Graduate thesis

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Reliability of a self-administered musculoskeletal pain questionnaire: The fourth Trøndelag Health Study (HUNT4)

Graduate thesis in Program of Professional Study, Medicine
Supervisor: Knut Hagen
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Abstract

Objectives: The aim of this population-based study was to estimate the reliability between a self-administered questionnaire and a face-to-face interview performed approximately two months later. We also assessed the 1-year prevalence of multiple musculoskeletal pain locations.

Methods: A random sample of 1201 participants in the fourth Trøndelag Health study (HUNT4) were invited to a "sleep and pain" sub-study. A total of 232 (19%) answered musculoskeletal questions adapted from the Nordic Musculoskeletal Questionnaire (NMQ) in a semi-structured interview. The reliability with the HUNT4 questionnaire was tested using Cohen`s Kappa statistics with 95% confidence intervals (CI). The 1-year prevalence of the different pain locations were stratified by gender and age and estimated with 95% CI.

Results: The reliability was good for chronic musculoskeletal pain (CMSP), chronic widespread musculoskeletal pain (CWMSP), and pain located in the hip and knee (kappa values 0.63-0.68). Moderate kappa values between 0.51-0.60 were found for pain in the neck, shoulder, elbow, hand, upper back, lower back, calf and ankles/feet, as well as having ≥7 pain sites.

The 1-year prevalence was estimated to 54.3% (95% CI 47.9-60.8) for CMSP and 17.2% (95% CI 12.3-22.1) for CWMSP, substantially higher for women and those aged 50 years and above.

Conclusions: In this population-based study the reliability of the self-administered questionnaire was good to moderate for most pain locations. In particular, the questionnaire seems to be a useful tool to identify CMSP, CWMSP and pain in the hip and knee.

Key words: Nordic Musculoskeletal Questionnaire, prevalence, epidemiology, pain.

Introduction

Musculoskeletal disorders are ranked as one of the top ten causes of years lived with disability, most evident for lower back pain and neck pain (1). Musculoskeletal disorders affect the health and economy both individually and in the society, and is an economic burden to most countries in Europe (2).

The prevalence of chronic musculoskeletal pain (CMSP) in the general population is high (3-8), and during the last decades, an increasing trend has been reported (3, 9). Interestingly, during the covid-19 pandemic, even higher incidence of CMSP has been expected (10). To

investigate this further, future post-pandemic prevalence studies need to be compared with corresponding studies conducted shortly before the outbreak.

The standardized Nordic Musculoskeletal Questionnaire (NMQ) was developed in the last part of the 1980s (11). During the last three decades, the NMQ has been used in many clinical (12) as well as population-based studies (e.g. (3-8)). The test-retest reliability of NMQ has been evaluated in several selected groups (13-17). On the other hand, only one previous population-based study has reported some reliability data (3).

This Norwegian cohort study from the Trøndelag Health Study (HUNT) have included musculoskeletal questionnaires adapted from the NMQ since the first study was performed in the1980`s.

The aim of this longitudinal population-based study is to evaluate the reliability of single and multiple musculoskeletal pain sites between a self-administered questionnaire and a subsequent face-to-face interview performed approximately two months later. In addition, the 1-year prevalence of the corresponding pain locations based on the face-to-face interview is reported.

Methods

HUNT4 and Q2

The Trøndelag Health Study (HUNT) is one of the largest population-based surveys ever performed (18) and has been conducted in four waves between 1998 and 2019. The last three surveys include data from questionnaires, interviews, clinical measurements and biological samples (3, 7).

In the adult version of HUNT4 all inhabitants aged 20 or more in Nord-Trøndelag county were invited to the survey (19) in the period between September 2017 and February 2019 (3, 7).

The HUNT4 survey included two questionnaires; questionnaire 1 (Q1) and questionnaire 2 (Q2), where Q2 contained a musculoskeletal questionnaire mainly adapted from the NMQ. Compared to the original NMQ, check boxes for jaw, chest, calf and thigh were added, increasing the total number of pain locations from 9 to 13 (Figure 2).

Among 96 396 invited adults aged ≥20 years in HUNT4, a total of 50 078 (58%) answered Q1, whereof 41 643 (44%) individuals answered Q2 (Figure 1).

