Pain and associated factors in German occupational therapists: a nationwide cross-sectional survey study

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Abstract

Background Back pain is a common event in the general German population, but little is known about pain prevalence among occupational therapists (OT).

Objective The aim of this study was to estimate the prevalence of pain and associated factors in German OTs.

Methods We conducted a cross-sectional survey study. The prevalence of acute, chronic, and recurrent pain was calculated, and factors associated with chronic and recurrent pain were identified using multivariate logistic regression analysis.

Results A total of 444 OTs (89.41% female) with a mean age of 37.78 (SD = 11.63) years were included into the final analysis. Prevalence of acute pain was 3.83% (95% confidence interval [95% CI]: 2.25%; 6.06%), of chronic pain 15.54% (95% CI: 12.30%; 19.25%), and of recurrent pain 43.02% (95% CI: 38.36%; 47.77%). The most frequently affected pain site was the lumbar spine. Significantly associated with chronic pain was the level of depression (adjusted odds ratio [AOR]: 1.05 [95% CI 1.00; 1.10]; p ≤ 0.042) of study participants. Recurrent pain was significantly associated with a standing working position, working in geriatrics, stress level, and the level of graduation in multivariate analysis.

Conclusion This study estimated the prevalence of pain and identified factors associated with chronic and recurrent pain in participating OTs. To provide prevention measures and to identify more factors, further studies should be conducted.

Keywords Work-related pain · Chronic pain · Job distress · Occupational therapy · Stress

Schmerzen und assoziierte Faktoren bei Ergotherapeut*innen: eine deutschlandweite Querschnittstudie

Zusammenfassung

Hintergrund In der deutschen Bevölkerung sind Rückenschmerzen weit verbreitet, allerdings ist wenig zur Prävalenz von Schmerzen bei Ergotherapeut*innen bekannt.

Ziel der Studie Das Ziel dieser Studie war, die Schmerzprävalenz sowie mit Schmerzen assoziierte Faktoren bei Ergotherapeut*innen zu ermitteln.

Methoden Es wurde eine Querschnittstudie mittels Onlinebefragung durchgeführt. Im Anschluss wurde die Prüvalenz akuter, chronischer und wiederkehrender Schmerzen berechnet sowie Faktoren mittels multivariater Analysen identifiziert, welche mit chronischen und wiederkehrenden Schmerzen assoziiert waren.

Ergebnisse Insgesamt wurden 444 Ergotherapeut*innen (89,41 % Frauen) mit einem Durchschnittsalter von 37,78 (Standardabweichung [SD]=11,63) Jahren in die Analyse eingeschlossen. Die Prüvalenz akuter Schmerzen lag bei 3,83% (95%-Konfidenzintervall [95%-KI]: 2,25%; 6,06%), der chronischen Schmerzen bei 15,54% (95%-KI: 12,30%; 19,25%) und die Prävalenz wiederkehrender Schmerzen bei 43,02% (95%-KI: 38,36%; 47,77%). Am häufigsten betroffen war die Lendenwirbelsäule. Signifikant mit chronischen Schmerzen assoziiert war das Ausmaß einer Depression (adjustierte Odds Ratio [AOR]: 1,05; 95%-KI: 1,00; 1,10; p ≤ 0,042). Mit wiederkehrenden Schmerzen waren das Arbeiten in stehender Position sowie in der Geriatrie, das Ausmaß von Stress und der Bildungsabschluss signifikant assoziiert.
Introduction

Healthcare professionals (HCPs) such as physicians, nurses, and occupational therapists (OTs) are exposed to different work-related stressors (e.g., patient care, administration, workload) and have great responsibility. These factors can negatively affect the mental but also the physical health of HCPs (Kunzler et al. 2020). By focusing on improving occupation and function and supporting independence and wellbeing, as well as managing chronic diseases, OTs can help to improve patient outcomes while decreasing costs.

