

ORIGINAL REPORT

NECK AND BACK PAIN: DIFFERENCES BETWEEN PATIENTS TREATED IN PRIMARY AND SPECIALIST HEALTHCARE

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Objective: To describe and compare patients with neck or back pain treated by physiotherapists in primary healthcare (PHC) and in departments for physical medicine and rehabilitation in specialist healthcare (SHC) in Norway.

Design: Cross-sectional study using data from the FYSIOPRIM (FP) database in PHC and the Norwegian Neck and Back Registry in SHC. Neck and back pain patients in the period 2014–18 aged ≥ 18 years were included. Demographics, lifestyle and clinical factors were investigated.

Results: A total of 8,125 patients were included: 584 in PHC and 7,541 in SHC. Mean age was 47.1 and 45.5 years, respectively, with more females in PHC (72% vs 56%). Low levels of education and physical activity, high workload and receiving social benefits were associated with treatment in SHC. Treatment in SHC was most common among patients with pain duration 3 to 12 months. Higher pain intensity and lower health-related quality of life were found in patients treated in SHC, no differences were found for psychological distress.

Conclusion: This is the first study comparing register data in patients with neck or back pain treated in PHC and SHC. Differences were found in pain and health-related quality of life, but levels of psychological distress were similar between patients treated in PHC and those treated in SHC.

Key words: registry data; physiotherapy; rehabilitation; physical medicine; referral process.

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Neck and back pain are major health challenges, which result in disability, sick leave and high levels of healthcare utilization (1). The economic burden for both individuals and society is substantial (2–4), with expenditure on healthcare services being a large contri-

LAY ABSTRACT

Patients with neck or back pain have high levels of healthcare utilization, both in primary and specialist healthcare. The aim of this study was to investigate patients referred and treated by physiotherapists in primary healthcare and by specialists in specialist healthcare in Norway, to evaluate differences in the demographics, lifestyle and clinical factors of patients treated in each healthcare setting. Included patients had been diagnosed with neck or back pain from 2014 to 2018, and were aged ≥ 18 years. Patients in specialist care had more pain and lower health-related quality of life, but similar levels of psychological distress to those treated in primary healthcare. Furthermore, patients treated in specialist healthcare had lower socioeconomic status (education, workload, social benefits) compared with those treated in primary healthcare.

butor. Among the musculoskeletal disorders (MSD), neck and back pain are the most common reasons for primary healthcare (PHC) utilization (5, 6). Referrals from general practitioners (GPs) to physiotherapists (PTs) and specialist healthcare (SHC) are common (7, 8), but vary depending on referral practice, populations and healthcare systems. The referral process has been described as complex and multifactorial (9). Female patients with high levels of pain, education and physical activity were more often referred to PTs (10–12), while high levels of pain, disability and psychological distress have been shown to be associated with referrals to SHC (12). Higher socioeconomic status has also been associated with higher utilization of SHC (13).

There is no clear definition regarding which neck or back patients should be referred to PTs in PHC or to SHC, and when they should be referred, except the general right to receive necessary and beneficial healthcare at a reasonable cost (14). However, updated clinical guidelines set out recommendations (15–17). Neck and back pain patients should be treated in PHC, receive information to remain active and remain in work, and to get exercise therapy (15–17). For most patients this is sufficient. For non-responders with so-called yellow flags, i.e. prolonged pain and psychological distress, specialist (multidisciplinary) treatment is often required (17).

Norway has one of the highest prevalences of neck and back pain in Europe (18, 19) along with one of the highest healthcare expenditures per capita (4). Furthermore, 86% of all health expenditure is publicly funded, and only 10% of the population have additional voluntary health insurance; thus comparison with studies from other countries can be difficult (4). Like many western countries Norway has a healthcare system divided into primary and specialist healthcare, with general practitioners (GPs) as gatekeepers (20). Treatment of patients in SHC is more costly for society and less accessible for patients. It is a political goal to treat patients at the lowest effective care level, with the first contact in PHC. By introducing the Norwegian Coordination Reform in 2012, one goal was to strengthen PHC in order to reduce referrals to SHC (21). Nevertheless, a Norwegian report from 2018 showed divergent referral practices among GPs (22).

In 2012 the referral rate in Norway among patients with MSD was 7% to PTs and 6% to SHC (5). However, there is little knowledge about these patients, and whether patients referred and treated in SHC are more affected by their pain compared with those in PHC.