The HUNT4 sleep and pain study

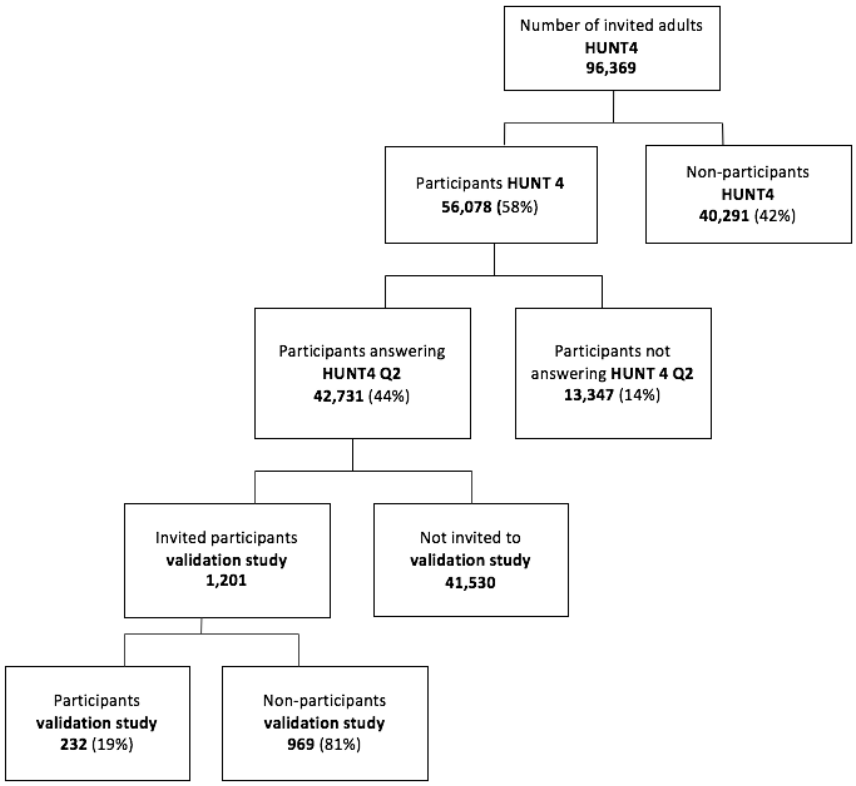
The present study is part of a subproject in HUNT4 called "Sleep and Pain Study", mainly focusing on sleep disorders and included invitation to polysomnography (PSG) and neurophysiological measurements. A random selection of the HUNT4 respondents received an invitation letter sent by postal mail informing about an initial interview focusing on sleep disorders. Questions about musculoskeletal pain were not mentioned in the invitation letter.

Study population

The main goal with the "sleep and pain study" was to perform at least 200 PSGs. Based on a participation rate of <20% in a HUNT3 PSG-study (20), it was decided to send 1200 postal written invitations randomly to adult HUNT4 participants living in Stjørdal who had participated in HUNT4 in the period from September 4th 2017 to November 30th 2017. They should all have responded to both HUNT questionnaires. No stratification by sex or age was performed. However, based on previous experience with HUNT3 (20), we anticipated that participation would be higher among women than men, highest in the age group 60-69 years, and lowest in the age group 20-29 years.

Among the randomly 1201 invited persons to the interview, 239 agreed to participate. Seven people could not attend because they were out of town, had a sick husband, were busy at work or had forgotten the invitation (19). A total of 232 attended a semi-structured interview (19% participation rate) (Figure 1).

Figure 1: Diagram of the invited population according to type of participation in different parts of HUNT4

