417–428. doi:https://doi.org/10.3233/bmr-150649
- Ministry of Family, Labour and Social Policy, Labour Market Department. Information about the Physiotherapist (229201). Warsaw (Poland); 2018. https://psz.praca.gov.pl (in Polish).
- Abaraogu UO, Ezema CI, Nwosu CK. Job Stress Dimension and work-related Musculoskeletal Disorders among Southeast Nigerian Physiotherapists. *Inter J Occup Safety Ergon*. 2016;23(3):404–409. doi:https://doi.org/10.1080/10803548.2016.1219476
- Kowalska J. Professional Burnout in Polish Physiotherapists. *Advances in Rehabilitation*. 2011;25(3):43–52. doi:https://doi.org/10.2478/rehab-2013-0014
- Wrześcińska M, Rasmus P, Wicherska K, Krukowska J. Burnout and Demographic and Psychosocial Variables in Practicing Physiotherapist. *Public Health Management*. 2015;13(3):295–301. doi:https://doi.org/10.4467/20842627oz.15.030.4788
- Ezzatvar Y, Calatayud J, Andersen LL, Aiguadé R, Benítez J, Casaña J. Professional experience, Work setting, Work Posture and Workload Influence the Risk for Musculoskeletal Pain among Physical therapists: a cross-sectional Study. *Inter Arch Occup Environ Health*. 2019;93(2):189–196. doi:https://doi.org/10.1007/s00420-019-01468-7
- Muaidi QI, Shanb AA. Effects of Work Demands on Physical Therapists in the KSA. *J Taibah Univ Med Sci*. 2016;11(1):56–62. doi:https://doi.org/10.1016/j.jtumed.2015.12.004
- Passier L, McPhail S. Work Related Musculoskeletal Disorders Amongst Therapists in Physically Demanding roles: Qualitative Analysis of Risk Factors and Strategies for Prevention. *BMC Musculoskel Dis*. 2011;12(1). doi:https://doi.org/10.1186/1471-2474-12-24
- Shah MK, Desai RG. Prevalence, Risk Factors and Prevention of Work-Related Musculoskeletal Disorders in Physiotherapist According to Their Specialization – a Review. *Inter J Res Rev*. 2022;9(3):485–495. doi:https://doi.org/10.52403/ijrr.20220354
- Iqbal Z, Alghadir A. Prevalence of work-related Musculoskeletal Disorders among Physical Therapists. *Med Pr*. 2015;66(4):459–469. doi:https://doi.org/10.13075/mp.5893.00142
- Le T, Jalayondeja W, Mekhora K, Bhuuanantanondh P, Jalayondeja C. Prevalence and Risk Factors of work-related Musculoskeletal Disorders among Physical Therapists in Ho Chi Minh City, Vietnam. *BMC Public Health*. 2024;24(1). doi:https://doi.org/10.1186/s12889-023-17527-1

30. Kotejshyer R, Punnett L, Dybel G, Buchholz B. Claim Costs, Musculoskeletal Health, and Work Exposure in Physical Therapists, Occupational Therapists, Physical Therapist Assistants, and Occupational Therapist Assistants: a Comparison among Long-Term Care Jobs. *Physical Ther.* 2019;99(2):183–193. doi:https://doi.org/10.1093/ptj/pzy137
31. Abu-Taleb W, Rehan Youssef A. Work-related Musculoskeletal Disorders among Egyptian Physical Therapists. *Bulletin of Faculty of Physical Therapy.* 2021;26(1). doi:https://doi.org/10.1186/s43161-021-00025-z
32. Desai RG, Shah MK. Prevention of Work-Related Musculoskeletal Disorders in Physiotherapist – a Review. *Inter J Res Rev.* 2021;8(12):497–502. doi:https://doi.org/10.52403/ijrr.20211261
33. Walkeden S, Walker KM. Perceptions of Physiotherapists about Their Role in Health Promotion at an Acute hospital: a Qualitative Study. *Physiother.* 2015;101(2):226–231. doi:https://doi.org/10.1016/j.physio.2014.06.005
34. Khairy WA, Bekhet AH, Sayed B, Elmetwally SE, Esayed AM, Jahan AM. Prevalence, Profile, and Response to Work-Related Musculoskeletal Disorders among Egyptian Physiotherapists. *Open Access Macedonian J Med Sci.* 2019;7(10):1692–1699. doi:https://doi.org/10.3889/oamjms.2019.335
