

Projektnummer: 7-2007-03

Slutrapport til Arbejds miljøforskningsfonden

Risikofaktorer for smerter i ryg, led og muskler med speciel fokus på smerter der fører til lægekontakt.

Odderprojekt 1

Johan Hviid Andersen, projektleder

Projektet er udført ved arbejdsmedicinsk klinik i Herning.

Forord

Denne slutrapport fremlægger resultater af Odderprojekt I ”Risikofaktorer for smerter i ryg, led og muskler med speciel fokus på smerter der fører til lægekontakt”. Projektet omfatter etablering af en database omfattende alle tilmeldte personer hos 8 praktiserende læger i Lægehuset i Odder. Alle modtog et spørgeskema, hvorefter alle blev fulgt op de næste 18 måneder, med specielt fokus for at søge læge med smerter i bevægeapparatet. Formålet var så herefter at undersøge hvorvidt potentielle faktorer i det fysiske og psykiske arbejdsmiljø, personlige faktorer og faktorer relateret til helbred kunne forudsige hvem der søgte læge og hvem der ikke gjorde det.

Projektet er gennemført med bevilling fra Arbejdsmiljøforskningsfonden.

Projektet har udmøntet sig i fire videnskabelige artikler, hvoraf de 3 er offentliggjort, og den sidste er på vej. Herudover har læge Jens Chr. Jensen d. 9.11.2012 forsvaret en ph.d. ‘Predictors of care-seeking in general practise for back pain and upper extremity pain. A Danish population based study.’, som baserer sig på Odderprojekt 1. Projektet er endvidere videreformidlet på indenlandske og udenlandske konferencer og møder.

Projektet har været udsat for forskellige forhold der har forsinket gennemførelsen, bl.a. i relation til at en interventionsstudie (Odderprojekt 2) blev stoppet før tid. Baggrunden for dette er tidligere rapporteret til Arbejdsmiljøforskningsfonden. Der er endvidere redegjort for forsinkelsen af dette projekt i bemærkninger til regnskab.

Projektgruppen har bestået af Professor Johan Hviid Andersen (projektleder), Læge Jens Chr. Jensen og overlæge Jens Peder Haahr, begge fra Arbejdsmedicinsk klinik Herning samt overlæge Poul Frost, Arbejdsmedicinsk Klinik i Århus.

Projektgruppen vil gerne takke lægerne i Lægehuset i Odder for at stille deres materiale til rådighed.

På projektgruppens vegne, januar 2012

Johan Hviid Andersen, Susanne Wulff Svendsen, Professor, overlæge, ph.d.

Indholdsfortegnelse

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Artikel 1

Jensen JC, Haahr JP, Frost P, Hviid Andersen J. Looking beyond pain. The significance of health anxiety and somatization in care-seeking for back pain and upper extremity pain. *Fam Pract* 2012;29(1):86-95.

Artikel 2

Jensen JC, Haahr JP, Frost P, Andersen JH. Do work-related factors affect care-seeking in general practice for back pain or upper extremity pain? *Int Arch Occup Environ Health*. 2012 Sep 16. [Epub ahead of print]

Artikel 3

Jensen J.C., Haahr J.P., Frost P., Andersen J.H.
Does number of pain sites and comorbidity predict consultation for back pain and upper extremity pain in general practice? A Danish population- based cohort study (*Draft*).

Artikel 4

Andersen JH, Jensen JC. Modern health worries and visits to the General Practitioner in a general population sample - An 18 month follow-up study. *Journal of Psychosomatic Research* 2012;73(4):264-7.

Læsevejledning

Faktaboks på side 4 opsummerer resultaterne. Side 5-11 gennemgår undersøgelsen på dansk. Side 12 – 71 er en sammenfatning på engelsk med dansk resume på side 18-19. På side 72 – 117 findes det spørgeskema, som er anvendt i undersøgelsen. Herefter findes de fire videnskabelige artikler, som foreløbig er udarbejdet.

FAKTABOKS

Resultaternes betydning for **arbejdsmiljøet**:

Tunge løft spiller stadig en rolle for ondt i ryggen, og de der har tungt arbejde søger oftere læge end de der ikke har tungt arbejde. Om det tunge arbejde er en årsag til ondt i ryggen eller om det tunge arbejde forværrer ondt i ryggen kan ikke sikkert afgøres, men begrænsning af tungt arbejde i form af brug af tekniske hjælpemidler og aflastning indeholder fortsat et forebyggelsespotential. Undersøgelsen cementerer endvidere at personer med smerter i ryggen eller i nakke-skulder-arm som oftest passer deres arbejde trods generne, og sygemelding bliver kun brugt i mindre omfang.

Resultaternes betydning for de **praktiserende læger**:

Personer som søger læge med ondt i ryggen og øvre bevægeapparatssmerter har ofte andre typer af problemer såsom smerter eller gener andre steder fra kroppen, de er bekymrede og usikre. Det betyder at Lægens ord kan være en betydningsfuld intervention. De forkerte ord om et helbredsproblem eller dets relation til arbejdet kan skabe eller vedligeholde myter. Lægens ord skal afspejle evidens – giv positive budskaber og man maner myter i jorden. Lægen bør inddrage mulige andre symptomer og problemer i konsultationen med den person som søger læge med bevægeapparatssmerter. Dette skal gøres med skyldigt hensyn til at undgå yderligere bekymring hos den der søger læge.

Resultaternes betydning for de **der oplever bevægeapparatssmerter**:

Otte ud af ti voksne danskere oplever i løbet af et år gener eller smerter fra bevægeapparatet, men kun de færreste opsøger læge, hvilket betyder at de fleste finder en måde selv at tackle deres bevægeapparatsproblemer på. Dem der har opsøgt læge angiver for 80 % 's vedkommende at de gerne vil have lægen til at fortælle, hvad de kan gøre og ikke gøre med dette problem, mens kun 20 % ønsker at lægen udskriver medicin. Det er således råd og vejledning som er det afgørende for de der har bevægeapparatssmerter.

Baggrund.

Smerter i muskler, led og sener (bevægeapparatet) er udbredte i befolkningen og har mange forskellige årsager. I almen praksis er bevægeapparatsmerter en hyppig kontaktårsag, repræsenterende alt lige fra små skader til kroniske udbredte smertetilstande. Hovedparten af disse patienter har enten ondt i ryggen eller i skuldre, arme eller hænder. Sygemeldinger og tidlig tilbagetrækning fra arbejdsmarkedet på grund af bevægeapparatsmerter har store økonomiske konsekvenser både for samfundet og for det enkelte individ

En stor del af den eksisterende forskning har beskæftiget sig med hvorvidt en given påvirkning, f.eks. tunge løft og arbejdsstillinger har kunnet udløse en given lidelse, f.eks. kroniske lænderygsmarter. Denne forskning har ført til en lang række tiltag vedrørende det fysiske arbejdsmiljø og har været rettet mod bl.a. tunge løft, ensidigt, gentaget arbejde (EGA) og monotont arbejde samt akavede arbejdsstillinger.

Samtidig er en lang række af de fysisk mest belastende arbejdspladser forsvundet fra Danmark. På trods af disse tiltag og forandringer er forekomsten af bevægeapparatsmerter ikke blevet reduceret.

Selvom bevægeapparatsmerter er en hyppig kontaktårsag i almen praksis er det langt fra alle med ondt i ryggen eller armene der søger læge. Hvilke faktorer der udover smerte og funktionspåvirkning har betydning for beslutningen om at søge læge er utilstrækkeligt belyst. Hvor faktorer der er forbundet med bevægeapparatsmerter, sygefravær og lægesøgning kan være de samme kan de også være forskellige. En bedre forståelse af hvilke faktorer der medvirker til lægesøgning kan have betydning for planlægning i sundhedsvæsenet. Til brug for planlægningen har igennem tiderne været udarbejdet forskellige modeller der inkorporerer elementer som befolkningens

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sammensætning, helbredsforestillinger, samfundsmæssige forhold, herunder det fysiske og psykiske arbejdsmiljø, adgang til lægen samt patientens oplevede behov for ydelser. Hvilke elementer i modellen der vægter tungest vil variere over landegrænser, f.eks. om lægebesøg er finansieret over skatten eller medfører en grad af egenbetaling.

Odder-projektet beskriver forskellige faktorerers betydning for lægesøgning med rygsmerter eller smerter i overekstremiteterne. Det drejer sig om individuelle faktorer som helbredsangst, somatiseringstendens og fear-avoidance adfærd (undgåelsesadfærd), Modern Health Worries dvs. bekymringer om helbredspåvirkning af forskellige påvirkninger i det moderne liv, fysiske og psykiske arbejdsmiljøfaktorer, fysisk aktivitet i fritiden, tidligere lokal og udbredt smerte i bevægeapparatet, samt selvrapporeret fysisk og psykisk helbred, og endelig samtidig forekomst af andre sygdomme (komorbiditet) .

Metode.

Det tilgrundliggende studie er udført som et follow-up studie. Fra sygesikringen modtog vi data på samtlige personer mellem 17 og 65 år tilknyttet Odder Lægehus, i alt 8517 personer. Lægehuset rummer 8 læger i samarbejdspraksis. Lægerne deler ikke patienter men deler sekretariat og patient software , som blev anvendt ved dataindsamlingen. Ved projektstart fik samtlige 8517 tilsendt et spørgeskema dækkende de ovennævnte faktorer. I alt svarede 5068 (59.5 %). De efterfølgende 18 mdr. blev der indsamlet data i form af de ICPC-diagnoser (International Classification of Primary Care) som patienterne blev tildelt når de søgte læge for smerter i ryg eller overekstremiteter. Hovedinteressen samlede sig om tid til første besøg hos lægen

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med en af disse tilstande beregnet fra baseline, dss. Den dag de havde udfyldt spørgeskemaet. Derudover registrerede vi for året før projektstart alle diagnoser på hjerte-kredsløbslidelse, sukkersyge, hovedpine og mavesymptomer samt angst, stress og depressionstilstande. Til den statistiske analyse anvendte vi Cox regressionsanalyse hvor effekten af hver enkelt faktor blev analyseret justeret for de andre faktorer. Udfaldet blev opgivet i hazard ratios med 95 % konfidensintervaller. Analyserne blev opdelt på køn for at demonstrere vigtige forskelle. Til den del af projektet der omhandlede Modern Health Worries' effekt på hyppigheden af lægesøgning generelt blev der brugt multipel ordinal logistisk regression.

Resultater.

5068 personer var tilgængelige i undersøgelsen og af disse konsulterede 3969 (78,3 %) lægen indenfor de 18 måneders follow-up, heraf var 57,5 % kvinder og 42,5 % mænd.

607 (15,3 %) konsulterede mindst engang deres læge for rygsmerter, mens 561 (14,1 %) mindst engang konsulterede for overekstremitetssmerter. Kvinder udgjorde 61,6 % af dem der konsulterede for rygsmerter og 53,5 % af dem der konsulterede for overekstremitetssmerter. I den del af undersøgelsen der inddrog arbejdsforhold blev kun de der havde tilknytning til arbejdsmarkedet inddraget, i alt 4325.

Arbejdsforhold.

Tungt fysisk arbejde øgede risikoen for lægesøgning hos mænd med rygsmerter med 90 %, men dette var ikke tilfældet hos kvinder. Der var en samtidig et positiv eksponerings-respons forhold således at jo tungere arbejdet blev beskrevet jo større var risikoen for lægesøgning. Repetitivt arbejde havde ikke betydning for lægesøgning for rygsmerter og det var gældende for både mænd og kvinder. Psykisk arbejdsmiljø i

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form af indflydelse på arbejdet, tilfredshed med arbejdet, krav og tilfredshed med ledelsen havde ingen sikker effekt på lægesøgning med ondt i ryggen.

For lægesøgning med smerter i skuldre, arme og hænder var tungt fysisk arbejde forbundet med øget lægesøgning men kun med sikkerhed hos mænd hvor risikoen var øget med 109 %. Som for rygsmerterne var der også her en positiv eksponeringsrespons effekt. Der var ingen sikker øget risiko for lægesøgning pga. repetitivt arbejde og det samme var gældende for de psykosociale faktorer. Dette var gældende for begge køn.

Helbredsbekymring og somatisering.

For lægesøgning med rygsmerter fandt vi at en høj grad af helbredsbekymring hos kvinder gav en let øget risiko for lægesøgning på 36 %. Det kunne ikke genfindes for mænd. Somatisering (tendens til at udvikle legemlige symptomer uden påviselig fysisk grund) var såvel hos kvinder som hos mænd forbundet med øget risiko for lægesøgning med rygsmerter, henholdsvis 64 og 70 %. Tidligere rygsmerter var en stærk prædiktor for lægesøgning hos både mænd (170 %) og kvinder (100 %).

Helbredsbekymring havde ingen betydning for lægesøgning med overekstremitetsmerter, somatisering gav en let øget risiko hos kvinder, men ikke statistisk sikker. Tidligere kraftige overekstremitetssmerter gav både hos mænd (134 %) og hos kvinder øget risiko for lægesøgning.

Komorbiditet og tidligere udbredt smerte.

I denne del af undersøgelsen deltog alle, uanset tilknytning til arbejdsmarkedet. Tidligere udbredt smerte i bevægeapparatet var en stærk prædiktor for lægesøgning med rygsmerter og dette ændrede sig ikke selvom vi justerede resultatet for andre sygdomme og alder. For mænd var risikoen øget med 134 % og for kvinder 120 %.

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Tidligere hovedpine, psykiatriske symptomer (stress, angst, depression) var også forbundet med øget lægesøgning for rygmerter, men der var mindre forskelle mellem kønnene. Diabetes og hjertekredsløbssygdomme var kun af ringe betydning for lægesøgning med rygmerter. Alder var stærkest forbundet med lægesøgning blandt mænd.

For smerter i skuldre, arme og hænder viste tidligere udbredt smerte sig at have mindre betydning end hos patienterne med rygmerter. Mænd med tidligere udbredt smerte havde 35 % øget risiko for lægesøgning, mens kvinder havde 55 % øget risiko. Mavesymptomer og smerter samt diabetes øgede risikoen hos kvinder for lægesøgning med overekstremitetssmerter. Alder var en meget stærk prædikator hos kvinder på mellem 40-49 år (199 %) og i aldersgruppen 50-59 år 265 %.

Moderne helbredsbekymringer.

I denne del af undersøgelsen indgik alle deltagere og vi inddrog samtlige konsultationer af hensyn til at få et stort nok materiale. 8 ud af 10 deltagere konsulterede deres læge mindste engang i løbet af de 18 mdr.'s opfølgningstid og ikke mindre end 25 % konsulterede mere end 6 gange. Et flertal af deltagerne var bekymrede for en række potentielle helbredspåvirkninger i dagligdagen. Deltagerne var mest bekymrede for tilsætninger i fødevarer, forurenede vand, resistente bakterier og antibiotika i mad samt luftforurening og stress. Mindst bekymrende var mobiltelefoner, vaccinationer og højspændingsledninger. Kvinder udviste en større grad af moderne helbredsbekymringer end mænd, med en gennemsnitlig score på 33,6 mod mændenes 27,5. Der var en lineær sammenhæng mellem alder og moderne helbredsbekymringer og deltagere over 60 år havde en øget forekomst af disse bekymringer på 140 % i forhold til aldersgruppen mellem 17 og 29 år. Selv når vi korrigerede for selvrapporeret helbred og angst havde den del af deltagerne der

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havde den højeste grad af moderne helbredsbekymringer 20 % højere lægesøgning på hvert trin mellem 1-5 lægesøgninger og over 6 lægesøgninger.