Substantial attention has been given to factors affecting recruitment of health professionals in general and the prevention of their mental or physical health disorders. However, to date, little is known about aspects affecting the health status of occupational therapists (Millsteed 2002). In contrast, it is well known that pain and mental stress seem to play an important role in the general population (Saylor and Steiner 2018). For the German general population, a 12-month prevalence of 61% for back pain and 16% for chronic back pain was reported (von der Lippe et al. 2021). In addition, the German Robert Koch Institute reported that mental disorders like depression and mood swings are associated with back pain. Other factors increasing the risk of back pain are previous pain, passive behaviors, and work-related factors (Raspe 2012).

It is already known that chronic and recurrent pain are frequent events among German pre-hospital emergency medical services (EMS) staff and physiotherapists. In addition, 35% of those physiotherapists and 53% of EMS staff with pain used analgesics (Möckel et al. 2021; Steiner and Möckel 2021). In physiotherapists, chronic pain was associated with age and working years, whereas recurrent pain was associated with gender. Nevertheless, after adjustment for confounding, no factor was identified to be independently associated with pain (Steiner and Möckel 2021). For German nurses it has been reported that they more often indicate an incapacity to work due to disorders of the musculoskeletal and connective tissue system compared to the general German working population. In particular, back pain is one of the most frequent diagnoses leading to absence from work (Grobe and Steinmann 2019). However, to the best of our knowledge, nothing has been reported on pain, associated factors, and analgesic intake for German occupational therapists (OTs).

Study objectives

Due to the risk of pain in German HCPs and the lack of data for OTs, the present study had the following objectives:

1. to estimate the prevalence of acute, recurrent, and chronic pain;
2. to identify locations affected by pain and the pain severity by site; and
3. to identify factors associated with pain.

Methods

Study design

This study was a nationwide cross-sectional online survey study conducted in Germany from 3 May 2021 to 17 May 2021 among OTs. Study participants were recruited by distributing the link to the survey via the Bundesverband für Ergotherapeuten in Deutschland e. V. (BED e. V.; Federal Association of Occupational Therapists in Germany) and the Deutscher Verband Ergotherapie (DEV; German Association Occupational Therapy), by sending the link to randomly selected practices and hospitals as well as by snowball system.

Participation in the study was voluntarily and anonymous, and participants were able to terminate the survey at any time. Study participants did not belong to a vulnerable population and no stigmatizing questions were asked. The data were not shared with any third party and handled in accordance with the local data protection laws. All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Due to the nature of the study, ethical approval was not necessary. All study participants provided informed consent.

Questionnaire

The full questionnaire consisted of 27 self-developed items and the short version of the Depression Anxiety Stress Scale (DASS-21; Nilges and Essau 2015). We used self-developed items for sociodemographic (e.g., age, gender, marital status, immigration background) and job-related (e.g., workload, working environment, specialties, main
working position, work experience) factors. In addition, all study participants were asked “Do you currently have pain?” with the following options to answer: Yes, acute pain; Yes, chronic pain; Yes, recurrent pain; No (Möckel et al. 2021). Chronic pain was defined as pain for 3 months or longer (Becker et al. 2013; Hensler et al. 2009; Möckel et al. 2021). Study participants who reported to have pain were then asked at which locations and to rate the severity of pain using a numerical rating scale ranging from 0 (no pain) to 10 (worst possible pain). In addition, participants with pain were asked if they were using analgesics and if yes, how often per week.

All study participants had to answer the DASS-21, which subscales (depression, anxiety, and stress) revealed Cronbach’s $\alpha$ of 0.76–0.92 (Nilges and Essau 2015). The DASS-21 consists of 21 items, seven per subscale (Henry and Crawford 2005; P. F. Lovibond and Lovibond 1995; S. Lovibond and Lovibond 1995; Nilges and Essau 2015). Each item represents a statement, and study participants had to rate how much the statement had applied to them over the past week with the following options to choose from: Did not apply to me at all; Applied to me to some degree, or some of the time; Applied to me to a considerable degree or a good part of time; Applied to me very much or most of the time (Henry and Crawford 2005; P. F. Lovibond and Lovibond 1995; S. Lovibond and Lovibond 1995; Nilges and Essau 2015).

Study participants had no time limit in which to answer the questionnaire and no option to go back to correct previous questions. The final survey was conducted using the SosciSurvey online tool (SoSci Survey GmbH, Munich, Germany) (SoSci Survey GmbH 2022).