With access to a database and a quality register including patients with neck or back pain, the aims of this study were to describe and compare patients treated by PTs in PHC and by healthcare professionals in departments for physical medicine and rehabilitation in SHC in Norway. Demographic and lifestyle factors, psychological distress, pain, disability and health-related quality of life (HRQoL) were investigated.

METHODS

Data sources

This cross-sectional study used data from the FY-SIOPRIM database and the Norwegian Neck and Back register for the period 2014–18. FP consists of data from patients treated by PTs in PHC, hereafter presented as patients treated in PHC. FP is a research programme about physiotherapy in PHC, accomplished in Norway (23). Standardized methods and tools have been developed to systematically collect data from, and about, patients treated by PTs. The PTs are either private practitioners, with a legal agreement to practice in specific municipalities, or are employed in different municipalities from all health regions in Norway. At the time of inclusion to the database, referral to PT was mandatory. NNRR is a national quality register including patients with neck or back pain treated in a department for physical medicine and rehabilitation in SHC and assumed not to be in need of surgery. The patients are referred from PHC to the department for physical medicine and rehabilitation/specialist centre

at hospitals in Norway (University Hospital of North Norway in Tromsø, St Olavs Hospital in Trondheim, Haukeland University Hospital in Bergen, and Oslo University Hospital in Oslo) and are hereafter presented as patients treated in SHC. Treatment in the departments for physical medicine in SHC consists of further interdisciplinary examinations and/or treatment, including referrals to other healthcare services or applications for disability pension. The purpose of the register is to improve treatment quality and service provision (24).

From both FP and NNRR, the study included patients with neck or back pain, aged ≥ 18 years, with the following diagnostic codes; ICPC-2 L01-03 and L83-87 in FP, and ICD-10 M40-54 in NNRR. If diagnostic codes were missing, other registered information (treatment/treatment goal) was used to identify whether neck or back pain were the cause of treatment. Patients were coded with either neck or back pain. Back pain included pain located both in the thoracic and lumbar spine.

This project was approved by the Regional Committee for Medical and Health Research Ethics in Norway (2018-1280-1).

Variables

The study used information from questionnaires present in both FP and NNRR. Table SI describes the recoding process needed to align some of the variables from the 2 sources. Demographic and lifestyle information included age, sex, nationality (Norway, Europe, Africa, Asia, America, others), marital status (partner/single), smoking (yes/no), education (elementary school, college, university/high school ≤ 4 years, university/high school > 4 years, workload (mostly seated/much walking/much walking and lifting/heavy lifting), work status (at work/work at home/student/retired/unemployed/on sick leave ≤ 1 year/on sick leave > 1 year/disability pension), physical activity (not physical active/low/moderate/often) and previous PT treatment (yes/no). For analysis purposes, nationality and education was recoded (Table SI) and work status was dichotomized based on receiving social benefits or not (at work/homeworker/ student/retired = no social benefits, on sick leave ≤ 1 year/on sick leave > 1 year/disabled pension/unemployed = social benefits). Pain duration was analysed with 3 corresponding categories (< 3 months, 3–12 months, > 12 months).

Psychological distress. Psychological distress was assessed with the Hopkins Symptom Checklist-10 (SCL-10). SCL-10 is the shorter version of the original SCL-25 and they are highly correlated ($r=0.97$) (25). SCL-10 includes 4 items related to anxiety (feeling panicky, anxious, dizzy, tense) and 6 for depression (sleepless, sad, worthless, hopeless, fault within self, finding everything a burden). Each item is rated on

a 4-point scale (1–4), with a higher score indicating higher psychological distress. A mean score for all 10 items was calculated, with a cut-off value above 1.85 indicating high level of psychological distress (25).

Pain intensity. Pain intensity was recorded on an 11-point numerical rating scale (0–10; 0=no pain and 10=worst pain ever).

Disability. Disability was recorded with the Neck Disability Index (NDI) for neck patients and the Oswestry Disability Index Version 2.0 (ODI) for back patients (26, 27). Both indexes consist of 10 items rated on a 6-point scale (0=no disability, 5=total disability) with a sum score calculated (0–20=minimal disability, 21–40=moderate disability, 41–60=severe disability, 61–80=crippled, 81–100=bed-bound). If patients had completed both questionnaires, the one with the highest sum score was used.