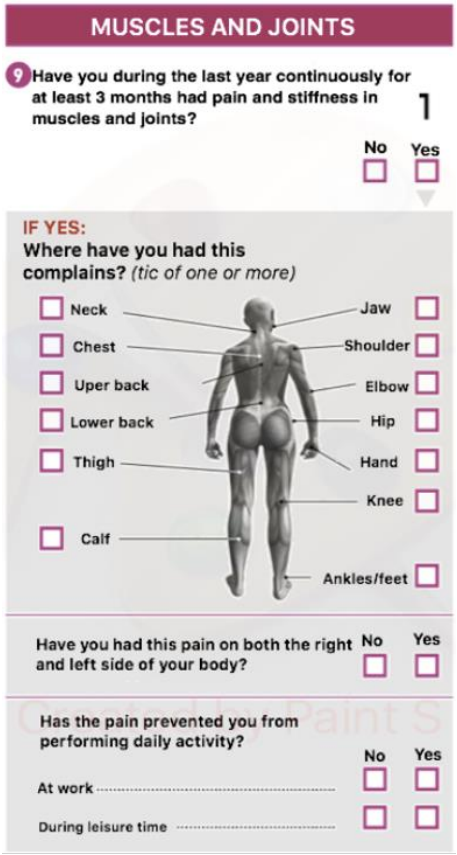


The semi-structured interview

A semi-structured interview was performed by five medical doctors (three neurologist) with special interest and competence of headache and pain disorders (19). The interview questions were identical to the questions in the Q2 of HUNT4 (Figure 2).

The participants were initially asked the screening question "during the last year, have you had pain and stiffness in your muscles and joints that lasted for at least three consecutive months?" Those who answered "no" to the screening question in the interview or HUNT4 questionnaire were not supposed to answer further questions considering musculoskeletal complains. Individuals who answered "yes" were classified as having CMSPs, and they were also asked to mark the localization(s) in a drawing, with the following 13 options (Figure 2): jaw, neck, shoulder, elbow, hand, chest, upper back, lower back, hip, knee, ankles/feet, thigh and calf.

Figure 2: The musculoskeletal questionnaire included in HUNT4 and replicated in the face-to-face interview



During the semi-structured interview, the participants with CMSP were asked if previous consultation and supplementary investigation had resulted in a doctor-evaluated specific diagnosis.

The definition of chronic widespread musculoskeletal pain

Chronic widespread MSP (CWMSP) was defined according to the 1990 criteria of the American College of Rheumatology (ACR) and included pain in both sides of the body and CMSP from all the following three regions: axial skeleton (neck, chest, upper back or lower back), above the waist (neck, shoulder, elbow, hand, chest or upper back) and below the waist (lower back, hip, knee or ankles/feet) (21). Furthermore, we also made separate analyses for individuals having respectively 3-6 and ≥7 pain sites with specific relevance to the revised fibromyalgia 2016 criteria (22).

Missing data

In the interview, two out of 232 participants had missing data on the screening question. In the present study, they were both recoded to answering "no" based on negative responses on the subsequent 13 pain locations (no pain or hip pain only). Among the 232 participants, 15 did not answer the screening question in the second questionnaire in HUNT4. Thus, the reliability was evaluated among 217 participants with valid data both in the questionnaire and interview. One of the 217 had not answered the question about pain in both left and right side of the body in the Q2. For the calculation of CWMSP we made the most conservative choice and recoded the answer as "no" in the questionnaire data for this participant.

Statistics and analysis

The reliability between the questionnaire and the interview for the corresponding CMSP locations was evaluated by Cohen kappa statistics with 95% confidence interval (CI). The CI was estimated by multiplying the standard error of kappa with 1.96. Kappa statistics is frequently used in test-retest and interrater reliability analyses and was introduced by Jacob Cohen in 1960 (23). A kappa value of <0.20 is considered as poor, 0.21-0.40 as fair, 0.41-0.60 as moderate, 0.61-0.80 as good and 0.81-1.00 as very good strength of agreement (24).

The 1-year prevalence of the various pain sites was estimated with 95% CI stratifying for gender and for the age groups below 50 years and 50 years and above.

For all our analysis we used IBM® SPSS® Statistics (Chicago, IL, USA), version 26.

Ethics

This study was approved by the Regional Committee for Medical and Health Research Ethics (2018/2422/REK Midt). The participants have given written informed consent. HUNT 4 project was also approved by the Norwegian data inspectorate.

Results

Demographic data of the study population

As demonstrated in Table 1 below, more women (65%) than men (35%) participated in the interview. The mean age was 58.4 years (range, 22-89 years). Individuals aged between 20-39 years were less likely to participate, and 70% were in the age group 50-79 years (Table 1).

Table 1: Characteristics of the population participating in the interview (n=232):

	Women n=151	Men n=81	Total n=232
Sex (%)	65.1	34.9	100
Mean age	57.5	60.1	58.4
Age range	22-83	23-89	22-89
20-29	6	4	10
30-39	13	4	17
40-49	26	7	33
50-59	32	20	52
60-69	37	23	60
70-79	31	19	50
80-89	6	4	10

Accordingly, the mean age was 57.8 years in the group of 217 persons (65% women and 69% aged 50-79 years) with valid data on the self-administered questionnaire in HUNT4.