### Statistical analysis

Study participants were included into the analysis if they fulfilled the following inclusion criteria: participants had to be (1) aged $\geq 18$ years and (2) actively working as occupational therapist, (3) if at least 80% of the survey and in any case the questionnaire items on (4) age, (5) gender, and (6) current pain were answered.

Characteristics of study participants and severities of pain by location are presented as mean values and corresponding standard deviation (SD) or frequencies. Prevalence of pain was calculated by type of pain (acute, chronic, recurrent) based on the full study sample and by pain location for those with pain. Risk of analgesic intake was calculated for all study participants with pain and by type of pain. In addition, the corresponding 95% confidence intervals (95% CI) were computed.

Items of the DASS-21 subscale scores for depression, anxiety, and stress were summed up and multiplied by two to obtain scores equivalent to the full DASS subscale scores (Henry and Crawford 2005; P. F. Lovibond and Lovibond 1995; S. Lovibond and Lovibond 1995). Subscale scores are presented as the mean with corresponding SD.

To identify variables associated with chronic or recurrent pain, univariate methods using Pearson Chi$^2$-test, Fisher’s exact test, or logistic regression were applied. Odds ratios (OR) and corresponding 95% CIs were calculated. Variables which indicated a $p$-value of $\leq 0.2$ in univariate analysis were included into a multivariate logistic regression model. For the multivariate model, adjusted ORs (AOR) and 95% CIs were calculated. Subgroups with $\leq$ 10 participants were not separately analyzed.

For all analyses, a $p$-value of $\leq 0.05$ was considered statistically significant. Statistical analysis was performed using the JASP software package (University of Amsterdam, Amsterdam, Netherlands) (JASP Team 2022).

### Results

#### Response rate and characteristics of study participants

The link to the survey was accessed by a total of 895 OTs of whom 469 (52.40%) participated in the survey. Full inclusion criteria were fulfilled by a total of 444 (49.61%) study participants. Mean age of participating OTs was 37.78 (SD = 11.63) years and 89.41% were female (Table 1). A total of 16.67% were smokers and 12.61% revealed having an immigration background. Mean working experience was 12.82 (SD = 9.93) years and the majority worked in an outpatient setting (69.19%).

Study participants indicated a mean depression score based on doubled DASS-21 subscale of 8.80 (SD = 8.55). The mean scores for anxiety and stress were 5.93 (SD = 6.73) and 13.83 (SD = 8.99), respectively.

| Characteristic                                      | N = 444 |
|----------------------------------------------------|---------|
| Gender, % female                                    | 89.41%  |
| Age, mean (SD) in years                             | 37.78 (11.63) |
| Working experience, mean (SD) in years              | 12.82 (9.93) |
| Smokers, %                                          | 16.67%  |
| With immigration background, %                      | 12.61%  |
| Working environment                                 |         |
| Inpatient                                          | 30.81%  |
| Outpatient                                         | 69.19%  |
| With shift work, %                                  | 2.58%   |
| Number of OT coworkers, mean (SD)                   | 6.97 (7.50) |
Fig. 1 Prevalence of pain in participating occupational therapists (n = 444); in brackets 95% confidence interval (95% CI)

Pain and analgesic intake

Acute pain was prevalent in 3.83% (95% CI: 2.25%; 6.06%) of participating OTs (Fig. 1). A total of 15.54% (95% CI: 12.30%; 19.25%) reported chronic and 43.02% (95% CI: 38.36%; 47.77%) recurrent pain. Those with pain (n = 271) reported that lumbar spine (52.40% [95% CI: 46.27%; 58.47%]), head (50.55% [95% CI: 44.44%; 56.66%]), and cervical spine (47.60% [95% CI: 41.53%; 53.73%]) were the most frequently affected pain locations (Fig. 2a). Depending on pain location, the severity of pain ranged from 3.76 (SD = 1.89) for pain at lower extremities to 4.94 (SD = 2.13) for head pain (Fig. 2b). Full details on pain locations and pain severity in participating OTs with pain are shown in Fig. 2.