Health-related quality of life. HRQoL was measured with the EuroQol Questionnaire 5 Dimension (EQ-5D) (28). All items had to be fulfilled to get a score. FP and NNRR utilized different versions of EQ-5D, 5L and 3L, respectively. To be able to compare the scores, a crosswalk calculator was used (Index Value Calculator, UK version) developed by EuroQol Group, with scores from –0.594 to 1 (0=death, 1=full health, negative score=worse than death) (29).

Statistical analysis

Patient's characteristics are presented as frequencies (%) and means (standard deviation (SD)). Initial descriptive analysis revealed that patient's characteristics and lifestyle factors were quite similar in neck and back patients (Table SII), thus the diagnoses were merged in the analyses.

Additional analysis of patients with missing disability score was performed to detect potential bias (Table SIII).

Logistic regression analyses were used to compare patients in SHC vs PHC with regards to smoking, education, workload, physical activity, social benefits and pain duration. The results are presented as odds ratios (ORs) with 95% confidence interval (95% CIs). Based on directed acyclic graphs (DAGs), we adjusted for a minimal set of covariates to control for confounding and estimate the total effects. All analyses were adjusted for age, sex and nationality. In the analysis of smoking, we also adjusted for education and physical activity, and, for workload, we also adjusted for education. For social benefits, we included marital status, education, smoking, physical activity, previous PT, pain duration and pain, while in the analysis of physical activity, we added marital status, education and smoking.

Linear regression was used to study the associations between clinical factors (pain, disability, psychological

distress (SCL-10) and HRQoL (EQ-5D)) and treatment group (PHC and SHC). Results are presented as mean differences (95% CIs). DAGs were used to identify potential confounders. Age, sex, nationality, workload, physical activity, previous PT and pain duration were included in the models. Pain was additionally adjusted for smoking. Psychological distress and HRQoL were additionally adjusted for pain and smoking. Clinically relevant statistical interactions were tested by a likelihood ratio test, and presented only if the difference was considered to be of clinical importance.

Data were analysed using STATA (version 16, Stata-Corp., Texas City, TX, USA) and SPSS (version 26, SPSS Inc., Chicago, IL, USA), with a 5% level of significance.

RESULTS

Demographics and lifestyle factors

A total of 8,125 patients with neck or back pain were included in the final analysis; 584 treated in PHC and 7,541 treated in SHC (Fig. 1). Patients in PHC were slightly older than those in SHC (mean (SD) 47.1 (16.8) vs 45.5 (13.8) years) (Table I). There were more females in PHC than in SHC (72% vs 56%). The majority were Norwegian (94% in PHC and 90% in SHC) followed by European nationality (4.9% and 6.4%, respectively). In SHC, 22.7% had previously received treatment by PT compared with 3.9% in PHC.

Disability data was missing for 2,634 (32%) of the patients. However, those with missing disability score ($n=2,634$) were similar in age, sex and education level to those with a score ($n=5,491$), but reported somewhat higher level of psychological distress (mean (SD) 2.10 (0.67) vs 1.84 (0.62)), pain (6.23 (1.94) vs 5.54 (2.00)) and slightly lower HRQoL (0.44 (0.33) vs 0.53 (0.30)) (Table SIII).

Higher levels of education and physical activity lowered the odds for treatment in SHC (adjusted OR (95% CIs) for highest vs lowest category 0.31 (0.24,

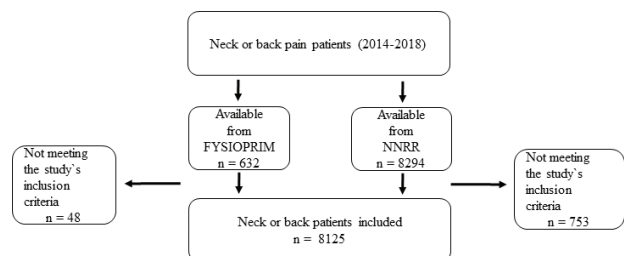


Fig. 1. Flow diagram for inclusion of patients treated for neck and back pain by physiotherapists (PT) in primary healthcare (PHC) included in Fysioprim and by healthcare professionals in a department for physical medicine and rehabilitation in specialist healthcare (SHC) included in the Norwegian Neck and Back Register (NNRR) (2014–2018).