Diskussion og konklusion.

Undersøgelsen viser at tidligere oplevet lokaliseret og udbredt smerte er en stærk risikofaktor for lægesøgning med ryg - og overekstremitetssmerter. De fysiske arbejdsforhold spiller en rolle, især tungt fysisk arbejde og især for mænd, hvorimod der ikke er fundet en effekt af de psykosociale forhold i denne undersøgelse. Hos patienter der henvender sig med rygsmerter har helbredsangst/bekymring en vis betydning blandt kvinder og somatisering spiller en rolle for begge køn. Dette gælder ikke for patienter med ondt i skulder, arme og hænder. Tilstedeværelse af anden sygdom spiller en rolle, især for rygpatienterne. Moderne helbredsbekymringer har betydning for lægesøgning generelt.

Undersøgelsen styrke beror dels på det prospektive design der tillader at drage konklusioner vedr. årsagsvirkning forhold. Derudover repræsenterer deltagerne et bredt udsnit af befolkningen og mange varierende erhverv og dermed også et bredt spektrum af erhvervsmæssige eksponeringer. Begrænsningerne i undersøgelsen ligger i at informationerne givet i spørgeskemaet kan have ændret sig over tid. Desuden har vi ikke nogen viden om smertens intensitet eller varighed på konsultationstidspunktet og kan derfor heller ikke skelne mellem akut og kronisk smerte. Vi fandt at specielt tungt arbejde havde en betydning for lægesøgning, men om det skyldes at det tunge arbejde har forårsaget smerterne eller om smerterne giver begrænsninger i forhold til arbejdets udførelse kan vi ikke besvare ud fra de foreliggende data.

Resultaterne fra projektet kan danne basis for yderligere undersøgelser der kan pege

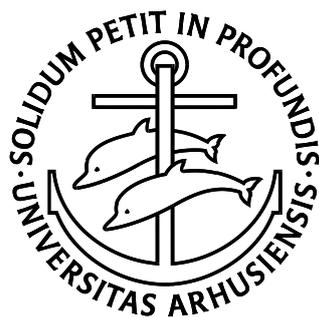
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på hvilke faktorer der kan påvirkes i planlægningen af sundhedsvæsenet. Endvidere kan resultaterne være vejledende for hvilke faktorer den praktiserende læge tager med i sine overvejelser i mødet med patienter med ryg - og overekstremitetssmerter, hvilket kan have betydning ved udfærdigelse af mulighedserklæringer hos sygemeldte, hvor mulige hindringer for tilbagevenden til arbejdspladsen skal kortlægges. Undersøgelsen understøtter tidligere forskning der har vist at smertetilstande i bevægeapparatet er komplekse. Hvis man ser bag smerterne har en lang række andre faktorer betydning i patienternes møde med sundhedsvæsenet.

A Danish population based study.

PhD thesis

Jens Christian Jensen



Faculty of Health Sciences

University of Aarhus
2012

Abbreviations

BP - Back Pain

CI - confidence intervals

DMQ - Dutch Musculoskeletal Questionnaire

GP - General Practitioner

HR - hazard ration

ICPC - International Classification of Primary Care

kg - kilogram

MHW - Modern Health Worries

MP - Musculoskeletal pain

MSP - Multi-site pain

SEQ-Pain - Standard Evaluation Questionnaire-pain

SF-12 - Short Form 12-item version 2

WRMSD - Work -Related Musculoskeletal Disease

1. English summary

Musculoskeletal pain (MP) is frequently occurring and has a multifactorial origin. In general practice MP is a common reason for consulting, representing anything from small strains and injuries to chronic generalized pain conditions. Among patients with MP, patients with back pain or upper extremity pain form the major part. Even so, far from all patients with either back pain or upper extremity pain seek care with their General Practitioner, and which factors are important for the decision of care-seeking seems to be inadequately clarified. Better knowledge of these factors could have importance when planning in the health care system. There are different explanatory models for the use of health care services that includes factors such as demography, social structure including physical and psychosocial working environment, health beliefs, enabling resources, and perceived need of the patient.

This thesis deals with the importance of different factors leading to care-seeking for back pain or upper extremity pain. It concerns such individual factors as health anxiety, somatization and fear-avoidance beliefs, modern health worries, physical and psychosocial work environment, leisure time physical activity, previous local and multi-site musculoskeletal pain and self-reported general and mental health and, finally, comorbidity. The underlying study was designed as a cohort study including all persons between 17 and 65 years registered to a group practice of eight General Practitioners in the town of Odder, Denmark. At baseline 8.517 persons of both genders and covering a wide spectre of occupational exposures were mailed a questionnaire covering all the aforementioned factors and demography. Of these, 5.068 (59.5%) answered. During 18 months of follow-up, data in the form of ICPC (International Classification of Primary Care) diagnoses were collected for all patients seeking care for back pain or upper extremity pain. Thus, outcome was time to first visit at the General Practitioner from baseline. The results were analyzed by Cox proportional hazard regression and outcomes were reported in hazard ratios with 95 % confidence intervals. Adjustments were made for relevant confounders.

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Analyses were stratified by gender to show important differences. The study shows that previous pain is strongly associated with care-seeking for both back pain and upper extremity pain. The same was shown for multi-site pain and especially if three or more regions were involved. This is in agreement with previous research. There was an association between health anxiety among females and somatisation with both genders and care-seeking for back pain. This association was not found for upper extremity pain. The highest level of heavy lifting was associated with care-seeking for back pain and upper extremity pain among males but not among females. None of the psychosocial work-related factors were associated to care-seeking, which is in agreement with previous research. Consulting the year before baseline for headache and abdominal symptoms were related to an increased risk of becoming a care-seeker for back pain for both genders, whereas females who had sought care in the previous year for stress, anxiety or depressive conditions had a higher risk of becoming care seekers for back pain. For upper extremity pain, the study shows that women who in the previous year sought care for diabetes or abdominal pain had a higher risk of becoming care seekers. Modern health worries were associated with a higher risk of becoming care seekers for all reasons among elder women.

The thesis suggests that different conditions in the musculoskeletal system call for different preventive measures regarding health anxiety and gender. Looking beyond the physical pain is a challenge to the General Practitioner. The physician's knowledge of the patient's work-related burdens is important for the patient's return to work. Comorbidity has an impact on care-seeking, especially other pain conditions in relation to back pain, pointing to the complexity of back pain patients

2. Danish summary

Muskuloskeletale smerter (MS) er hyppigt forekommende og har multifaktorielle årsager. I almen praksis er MS en hyppig kontaktårsag, repræsenterende alt lige fra små skader til kroniske generaliserede smertetilstande. Blandt patienter med MS udgør patienter med ondt i ryggen eller ondt i overekstremiteterne hovedparten. Alligevel er det langt fra alle patienter med ondt i ryggen eller overekstremiteterne der søger læge, og hvilke faktorer der har betydning for beslutningen om at søge læge er utilstrækkeligt belyst. En bedre viden om disse faktorer kan have betydning for planlægning i sundhedsvæsenet. Der findes forskellige forståelses modeller for brug af ydelser i sundhedsvæsenet som f.eks. inddrager helbredsforestillinger, demografi, samfundsmæssige forhold herunder det fysiske og psykiske arbejdsmiljø, adgang til lægen, patientens oplevede behov for ydelser.

Denne afhandling beskriver forskellige faktorer betydning for lægesøgning med rygsmerter eller smerter i overekstremiteterne. Det drejer sig om individuelle faktorer som helbredsangst, somatiseringstendens og fear-avoidance adfærd, Modern Health Worries, fysiske og psykiske arbejdsmiljøfaktorer, fysisk aktivitet i fritiden, tidligere lokal og udbredt smerte i bevægeapparatet, samt selvrapporert fysisk og psykisk helbred, og endelig komorbiditet.

Det tilgrundliggende studie er lavet som et kohorte studie på alle personer mellem 17 og 65 år tilknyttet en ottemands samarbejdspraksis i Odder. I alt 8517 personer som dækkede begge køn og et bredt spektrum af arbejdsmæssige eksponeringer. Ved baseline blev alle potentielle deltagere tilsendt et spørgeskema der dækkede demografi samt de ovennævnte faktorer. I alt svarede 5068 (59.5 %). Follow-up tiden var 18 mdr. hvor der blev samlet data i form af de ICPC-diagnoser (International Classification of Primary Care) som pt. blev givet når de søgte læge for enten ryg- eller overekstremitetssmerter. Outcome var således tid til første besøg hos egen læge beregnet fra baseline. Resultater blev analyseret med Cox proportional hazard regression og outcome blev opgivet i hazard ratios med 95 % konfidensintervaller. Der blev justeret for relevante confoundere. Analyserne blev stratificeret på køn for at demonstrere vigtige forskelle.

Studiet viser at tidligere smerte er stærkt associeret med lægesøgning både for ryg og overekstremitetssmerter. Det samme gælder for udbredt smerte og særligt hvis der er

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smerte i tre regioner eller derover. Dette er i god overensstemmelse med tidligere forskning. Der var association mellem helbredsangst hos kvinder og somatisering hos begge køn og lægesøgning for rygsmerter. Denne association kunne ikke genfindes for overekstremitetssmerter. Tunge løft var associeret med lægesøgning for rygsmerter og overekstremitetssmerter hos mænd men ikke hos kvinder. Ingen af de psykosociale faktorer på arbejdet var associeret med lægesøgning, hvilket er i overensstemmelse med tidligere forskning. Konsultation i året før baseline for hovedpine og mavesymptomer var forbundet med øget risiko for at søge læge med ondt i ryggen for begge køn, mens kvinder med konsultation i det forgangne år for stress, angst eller depressionstilstande havde øget risiko for lægesøgning for rygsmerter. For patienter med overekstremitetssmerter viste studiet at kvinder der tidligere havde konsulteret for mavesymptomer samt kvinder med diabetes havde øget risiko for lægesøgning. Modern Health Worries var associeret med en generel højere lægesøgning blandt ældre kvinder.

Afhandlingen peger på at forskellige tilstande i bevægeapparatet kræver forskellige præventive tiltag i forhold til helbredsangst og køn. At se bagom om den fysiske smerte er en udfordring for primærlægen. Kendskab til belastninger på arbejdspladsen kan have betydning for arbejdsfastholdelse. Andre sygdomme influerer på risikoen for lægesøgning, især andre smertetilstande i forhold til ryglidelse og dette peger på kompleksiteten omkring rygpatienter.

3. Introduction

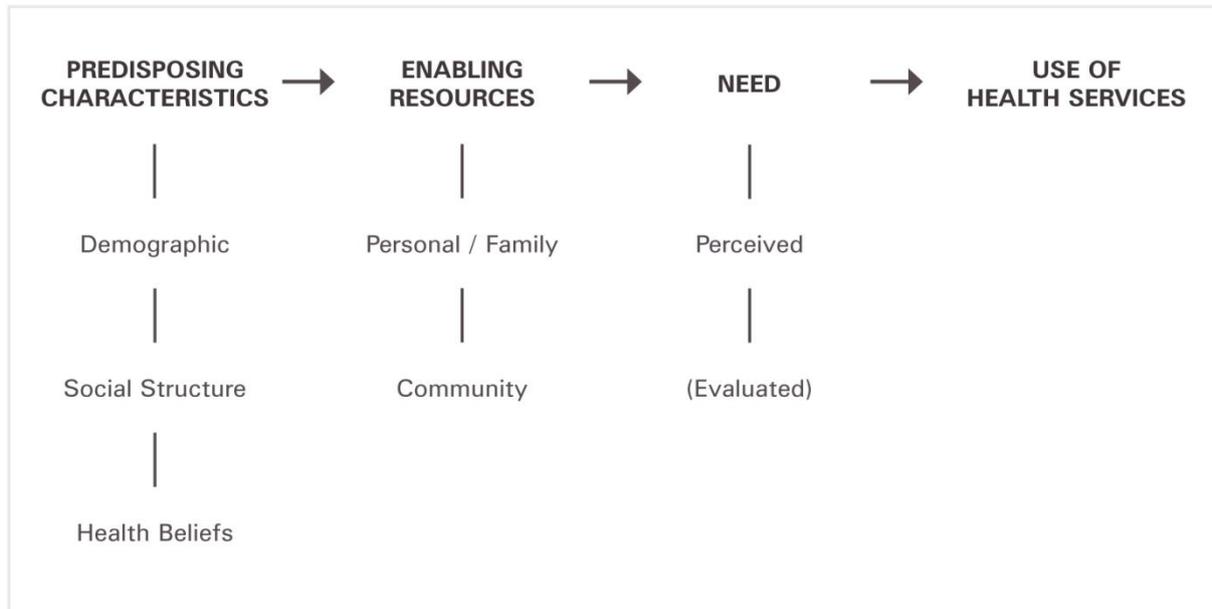
In Denmark the General Practitioner (GP) is the primary point of entry into the health system for patients with a new symptom or illness and at the same time the major contributor when dealing with chronic disease. Musculoskeletal pain (MP) is the second most important reason for consulting your GP only surpassed by upper airway infections. (1) As much as 20 % of the adult population consult their GP with musculoskeletal complaints over the course of a year. (2) A major part of patients seeking care for MP consist of patient with back pain (BP) or upper extremity pain (UEP). (3) Regional pain such as BP or UEP is often accompanied by other symptoms such as more widespread or multi-site pain (MSP), psychiatric disorders such as anxiety, stress or depression or other pain conditions like headache, abdominal symptoms or even more chronic diseases like diabetes or cardiovascular disease (4-6). Dealing with these patients puts high demands on the GP's abilities. MP could lead to disability and is a major cause of sickness absence and impaired production with ensuing economic consequences on both the individual and community level. Patients developing chronic MP may experience impacts on their quality of life due to depression and social isolation. (7)

Although patients with BP or UEP are quite common in primary care, a large part of the patients who experience pain do not seek care. The exact prevalence of care-seeking is difficult to determine, but a meta-analysis based on seven population-based surveys found a pooled prevalence of 58% on care-seeking for back pain. (8) A community-based study found that that 21 % of people with self-reported shoulder-neck pain consulted their GP for reasons related to their pain over a two year period. (9) Understanding why some people choose to seek care while others do not could help when planning health care utilities in our society. Over time several attempts have been made to build explanatory or even predictive models for health care usage. Some models have focused on the family as a unit, but due to the potential heterogeneity of the family members, a preference of the individual as the unit of analysis has been chosen. (10) An example of an explanatory and predicting model has been made by Ronald M. Andersen (10) . It is called the behavioural model and suggests that people's use of health care services is a function of their predisposition to use services,

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factors which enable or impede usage, and their need for care. The model is depicted in figure 1.

Figure 1. The Behavioral Model.



Used with permission from Ronald M. Andersen.