Reliability between interview and questionnaire

The mean and medium interval between answering the Q2 questionnaire and attending the interview was 59 days (95% CI 56-62 days) and 60 days (range 14-110 days), respectively. As demonstrated in Table 2, the estimated kappa values ranged from 0.21 to 0.68. The kappa values were good for CMSP (0.64, 95% CI 0.54-0.74), CWMSP (0.63, 95% CI 0.50-0.76), hip (0.67, 95% CI 0.55-0.79) and knee (0.68, 95% CI 0.57-0.80)

For the locations neck, shoulder, elbow, hand, upper back, lower back, ankles/feet and calf, as well as ≥7 pain sites, we found kappa values ranging from 0.51 to 0.60.
The lowest estimated reliability was found for pain in the chest and thigh, and for 1-2 pain sites and 3-6 pain sites, with kappa values ranging from 0.21 to 0.33 (Table 2).

1-year prevalence of musculoskeletal pain

The overall 1-year prevalence of CMSP was 54.3% (95%CI 47.9-60.8) and of CWMSP 17.2% (95% CI 12.3-22.1) (Table 3). Among the 126 individuals with CMSP, 107 persons (80%) had unspecified pain, whereas the remaining 25 persons (20%) reported a doctor-evaluated diagnosis in the semi-structured interview, e.g. arthrosis, fibromyalgia, rheumatoid arthritis or spinal stenosis.
As demonstrated by Table 3, the highest 1-year prevalence of pain was localized in the knee (23.7%), shoulder (22.0%), hip (22.0%), neck (21.6%), hand (20.7%) and lower back (20.7%), whereas the lowest prevalence was found for pain in the chest (5.6%) and jaw (4.7%).
The 1-year prevalence were almost consistently higher for women than for men (Table 3), most evident for pain in the neck, shoulder, hand, upper back, hip and ankles/feet. For example, 24.5% of women and 9.9% of men reported pain in the ankles/feet (Table 3). Furthermore, women were more likely to have ≥7 pain sites than men (14.6% versus 1.2%). On the other hand, more men than women reported 1-2 pain sites (33.3% versus 19.2%).
Regarding the impact of age, a higher 1-year prevalence of pain was found for individuals aged 50 years and above than for those below 50 years of age, except for pain in the neck, shoulder, elbow and upper back (Table 3).

Discussion

Reliability between questionnaire and interview

The main results in this population-based study were that the change-corrected agreement between the questionnaire and the semi-structured interview was good (kappa value > 0.60) or moderate with kappa values ≥0.50 for most pain locations.
The kappa value for CMSP of 0.64 in the present study was identical as reported in HUNT3 based on interview of 293 of HUNT3 participants, whereas a higher kappa value was found for CWMSP in the present study (0.63) compared to the corresponding study in HUNT3 (0.48) (3). The reason for the better kappa value in HUNT4 is unclear. However, it should be

mentioned that the 293 persons who participated in the reliability study in HUNT3 were younger (mean age 52.3 versus 58.4 years) and more likely to be men (51% versus 35%) compared to the present study population. Speculatively, lower occurrence of CWMSP in HUNT3 compared to HUNT4 may, at least in part, explain the lower agreement reported in HUNT3.

A kappa value ≥0.61 was also found for pain in the hip and knees, and kappa values ≥0.51 were found for pain in the neck, shoulder, elbow, hand, upper back, lower back, calf and ankles/feet, as well as for those reporting ≥7 pain sites. Thus, self-administered musculoskeletal questionnaire seem to be a useful tool for all these pain locations.

On the other hand only fair agreement was found for pain in the chest and thigh and for 1-2 pain sites and 3-6 pain sites with kappa values between 0.21-0.33(24). The good agreement for ≥7 pain sites and only fair agreement for 3-6 pain sites, chest and thigh are of relevance for the revised fibromyalgia 2016 criteria (22). Thus, the interpretation of questionnaire-based diagnosis of fibromyalgia using 3-6 pain sites, chest and thigh should be done with great caution. It should be highlighted that the pain locations jaw, thigh and calf were not a part of the NMQ and were included in the questionnaire for the first time in HUNT4.