Table I. Patient characteristics, stratified by treatment by physiotherapist in primary healthcare (PHC) and treatment by healthcare professionals in departments for physical medicine and rehabilitation in specialist healthcare (SHC), 2014–2018

	PHC n = 584	SHC n = 7541
Age, mean (SD)	47.1 (16.8)	45.5 (13.8)
Missing	1	5
Sex, female (%)	402 (71.7)	4,206 (55.8)
Missing	23	4
Nationality, n (%)		
Norway	397 (94.0)	6,386 (89.8)
Europe	21 (4.9)	458 (6.4)
Asia	4 (0.9)	142 (2.0)
Africa	1 (0.2)	49 (0.7)
America	3 (0.7)	35 (0.5)
Other	0	41 (0.6)
Missing	158	430
Marital status, partner, n (%)	295 (68.3)	5,151 (71.4)
Missing	152	331
Smoking, yes, n (%)	43 (9.9)	1,342 (18.7)
Missing	149	362
Education, n (%)		
Elementary school	14 (3.2)	989 (14.3)
College	135 (31)	3,439 (49.7)
University/high school ≤ 4 years	161 (36.9)	1,468 (21.2)
University/high school > 4 years	126 (28.9)	1,031 (14.9)
Missing	148	614
Workload, n (%)		
Mostly seated	153 (58.4)	1,590 (24.8)
Much walking	54 (20.6)	1,355 (21.2)
Much walking and lifting	50 (19.1)	1,997 (31.2)
Heavy lifting	5 (1.9)	1,458 (22.8)
Missing	322	1,141
Work status, n (%)		
At work full-time	222 (51.5)	2,868 (38.4)
Home worker	4 (0.9)	48 (0.6)
Student	34 (7.9)	201 (2.7)
Retired	60 (13.9)	511 (6.8)
Unemployed	2 (0.5)	206 (2.8)
On sick leave ≥10%	67 (15.5)	2,705 (36.2)
On sick leave >1 year	21 (4.9)	529 (7.1)
Disability pension	21 (4.9)	404 (5.4)
Missing	153	69
Physical activity, n (%)		
Not physical active	26 (7.0)	942 (13.1)
Low	67 (18.1)	4,565 (64.8)
Moderate	208 (56.1)	1,206 (17.1)
Often	70 (18.9)	335 (4.8)
Missing	213	493
Previous PT, yes, n (%)	19 (3.9)	1,549 (22.3)
Missing	95	595
Pain duration, n (%)		
< 3 months		
3–12 months	86 (20.1)	1,628 (22.7)
>12 months	132 (30.8)	3,271 (45.5)
Missing	211 (49.2)	2,288 (31.8)
	155	354

PT: physiotherapy.

0.39), and 0.06 (0.04, 0.09), respectively) (Table II). Smoking was not significant in the adjusted model ($p=0.205$). Heavier workload increased the odds for treatment in SHC (adjusted OR (95% CIs) for highest category vs mostly seated (4.6 (3.29, 6.42)). Receiving social benefits also increased the odds for treatment in SHC (adjusted OR (95% CI) 2.10 (1.57, 2.81)). No significant interactions with age, sex and nationality were found for pain duration, education, smoking, workload, social benefits and physical activity ($0.211 \leq p \leq 1$).

Compared with patients with <3 months pain duration, those with 3–12 months duration were slightly more likely to be treated in SCH, while the opposite was found for those with >12 months pain duration (adjusted ORs (95% CIs) 1.33 (1.00, 1.76) and 0.60 (0.46, 0.79), respectively).