Demographic factors like age and gender would most likely play a role for care-seeking. Social structure would include factors such as educational level, occupation including physical and psychosocial working environment and to some extent ethnicity. Health beliefs are attitudes, values and knowledge about health and health services. Health beliefs on a community level could influence on how we arrange our health services. Health beliefs on an individual level might affect perceived need. Enabling resources would in Denmark be accessibility to the GP which, we believe, is good. If there is no perceived need there will be no care-seeking. Perceived need could be closely related to the character and seriousness of the actual condition or disease experienced by the patient, and modified by the patient's health beliefs connected to this condition. This could very well be the case with MP. What one person would perceive as common bodily sensations could by others be regarded as abnormal leading to care-seeking.(11) Cultural differences in health beliefs may have an important influence on musculoskeletal symptoms. (12) Health campaigns in the media may

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impact differences in health beliefs within the general population. (13) Despite an overall improvement in objective health and overall lifespan there has been and increasing demand for health care(14). Increased focus on health in modern life could drive the perception that routine daily symptoms are caused by physiological consequences of environmental factors, and these concerns about health has been proposed to be aggravated by the media's growing awareness of all kind of risks and diseases.(15;16) This phenomenon has been called Modern Health Worries (MHW) and is defined as the concerns individuals have regarding the health consequences of modern living. (17)

Research in work-related musculoskeletal disease (WRMSD) has mainly dealt with causation, asking the question whether specific work task were related to musculoskeletal disorders. (18) Even though some of the factors predicting MP, care-seeking for MP and taking sick leave due to MP are overlapping, others may differ. (19) Previous research has dealt with associations between care-seeking and gender, pain history, disability and well known work related factors. The results of this research suggest that the nature and severity of pain were strong predictors of care-seeking but also suggested that well known work-related risk factors for developing back pain did not determine use of care. (20;21) Other studies did, however, find an association between work-related factors and care-seeking.(22) Only a few studies have taken non-physical aspects or health beliefs into account and most of these studies have been cross-sectional. Nevertheless, they did suggest that health beliefs were associated with care-seeking and that having an externalized locus of control for pain management increased the odds of consulting your GP. (23-25)

Acknowledging that patients suffering from MP often have other diseases or conditions would raise the question whether this would lead to an increased use of care for MP. One argument could be that a poorer general health would lead to increased care-seeking for MP (26), the other argument being that patients do not seek care for MP when suffering from conditions perceived to be more amenable to care.(27) It has been shown that diseases clusters in certain persons and it could be assumed that musculoskeletal conditions such as back pain are a part of this. (5) The question is if this is merely simple coexisting or the diseases have a common cause, which could be of great importance for the GP when dealing with and treating these patients. Chronic MP has been shown to be associated with anxiety and depression (28), a fact that tends to complicate management and adds to health care utilization and costs. (29) That comorbidities should be routinely evaluated by the GP when

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dealing with patients who presents themselves with MP is promoted by the fact that patients with comorbidities have longer sick leave periods than those without comorbidities.
(30)

When using the terms back pain or upper extremity pain one would normally think of localized musculoskeletal pain. But in fact, most patients suffering from either would most like have other pain sites (31), and the more pain sites, the larger risk of disability and sick leave. Back pain patients often suffer from a wide range of other subjective symptoms, which should be taken into account by the GP.(32)

4. Aim of the thesis

The aim of this thesis is to evaluate factors related to care-seeking for back pain or upper extremity pain by looking at

- individual factors like somatization, health anxiety and fear-avoidance beliefs.

- physical and psychosocial work-related factors

- previous pain (localized and multi-site) and comorbidity.

As an addition Modern Health Worries and their impact on care-seeking in general was included.

5. Design

Almost all inhabitants in Denmark are registered with a GP. From the Public Health Insurance system we received information on all people between ages 17 and 65 years registered with eight GPs in the town of Odder. Age-limits were chosen in order to include people most likely connected to a work place. The Municipality of Odder is inhabited by 21.500 people, in the town of Odder and its rural surrounding, and is quite typical for the Danish population as such. The study population consisted of both men and women with an age range between 17 and 65, including both town and countryside inhabitants. Respondents were employed in a wide range of occupations giving a broad selection of work-related exposures. The eight GPs were independent of each other, each having their own patients, but placed in the same building with a shared reception and mutual patient software.

The study was conducted as a prospective study with a baseline questionnaire and an ensuing 18-month follow-up where all ICD-10 (33) diagnosis dealing with MP were registered on a weekly basis.

6. Methods

Ethical issues

In accordance with the Danish National Committee on Biomedical Research Ethics, studies only involving register-based data or questionnaire data are not obliged to be notified to the local committee. All participants signed written informed consent forms. The study was approved by the Danish Data Protection Agency.

Questionnaire

A total of 8.517 men and women were eligible from the eight selected GPs. A baseline postal questionnaire collected information on demographics, educational level, vocational situation, psychosocial and physical factors at the workplace, self-rated health, scales for somatisation, depression, anxiety, perceived stress, health anxiety, fear-avoidance behaviour, personality, and modern health worries, as well as pain history, pain intensity and pain generalisation, social network, smoking habits, and leisure time physical activity. The questionnaire was issued both on paper and as an identical web-based questionnaire in order to increase the participation rate. The response rate for the questionnaire was 59.5% (N = 5068). The questionnaire (in Danish) is found in appendix A.

Fear-avoidance.

Five items from the Fear Avoidance Belief Questionnaire(34) were used, but we chose to paraphrase items in order to ensure that both those with and without symptoms could answer. We supplied the question: "How much do you agree with the following statement: My work may harm my back and other parts of my body" A sum score from the six items (Cronbach's Alpha=0.67) was dichotomised at the 75th percentile.

Health anxiety.

The seven-item Whiteley Index was used to measure health anxiety. This has previously been shown to work well in primary care settings (35). The Whiteley Index is a one factor index, (Alpha=0.90). Items were summed and the score then dichotomised with a cut point at the 75th percentile.

Somatization

Somatisation was measured by the 12 items SCL-SOM, taken from the Symptom Check List 90-items (SCL-90)(36).(Cronbach's Alpha=0.83). A raw score was the simple sum of item scores for this dimension. This was dichotomised with a cut point at the 75th percentile.

Modern Health Worries.

The scale assesses how concerned respondents are about the health consequences of modern life (17). A 21 item version of the scale was used, with answer categories from 1 (no concern) to 5 (extreme concern). We adapted 14 items of the original 25 items, and omitted

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the item “depletion of ozone layer”, and instead we included an overall question on “climate changes”. We omitted “pesticides in food”, “overuse of antibiotics”, “Hormones in food”, “bacteria in air condition systems”, “pesticide spray”, “poor building ventilation”, “Leakage from microwave ovens”, “fluoridation of water”, “radio of cell phone towers” and “medical and dental x-rays”, which has not been discussed as dangers in our country in recent years. We further included 6 new items on “radioactive emission”, “toxic chemicals in toys”, “stress”, “use of computer mouse”, “moulds in buildings”, and “terrorism”, which has been heavily discussed in the public as potentially detrimental for health. Cronbach’s alpha for this scale was 0.95.

Neuroticism.

This was rated through The Mini International Personality Item Pool – Five Factor Model measure (Mini-IPIP-FFM Scales), where the scale for neuroticism included five items with a Cronbach alpha on 0.74 (37)

Symptoms of anxiety.

The CMD-SQ (Common Mental Disorder screening questionnaire) was used to assess symptoms of anxiety (SCL-ANX4) (38). Cronbach’s alpha was 0.87. The scale used four questions asking about “feeling scared”, “nervous”, “panic” and “worry”.

Pain.

Previous regional pain was measured by the Standard Evaluation Questionnaire (SEQ-pain) (39). This questionnaire consists of 4 sections of which we used the first section to measure regional pain. This section consists of 7 items relating to intensity of pain in different regions during the past four weeks. The

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original questionnaire was translated from English to Danish independently by the writers and two native English speaking colleagues and consensus was reached. A sum score was calculated for upper extremity pain and this was recoded to a categorical variable with cut points at the 50th, 75th and 90th percentiles. In the same way, the score for back pain was calculated and categorised with cut points at 50, 75 and 90 %.

Previous Multi-site pain (MSP) was measured by using the SEQ-pain manikin which is shown in figure 2. (39). Participants were asked to hatch those areas where they had experienced pain the foregoing 4 weeks. The number of areas hatched were then summed and using tertiles MSP was categorized into pain in 0-1 region, 2-3 regions and >3 regions. The SEQ-pain manikin does not provide data that are comparable to those derived by the definitions of widespread pain such as the American College of Rheumatology (40) or the Manchester definition. (41)

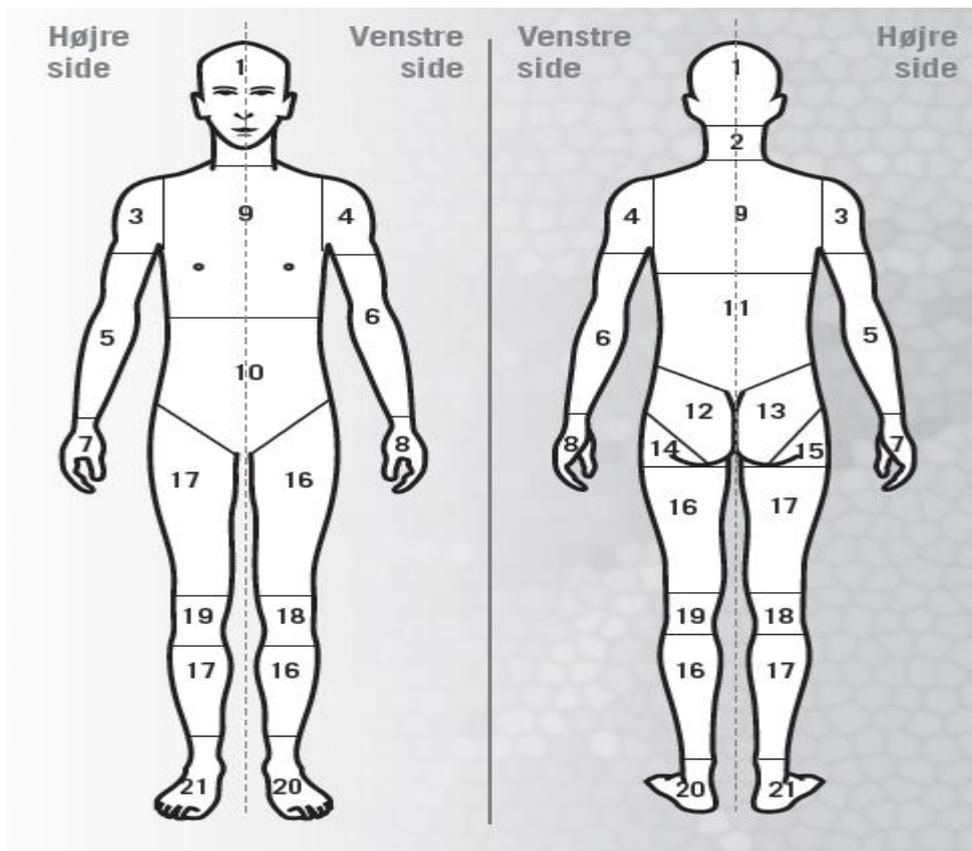


Figure 2. SEQ-pain manikin

Psychosocial work environment.

We used 4 items from the Glostrup Questionnaire (42) and added two supplementary items, one on job demands and one on satisfaction with management. Job demands (two items), decision authority (two items), job satisfaction (one item) and satisfaction with management (one item) were scored as single items on a scale from 1 to 6. Scores were dichotomized a priori on the basis of the response option wordings to indicate a high risk. The questions were used as single items in the analysis, and analyses have shown moderate to high correlation of single item questions on job demand, job control and social support with scale constructions (Mikkelsen, S., personal communication). The use of single item questions was mainly substantiated by the purpose of creating a questionnaire that was not too comprehensive in number of questions.

Physical work environment.

Monotonous repetitive work ($\alpha=0.80$) and heavy physical work ($\alpha=0.90$) were measured using four items from the Dutch Musculoskeletal Questionnaire, DMQ (43). The DMQ does not provide exact numbers of movements or kg lifted but rather asks about the frequency with which this kind of work is performed. The scores were dichotomized with a cut point at the 75th percentile.

Educational level.

One of six levels of education could be chosen. These were then recoded into three categories: i) "No education beyond ordinary school" or "One or more short courses". ii) "Skilled worker" or "Short further education". iii) "Medium-level further education", "Higher further education".

Self-rated general and mental health.

We used the SF-12© (Short Form 12-item version 2) (44). General Health and Mental Health scores were included in analyses. Raw scores were simple sums of items; these were then dichotomized with a cut point at the 75th percentile.

Leisure-time physical activity.

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We asked: "If you should describe your physical activity during the past year, including going to and from work, which of the following groups would you consider yourself to belong to?"

1. Almost physically inactive or slightly active for less than 2 hours weekly
2. Light physical activity between 2 and 4 hours weekly (walking, biking, gardening)
3. Light physical activity for more than four hours a week, or heavy physically active between 2 and 4 hours weekly (fast walking or biking overtaking others, heavy gardening, working out and getting short of breath).
4. Vigorous physical activity more than 4 hours weekly or heavy training on a regular basis and competing on weekly basis.

We dichotomized a priori between level 2 and 3.

Comorbidity.

For elucidating comorbidity we retrieved data from the eight GPs' patient journals covering the year before baseline and giving us information on which pre-baseline ICPC-diagnosis the patients had in five different fields: psychiatric disorders (covering perceived stress, anxiety, and depression), headache, abdominal pain/symptoms, cardiovascular conditions/symptoms and diabetes. This was coded as a dichotomous variable. For a detailed list of conditions/symptoms included see figure 3.

Figure 3.

Comorbidity Variables:

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Psychiatric disorders:

- P01: Feeling anxious/nervous/tense
- P02: Acute stress/trans/situate disturb
- P03: Feeling depressed
- P06: Disturbances of sleep/insomnia
- P74: Anxiety disorder/anxiety state
- P76: Depressive disorder

Headache:

- N01: Headache (excl N02 N89 R09)
- N02: Tension headache
- N89: Migraine
- N90: Cluster headache

Abdominal pain/symptoms:

- D01: Generalized abd. pain/cramps
- D02: Stomach pain/ache
-
- D06: Other localized abd pain
- D09: Nausea
- D11: Diarrhea
- D12: Constipation
- D18: Change in feces/bowel movements
- D26: Fear of cancer in digest system
- D85: Duodenal ulcer
- D86: Other peptic ulcers
- D93: Irritable bowel syndrome

Cardiovascular conditions/symptoms:

- K01: Pain attributed to heart
- K02: Pressure/tightness attributed to heart
- K04: Palpitations/aware of heartbeat
- K05: Other abn/irreg heartbeat/pulse
- K24: Fear of heart attack
- K74: Angina Pectoris
- K76: Other/chron ischaemic heart disease
- K77: Heart Failure
- K78: Atrial fibrillation/flutter

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- K79: Paroxysmal tachycardia
- K86: Uncomplicated hypertension
- K87: Hypertension with involvement of target organs
- K89: Transient cerebral ischaemia
- K90: Stroke/cerebrovasc accident

Diabetes:

- T90: Diabetes mellitus

DREAM data.

Data on social benefits was obtained from the DREAM register (45), a national register on all transfer payments made in Denmark. The data was merged with responders and non-responders in this study to examine if participation rate at the labour market was different between responders and non-responders.

Follow-up data.