Several studies have adopted versions of the NMQ to other languages and cultures and analyzed the validity and reliability of these questionnaires in different selected groups (14, 17, 25-29). Most of them have performed a test-retest reliability analysis, where the same participants answered the same questionnaire twice with or without a certain time interval in between. The interval between answering the questionnaire twice varies from study to study from a mean time of hours/days to a few weeks (17, 25-29). These test-retest studies all found moderate to excellent reliability (kappa values ranging from 0.57 to 1.0)(17, 25-28). In the present study the mean time-interval between answering the questionnaire and participating in the interview was nearly 2 months. Hence, the long re-test interval may possibly give a greater risk of changed pain-experience for each participant. How much their pain bothered them at the time of the interview could also affect their answers. On the other hand, longer re-test intervals may also reduce the risk of a memory effect where recall of previous answers can influence the reliability (26).

Prevalence of musculoskeletal pain

In the present study the overall prevalence of CMSP was 54.3% and of CWMSP 17.2%, and even higher figures were found for those aged 50 years or more and among women.

Interestingly, only 20% of those with CMSP reported having a doctor diagnosis explaining their pain, indicating that 80% had unspecified musculoskeletal pain.

Several population-based Scandinavian studies have used the same definition of CMSP and CWMSP as in the present study (3, 5, 6, 8). In a prospective study performed in Tromsø in Norway from 1994-1995, the 1-year prevalence of CMSP and CWMSP were respectively 35.7% and 12.8% (30). In the same period in the Nord-Trøndelag County of Norway, the corresponding prevalence were 44.8% and 22.0% based on data from 64 490 participants in HUNT2 aged 20 years or older (3). Furthermore, the 1-year prevalence of CMSP and CWMSP in Sweden (1995) were 34.5% and 11.4%, substantially lower than our findings (6). Later, in HUNT3 (2006-8) the prevalence of CMSP and CWMSP were estimated to be 47.9% and 20.0% respectively (3).

In the present study knee, hip, shoulder and neck were the most prevalent locations of CMSP. In accordance, high prevalence of pain in the neck- and shoulder-region were reported in several other population-based studies (3, 8, 31, 32).

We found higher prevalence of CMSP among individuals aged 50 years and above than among those below 50 years, in accordance with many other population-based studies (3, 8, 33-39). Furthermore, a peak in those aged 50-59 years was reported in a Swedish survey (32).

Men were more likely to report 1-2 pain sites, whereas the opposite was found for 3-6 and ≥7 pain sites. In similar way have other population-based studies found that women are more likely to have more severe or extensive musculoskeletal complaints than men (8, 31).

Overall, estimated prevalence of CWMSP from other studies in Europe using the ACR criteria varies from 4.2% to 18% (6, 40-42). That leaves our estimation of CWMSP of 17.2% in the higher range compared to the other studies. Notably, in HUNT2, as the questionnaire did not include an option for “pain in both sides of the body”, the definition of CWMSP used in prevalence estimations in HUNT2 and HUNT3 did not acquire this. In example, the prevalence of CWMSP in HUNT3 increased from 20.0% to 23.6% not including the “pain in both sides of the body”-option. Accordingly, the prevalence of CWMSP in our study increased from 17.2% to 19.8% without including this option.

During the last decades, some studies in Europe suggest a stable, but high prevalence of CMSP (43, 44), whereas other large-scale population-based studies have reported a trend of increasing prevalence of CMSP and CWMSP (3, 9). Accordingly, comparing the overall 1-year prevalence of CMSP in HUNT2 (44.8%), HUNT3 (47.9%) and the present HUNT4 sub-

study (54.3%), an increasing trend may be assumed. It should be highlighted that the present study was performed one year before the covid-19 pandemic outbreak.
Interestingly, an further increasing trend in the occurrence of CMSP and CWMSP have been suggested because of the covid-19 pandemic (10). Regarding this prediction, it may be of relevance that the use of computers and digital meetings have become more frequent during the covid-19 pandemic, and computer- and mobile-usage has been associated with musculoskeletal complaints (45). Thus, future population-based studies performed after the outbreak will be of particular interest regarding occurrence of CMSP and CWMSP.