In multivariate analysis (Table 2), chronic pain was significantly associated with DASS-21 depression score (AOR: 1.05 [95% CI: 1.00; 1.10]; p = 0.042; Table 2). Higher odds for experiencing recurrent pain were identified for those working mainly in a standing position (AOR: 1.69 [95% CI: 1.07; 2.64]; p = 0.02) and in geriatrics (AOR: 1.64 [1.04; 2.59]; p = 0.033). Furthermore, recurrent pain was significantly associated with stress score level (AOR: 1.06 [95% CI: 1.02; 1.09]; p = 0.003). In contrast, study participants with a university degree indicated significantly lower odds of recurrent pain (AOR: 0.62 [95% CI: 0.39; 0.99]; p = 0.047) compared to those with vocational training (Table 2).

Analgesics were taken by 41.11% (95% CI: 35.18%; 47.24%) of participants with pain (n = 270). When stratified by type of pain, 52.94% (95% CI: 40.45%; 65.17%) with chronic, 37.63% (30.65%; 45.02%) with recurrent, and 31.25% (95% CI: 11.02%; 58.66%) with acute pain used analgesics, respectively. Frequency of analgesic intake (per week) was 2.27 (SD = 2.43; n = 109) for all participants with pain, 3.33 (SD = 3.53; n = 35) for those with chronic, 1.66 (SD = 1.30; n = 69) with recurrent, and 3.20 (SD = 2.68; n = 5) with acute pain who disclosed using analgesics.

Discussion

This study with German occupational therapists reveals a high prevalence of chronic and recurrent pain in study participants. In addition, chronic pain was only associated with depression level, whereas recurrent pain was associated with several factors.

Based on our analysis, 50.55%, 52.40%, and 27.68% of those with pain reported head pain or pain at the lumbar or thoracic spine, respectively, which corresponds to 31%, 32%, and 17% of the full study population. When we compare these numbers to the general German population, for which a 12-month prevalence of 44–58% for head pain and 61% for back pain was reported recently (Porst et al. 2020; von der Lippe et al. 2021), it seems that the prevalence in OTs is lower. Nevertheless, one must keep in mind that our analysis reports the prevalence for the timepoint at which the study was conducted (point prevalence). Therefore, we expect that the 12-month prevalence of head and back pain in German OTs is higher than the point prevalence estimated in our study and might be even higher compared to the general population. To be mentioned here is that compared to German EMS staff, the prevalence of chronic pain is higher in German occupational therapists and comparable to physiotherapists (PT) (EMS: 11%; PT: 15% OT: 16%; Möckel et al. 2021; Steiner and Möckel 2021).

Interestingly, only the level of depression based on the DASS-21 subscale score was significantly associated with chronic pain (OR 1.05 [95% CI: 1.00; 1.10]). This indicates an increase in the odds for chronic pain by 0.05 for each unit increase in the DASS-21 depression subscale score. It is well known that there is an association between chronic (back) pain and mental health (Raspe 2012). In addition, a study of Zhang et al. (2019) reported that psychological job demand was associated with a higher odds ratio (2.80 [95% CI: 1.25; 6.31]) for lower back pain in Chinese emergency ambulance workers. Therefore, the association of chronic pain and depression in our study is in line with previously published data. Nevertheless, it should be mentioned here that the OR in Zhang et al. (2019) was much higher compared to our data, which may be due to
the fact that they analyzed chronic lower back pain only, whereas we analyzed chronic pain at any location.

Other identified risk factors for depression and/or back pain are gender, age, income, educational level, unemployment and marital status, personality traits, family history of depressive disorder, chronic disease, and previous pain (Bonde 2008; Raspe 2012). Specific risk factors at work include occupational inequalities such as factors related to decision latitude, social support, and an imbalance between overspending and rewarding (Niedhammer et al. 2016; Raspe 2012). Even though we did not collect data on job satisfaction or inequalities, our study indicates an impact of the educational level on pain, showing that OTs with a university degree indicated lower odds for recurrent pain. Open remains whether OTs with a higher level of graduation are also more satisfied or better treated at work.