The eight participating GPs all used the International Classification for Primary Care (ICPC) when they issued diagnoses. The ICPC has been shown to be a reliable tool when diagnosing musculoskeletal disease, but is most likely strongest when using a symptom diagnosis instead of a specific diagnosis (33). A list of the diagnoses searched for is presented in figure 4. The search instrument in the patient software (AESKULAP©) retrieved lists of patients who had sought care resulting in an ICPC diagnosis for musculoskeletal disease. We only looked at face-to-face contacts between patient and GP. We made searches on 2 sub groups: upper extremity pain and back pain. We excluded diagnoses such as neoplasm, congenital malformations or diseases, fractures, osteoporosis and inflammatory disease. We performed the searches group-wise in weekly intervals over an 18 month period. By this method we ensured information on all participants concerning whether they had become a

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case in any of the sub groups, the date of their first care-seeking, the frequency of their care-seeking, and the time from their first visit to their last visit during the observation period.

Upper extremity:

- L01: Neck symptoms/complaints excl. headache
- L08: Shoulder symptoms/complaints
- L09: Arm symptoms/complaints
- L10: Elbow symptoms/complaints
- L11: Wrist symptoms/complaints
- L12: Hand & finger symptoms/complaints

Back:

- L02: Back Symptoms/complaints
- L03: Low back complaints excl. radiation
- L04: Chest symptoms/complaints
- L05: Flank symptoms/complaints
- L86: Lumbar disc lesion/radiation

Figure 4. ICPC-diagnoses (ICPC-1) used for collecting follow-up data.

For the part of the study that investigated the role of MHW on care-seeking all consultations during follow-up were registered disregarding the specific reason for care-seeking. We chose this to have a large enough sample to be able to look at frequencies of consulting.

Data analysis for papers dealing with health anxiety, somatisation and work-related factors.

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The main outcome measure was time to first visit at the GP with either back pain or upper extremity pain in the 18 months of follow-up. For analyses of this we used Cox regression analysis. Assumptions of proportional hazards were tested using Schoenfeld Residuals.(46) Considering the term “working population” we asked people if they were working full time or part time, were unemployed, on long-term sick leave, on leave, on welfare, students or retired. The analysis was restricted to 4.325 participants that were currently employed. We did not address missing values in any particular way, since data were missing in a random pattern and were less than 2 % in the scales we used to create the variables of interest. Data were analysed separately for BP and UEP. All scales were plotted to look for distributional characteristics and potential thresholds, which we did not find. We then used distributional cut points. Cronbach Alpha’s measures for reliability were made on the continuous scales. We stratified on gender because this approach revealed some differences that were not fully accounted for if gender was used only as a potential confounder. We tested for correlations between previous pain level and fear-avoidance, but found none. Correlations between health anxiety, somatisation and fear-avoidance were also tested for. The statistical model was built in a forward stepwise manner. Each predictor was examined one at the time, ending up with two models. The first model included age, educational level, job demands, decision authority, job satisfaction, satisfaction with management, heavy lifting at work, repetitive work, and leisure-time physical activity level. The second model included self-rated general and mental health since we thought they might influence the decision to seek care. Thus we calculated both crude, model 1 and model 2 adjusted Hazard Ratios (HR) with 95 % confidence intervals for both outcomes. We calculated incidence-rates pr. 1000 days for both genders and for both back pain and upper extremity pain. All analyses was performed using Stata 10.1 (StataCorp., College Station, TX, USA).

Data analysis for paper dealing with MSP and comorbidity.

Odderprojekt 1

Data were analysed separately for BP and UEP and stratified by gender for the same reasons mentioned above. The main outcomes were future care-seeking for either BP or UEP in the 18 month follow-up. For analyses of this dichotomous outcome we used Cox proportional hazard regression analysis. Schoenfeld residuals were used to test the assumption of proportional hazards. Correlations between multi-site pain and various comorbidity variables were tested but none were at the size of implying collinearity. We calculated both crude and adjusted hazard ratios (HR) mutually adjusting each variable for the others and age by group. We used 95 % confidence intervals. All analyses were performed using Stata 11.2 (StataCorp., College Station, TX, USA).

Data analysis for paper dealing with MHW and frequency of consulting.

In the analysis we divided consultations at the GP into 0, 1-5, and more than 5 consultations in the follow-up period of 18 month. The associations between baseline measures and future consultations were analyzed by multiple ordinal logistic regression proportional odds models, and the proportional odds/ parallel lines assumption was tested with `gologit2` (STATA® statistical package). MHW was divided into quartiles, Self-rated health into tertiles. The scales for neuroticism, anxiety, somatization and health anxiety were dichotomized with a cut point at the 75th percentile. We performed the analysis in three steps with model 1 including self-rated health, neuroticism, anxiety, somatisation and health anxiety, model 2 included MHW, adjusted for age and gender, and the fully adjusted model 3 included all the variables from model1 and model 2.

7. Results

The questionnaire and answering rate.

Of the 8.517 eligible participants, 88 had a missing address, 1.196 did not want to participate, 2.124 never returned the questionnaire, 2 died and 10 were severely mentally ill. 5.097 answered the questionnaire (4.297 on paper, 800 on a web-based questionnaire). We further excluded 29 for various reasons, mainly due to identification problems. 5.068 respondents (59.5%) were available for analysis. A flow chart showing participation can be found in figure 5.

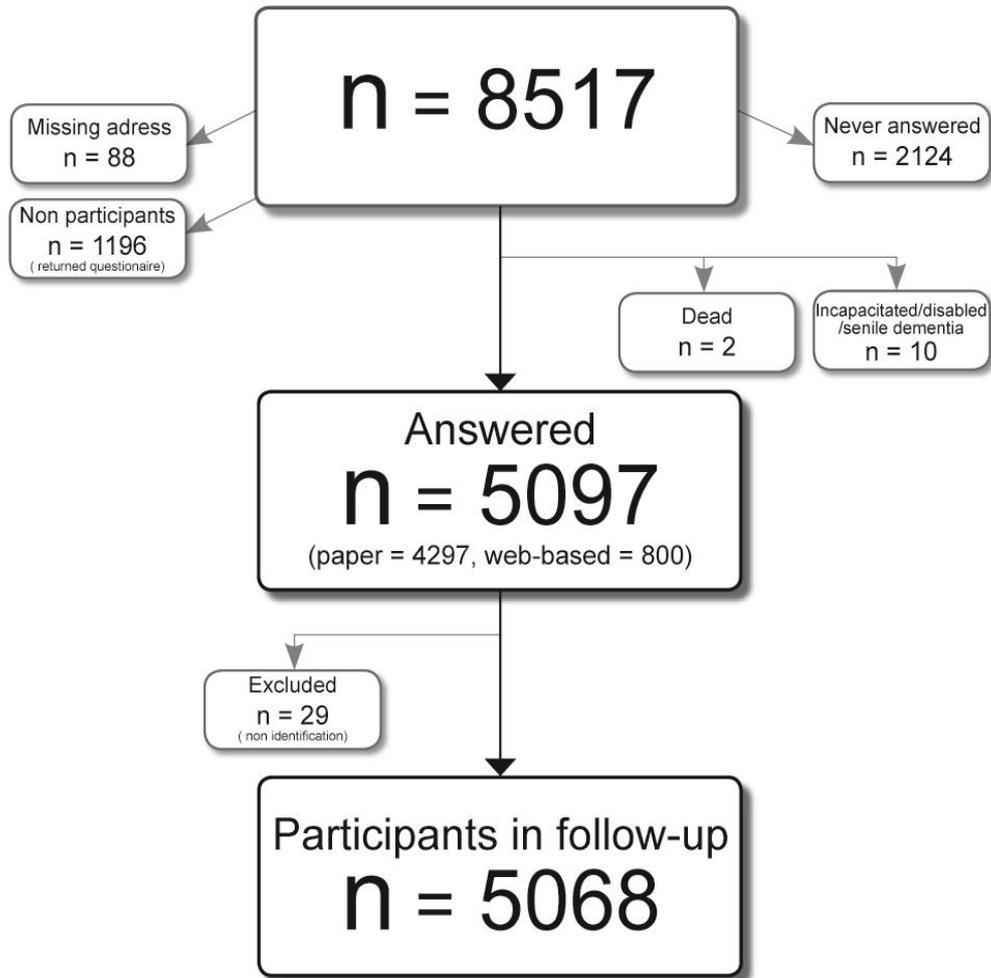


Figure 5. Flowchart showing participation.

Differences between respondents and non-respondents.

The proportion of women and the mean age was higher among respondents than non-respondents. Since information on care-seeking and diagnoses could be attained by the GP's computer system for all persons differences between responders and non-responders could be studied. A total of 3.969 participants (78.3 %) consulted their GP in the 18-month follow up (57.5 % women and 42.5 % men), of whom 607 (15.3) consulted for back pain and 561 (14.1 %) with upper extremity pain. Women consulted more often

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than men, for back pain 61.6 % were women, and for upper extremity pain 53.5 % were women.

Non-responders had a slightly lower (1-2%) participation rate at the labour market at the time of answering the questionnaire. Overall, the participation rate on the labour market was higher than 80 % in both groups. Non-responders also were younger and there were more men among non-responders.

There was a small, but insignificant, difference in the level of care-seeking for back pain between respondents and non-respondents, whereas there was a significant difference in care-seeking for upper extremity pain, study respondents seeking care more often than non-respondents. Differences in age, gender and care-seeking between respondents and non-respondents are shown in

figure 6.

	Males			Females		
	Respondents n=2254	Non-respondents n=1949	All n=4203	Respondents n=2814	Non-respondents n=1500	All n=4314
Mean Age (years)	47 SD*=12.87	40 SD*=13.63	44 SD*=13.63	45 SD*=12.85	41 SD*=13.65	44 SD*=13.28
Care-seeking in 18 months follow up, back pain. ¹	233 (10.34 %)	200 (10.26 %)	433 (10.30 %)	374 (13.29 %)	194 (12.93 %)	568 (13.17 %)
Care-seeking i 18 months follow-up, upper extremity pain ¹	261 (11.58 %)	160 (8.21 %)	421 (10.02 %)	300 (10.66 %)	137 (9.13 %)	437 (10.13 %)

Figure 6. Care-seeking based on respondents and non-respondents of the questionnaire.

* SD = Standard Deviation.

1) Care-seeking at least one time during follow-up.

Results for papers I and II.

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5.068 respondents were available for analysis, but since we included work-place factors in all our analyses we restrained the number to those participants employed at baseline, leaving 4.325. Incidence-rates pr. 1.000 days for back pain were 0.1961 [95 % CI: 0.1703 - 0.2259] for males and 0.2578 [95 % CI: 0.2305 - 0.2884] for females. For upper extremity pain the incidence-rates pr. 1.000 days were 0.2125 [95 % CI: 0.1854 - 0.2436] for males and 0.1982 [95 % CI: 0.1746 - 0.2250] for females.

Back Pain

For BP no association was seen between a high level of fear-avoidance behaviour and care-seeking. A high level of health anxiety was marginally associated with care-seeking among women (HR 1.36 [95 % CI 1.00 – 1.84]). Somatisation was significantly associated with care-seeking among men (HR 1.64 [95 % CI 1.04 -2.57]) as well as among women (HR 1.70 [95 % CI 1.21 -2.39]). Moderate back pain level at baseline was a significant predictor of care-seeking among women (HR 1.84 [95 % CI 1.22 – 2.78]) but not among men. High back pain level was strongly associated with care-seeking both among men (HR 2.70 [95 % CI 1.68 -4.33]) and among women (HR 2.00 [95% CI 1.28 -3.13]). . Regarding the physical work environment we found that high levels of heavy lifting at work resulted in an increased hazard ratio for males (HR 1.90 [95 % CI 1.14-3.15]). For females heavy lifting at any level did not result in an increased HR. Repetitive work had no impact on care-seeking.

Among psychosocial work environment factors, low level of job satisfaction resulted in an increased HR for both genders, but not in a statistically significant way. Other psychosocial work environment factors did not seem to contribute to the decision of care-seeking with back pain. Adjusting for self-rated general and mental health did not make any difference.

Upper extremity pain.

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For UEP we found no association between fear-avoidance behaviour and care-seeking for upper extremity pain for either gender. No associations were seen for health anxiety. Women with high levels of somatisation had a slightly increased risk (HR 1.40 [95 % CI 0.97 -2.04]) but it was not statistically significant. There was no statistically significant association between moderate pain levels and care-seeking for either gender, but a high level of upper extremity pain were associated with care-seeking among men (HR 2.34 [95 % CI 1.58 – 3.49]) and although less pronounced , also among women (HR 1.64 [95 % 1.11 – 2.41]). The highest level of heavy lifting at work resulted in an increased risk among males (HR 2.09 [95 % CI 1.30 - 3.38]), and marginally among females (HR 1.54 [95 % CI 0.96-2.49]). Repetitive work had no impact among males. We found a slightly increased risk among females. Concerning psychosocial work-related factors, low level of decision authority among females, low levels of job satisfaction among males and females and low levels of satisfaction with management among males were slightly associated with increased risk for care seeking, but the associations did not reach our chosen level for statistical significance. Adjusting for self-rated general and mental health did not change the result in any way.

Results paper III.

In this part of the study we used all available 5.068 participants. A total of 3,969 participants (78.3 %) consulted their GP in the 18-month follow up (57.5 % women and 42.5 % men), of whom 607 (15.3) consulted for back pain and 561 (14.1 %) with upper extremity pain. Women consulted more often than men, for back pain 61.6 % were women, and for upper extremity pain 53.5 % were women.

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Non-responders had a slightly lower (1-2%) participation rate at the labour market at the time of answering the questionnaire. Overall, the participation rate on the labour market was higher than 80 % in both groups. Non-responders also were younger and there were more men among non-responders.

Multisite pain was strongly associated with future consultation for BP and this association persisted at around the same level when adjusted for other symptoms and age. For men the adjusted hazard ratio was 2.34 (95 % CI 1.69-3.27) and for women 2.20 (95 % CI 1.66-2.89). Prior headache, psychiatric symptoms, and abdominal symptoms also predicted consultation for BP for both men and women, but with some differences in effect size between the two genders. Diabetes and cardiovascular symptoms only had minor and hardly significant associations. Age was strongest associated with care seeking for BP among men, whereas age declined as a predictor for women more than 59 years of age.

MSP was of less importance for care seeking with UEP; men (HR 1.35 (95 % CI: 0.99 - 1.85)) and women (1.55 (95% CI: 1.16 - 2.06)). Abdominal pain and diabetes among women both increased the risk of care seeking with upper extremity pain. Age contributed strongly among women with an increased HR for women between 40-49 years (2.99 (95% CI: 1.72 - 5.17)), and (3.65 (95 % CI: 2.11 - 6.30)) among women between 50-59 years old.

Results paper IV.

Eight out of ten respondents visited their GP at least once in the 18 month follow-up period; a quarter visited the GP more than six times. A major proportion of the participants were concerned about a number of modern health worries (Fig. 7). The highest concern was about additives in food, contaminated water supply, drug resistant bacteria and antibiotics in food, but there was also concern about air pollution, and stress. The lowest concerns were from cell phones, vaccination programs and high tension power lines.

Women (mean 33.6, SD 20.1) reported higher concerns than men (mean 27.5, SD 19.2), $t=6.05$, $p < 0.000$, and women also consulted their GP more frequently (Table 1; Table 2). There was a linear association between MHW and age, and participants aged 60+ ($n=796$)

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revealed an odds ratio on 2.4 (95 % CI; 1.9-2.9) compared to 17-29 year old participants (n=659).