Clinical factors

Mean (SD) score of psychological distress (SCL-10) was 1.66 (0.48) in PHC and 1.92 (0.64) in SHC. Fifty-two (13%) and 2,342 (36%) patients, respectively, scored above the 1.85 cut-off for psychological stress. However, there was no significant difference between PHC and SHC in the multivariable model (mean difference 0.06, 95% CI (−0.03, 0.14)). Patients treated in SHC reported significantly higher pain (mean (SD) 5.73 (1.90)) than those treated in PHC (mean (SD) 4.52 (2.21)) (mean difference 1.23, 95% CI (0.96, 1.50), Table III), and also remained significantly higher in the multivariable model (mean difference 0.80, 95% CI (0.54, 1.01)). For disability, mean (SD) score was 21.65 (11.20) in PHC and 31.63 (17.79) in SHC. In the multivariable analysis, significant interaction was found between pain duration and disability ($p_{\text{interaction}} < 0.001$). Patients in SHC with pain duration ≤12 months scored significantly lower on disability compared with those in PHC (mean difference −7.46 (−10.70, −4.22)), while no significant difference was found between PHC and SHC in patients with pain duration >12 months (mean difference −1.05, 95% CI (−4.46, 2.53)). For HRQoL, the EQ-5D mean (SD) scores were 0.65 (0.18) and 0.49 (0.31), respectively, and the difference between the 2 groups remained significant after adjustment (−0.07 (−0.11, 0.03)) (Table III). The interaction effects were significant between all the clinical variables and sex and pain duration ($p < 0.001$), but the differences were only considered to be of clinical relevance for disability and pain duration (as shown in Table II). For more information on interaction effects, see Table SIV.

DISCUSSION

This study found that patients with pain duration of 3–12 months were more likely to be treated in SHC compared with those with pain <3 months, while patients with pain duration >12 months were less likely to be treated in SHC. There was no difference in psychological distress between patients in PHC and SHC, but the latter reported more pain and lower HRQoL compared with patients in PHC. Finally, treatment in SHC was associated with lower education, heavier workload, less physical activity and receiving social benefits.

Patients with prolonged neck or back pain are, according to clinical guidelines, recommended for

Table II. Odds ratios^a (ORs) with 95% confidence interval (95% CIs) for demographic and lifestyle factors and pain duration, for patients treated by healthcare professionals in departments for physical medicine and rehabilitation in specialist healthcare (SHC) vs patients treated by physiotherapists in primary healthcare (PHC)

Variable	Number in PHC (n= 584)	Number in SHC (n= 7541)	Crude OR (95% CI)	Adjusted ^b OR (95% CI)
Smoking				
No	321 (90.7)	5,154 (94.1)	1.00 (Reference)	1.00 (Reference) ^c
Yes	33 (9.3)	1,211 (19.0)	1.51 (1.26, 1.81)	1.13 (0.93, 1.38)
p-value			<0.001	0.205
Education				
Elementary school/college	146 (34.4)	4286 (63.6)	1.00 (Reference)	1.00 (Reference)
University/high school ≤ 4 years	155 (36.5)	1,436 (21.3)	0.32 (0.25, 0.40)	0.34 (0.27, 0.43)
University/high school > 4 years	124 (28.2)	1,019 (15.1)	0.28 (0.22, 0.36)	0.31 (0.24, 0.39)
p-value for trend			<0.001	<0.001
Workload				
Mostly seated	146 (57.5)	1,417 (23.9)	1.00 (Reference)	1.00 (Reference) ^c
Much walking	54 (21.3)	1,249 (21.1)	2.38 (1.73, 3.29)	2.12 (1.53, 2.94)
Walking and lifting/heavy lifting	54 (21.3)	3,257 (55.0)	6.21 (4.52, 8.54)	4.60 (3.29, 6.42)
p-value for trend			<0.001	<0.001
Social benefits				
No	257 (75.8)	2702 (47.5)	1.00 (Reference)	1.00 (Reference)
Yes	82 (24.2)	2982 (52.5)	3.46 (2.68, 8.54)	2.10 (1.57, 2.81) ^d
p-value			<0.001	<0.001
Physical activity				
No/low	91 (25.4)	5034 (78.2)	1.00 (Reference)	1.00 (Reference) ^e
Moderate	199 (55.4)	1,106 (17.2)	0.10 (0.08, 0.13)	0.10 (0.08, 0.13)
Often	69 (19.2)	299 (4.6)	0.08 (0.06, 0.11)	0.06 (0.04, 0.09)
p-value for trend			<0.001	<0.001
Pain duration				
<3 months	84 (12.0)	1,577 (22.6)	1.00 (Reference)	1.00 (Reference) ^b
3–12 months	130 (30.9)	3,163 (45.3)	1.30 (0.98, 1.72)	1.33 (1.00, 1.76)
>12 months	207 (49.2)	2,248 (32.2)	0.58 (0.45, 0.75)	0.60 (0.46, 0.79)
p-value for trend			<0.001	<0.001