Strengths and limitations

The strengths of this study were the population-based study design inviting a random sample of participants, the use of semi-structured interviews performed by doctors with special competence of pain disorders, and that most of the questions included in the interview and questionnaire were based on the NMQ. The random invitation reduces the risk for selection bias. Furthermore, the invitations to the sub-study did not mention that the interview would contain questions considering musculoskeletal pain. This gives a lower risk of selection bias toward people with special interest in musculoskeletal pain.
For the reliability analysis Altman recommends at least 50 subjects for evaluation of the measures (24). Other studies testing validity and reliability of the NMQ have included from 39 to 312 participants (14, 17, 25-29). Hence, we can say that our study with 217 participants is in the higher range of number of participants compared to other reliability studies.

There are limitations to the present study that must be taken into account. The population that agreed to attend the interviews had an overweight of women and of ages 50-79 years. The interviews were performed during daytime, which may make the working population less likely to attend the interviews. Because female gender and older age are more likely to develop CMSP, this might contribute to an overestimation of the overall 1-year prevalence figures in our study. In addition, the subproject mainly focused on sleep disorders. The population had an overrepresentation of individuals with insomnia (46), which may be a result of interest-related participation. Thus, we could not rule out the possibility that this selection bias could have interfered with the prevalence rates of musculoskeletal pain.
Other population-based questionnaire-based studies estimating prevalence of CMSP in Norway have included several thousand participants and had participation rates of 42-69% (3, 5, 8). Hence, generalization of our prevalence-figures should be done with caution

considering the low participation rate of 19%. In addition, our relatively low number of participants (n=232), gave relatively wide confidence intervals of our prevalence estimates.

Conclusions

In this population-based study, the self-administered HUNT4 musculoskeletal questionnaire has shown to have moderate to good reliability for most pain locations. In particular, the questionnaire seems to be a useful tool to identify CMSP, CWMSP as well as pain in the hip and knee. Only fair agreement was found for pain in the chest and thigh as well as for 1-2 and 3-6 pain sites. Thus, interpretation of these locations should be done with caution.

Acknowledgements: The Trøndelag Health Study (The HUNT Study) is a collaboration between HUNT Research Centre, (Faculty of Medicine and Health Sciences, NTNU, Norwegian University of Science and Technology), Trøndelag County Council, Central Norway Regional Health Authority, and the Norwegian Institute of Public Health.

We would like to thank our supervisor Knut Hagen for his thorough guidance and support on writing our thesis. This was a new experience for us, and having such an available and helpful supervisor made the process both enjoyable and educational.

Table 2: Reliability measured by kappa values with 95% confidence intervals comparing musculoskeletal pain locations based on questionnaire and interview (n=217)

Pain location	Interview (n)	Questionnaire (n)	False positive	False negative	Kappa value with 95% CI
CMSP[a]	116	119	21	18	0.64 (0.54-0.74)
-Jaw[b]	11	17	10	4	0.47 (0.23-0.70)
-Neck	48	66	29	11	0.53 (0.40-0.65)
-Shoulder	47	67	27	7	0.60 (0.48-0.72)
-Elbow	28	29	12	11	0.54 (0.37-0.70)
-Hand	45	56	24	13	0.52 (0.39-0.66)
-Chest	12	10	6	8	0.33 (0.07-0.59)
-Upper back	28	32	13	9	0.58 (0.42-0.73)
-Lower back	44	62	29	11	0.51 (0.37-0.64)
-Hip	44	48	14	10	0.67 (0.55-0.79)
-Thigh	25	17	11	19	0.21 (0.02-0.40)
-Knee	51	52	13	12	0.68 (0.57-0.80)
-Calf	29	24	9	14	0.51 (0.33-0.68)
-Ankles/feet	42	49	18	11	0.60 (0.47-0.73)
CWMSP[c]	37	51	20	6	0.63 (0.50-0.76)
1-2 pain sites[d]	53	39	19	33	0.29 (0.14-0.43)
3-6 pain sites	42	51	29	20	0.33 (0.18-0.48)
>=7 pain sites	21	29	14	6	0.55 (0.37-0.72)

a) CMSP= chronic musculoskeletal pain. Answered "yes" to the screening question: "Have you during the last year continuously for at least 3 months had pain and stiffness in muscles and joints?"

b) If yes, where have you had this complains? (tic of one or more locations at the drawing)

c) CWMSP= Chronic Widespread musculoskeletal pain according to the ACR 1990 criteria: "Axial plus upper and lower segment plus left- and right-sided pain"

d) Number of locations

Table 3: 1-year prevalence with 95% confidence intervals of Chronic Musculoskeletal Pain (CMSP) separated by pain location and number of pain sites