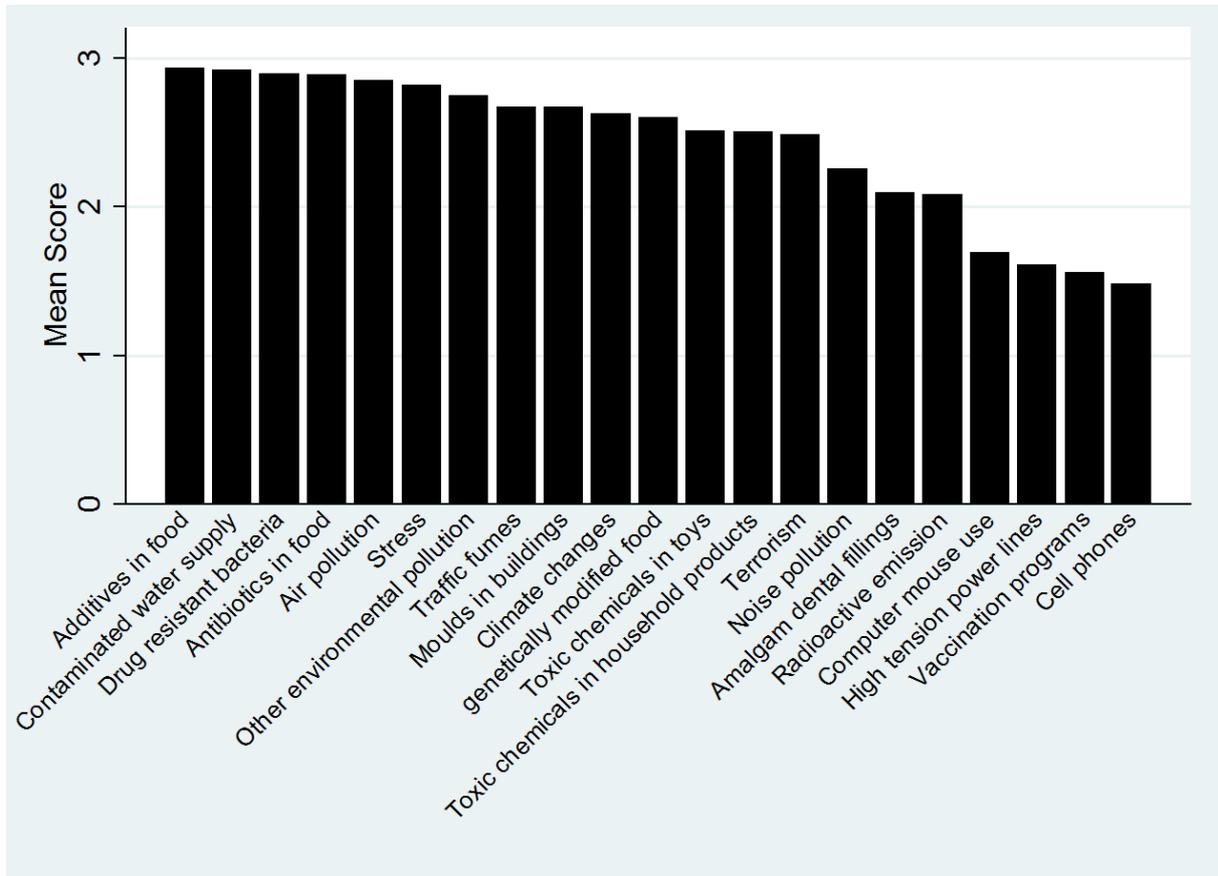


Figure 7. Distribution of MHW scores on single issues.

Figure 8 shows the association between the series of independent variables and consultations with the GP. Model 1 reveals an exposure response relationship between self-rated health, and consulting the GP, and effect of somatisation and general health worries as measured by Whiteley-7. The effect of MHW was small, but remained significant when all other variables were included in model 3. Estimates for the health related variables did not change when MHW was included and this

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suggests an independent small effect of MHW for care-seeking. The highest quartile of participants with modern health worries still had a 20 % higher attendance rate for each step from zero to 1-5 and more than 6 consultations. Educational level did not predict future care-seeking in this population.

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Figure 8. Predictors for consultations at the GP (0, 1-5 and > 6 times) in a follow up for 18 month among the general Danish population. Odds ratios (OR) with 95 % confidence intervals (95 % CI) obtained by ordinal logistic regression. N=4409-5058.

	Model 1 ^a	Model 2 ^b	Model 3 ^c
	OR (95 % CI)	OR (95 % CI)	OR (95 % CI)
	N=5068	N=4791	N=4409
<i>Modern Health Worries(MHW)</i>			
Quartile 1, low		1.0	1.0
Quartile 2		1.1 (0.9-1.3)	1.1 (0.9-1.4)
Quartile 3		1.1 (0.9-1.3)	1.1 (0.9-1.2)
Quartile 4, high		1.3 (1.1-1.5)	1.2 (1.0-1.4)
Age -continuous	1.02 (1.01-1.02)	1.02 (1.01-1.02)	1.02 (1.01-1.02)
Female versus male	1.8 (1.6-2.0)	1.8 (1.7-2.1)	1.7 (1.5-2.0)
<i>Education</i>			
High	1.0		1.0
Middle	1.1 (0.9-1.2)		1.1 (0.9-1.2)
Low	1.0 (0.8-1.2)		1.0 (0.8-1.2)
<i>Self rated health –SF 12</i>			
High	1.0		1.0
Medium	1.2 (0.9-1.5)		1.2 (0.9-1.4)
Low	1.8 (1.4-2.4)		1.8 (1.4-2.4)
Neuroticism	1.2 (1.0-1.4)		1.2 (1.0-1.4)
Anxiety	1.1 (0.9-1.3)		1.1 (0.9-1.3)
Somatization SCL-SOM	1.2 (1.0-1.4)		1.2 (1.0-1.4)
Whiteley-7	1.3 (1.1-1.5)		1.2 (1.1-1.4)
Test for proportional odds/ parallel lines assumption			P=0.69

^aModel 1: Mutual adjustment for all covariates besides MHW

^bModel 2: Effect of MHW, adjusted for age and gender

^cModel 3: Model 1 and MHW included

8. Discussion

Key findings

Papers I and II.

We found that previous regional pain was related to care-seeking for upper extremity pain and back pain in both genders. Among patients with back pain, high levels of health anxiety were associated with care-seeking among women and high levels of somatisation were associated with care-seeking in both genders. Patients suffering from upper extremity pain differed from back pain patients, as neither fear-avoidance nor health anxiety nor somatisation showed any association to care-seeking for upper extremity pain. As for work-related factors, heavy lifting increased the hazard ratio for care-seeking for back pain among males, but not for females. Repetitive work and psychosocial work environment factors did not contribute to care-seeking for low back pain in any significant way. As for seeking care for upper extremity pain we found again that heavy lifting was associated with an increased risk, but only statistically significant among men. Even though we did find slightly raised HRs for some of the psychosocial factors and for repetitive work among females, there was no statistically significant impact on care-seeking for upper extremity pain for any of these factors. Finally, we did not find any noticeable differences in HRs when including self-rated general and mental health in the statistical model.

Paper III.

Multi-site pain at baseline was a risk factor for care seeking with back pain for both men and women, but MSP was not significantly associated with care seeking with upper extremity pain. Care seeking with back pain was also associated with headache, psychiatric conditions, abdominal pain and age in an inverse U-shaped

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pattern with highest attendance rate among participants between 30 and 59, and age contributed more to care seeking with back pain among men. For upper extremity pain MSP contributed less to care seeking and also other symptoms and diseases showed a smaller association with care seeking for upper extremity pain, even though abdominal pain and diabetes predicted care seeking with upper extremity pain among women. Age again was a risk factor at middle age, but only for women.

Paper IV.

The results from this population sample of adults show that a high proportion of the population report high concerns about modern life affecting their health. The concerns are about food and pollution, but also stress and crime are a major concern in this study. Self-rated health, neuroticism, somatization and other health worries were associated with future care seeking, regardless of cause, at the GP, and MHW showed an independent contribution to the statistical model after adjusting for all the other factors. As expected the health related factors were stronger predictors of future care seeking than MHW. Adjusting for all included variables left an increased risk of around 20 % for those in the highest quartile on the modern health worries scale.

Strengths and limitations.

The strength of our study is the prospective design with the patients being harvested at their visit to the GPs. The number of people available for analysis, 59.5 % is fairly high in our opinion, taking into consideration that we mailed the questionnaire to the general population. The study population, including both men and women and covering both town and countryside inhabitants, revealed a wide range of occupations thus ensuring a large variation in work-related exposures. In many countries there are obstacles for those who want to seek care, based on economy or

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availability of health care. This is not the case in Denmark where care-seeking is free of charge, and availability is good. Nearly 100 % of the population is registered with a GP in Denmark. ICPC diagnostic codes were used to identify upper extremity pain and back pain and other consultations in the general practitioners' computerized records. These simply represent how the general practitioners classified the problem, and were not based on standardized diagnostic criteria. From this point of view of the study, the important distinction was between consultations versus no consultation for any of these problems.

On the other hand the study has weaknesses and limitations. In the questionnaire we changed the wording of the original fear-avoidance questionnaire (34), enabling people with only little or no pain to answer. Well aware that most people have experienced pain previously, we assumed that this would not impede the validity. The part of the SEQ-pain questionnaire (39) we used has been validated thoroughly in German, we translated it and we cannot be absolutely sure how this affects the validity. But given it was a very simple question we believe that the impact on validity was very small if any. The responders of the questionnaire were a little older, and included more women than were in the group of non-responders. Furthermore, at baseline, non-responders were slightly more often not active in the labor market. Still, we don't think that these small differences influenced neither the representativeness of the study nor introduced severe bias in the associations between predictors and outcomes. As in all prospective studies the information given in the baseline questionnaire may have changed during follow-up. The 18 month follow-up period was a compromise between weighing the validity of the original information and ensuring enough cases. In the part of the study that included MHW consultations were treated without discriminating different reasons for care seeking, which certainly is a shortcoming of the study. Modern health worries would possibly be more important for symptom based conditions than for some established diseases, but our purpose was to elucidate the overall importance of modern health worries for general care-seeking as a burden in modern societies. Our adjustments for health

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parameters will probably diminish the importance of different diseases and symptoms in care seeking. Another shortcoming is that all of the independent variables for MHW were measured at the same time, where we believe that MHWs are not constant over time.

Interpretation.

This study only involves care-seeking from GPs. From other studies we know that patients with MP also seek care from chiropractors and physiotherapists.(47) In Denmark, use of the general practitioner is free, whereas consulting a chiropractor or a physiotherapist is subject to payment. Some patients seek care from more than one provider. We chose the GP as our subject of interest because of the ICD coding which makes it easy to identify cases and subgroups of cases. This was not possible with other providers.

We did not include an indicator of the general availability of health care as we believe this is not a problem in a welfare state with a solid infrastructure like in Denmark. Our results show that having experienced pain in the past, and the more intense this pain was, the larger is the chance of becoming a care-seeker in the future. This is in line with findings in previous studies, where pain level was strongly associated with care-seeking (8;20-22;24-26;48). This was true for both back pain and upper extremity pain.

Earlier research has shown differences in exposures, interactions, and reporting between men and women (49) and we decided to stratify our statistical analysis by gender, thereby losing some statistical power. We decided to do so since previous work has shown that stratifying by gender is necessary if the full range of associations between exposure and MP is to be detected and understood (50). Taking the loss of statistical power in account, we find that our results, especially those regarding physical work environments, should be interpreted with some precaution

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since the numbers of those exposed are small. The percentage of males and females reporting high levels of heavy lifting are nearly the same, but it was only among males that we found a statistically significant raise in HR for care-seeking. We used the DMQ (43) for assessing heavy lifting, but this questionnaire does not put actual numbers in kilograms on the amount lifted. Thus, the term heavy lifting could, among males and females, correspond to loads with different characteristics, since what is considered heavy by a female might not necessarily be considered heavy by males. In this way there is a chance that women might have overestimated their level of heavy lifting, thus concealing differences in true exposure between genders.

We found that among women with back pain, health anxiety was associated with seeking care. We treated the health anxiety variable, which was based on the 7-item Whiteley index, in a dichotomous way, but we also tested the variable as a continuous predictor using fractional polynomials (51), and this did not change associations (data not shown). We did not find the same association with health anxiety for women with upper extremity pain, suggesting that health beliefs could play an important role in the decision for care-seeking with back pain, a point that has been made previously (25). We also found that somatisation was a predictor in the case of back pain but not for upper extremity pain, which supports the assumption that the two groups differ, and perhaps preventive measures should take this into account. Fear-avoidance behaviour was not a predictor of care-seeking as such, but could be a predictor of continued care-seeking or taking sick leave, neither of which we have looked at in this study.

Modern health worries have been associated to symptom complaints as well as the use of both traditional (17) and alternative health care services (52;53) Most studies of MHW have been cross-sectional, and have shown that MHW are common in the general population (17), and even among young healthy samples (17), and MHW have been associated with depression, symptom reporting and quality of life (54). Self-rated health, neuroticism, somatization and other health worries were associated with future care seeking at the GP, and MHW showed an independent contribution

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to the statistical model after adjusting for all the other factors. As expected the health related factors were stronger predictors of future care seeking than MHW. Adjusting for all included variables left an increased risk of around 20 % for those in the highest quartile on the modern health worries scale. Our findings are in accordance with a recent German population sample (52), which also found that changes to food production were of major concern, and that cell phones and high tension power lines were of less concern. But the mean score for concern was higher in the German sample than in our Danish population, and as a novel finding we also found a strong relation with increasing age. The concerns more frequent among the elderly were antibiotics in food, toxic chemicals in household, drug resistant bacteria, additives in food, and amalgam in dental fillings, whereas no differences in relation to age were found for stress, climate changes and cell phones. The lower mean score in the Danish population sample compared to the German sample could partly be explained by different items, but we do not think that this explanation is important, because on the same items used in both samples, the German population scored higher. The most likely explanation would be that in most surveys of the European population, the Danish population seems to be the most optimistic about their life situation and satisfaction (55), and Denmark still has one of the lowest Gini coefficients for inequality in the world (56).

Other studies have found that health conditions and co-morbidity were indices of care-seeking (26;27). In a review of comorbidities with low back pain there were positive associations to all disorders investigated (headache/migraine, respiratory disorders, cardiovascular disease, general health, and others) with the exception of diabetes. There was very little information regarding temporality, therefore there were no clues as to causal mechanisms. (5) In our study diabetes was stronger associated with upper extremity pain, which could be explained by higher risk for carpal tunnel syndrome and tendopathies in the upper extremity in diabetic patients (57). The independent role of abdominal pain for care seeking with both outcomes could be ascertained to somatization tendency, but somatization and abdominal pain

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was only minor correlated ($r=0.08$). Another explanation could be some common inflammatory components for regional musculoskeletal pain and abdominal pain, but this is pure speculative and cannot be verified by our data. A third explanation could be that MSP and abdominal pain in some circumstances run along in chronic widespread pain (41).