^aOR, odds ratio, logistic regression analysis.^bAdjusted for age, sex and nationality.^cAdditionally adjusted for education.^dAdditionally adjusted for marital status, education, workload, physical activity, pain, pain duration, previous physiotherapy (PT).^eAdditionally adjusted for marital status, education and smoking.

multidisciplinary treatment, which is more often offered in SHC (17). The results of the current study may indicate that clinical guidelines with regards to referral practice for patients with persistent pain are followed, since patients with pain duration of 3–12 months were most likely treated in SHC. Patients with longer pain duration (>12 months) were less likely to be treated in SHC, despite an

increase in psychological distress, pain, disability and decrease in HRQoL with pain duration (data not shown). However, this study did not include information about previous treatment in SHC, refused referrals to SHC, or about treatment by other healthcare professionals for these patients. Yet, these findings may imply that patients with pain duration >12 months are considered not to benefit

Table III. Mean difference^a (95% confidence intervals (CIs)) in psychological distress (SCL-10), pain, disability and health-related quality of life (EQ-5D) between patients treated in departments for physical medicine and rehabilitation in specialist healthcare (SHC) and by physiotherapists in primary healthcare (PHC)

Variable	Number in PHC (%)	Number in SHC (%)	PHC	SHC	Crude	Adjusted ^b
	n=584	n=7,541	Mean (SD)	Mean (SD)	Mean difference (95% CI)	Mean difference (95% CI)
SCL-10 (1–4)	199 (34.0)	4,849 (64.3)	1.66 (0.48)	1.92 (0.64)	0.26 (0.17, 0.35)	0.06 (–0.03, 0.14) ^c
Pain (0–10)	200 (34.2)	5,156 (68.4)	4.52 (2.21)	5.73 (1.90)	1.23 (0.96, 1.48)	0.76 (0.49, 1.02) ^d
Disability (0–100)	155 (26.5)	2,479 (32.8)				
Pain ≤ 12 months ^e	85	108	21.85 (12.38)	26.34 (15.91)	4.49 (1.02, 7.95)	–7.46 (–10.7, –4.22) ^{f,g}
Pain > 12 months	70	1,371	21.40 (9.65)	35.90 (18.08)	14.05 (10.23, 18.78)	–1.05 (–4.64, 2.53) ^{f,g}
EQ-5D (–0.59–1)	198 (33.9)	4,870 (64.6)	0.65 (0.18)	0.49 (0.31)	–0.17 (–0.21, –0.12)	–0.07 (–0.11, 0.03) ^c

^aLinear regression.^bAdjusted for age, sex, nationality, workload, physical activity, pain duration, previous PT.^cAdditionally adjusted for education, smoking, marital status, pain.^dAdditionally adjusted for education and smoking.^eCategory <3 months and 3–12 months merged.^fAdditionally adjusted for pain.^gSignificant interaction between disability and pain duration ($p_{\text{interaction}} < 0.001$); thus disability results are presented stratified by pain duration.

from treatment or have already completed treatment in SHC and then been referred back to PHC. For many neck and back patients, total recovery is never accomplished (30) and follow-up will continue for years. The relatively low proportion of patients in the acute phase, especially in PHC, cannot be explained by the current data. It might be that most patients in the acute phase are treated by their GPs according to clinical guidelines, but we cannot eliminate the risk of bias in our data due to inclusion. Waiting time for an appointment both for PT in PHC and in SHC may also have influenced the duration of pain, and, in addition, patient delay.

In total, 13% and 36% of patients in PHC and SHC, respectively, scored above the cut-off value of 1.85 on SCL-10. Hence, a larger proportion of patients in SHC reported psychological distress, and this can support that patients with higher psychological distress are more often referred to SHC. In the univariate analysis, psychological distress differed slightly between the groups. However, this difference did not remain significant in the multivariable analysis, suggesting there are other more important factors influencing the referral to treatment in SHC. No difference in psychological distress between groups may also indicate a biopsychosocial approach with cognitive therapy among PTs (31). As expected, the patients in SHC reported more pain. This is comparable to previous findings in clinical trials in Norway (12, 31–33). Despite statistically significant, pain is moderate in both groups in the current study, and the difference is probably not clinically relevant (34, 35). A previous study of neck patients, also from NNRR, reported more pain (36). However, a smaller sample of patients, from a specific geographical area in Norway, were included, which might explain the difference.