Pain location	Number with pain	< 50 years n=60[e]	>= 50 years n=172[e]	Women n=151[e]	Men n=81[e]	Overall n=232[e]
CMSP[a]	126	51.7 (38.7-64.7)	55.2 (47.7-62.7)	58.9 (51.0-66.9)	45.7 (34.6-56.8)	54.3 (47.9-60.8)
If yes; Where?[b] :						
-Jaw	11	0.0	6.4 (2.7-10.1)	7.3 (3.1-11.5)	0.0	4.7 (2.0-7.5)
-Neck	50	25.0 (13.7-36.3)	20.4 (14.3-26.4)	27.8 (20.6-35.0)	9.9 (3.2-16.5)	21.6 (16.2-26.9)
-Shoulder	51	23.3 (12.3-34.4)	21.5 (15.3-27.7)	27.8 (20.6-35.0)	11.1 (4.1-18.1)	22.0 (16.6-27.4)
-Elbow	30	13.3 (4.5-22.2)	12.8 (7.8-17.8)	16.6 (10.6-22.6)	6.2 (0.8-11.5)	12.9 (8.6-17.3)
-Hand	48	18.3 (8.3-28.4)	21.5 (15.3-27.7)	27.8 (20.6-35.0)	7.4 (1.6-13.2)	20.7 (15.4-25.9)
-Chest	13	5.0 (0.0-10.7)	5.8 (2.3-9.4)	8.0 (3.6-12.3)	1.2 (0.0-3.7)	5.6 (2.6-8.6)
-Upper back	29	15.0 (5.7-24.3)	11.6 (6.8-16.5)	17.9 (11.7-24.1)	2.5 (0.0-5.9)	12.5 (8.2-16.8)
-Lower back	48	16.7 (7.0-26.4)	22.1 (15.8-28.4)	23.8 (17.0-30.7)	14.8 (6.9-22.7)	20.7 (15.4-25.9)
-Hip	51	15.0 (5.7-24.3)	24.4 (17.9-30.9)	29.1 (21.8-36.5)	8.6 (2.4-14.9)	22.0 (16.6-27.4)
-Thigh	27	10.0 (2.2-17.8)	12.2 (7.3-17.2)	16.6 (10.6-22.6)	2.5 (0.0-5.9)	11.6 (7.5-15.8)
-Knee	55	13.3 (4.5-22.2)	27.3 (20.6-34.1)	27.2 (20.0-34.3)	17.3 (8.9-25.7)	23.7 (18.2-29.2)
-Calf	32	11.7 (3.3-20.0)	14.5 (9.2-19.9)	17.2 (11.1-23.3)	7.4 (1.6-13.2)	13.8 (9.3-18.3)
-Ankles/feet	45	11.7 (3.3-20.0)	22.1 (15.8-28.4)	24.5 (17.6-31.4)	9.9 (3.2-16.5)	19.4 (14.3-24.5)
CWMSP[c]	40	15.0 (5.7-24.3)	18.0 (12.2-23.8)	23.8 (17.0-30.7)	4.9 (0.1-9.8)	17.2 (12.3-22.1)
1-2 pain sites[d]	56	23.3 (12.3-34.4)	24.4 (17.9-30.9)	19.2 (12.9-25.6)	33.3 (22.8-43.8)	24.1 (18.6-29.7)
3-6 pain-sites[d]	47	21.7 (10.9-32.4)	19.8 (13.8-25.8)	25.2 (18.2-32.2)	11.1 (4.1-18.1)	20.3 (15.1-25.5)
>=7 pain-sites[d]	23	6.7 (0.2-13.2)	11.1 (6.3-15.8)	14.6 (8.9-20.3)	1.2 (0.0-3.7)	9.9 (6.0-13.8)

a) CMSP= chronic musculoskeletal pain. Answered "yes" to the screening question: "Have you during the last year continuously for at least 3 months had pain and stiffness in muscles and joints?"
b) If yes, where have you had this complains? (tic of one or more locations at the drawing)
c) CWMSP= Chronic Widespread musculoskeletal pain according to the ACR 1990 criteria: "Axial plus upper and lower segment plus left- and right-sided pain"
d) Number of locations under (b)
e) Number of participants in each category

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