Psychiatric conditions were associated with subsequent care seeking for back pain among women. Several studies have shown comorbidity between depression/anxiety and back pain (4;58-61). The inverse U-shaped associations between age and care seeking for both pain outcomes were probably due to higher attendance among working participants for whom regional pain poses a problem in fulfilling their work tasks. In this cohort we have reported on the effect of somatization on care seeking for back pain, and the role of MSP seen in this study could be ascribed to somatization. But including somatization into the statistical models in this study did not eliminate the importance of MSP for care seeking with back pain (results not shown). Also for care seeking with upper extremity pain, MSP contributed in a model including somatization, which in itself did not predict care seeking with upper extremity pain. So, there is an independent effect of MSP, which is not mediated by somatization. Consulting with back pain was in general more influenced by MSP and other symptoms than attending with upper extremity pain. This difference could be related to a more multifactorial character of back pain than for upper extremity pain.

Overall, in this population we found that consulting the GP with back and upper extremity pain in an 18 month follow up was associated with MSP at baseline and consulting with a number of other complaints in the preceding year.

Implications.

The concept of mutability is part of the behavioural model explained in the introduction (10). If a component of the model should be of interest for health care

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planners and providers of health care, it should also be mutable or susceptible to change or intervention. An overview of the components in the model and their mutability is shown in figure 9.

Model Component	Degree of Mutability
DEMOGRAPHIC	LOW
SOCIAL STRUCTURE	LOW
HEALTH BELIEFS	MEDIUM
ENABLING	HIGH
NEED	(LOW ?)

Figure 9. The behavioural model, its components and their mutability.

Gender and age are hard to change and thus the mutability of demographics is low. Some components of social structure are difficult, expensive and very time consuming to change i.e. the educational level of the population. Work-place related factors are part of the social structure. In Denmark the emphasis of preventive measures and legislation regarding the physical working environment, has been on heavy lifting, repetitive movements, monotonous work and working postures (62). Yet musculoskeletal morbidity shows no tendency to diminish. (63) One explanation could be that while the controls on hazardous activities in the workplace may reduce physical stress on the tissues they may also reinforce beliefs that the activities controlled carry serious risks to health (12). This ergonomical paradox implicates that other fields of preventive measures should be explored. One of these fields could be health beliefs that could be responsible for some of the variations in care-seeking. In Australia, population based campaigns on back pain belief has proven successful (13). Health beliefs are also closely related to perceived need. The health professional, in this case the GP has an important role in evaluating the patient's perceived need. To do this thoroughly, the GP should incorporate the patient's thoughts and beliefs about work-related hazards. Many GPs might not have the knowledge necessary to

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understand their patient's work life (64). To overcome this sick notes could be replaced by fitness notes (65). In 2009 Danish authorities introduced a new concept of a fitness for work note meant to replace the former sick note. The fitness note involves the employer and the employee, requiring them both to contribute in finding solutions in order to keep the employee at work if possible. The GP's role is to consider if these solutions are compatible with the character of the patient's disease. The fitness for work note has recently (2011) been evaluated and was found to be successful, but it calls for the GP to carefully consider all obstacles for each individual patient that could delay or obstruct return to work (66). Such obstacles could, as shown in this study, be health beliefs and somatisation, to some extent MHWs, comorbidity and of course work-related factors.

Given the relatively good prognosis of common musculoskeletal pain, and the low level of the knowledge base on risk as well as prognostic factors for such pain, extensive advice by GPs to overcome obstacles at work should probably be avoided, in order not to stigmatize their patients more than necessary. Rather the GP should contribute to and support in keeping the patient's options on returning to work open.

9. Conclusion

We found that previous regional and multi-site musculoskeletal pain were associated with consulting your GP with either back pain or upper extremity pain for both genders, and in this we were in agreement with earlier studies.

But looking beyond pain we also found that health anxiety and somatization were of importance for care-seeking for back pain along with psychiatric ailments such as perceived stress, anxiety and depression, especially for women. This point to the complexity of back pain.

High levels of heavy physical work were associated with care-seeking for back pain and upper extremity pain, mainly for men. We could not find statistically significant association between repetitive work or psychosocial work factors and consulting. This is in agreement with previous research, indicating that the while some factors predicting MP, care-seeking for MP and sick leave due to MP might be overlapping, others may differ.

10. Perspectives and future research

Our observations in this study points to some differences between men and women.

These differences could be based on biological grounds but could also be due to cultural differences and that men and women experience their health and their the work place differently.

Further studies should deal with better exposure measures for men and women.

For work place exposures more objective measures are needed, and development of job exposures matrices based on both physical and psychosocial exposures should be developed. Another achievement would be to include qualitative and quantitative responses from the attendees at the time of consultation to better understand the exact reason for consulting their GP. Also, it could enlighten the question about thresholds for pain when consulting if participants graded their pain at the day of consulting, and investigate to what extent work conditions and personal health beliefs affect the decision to consult. Another line of research should focus on expectations in consulting for musculoskeletal pain, earlier expectations and current expectations in relation to being fit for work and spare time as well. Suffering back pain and upper extremity pain today is probably different today than in earlier times. The pain is probably the same, but the degree which one suffers, the fashion in which one copes, one's notion about what caused the pain, and the menu of potential treatments are not the same. This variability over time and among people bears witness to the uncertainties regarding the cause and the cure of musculoskeletal pain. Further research could explain different kind of coping with musculoskeletal pain across individuals, social groups and cultures, and redirect our understanding of musculoskeletal pain.

11. References

Reference List

- (1) Grimsmo A, Hagman E, Faiko E, et al. Patients, diagnoses and processes in general practice in the Nordic countries. An attempt to make data from computerised medical records available for comparable statistics. *Scand J Prim Health Care* 2001 Jun;19(2):76-82.
- (2) Jordan K, Clarke AM, Symmons DP, et al. Measuring disease prevalence: a comparison of musculoskeletal disease using four general practice consultation databases. *Br J Gen Pract* 2007 Jan;57(534):7-14.
- (3) Jordan KP, Kadam UT, Hayward R, et al. Annual consultation prevalence of regional musculoskeletal problems in primary care: an observational study. *BMC Musculoskelet Disord* 2010;11:144.
- (4) Bair MJ, Wu J, Damush TM, et al. Association of depression and anxiety alone and in combination with chronic musculoskeletal pain in primary care patients. *Psychosom Med* 2008 Oct;70(8):890-7.
- (5) Hestbaek L, Leboeuf-Yde C, Manniche C. Is low back pain part of a general health pattern or is it a separate and distinctive entity? A critical literature review of comorbidity with low back pain. *J Manipulative Physiol Ther* 2003 May;26(4):243-52.
- (6) Bartholomeeusen S, Van ZJ, Truyers C, et al. Higher Incidence of Common Diagnoses in Patients with Low Back Pain in Primary Care. *Pain Pract* 2011 Apr 20.

Odderprojekt 1

- (7) Rudy TE, Kerns RD, Turk DC. Chronic pain and depression: toward a cognitive-behavioral mediation model. *Pain* 1988 Nov;35(2):129-40.
- (8) Ferreira ML, Machado G, Latimer J, et al. Factors defining care-seeking in low back pain--a meta-analysis of population based surveys. *Eur J Pain* 2010 Aug;14(7):747.
- (9) Badcock LJ, Lewis M, Hay EM, et al. Consultation and the outcome of shoulder-neck pain: a cohort study in the population. *J Rheumatol* 2003 Dec;30(12):2694-9.
- (10) Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav* 1995 Mar;36(1):1-10.
- (11) Fink P, Rosendal M, Olesen F. Classification of somatization and functional somatic symptoms in primary care. *Aust N Z J Psychiatry* 2005 Sep;39(9):772-81.
- (12) Madan I, Reading I, Palmer KT, et al. Cultural differences in musculoskeletal symptoms and disability. *Int J Epidemiol* 2008 Oct;37(5):1181-9.
- (13) Buchbinder R, Jolley D. Population based intervention to change back pain beliefs: three year follow up population survey. *BMJ* 2004 Feb 7;328(7435):321.
- (14) Barsky AJ. The paradox of health. *N Engl J Med* 1988 Feb 18;318(7):414-8.
- (15) Frost K, Frank E, Maibach E. Relative risk in the news media: a quantification of misrepresentation. *Am J Public Health* 1997 May;87(5):842-5.
- (16) Hofmann B. The paradox of health care. *Health Care Anal* 2001;9(4):369-86.
- (17) Petrie KJ, Sivertsen B, Hysing M, et al. Thoroughly modern worries: The relationship of worries about modernity to reported symptoms, health and medical care utilization. *Journal of Psychosomatic Research* 2001 Jul;51(1):395-401.
- (18) Andersen JH, Kaergaard A, Mikkelsen S, et al. Risk factors in the onset of neck/shoulder pain in a prospective study of workers in industrial and service companies. *Occup Environ Med* 2003 Sep;60(9):649-54.
- (19) IJzelenberg W, Molenaar D, Burdorf A. Different risk factors for musculoskeletal complaints and musculoskeletal sickness absence. *Scand J Work Environ Health* 2004 Feb;30(1):56-63.
- (20) Molano SM, Burdorf A, Elders LA. Factors associated with medical care-seeking due to low-back pain in scaffolders. *Am J Ind Med* 2001 Sep;40(3):275-81.
- (21) IJzelenberg W, Burdorf A. Patterns of care for low back pain in a working population. *Spine (Phila Pa 1976)* 2004 Jun 15;29(12):1362-8.
- (22) Tornqvist EW, Kilbom A, Vingard E, et al. The influence on seeking care because of neck and shoulder disorders from work-related exposures. *Epidemiology* 2001 Sep;12(5):537-45.
- (23) Hagen KB, Bjorndal A, Uhlig T, et al. A population study of factors associated with general practitioner consultation for non-inflammatory musculoskeletal pain. *Ann Rheum Dis* 2000 Oct;59(10):788-93.
- (24) Waxman R, Tennant A, Helliwell P. Community survey of factors associated with consultation for low back pain. *BMJ* 1998 Dec 5;317(7172):1564-7.
- (25) Szpalski M, Nordin M, Skovron ML, et al. Health care utilization for low back pain in Belgium. Influence of sociocultural factors and health beliefs. *Spine (Phila Pa 1976)* 1995 Feb 15;20(4):431-42.

Odderprojekt 1

- (26) Cote P, Cassidy JD, Carroll L. The treatment of neck and low back pain: who seeks care? who goes where? *Med Care* 2001 Sep;39(9):956-67.
- (27) Hurwitz EL, Morgenstern H. The effect of comorbidity on care seeking for back problems in the United States. *Ann Epidemiol* 1999 May;9(4):262-70.
- (28) Krishnan KR, France RD, Pelton S, et al. Chronic pain and depression. II. Symptoms of anxiety in chronic low back pain patients and their relationship to subtypes of depression. *Pain* 1985 Jul;22(3):289-94.
- (29) McLaughlin TP, Khandker RK, Kruzikas DT, et al. Overlap of anxiety and depression in a managed care population: Prevalence and association with resource utilization. *J Clin Psychiatry* 2006 Aug;67(8):1187-93.
- (30) Nordin M, Hiebert R, Pietrek M, et al. Association of comorbidity and outcome in episodes of nonspecific low back pain in occupational populations. *J Occup Environ Med* 2002 Jul;44(7):677-84.
- (31) Kamalari Y, Natvig B, Ihlebaek CM, et al. Localized or widespread musculoskeletal pain: does it matter? *Pain* 2008 Aug 15;138(1):41-6.
- (32) Hagen EM, Svensen E, Eriksen HR, et al. Comorbid subjective health complaints in low back pain. *Spine (Phila Pa 1976)* 2006 Jun 1;31(13):1491-5.
- (33) Nielsen MN, Aaen-Larsen B, Vedsted P, et al. [Diagnosis coding of the musculoskeletal system in general practice]. *Ugeskr Laeger* 2008 Sep 8;170(37):2881-4.
- (34) Waddell G, Newton M, Henderson I, et al. A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain* 1993 Feb;52(2):157-68.
- (35) Fink P, Ewald H, Jensen J, et al. Screening for somatization and hypochondriasis in primary care and neurological in-patients: a seven-item scale for hypochondriasis and somatization. *J Psychosom Res* 1999 Mar;46(3):261-73.
- (36) Derogatis LB, Cleary PA. Confirmation of the dimensional structure of the SCL-90: A study in construct validation. *Journal of Clinical Psychology* 1977 Oct;33(4):981-9.
- (37) Donnellan MB, Oswald FL, Baird BM, et al. The mini-IPIP scales: tiny-yet-effective measures of the Big Five factors of personality. *Psychol Assess* 2006 Jun;18(2):192-203.
- (38) Christensen KS, Fink P, Toft T, et al. A brief case-finding questionnaire for common mental disorders: the CMDQ. *Fam Pract* 2005 Aug;22(4):448-57.
- (39) Muller U, Tanzler K, Burger A, et al. A pain assessment scale for population-based studies: development and validation of the pain module of the Standard Evaluation Questionnaire. *Pain* 2008 May;136(1-2):62-74.
- (40) Wolfe F, Smythe HA, Yunus MB, et al. The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia. Report of the Multicenter Criteria Committee. *Arthritis Rheum* 1990 Feb;33(2):160-72.
- (41) Hunt IM, Silman AJ, Benjamin S, et al. The prevalence and associated features of chronic widespread pain in the community using the 'Manchester' definition of chronic widespread pain. *Rheumatology (Oxford)* 1999 Mar;38(3):275-9.

Odderprojekt 1

- (42) Brauer C, Mikkelsen S. The influence of individual and contextual psychosocial work factors on the perception of the indoor environment at work: a multilevel analysis. *International Archives of Occupational and Environmental Health*.
- (43) Hildebrandt VH, Bongers PM, van Dijk FJ, et al. Dutch Musculoskeletal Questionnaire: description and basic qualities. *Ergonomics* 2001 Oct 10;44(12):1038-55.
- (44) Ware J, Kosinski M, Keller S. A 12-Item Short-Form Health Survey: Construction of Scales and Preliminary Tests of Reliability and Validity. [Article]. *Medical Care* 1996 Mar;34(3):220-33.
- (45) Hjollund NH, Larsen FB, Andersen JH. Register-based follow-up of social benefits and other transfer payments: accuracy and degree of completeness in a Danish interdepartmental administrative database compared with a population-based survey. *Scand J Public Health* 2007;35(5):497-502.
- (46) Schoenfeld D. Residuals for the proportional hazards regression model. *Biometrika* 1982;69(1):239-41.
- (47) Cote P, Baldwin ML, Johnson WG. Early patterns of care for occupational back pain. *Spine (Phila Pa 1976)* 2005 Mar 1;30(5):581-7.
- (48) Linton SJ, Hellsing AL, Hallden K. A population-based study of spinal pain among 35-45-year-old individuals. Prevalence, sick leave, and health care use. *Spine (Phila Pa 1976)* 1998 Jul 1;23(13):1457-63.
- (49) Messing K, Stock SR, Tissot F. Should studies of risk factors for musculoskeletal disorders be stratified by gender? Lessons from the 1998 Quebec Health and Social Survey. *Scand J Work Environ Health* 2009 Mar;35(2):96-112.
- (50) Messing K, Punnett L, Bond M, et al. Be the fairest of them all: challenges and recommendations for the treatment of gender in occupational health research. *Am J Ind Med* 2003 Jun;43(6):618-29.
- (51) Schmidt CO, Ittermann T, Schulz A, et al. Linear, nonlinear or categorical: how to treat complex associations in regression analyses? Polynomial transformations and fractional polynomials. *Int J Public Health* 2012 May 9.
- (52) Rief W, Glaesmer H, Baehr V, et al. The relationship of modern health worries to depression, symptom reporting and quality of life in a general population survey. *J Psychosom Res* 2012 Apr;72(4):318-20.
- (53) Furnham A. Are modern health worries, personality and attitudes to science associated with the use of complementary and alternative medicine? *Br J Health Psychol* 2007 May;12(Pt 2):229-43.
- (54) Filipkowski K, Smyth J, Rutchick A, et al. Do Healthy People Worry? Modern Health Worries, Subjective Health Complaints, Perceived Health, and Health Care Utilization. *International Journal of Behavioral Medicine*.
- (55) European Commission. Eurobarometer. Public Opinion 2012 April 4 [cited 12 A.D. Apr 4]; Available from: URL: http://ec.europa.eu/public_opinion/index_en.htm
- (56) Holstein BE, Currie C, Boyce W, et al. Socio-economic inequality in multiple health complaints among adolescents: international comparative study in 37 countries. *Int J Public Health* 2009 Sep;54 Suppl 2:260-70.
- (57) Chammas M, Bousquet P, Renard E, et al. Dupuytren's disease, carpal tunnel syndrome, trigger finger, and diabetes mellitus. *J Hand Surg Am* 1995 Jan;20(1):109-14.