Mental health also plays an important role in the transition from acute to chronic back pain. Patients with psychological comorbidities indicated a 1.66-times higher risk (AOR 1.66 [95% CI, 1.28–2.15]) of transitioning from acute to chronic pain (Stevans et al. 2021). Even though depression and anxiety were not significantly associated with recurrent pain in our multivariate analysis, stress level was significantly associated with increased odds for recurrent pain. Nevertheless, little has been reported about recurrent pain and its associations in HCPs, although a study with adolescents from Sweden indicated for girls that pressure stress was associated with recurrent pain (Lindfors et al. 2017).

Besides stress level, other variables increasing the chance of recurrent pain were working in geriatrics and mainly in a standing position, whereas having a university degree decreased the odds of sustaining recurrent pain (Table 2).

Comparable to our results on graduation level, a meta-analysis on educational level and the prevalence of lower back pain identified that people with higher education are less often affected by pain compared to those with medium and low educational levels (Batista et al. 2017). In contrast, a study with adults aged 30–49 years from the USA indicated that participants with a bachelor’s or master’s did
| Variables                      | Chronic pain  | Recurrent pain  |
|-------------------------------|---------------|-----------------|
|                               | OR (95% CI)   | AOR (95% CI)    | OR (95% CI)   | AOR (95% CI)    |
| Female (n = 397)              | Reference     | Reference       | Reference     | Reference       |
| Male (n = 47)                 | 0.95 (0.41; 2.21); p = 0.897 | 0.80 (0.43; 1.49); p = 0.489 |
| Age in years                  | 1.04 (1.02; 1.06); p ≤ 0.001 | 1.04 (0.99; 1.08); p = 0.135 | 1.00 (0.98; 1.02); p = 0.867 |
| Working experience in years   | 1.05 (1.01; 1.06); p = 0.01 | 1.00 (0.95; 1.06); p = 0.884 | 0.99 (0.97; 1.01); p = 0.381 |
| Smoking status                |               |                 |               |                 |
| Non-smoker (n = 370)          | Reference     | Reference       | Reference     | Reference       |
| Smoker (n = 74)               | 1.19 (0.62; 2.32); p = 0.598 | 1.32 (0.80; 2.17); p = 0.284 |
| Immigration background        |               |                 |               |                 |
| No (n = 388)                  | Reference     | Reference       | Reference     | Reference       |
| Yes (n = 56)                  | 1.79 (0.91; 3.54); p = 0.09 | 1.80 (0.79; 4.09); p = 0.163 | 0.59 (0.32; 1.07); p = 0.079 | 0.59 (0.30; 1.16); p = 0.127 |
| Graduation                    |               |                 |               |                 |
| Vocational training (n = 321)  | Reference     | Reference       | Reference     | Reference       |
| University/college (n = 122)  | 0.76 (0.42; 1.39); p = 0.379 | 0.61 (0.39; 0.93); p = 0.023 | 0.62 (0.39; 0.99); p = 0.047 |
| Working environment           |               |                 |               |                 |
| Inpatient (n = 130)           | Reference     | Reference       | Reference     | Reference       |
| Outpatient (n = 292)          | 0.85 (0.48; 1.49); p = 0.564 | 0.94 (0.62; 1.43); p = 0.779 |
| Number of OT co-workers       | 0.95 (0.90; 1.00); p = 0.063 | 0.96 (0.91; 1.01); p = 0.101 | 1.01 (0.98; 1.04); p = 0.455 |
| Workload                      |               |                 |               |                 |
| 15–20h (n = 34)               | 1.27 (0.49; 3.29); p = 0.628 | 1.18 (0.41; 3.37); p = 0.765 | 0.99 (0.48; 2.05); p = 0.984 |
| 21–30h (n = 76)               | 0.70 (0.31; 1.58); p = 0.383 | 0.53 (0.21; 1.34); p = 0.178 | 1.02 (0.60; 1.77); p = 0.947 |
| 31–40h (n = 228)              | 1.70 (0.91; 3.19); p = 0.096 | 1.16 (0.56; 2.37); p = 0.692 | 0.76 (0.46; 1.27); p = 0.29 |
| Working position              |               |                 |               |                 |
| Sitting (n = 262)             | Reference     | Reference       | Reference     | Reference       |
| Standing (n = 146)            | 0.81 (0.45; 1.45); p = 0.471 | 0.71 (0.36; 1.41); p = 0.328 | 1.61 (1.07; 2.43); p = 0.022 | 1.69 (1.07; 2.64); p = 0.02 |
| Kneeling (n = 20)             | 2.30 (0.68; 6.85); p = 0.117 | 1.44 (0.46; 4.53); p = 0.532 | 1.05 (0.41; 2.65); p = 0.925 | 1.04 (0.39; 2.79); p = 0.933 |
| Specialty                     |               |                 |               |                 |
| Non-pediatrics (n = 258)      | Reference     | Reference       | Reference     | Reference       |
| Pediatrics (n = 171)          | 1.05 (0.62; 1.79); p = 0.85 | 0.91 (0.62; 1.35); p = 0.641 |
| Non-neurology (n = 231)       | Reference     | Reference       | Reference     | Reference       |
| Neurology (n = 198)           | 0.97 (0.57; 1.64); p = 0.901 | 0.97 (0.66; 1.42); p = 0.857 |
| Non-psychiatric (n = 322)     | Reference     | Reference       | Reference     | Reference       |
| Psychiatric (n = 107)         | 1.38 (0.77; 2.46); p = 0.274 | 0.86 (0.55; 1.35); p = 0.514 |
| Non-hand therapy (n = 314)    | Reference     | Reference       | Reference     | Reference       |
| Hand therapy (n = 115)        | 1.23 (0.69; 2.18); p = 0.486 | 1.03 (0.67; 1.59); p = 0.882 |
| Non-Orthopedics (n = 337)     | Reference     | Reference       | Reference     | Reference       |
| Orthopedics (n = 92)          | 1.47 (0.80; 2.66); p = 0.21 | 1.09 (0.69; 1.73); p = 0.714 |
Depression score