35. Gorce P, Jacquier-Bret J. Global Prevalence of Musculoskeletal Disorders among physiotherapists: a Systematic Review and meta-analysis. *BMC Musculoskeletal Dis.* 2023;24(1). doi:https://doi.org/10.1186/s12891-023-06345-6
36. Škrečková G, Pavol Nechvátal, Kozel M, Macej M. Prevalence of work-related Musculoskeletal Hand and Wrist Disorders in Physiotherapists. *Central Eur J Public Health.* 2023;31(3):178–183. doi:https://doi.org/10.21101/cejph.a7767
37. Campo M, Hyland M, Sueki D, Pappas E. Wrist and Hand Pain in Orthopaedic Physical therapists: a mixed-methods Study. *Musculoskeletal Sci Practice.* 2019;43:26–36. doi:https://doi.org/10.1016/j.msksp.2019.05.009
38. Ramanandi VH, Desai AR. Association of Working hours, Job position, and BMI with work-related Musculoskeletal Disorders among the Physiotherapists of Gujarat—an Observational Study. *Bulletin Faculty Phys Therapy.* 2021;26(1). doi:https://doi.org/10.1186/s43161-021-00022-2
39. Ramanandi V, Desai A. Prevalence and Risk Factors of work-related Musculoskeletal Disorders among Indian Physiotherapists: A Narrative Review of Literature. *Arch Occup Health.* 2021;5(2):961–968. doi:https://doi.org/10.18502/aoh.v5i2.6190
40. Tišlar MH, Starc G, Kukec A. Work-related Musculoskeletal Disorders among Physiotherapists and Physiotherapy Students in Croatia and Their Association with Physical Fitness. *Slov J Public Health.* 2022;61(3):171–180. doi:https://doi.org/10.2478/sjph-2022-0023
41. Bucher T, Volken T, Pfeiffer F, Schaffert R. Musculoskeletal pain in health professionals at the end of their studies and 1 year after entry into the profession: a multi-center longitudinal questionnaire study from Switzerland. *BMC Musculoskeletal Dis.* 2023;24(1). doi:https://doi.org/10.1186/s12891-023-06635-z
42. Kakaraparthi VN, Vishwanathan K, Gadhavi B, et al. The prevalence, characteristics, and Impact of work-related Musculoskeletal Disorders among Physical Therapists in the Kingdom of Saudi Arabia – a cross-sectional Study. *Med Pr.* 2021;72(4):363–373. doi:https://doi.org/10.13075/mp.5893.01114
43. Anyfantis ID, Biska A. Musculoskeletal Disorders among Greek Physiotherapists: Traditional and Emerging Risk Factors. *Safety Health Work.* 2018;9(3):314–318. doi:https://doi.org/10.1016/j.shaw.2017.09.003
44. West DJ, Gardner D. Occupational Injuries of Physiotherapists in North and Central Queensland. *Austr J Physiother.* 2001;47(3):179–186. doi:https://doi.org/10.1016/s0004-9514(14)60265-8
45. Chen CY, Lu SR, Yang SY, et al. Work-related musculoskeletal disorders among physical therapists in Taiwan. *Med.* 2022;101(7):e28885. doi:https://doi.org/10.1097/md.00000000000028885
46. Devreux ICN, Al-Awa B, Mamdouh K, Elsayed E. Relation of Work-related Musculoskeletal Disorders and Over-commitment of Rehabilitation Staff in Saudi Arabia. *Life Sci J.* 2012;9(3):781–785.
47. Holtermann A, Clausen T, Aust B, Mortensen OS, Andersen LL. Does occupational lifting and carrying among female health care workers contribute to an escalation of pain-day frequency? *Eur J Pain.* 2012;17(2):290–296. doi:https://doi.org/10.1002/j.1532-2149.2012.00175.x
48. Smedley J, Inskip H, Trevelyan F, Buckle P, Cooper C, Coggon D. Risk Factors for Incident Neck and Shoulder Pain in Hospital Nurses. *Occup Environ Med.* 2003;60(11):864–869. doi:https://doi.org/10.1136/oem.60.11.864