Even though moderate disability was reported both in PHC and SHC, the difference between the 2 groups, is considered clinically relevant (34). The levels of disability are also comparable to previous findings (31, 32, 37)). However, the results changed in the multivariable analyses. Patients in SHC with pain duration ≤ 12 months had less disability than patients in PHC, while no differences were found for patients with pain duration >12 months. This indicates that disability is, most likely, not an important reason for treatment in SHC. Due to the large number of participants without scores on disability, and the significant differences between patients with and without valid scores, these results should be interpreted with caution. The differences in HRQoL in patients treated in PHC and SHC were significant in both univariate and multivariable analyses, but small, and were considered of little clinical importance (38). Comparison with other studies is difficult due to methodological differences. We were not able to find

any studies using the crosswalk calculator for neck or back patients.

Based on the results from previous studies, identifying low education as a potential risk factor for neck and back pain (39, 40), we expected the educational level in the current study sample to be lower than the national level (41). However, we found a high educational level (>13 years, 66% and 36% in PHC and SHC, respectively) supporting previous findings, that patient with high education tend to use healthcare services more frequently than patients with lower education, especially PT treatment (10, 13, 42). The difference in educational level between groups may be due to different reasons for referral. Some patients in SHC are most probably referred for a medical certificate needed for application for disability benefits, which is also known to be associated with lower education (43). However, we do not have information about the purpose of the referral, or about the treatment or follow-up.

The study found that a heavy workload and low level of physical activity were associated with treatment in SHC, factors that previously have been identified as potential risk factors for neck and back pain (39, 40, 44, 45). These factors have also been found to increase the risk for prolonged pain and disability pension, and may be one explanation for referrals to and treatment in SHC. In addition, according to Statistics Norway, heavy workload is more common among people with low education (46). The lower level of physical activity in SHC compared with PHC might be due to patient's expectations. Patients treated by PTs both expect and prefer an active treatment strategy (47), hence are more physical active.

Neck and back pain are common reasons for sick leave and disability pension (48, 49), even though the amount of sick leave has declined in recent years (17). In the present study, the number of patients on sick leave is twice as high in SHC as in PHC, and receiving social benefits was also associated with treatment in SHC. Several factors found in previous studies can explain this: low education and heavy workload are risk factors for sick leave, while physical activity is protective (49–52). These factors differed between the groups in the current study. Pain intensity has also been considered a risk factor for sick leave (52, 53). Overall, we found that patients receiving social benefits reported more pain than patients not receiving social benefits (data not shown). Furthermore, the proportions of patients on disability pension were similar, but more patients were on sick leave in SHC. This may support the earlier assumption that some patients are referred for a medical certificate for disability pension. In contrast to previous studies reporting higher rates of sick leave and disability pension among women (48,

54), the current study found no difference in sick leave and disability pension between sex (data not shown).

Strengths and limitations

As far as we know, no other study has collected data with comparable methods and compared patients with neck or back pain treated in PHC and SHC. The use of a nationwide register data and a nationwide database ensured representation from all Norwegian regions. The FP database has been shown to be representative for patients treated by PTs in Norway (23). NNRR covered approximately 63% of all patients treated in departments for physical medicine and rehabilitation in SHC in 2018 (24). However, we could not include all patients in the FP database because no diagnostic codes were registered. Only 15% of FP patients had a neck or back diagnosis, which was lower compared with Evensen et al. (23), who found that 23% of patients in PT clinics in Norway reported neck or back pain. Furthermore, missing data is a challenge in patient-reported outcome measures and was also present in our study. However, the main limitation is that the lack of information about the neck or back patients treated only by GPs, as well as data on the referral process from GP and PHC to SHC, including refused referrals.

CONCLUSION

Patients with neck or back pain treated in PHC and SHC differed according to pain, HRQoL and pain duration. Treatment in SHC tended to be more common in patients with a pain duration of 3–12 months. Psychological distress, considered an important clinical factor for treatment in SHC, was similar between groups. Social benefits, education, workload and physical activity were factors associated with treatment in SHC. This study adds important aspects to the ongoing debate concerning priority in the health services, and challenges the beliefs of factors affecting referral practice.

When studying healthcare use, future studies should also include GP data, in order to capture all patients seeking healthcare for neck or back pain. With a longitudinal design following the patients through the healthcare services, more knowledge can be achieved about the referral processes and patient trajectories for patients with neck or back pain.

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