Odderprojekt 1

- (58) Britt HC, Harrison CM, Miller GC, et al. Prevalence and patterns of multimorbidity in Australia. *Med J Aust* 2008 Jul 21;189(2):72-7.
- (59) Khlal M, Chau N, Chau N, et al. Social disparities in musculoskeletal disorders and associated mental malaise: findings from a population-based survey in France. *Scand J Public Health* 2010 Jul;38(5):495-501.
- (60) Ritzwoller DP, Crounse L, Shetterly S, et al. The association of comorbidities, utilization and costs for patients identified with low back pain. *BMC Musculoskelet Disord* 2006;7:72.
- (61) Kamalari Y, Natvig B, Ihlebaek CM, et al. Does the number of musculoskeletal pain sites predict work disability? A 14-year prospective study. *Eur J Pain* 2009 Apr;13(4):426-30.
- (62) Jensen J. Work-related musculoskeletal discomfort. The Danish Working Environment Authority 2011 [cited 2011 Aug 23]; Available from: URL: <http://arbejdstilsynet.dk/da/regler/at-vejledninger-mv/arbejdets-udforelse/at-vejledninger-om-arbejdets-udforelse/d3-ergonomi/d34-muskel-og-skeletbesvaer.aspx>
- (63) Koch MB, Davidsen M, Juel K. The societal costs in Denmark related to diseases of the back and back pain. National Institute of Public Health University of Southern Denmark 2011 [cited 2011 Jul 18]; Available from: URL: <http://www.si-folkesundhed.dk>
- (64) Elms J, O'Hara R, Pickvance S, et al. The perceptions of occupational health in primary care. *Occup Med (Lond)* 2005 Oct;55(7):523-7.
- (65) Coggon D, Palmer KT. Assessing fitness for work and writing a "fit note". *BMJ* 2010;341:c6305.
- (66) Slotsholm A/S. Midway evaluation of the fitness for work note. <http://www.ams.dk/Aktuelt/Nyheder/2011/06-21-evalueringmulighedserklaering.aspx> 2011 [cited 2012 Jun 3]; Available from: URL: <http://www.ams.dk/Aktuelt/Nyheder/2011/06-21-evalueringmulighedserklaering.aspx>

Appendices.

Appendix A. Questionnaire in Danish.

SPØRGE- SKEMA

Om arbejde og helbred



2008

Et samarbejdsprojekt mellem Lægehuset, Thorvald Køhlsvej i Odder
og Arbejdsmedicinsk Klinik i Herning

Instruktion

Du skal ikke bruge for lang tid på spørgsmålene, men give det svar, som først falder dig ind.
 Nogle af spørgsmålene kan minde om hinanden, men de er ikke helt ens, og de undersøger noget forskelligt.
 Da spørgsmålene drejer sig om dine forhold og din me-

ning, bør du udfylde skemaet uden hjælp fra andre.
 Vær opmærksom på at der spørges til forskellige tidsperioder i nogle af spørgsmålene - f.eks. de sidste 4 uger, 6 måneder eller 12 måneder.

Udfyld venligst spørgeskemaet med blå eller sort kuglepen

Vi vil bede dig om at udfylde spørgsmålene og returnere skemaet i vedlagte svarkuvert. Svarene bliver scannet ind på en maskine, så det er vigtigt, at alle tal og krydser er nemme at tolke.

	RIGTIGT	FORKERT
Sæt et tydeligt kryds.		
Hvis et felt er udfyldt forkert, skraveres den pågældende kasse og krydset sættes i den rigtige kasse,	 	 
Tal skrives i felterne. Tal rettes ved at sætte en streg igennem det forkerte tal og skrive det rigtige tal ovenover.		

Læs videre om undersøgelsen på side 23

Skriv venligst dagens dato

dag		måned		år	

Baggrundsoplysninger

1. Er du:

Mand
 Kvinde

2. Hvornår er du født?

År

3. Hvilket land er du født i?

Danmark
 Andet land

Hvis andet land, skriv hvilket:

Hvis andet land, hvor mange år har du da boet i Danmark? år

Erhvervsstatus og Arbejdsforhold

4. Hvilken erhvervsuddannelse har du?

(Sæt kryds ved den længste uddannelse du har fuldført)

Ingen

Et eller flere kortere kurser (specialarbejderkurser, arbejdsmarkedskurser mv.)

Faglært indenfor håndværk handel, kontor mv. (lærlinge- eller EFG/HG uddannelse)

Kort videregående uddannelse under 3 år
(f.eks. social- og sundhedshjælper eller -assistent, pædagogisk grundudd.)

Mellemlang videregående uddannelse, 3 - 4 år (f.eks. folkeskolelærer, sygeplejerske, pædagog)

Lang videregående uddannelse, mere end 4 år, (f.eks. økonom, læge, jurist, psykolog)

Anden uddannelse:

Hvis anden uddannelse, skriv hvilken:

5. Hvad er din aktuelle erhvervsstatus?

(Sæt ét kryds)

I arbejde

Midlertidig fraværende på grund af sygdom

Studerende. (Hvis du ikke har arbejde ved siden af studierne spring til spørgsmål 18)

I aktivering (f.eks. skånejob, fleksjob, jobtræning)

Midlertidig fraværende pga. orlov (f.eks. barselsorlov, forældreorlov, uddannelsesorlov)

Elev/lærling

Kontanthjælpsmodtager

Arbejdsløs

Pensionist/efterlønner (Hvis du ikke har arbejde ved siden af pensionen, spring til spørgsmål 18)

Andet,

Hvis andet, skriv hvad

6. Hvad er din stilling rent faktisk?

(Nøjagtig angivelse: eksempelvis pædagog i børnehave (ikke blot pædagog), Sygeplejerske på børneafdeling (ikke blot sygeplejerske))

Skriv hvad

7. Hvor mange timer om ugen arbejder du rent faktisk?

Gennemsnitlig timetal pr. uge i det seneste år, (når du medregner frokostpause, overarbejde, bijob og arbejde hjemmefra)

Antal timer pr uge timer

8. Hjælp og støtte

(Sæt ét kryds ud for hvert spørgsmål ved det svar, der passer bedst)

	Altid	Ofte	Sommetider	Sjældent	Aldrig
Hvis du har problemer på dit arbejde, kan du så få den nødvendige hjælp og støtte fra din ledelse?	<input type="checkbox"/>				
Hvis du har problemer på dit arbejde, kan du så få den nødvendige hjælp og støtte fra dine kolleger?	<input type="checkbox"/>				

9. Hvor ofte skal du – som en del af dit arbejde –

(Sæt ét kryds)

	Altid	Ofte	Sommetider	Sjældent	Aldrig
- gøre den samme bevægelse i lange perioder?	<input type="checkbox"/>				
- bruge din maksimale fysiske styrke?	<input type="checkbox"/>				
- lave hårdt fysisk arbejde?	<input type="checkbox"/>				
- udføre samme arbejdsopgave med arme, hænder eller fingre mange gange i minuttet?	<input type="checkbox"/>				

10. Hvor stor en del af din arbejdstid arbejder du ved en computerskærm?

(Sæt ét kryds)

	Næsten hele tiden	Ca. ¾ af tiden	Ca. ½ af tiden	Ca. ¼ af tiden	Sjældent/meget lidt	Aldrig/næsten aldrig
	<input type="checkbox"/>					

11. Hvor krævende synes du alt i alt dit arbejde er?

(Sæt ét kryds)

	Særdeles krævende	Meget krævende	Ret krævende	Noget krævende	Ikke så krævende	Meget lidt krævende
	<input type="checkbox"/>					

12. Hvor stor synes du alt i alt din arbejdsbyrde er?

(Sæt ét kryds)

	Særdeles stor	Meget stor	Ret stor	Moderat stor	Ikke så stor	Ret lille
	<input type="checkbox"/>					

13. Hvor stor indflydelse har du normalt på tilrettelæggelsen og udførelsen af dit arbejde?
(Sæt ét kryds)

Særdeles stor	Meget stor	Ret stor	Moderat stor	Ikke så stor	Ret lille
<input type="checkbox"/>					

14. Er dit arbejde sædvanligvis stimulerende, udviklende og engagerende?
(Sæt ét kryds)

I meget høj grad	I høj grad	I nogen grad	I mindre grad	I ringe grad	I meget ringe grad
<input type="checkbox"/>					

15. Hvor tilfreds er du alt i alt med dit arbejde?
(Sæt ét kryds)

Meget tilfreds	Ret tilfreds	Tilfreds	Lidt utilfreds	Ret utilfreds	Meget utilfreds
<input type="checkbox"/>					

16. Hvor tilfreds er du alt i alt med den måde din arbejdsplads ledes på?
(Sæt ét kryds)

Meget tilfreds	Ret tilfreds	Tilfreds	Lidt utilfreds	Ret utilfreds	Meget utilfreds
<input type="checkbox"/>					

17. Besvar venligst følgende spørgsmål om tillid, retfærdighed og rummelighed på din arbejdsplads
(Sæt ét kryds ud for hvert spørgsmål)

	I meget høj grad	I høj grad	I nogen grad	I mindre grad	I ringe grad	I meget ringe grad
Bliver mænd og kvinder behandlet ligeværdigt på din arbejdsplads?	<input type="checkbox"/>					
Bliver konflikter løst på en retfærdig måde?	<input type="checkbox"/>					
Bliver man anerkendt for et godt arbejde?	<input type="checkbox"/>					
Er der plads til ansatte med forskellig race og religion?	<input type="checkbox"/>					
Er der plads til ældre medarbejdere?	<input type="checkbox"/>					
Bliver alle forslag fra de ansatte behandlet seriøst af ledelsen?	<input type="checkbox"/>					
Er der plads til ansatte med forskellige skavanker og handicaps?	<input type="checkbox"/>					
Bliver arbejdsopgaverne fordelt på en retfærdig måde?	<input type="checkbox"/>					

Helbredsforhold

18. Hvordan synes du dit helbred er alt i alt?

(Sæt ét kryds.)

Fremragende	Vældigt godt	Godt	Mindre Godt	Dårligt
<input type="checkbox"/>				

De følgende spørgsmål handler om aktiviteter i dagligdagen.

19. Er du på grund af dit helbred begrænset i følgende aktiviteter? I så fald hvor meget?

(Sæt ét kryds for hver linje)

	Ja, meget begrænset	Ja, lidt begrænset	Nej, slet ikke begrænset
Lettere aktiviteter såsom at flytte et bord, støvsuge eller cykle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
At gå flere etager op ad trapper	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Har du indenfor de sidste 4 uger haft nogen af følgende problemer med dit arbejde eller andre daglige aktiviteter på grund af dit fysiske helbred?

	Hele tiden	Det meste af tiden	Noget af tiden	Lidt af tiden	På intet tidspunkt
Jeg har nået mindre, end jeg gerne ville	<input type="checkbox"/>				
Jeg har været begrænset i hvilken slags arbejde eller andre aktiviteter, jeg har kunnet udføre.	<input type="checkbox"/>				

21. Har du indenfor de sidste 4 uger haft nogen af følgende problemer med dit arbejde eller andre daglige aktiviteter på grund af følelsesmæssige problemer?

	Hele tiden	Det meste af tiden	Noget af tiden	Lidt af tiden	På intet tidspunkt
Jeg har nået mindre, end jeg gerne ville	<input type="checkbox"/>				
Jeg har udført mit arbejde eller andre aktiviteter mindre omhyggeligt, end jeg plejer	<input type="checkbox"/>				

22. Hvor meget har fysiske smerter vanskeliggjort dit daglige arbejde indenfor de sidste 4 uger (både arbejde uden for hjemmet og husarbejde)?

	Slet ikke	Lidt	Noget	En hel del	Virkelig meget
	<input type="checkbox"/>				

23. Hvor stor en del af tiden de sidste 4 uger...

(Sæt ét kryds for hver linje)

	Hele tiden	Det meste af tiden	Noget af tiden	Lidt af tiden	På intet tidspunkt
har du følt dig rolig og afslappet?	<input type="checkbox"/>				
har du været fuld af energi?	<input type="checkbox"/>				
har du følt dig trist til mode?	<input type="checkbox"/>				

24. Hvor stor en del af tiden har dit fysiske helbred eller følelsesmæssige problemer indenfor de sidste 4 uger, gjort det vanskeligt for dig at se andre mennesker (besøge venner, slægtninge osv.)?

	Hele tiden	Det meste af tiden	Noget af tiden	Lidt af tiden	På intet tidspunkt
	<input type="checkbox"/>				

Symptomer

25. I løbet af de sidste 4 uger, hvor meget har du været generet af...
(Sæt ét kryds for hvert spørgsmål)

	Slet ikke	Lidt	Noget	En hel del	Virkelig meget
hovedpine?	<input type="checkbox"/>				
svimmelhed eller tilløb til at besvime?	<input type="checkbox"/>				
smarter i hjerte eller bryst?	<input type="checkbox"/>				
lavtsiddende rygsmarter?	<input type="checkbox"/>				
kvalme eller uro i maven?	<input type="checkbox"/>				
muskelsmarter?	<input type="checkbox"/>				
at du har svært ved at få vejret?	<input type="checkbox"/>				
anfald af varme eller kuldefornemmelser?	<input type="checkbox"/>				
følelsesløshed eller en snurrende fornemmelse i kroppen?	<input type="checkbox"/>				
en klump i halsen?	<input type="checkbox"/>				
at du føler dig svag i kroppen?	<input type="checkbox"/>				
at dine arme og ben føles tunge?	<input type="checkbox"/>				
bekymringer over, om der er noget alvorligt galt med din krop?	<input type="checkbox"/>				
bekymringer over, om du selv lider af en sygdom, du har læst eller hørt om?	<input type="checkbox"/>				
mange forskellige smarter?	<input type="checkbox"/>				
bekymringer over, om du lider af en alvorlig sygdom?	<input type="checkbox"/>				
mange forskellige sygdomssymptomer?	<input type="checkbox"/>				

26. I løbet af de sidste 4 uger, hvor meget har du været generet af...
(Sæt ét kryds for hvert spørgsmål)

	Slet ikke	Lidt	Noget	En hel del	Virkelig meget
tanken om at lægen måske tager fejl, hvis han siger, at der ikke er noget at bekymre sig om?	<input type="checkbox"/>				
bekymringer om dit helbred?	<input type="checkbox"/>				
at du pludselig bliver bange uden grund?	<input type="checkbox"/>				
nervøsitet eller indre uro?	<input type="checkbox"/>				
anfald af rædsel eller panik?	<input type="checkbox"/>				
at bekymre dig for meget?	<input type="checkbox"/>				
at føle dig ængstelig?	<input type="checkbox"/>				
at føle dig uden håb for fremtiden?	<input type="checkbox"/>				
en følelse af at alting er en anstrengelse?	<input type="checkbox"/>				
at føle dig nedtrykt?	<input type="checkbox"/>				
en følelse af ingenting at være værd?	<input type="checkbox"/>				
tanker om at gøre en ende på dit liv?	<input type="checkbox"/>				
en følelse af at være fanget i en fælde?	<input type="checkbox"/>				
at føle dig ensom?	<input type="checkbox"/>				
selvbebrejdelser?	<input type="checkbox"/>				

27. I løbet af de sidste 4 uger, hvor ofte...

(Sæt ét kryds for hvert spørgsmål)

	Slet ikke	Lidt	Noget	En hel del	Virkelig meget
har du følt dig uden indflydelse på væsentlige ting i dit liv?	<input type="checkbox"/>				
har du haft tillid til dine egne evner til at klare dine personlige problemer?	<input type="checkbox"/>				
har du oplevet medgang?	<input type="checkbox"/>				
har du følt at vanskelighederne hobede sig op, så du ikke kunne overkomme dem?	<input type="checkbox"/>				

Arbejdsevne

28. Forestil dig, at din arbejdsevne er 10 points værd, når den er bedst. Hvor mange points mener du, din arbejdsevne er værd nu?