Term marriages and other social sources helping to deal with people, higher education also leads to more successful long-term relationships through which education impacts health. Besides more healthy behavior in more highly educated people, higher education also leads to more successful long-term marriages and other social sources helping to deal with stressors and daily issues (Zajacova and Lawrence 2018).

Zajacova and Lawrence (2018) discussed in their review potential pathways through which education impacts health. Graduation in terms of any pain (Zajacova et al. 2020). Unfortunately, we cannot conclude from our data the causal link between higher graduation level and lower odds for recurrent pain.

Opens remains why working in geriatrics was significantly associated with increased odds for recurrent pain. Working in geriatrics is often characterized by handling of immobile, multimorbid patients with severe diseases such as stroke, heart issues, and femoral fractures. Therefore, we assume that these working conditions might be associated with potential factors leading to pain, such as a high maintenance and physical effort when handling patients and mental distress due to severe courses of disease.

Beside the special field of therapeutic action, a mainly standing working position seems to be increasing the odds for recurrent pain. Based on a review of the literature conducted by Halim and Omar (2011), it can be concluded that performing jobs in prolonged standing contributes to several health effects such as work-related musculoskeletal disorders, chronic venous insufficiency, preterm birth, and carotid atherosclerosis (Halim and Omar 2011). Beside these physical effects of a standing working position, we assume that a high workload is associated with a less relaxed posture and a higher stress level, both increasing the risk for pain (Nino et al. 2019; et al., Ansari et al. 2016).

Finally, our analysis suggests that preventive measures against pain in OTs are of practical relevance. OTs focus on enabling their clients to do things they want and need to do in their everyday life and consider their physical, psychological, social, and environmental needs. These multidi-

Table 2 (Continued)

| Variables | Chronic pain | AOR (95% CI) | Recurrent pain | AOR (95% CI) |
|-----------|--------------|--------------|----------------|--------------|
| **Non-geriatrics** (*n* = 305) | Reference | – | Reference | Reference |
| Geriatrics (*n* = 124) | 0.91 (0.51; 1.64); *p* = 0.751 | 1.64 (1.08; 2.50); *p* = 0.02 | 1.64 (1.04; 2.59); *p* = 0.033 |
| **Depression score** | 1.07 (1.04; 1.10); *p* ≤ 0.001 | 1.02 (1.00; 1.04); *p* = 0.095 | 0.98 (0.94; 1.01); *p* = 0.199 |
| **Anxiety score** | 1.08 (1.04; 1.12); *p* ≤ 0.001 | 1.03 (1.00; 1.06); *p* = 0.032 | 1.01 (0.97; 1.05); *p* = 0.762 |
| **Stress score** | 1.05 (1.03; 1.09); *p* ≤ 0.001 | 0.99 (0.95; 1.04); *p* = 0.807 | 1.04 (1.02; 1.06); *p* ≤ 0.001 | 1.06 (1.02; 1.09); *p* = 0.003 |

OR odds ratio from univariate analysis, AOR adjusted OR from multivariate analysis, 95% CI 95% confidence interval

a Multivariate model includes variables with *p* ≤ 0.2 in univariate analysis

b based on DASS-21 subscale scores

not significantly differ from those with only a high school graduation in terms of any pain (Zajacova et al. 2020). Zajacova and Lawrence (2018) discussed in their review potential pathways through which education impacts health. Besides more healthy behavior in more highly educated people, higher education also leads to more successful long-term marriages and other social sources helping to deal with stressors and daily issues (Zajacova and Lawrence 2018). Unfortunately, we cannot conclude from our data the causal link between higher graduation level and lower odds for recurrent pain.

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Beside the special field of therapeutic action, a mainly standing working position seems to be increasing the odds for recurrent pain. Based on a review of the literature conducted by Halim and Omar (2011), it can be concluded that performing jobs in prolonged standing contributes to several health effects such as work-related musculoskeletal disorders, chronic venous insufficiency, preterm birth, and carotid atherosclerosis (Halim and Omar 2011). Beside these physical effects of a standing working position, we assume that a high workload is associated with a less relaxed posture and a higher stress level, both increasing the risk for pain (Nino et al. 2019; et al., Ansari et al. 2016).

Finally, our analysis suggests that preventive measures against pain in OTs are of practical relevance. OTs focus on enabling their clients to do things they want and need to do in their everyday life and consider their physical, psychological, social, and environmental needs. These multidi-

mensional and high expectations require broad capabilities in different areas, which may not be conveyed in professional education in Germany. An academic qualifying study program for professional training is recommended from the profession members’ point of view (Ahrens and Treusch 2020) but not fully implemented to date.

Besides back pain, programs should focus on interventions for recreation and in particular headache management for OTs. Approximately 50% of those with headache in the general population—for the most part those with episodic headache—ought to be able to manage themselves or profit from short educational programs. Recent research into short educational interventions for headache prevention has demonstrated positive effects. Educational campaigns and train-the-trainer models can easily be adapted for implementation in a variety of settings (Saylor and Steiner 2018).

This study has several limitations. First, the study sample is small and thus indicates a limited representativity. Additionally, we have no information available on whether the age distribution in our study sample corresponds to the age distribution of OTs in Germany. Nevertheless, the prevalence of pain is comparable to other studies with German healthcare professionals. Therefore, we recommend performing further, larger studies to confirm potential factors increasing the odds for pain identified in the present study. In addition, more variables could be implemented into future studies to identify more factors associated with pain in German OTs. Second, this was a survey study and we had to rely on the honesty of the study participants. Third, this study was conducted during the COVID-19 pandemic, and we cannot estimate how the pandemic has influenced the results.
Conclusion

This analysis indicates that participating German OTs often experience pain and most frequently in the lower back. In addition, those with higher depression and stress level as well as OTs working in a standing posture or at geriatric wards indicate higher odds for pain. Therefore, approaching these factors might be a first step to reducing the risk of pain in German OTs. Nevertheless, further studies are needed to gather and analyze more data on work-related pain in German OTs, to efficiently mitigate risk factors and reduce pain prevalence in this group of HCPs.

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Conflict of interest

B. Stock and Y. Treusch declare that they have no competing interests. L. Möckel is a former employee of UCB Pharma and received speaker/consultancy fees and research funding from UCB Pharma.

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