(Sæt ét kryds)

Jeg er helt ude af stand til at arbejde										Jeg har min fulde arbejdsevne
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Smerter

29. Svar på hvert af følgende spørgsmål uanset hvor dine smerter sidder:
(Sæt ét kryds for det svar, der passer bedst)

	Slet ikke						Meget
Hvor ondt har du lige nu?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
Hvor ondt har du i gennemsnit haft den seneste uge?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
Hvor meget har dine smerter påvirket din tilfredshed eller glæde ved at deltage i sociale aktiviteter og fritidsaktiviteter i øvrigt?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
Hvor meget har dine smerter påvirket dine muligheder for at deltage i sociale aktiviteter og fritidsaktiviteter i øvrigt?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
Hvor godt har du været i stand til at håndtere dine problemer indenfor den seneste uge?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
Hvor godt har du været i stand til at tackle stressende situationer indenfor den seneste uge?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
Hvor irriteret har du følt dig indenfor den seneste uge?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7
Hvor anspændt eller bange har du følt dig indenfor den seneste uge?	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5	<input type="checkbox"/> 6	<input type="checkbox"/> 7

30. Hvor enig er du i følgende udtalelser, om det at have ondt?

(Sæt ét kryds for hver udtalelse, uanset om du har ondt lige nu eller ej)

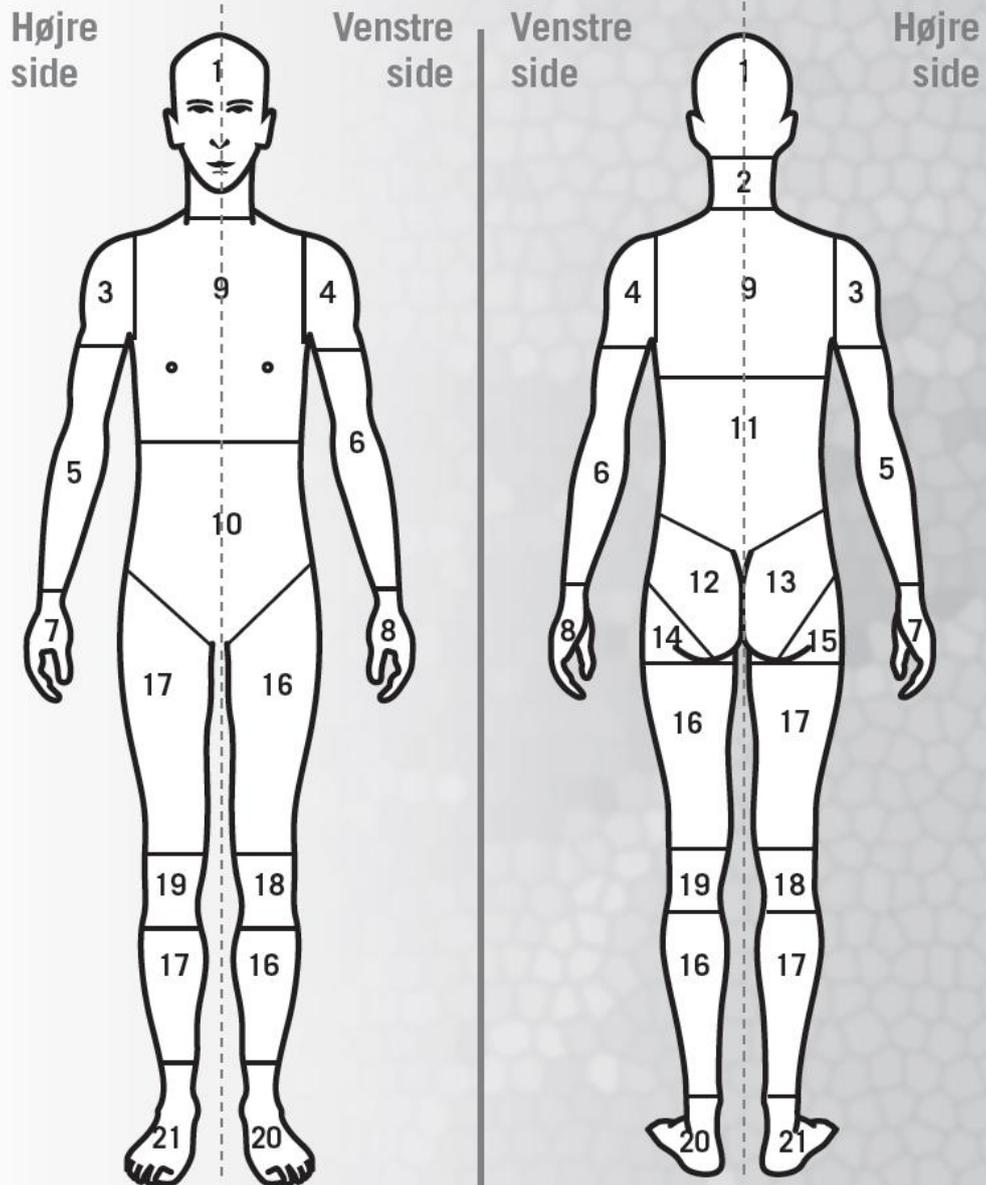
	Meget enig	Enig	Hverken enig eller uenig	Uenig	Meget uenig
Fysisk aktivitet kan skade min ryg og andre dele af kroppen	<input type="checkbox"/>				
Jeg bør undgå fysiske aktiviteter som (måske) kan gøre smerterne værre	<input type="checkbox"/>				
Jeg tror det går over af sig selv	<input type="checkbox"/>				
Det er vigtigt at søge læge straks ved de første tegn på besvær	<input type="checkbox"/>				
Hvis man tilsidesætter sine smerter, kan man få varige skader	<input type="checkbox"/>				
Mit arbejde kan skade min ryg og andre dele af kroppen	<input type="checkbox"/>				

31. Hvor mange smerter har du haft indenfor de sidste 4 uger i de dele af kroppen, der er nævnt nedenfor?

(Giv venligst et svar for hvert af de følgende områder af kroppen. Hvis du ikke har haft ondt, sæt kryds i "Ingen smerter")

	Ingen smerter					Værst tænkelige smerter	
	1	2	3	4	5	6	7
Hoved eller ansigt	<input type="checkbox"/>						
Venstre skulder, arm eller hånd.	<input type="checkbox"/>						
Højre skulder, arm eller hånd.	<input type="checkbox"/>						
Bryst eller mave.	<input type="checkbox"/>						
Nakke eller ryg.	<input type="checkbox"/>						
Venstre balde, hofte, ben, knæ eller fod	<input type="checkbox"/>						
Højre balde, hofte, ben, knæ eller fod.	<input type="checkbox"/>						

32. Hvis du har haft smerter indenfor de sidste 4 uger, angiv da den/de mest nøjagtige områder for smerten/smerterne.
(Skraver området)



33. Hvor mange smerter har du haft indenfor de sidste 4 uger, når du har gjort følgende?
 (Giv venligst et svar for hvert af de følgende aktiviteter. Hvis du ikke har haft ondt, sæt kryds i "Ingen smerter")

	Ingen smerter					Værst tænkelige smerter	
Ligget stille	<input type="checkbox"/>						
Vendt dig i sengen om natten	<input type="checkbox"/>						
Stået oprejst	<input type="checkbox"/>						
Siddet ned	<input type="checkbox"/>						
Gået på en jævn overflade	<input type="checkbox"/>						
Gået op af trapper	<input type="checkbox"/>						
Løftet armene over hovedet (f.eks. vasket hår, skruet en pære i)	<input type="checkbox"/>						
Kløet dig selv på ryggen	<input type="checkbox"/>						
Løftet en let byrde (f.eks. en liter mælk)	<input type="checkbox"/>						
Kastet en ting (f.eks. en bold)	<input type="checkbox"/>						
Gået på en ujævn overflade (f.eks. i skoven eller på en mark)	<input type="checkbox"/>						
Dyrket sport	<input type="checkbox"/>						

34. Hvor ofte har du haft smerter indenfor de sidste 4 uger?
 (Sæt kryds ved det svar, der passer bedst)

Hele tiden	Ikke hele tiden men daglig	To til seks gange om ugen	En til fire gange om måneden	Mindre end en gang om måneden.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

35. Hvad har udløst dine smerter indenfor de sidste 4 uger?

Hvis du ikke har haft smerter indenfor de sidste 4 uger, spring videre til spørgsmål 36
(Giv venligst et svar for hver af de følgende aktiviteter)

	Ja	Nej
Tung fysisk aktivitet	<input type="checkbox"/>	<input type="checkbox"/>
Moderat fysisk aktivitet	<input type="checkbox"/>	<input type="checkbox"/>
Let fysisk aktivitet	<input type="checkbox"/>	<input type="checkbox"/>
Hvile	<input type="checkbox"/>	<input type="checkbox"/>
Andre årsager	<input type="checkbox"/>	<input type="checkbox"/>
Der har ikke været en klar årsag	<input type="checkbox"/>	<input type="checkbox"/>

36. Hvor ofte har du taget smertestillende medicin indenfor de sidste 4 uger (også håndkøbsmedicin som Pamol og Kodimagnyl)?

(Sæt kryds ved det svar, der passer bedst)

Flere gange om dagen	En gang om dagen	To til seks gange om ugen	En til fire gange om måneden	Mindre end en gang om måneden	Aldrig
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

37. Hvornår begyndte dine smerter?

(Sæt kryds ved det svar, der passer bedst)

For mindre end en måned siden	For en til tre mdr. siden	For fire til 12 mdr. siden	For mere end et år siden
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Besøg hos lægen

38. Har du indenfor det sidste år været til samtale eller undersøgelse hos din læge på grund af smerter i ryg, led, muskler eller andre dele af kroppen?

(Sæt kryds ved det svar, der passer bedst).

Nej, Jeg har ikke været hos min læge med smerter det seneste år	Ja, for mindre end en måned siden	Ja, for en til tre mdr. siden	Ja, for fire til 12 mdr. siden
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. Hvilke forventninger havde du sidst, du gik til læge på grund af smerter i kroppen?
(Hvis ikke du har været hos din læge på grund af smerter i kroppen indenfor det seneste år skal du gå videre til spørgsmål 42)

Ved "Ja" angives vigtigheden af de enkelte udsagn.

Jeg ville...	Nej	Ja			
		Ikke vigtigt	Lidt vigtigt	Ret vigtigt	Meget vigtigt
- have lægen til at undersøge mig	<input type="checkbox"/>				
- have lægen til at fortælle mig, hvad jeg kan gøre og ikke gøre, med dette problem.	<input type="checkbox"/>				
- ønske at dele nogen af mine tanker, følelser og bekymringer over mit problem.	<input type="checkbox"/>				
- have at lægen fortalte mig om min tilstand vil blive bedre, blive ved, blive værre, eller komme igen senere.	<input type="checkbox"/>				
- have lægens hjælp til bedre at forstå min tilstand, så jeg kunne finde ud af, hvad jeg selv kunne gøre	<input type="checkbox"/>				
- have lægen til at sætte navn på min tilstand	<input type="checkbox"/>				
- have lægen til at gøre noget for at lindre mit fysiske ubehag	<input type="checkbox"/>				
- have lægen til at udskrive noget medicin til mig	<input type="checkbox"/>				
- have foretaget undersøgelser, der kunne vise, hvad der var galt	<input type="checkbox"/>				
- have lægen til at fortælle mig, hvad der var årsagen til mit problem.	<input type="checkbox"/>				

40. Dækker de 10 ovenstående udsagn de forventninger, du havde til besøget hos lægen?

Ja Nej

41. Hvis nej angiv her hvilke forventninger eller ønsker du havde:

Bekymringer om sundhed

42. Hvor bekymret er du for, at det følgende skal påvirke dig og din families sundhed?
(Sæt ét kryds for hver linie)

	Ikke bekymret	Lidt bekymret	Noget bekymret	Ret bekymret	Meget bekymret
Mobiltelefoni	<input type="checkbox"/>				
Højspændingsnettet	<input type="checkbox"/>				
Radioaktiv stråling	<input type="checkbox"/>				
Kemikalier i legetøj	<input type="checkbox"/>				
Luftforurening	<input type="checkbox"/>				
Klimaforandringer	<input type="checkbox"/>				
Støjforurening	<input type="checkbox"/>				
Bilos	<input type="checkbox"/>				
Anden miljøforurening	<input type="checkbox"/>				
Genmodificeret mad	<input type="checkbox"/>				
Tilsætningsstoffer i mad	<input type="checkbox"/>				
Kriminalitet	<input type="checkbox"/>				
Antibiotika i mad	<input type="checkbox"/>				
Skimmelsvamp i bygninger	<input type="checkbox"/>				
Forurenet grundvand	<input type="checkbox"/>				
Stress	<input type="checkbox"/>				
Vaccinationsprogrammer	<input type="checkbox"/>				
Brug af computermus	<input type="checkbox"/>				
Giftige kemikalier i husholdningen	<input type="checkbox"/>				
Terrorisme	<input type="checkbox"/>				
Modstandsdygtige bakterier	<input type="checkbox"/>				
Kviksølv i tandfyldninger	<input type="checkbox"/>				

Dig som person

43. Hvor godt passer følgende udsagn på dig?

(Sæt ét kryds for hver linie)

	Passer meget dårligt	Passer dårligt	Passer hverken godt eller dårligt	Passer godt	Passer meget godt
Jeg er festens midtpunkt	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg føler medlidenhed med andre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg får mine opgaver fra hånden med det samme	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har ofte humørsvingninger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har en livlig fantasi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg taler ikke så meget	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg interesserer mig ikke for andres problemer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg glemmer ofte at sætte ting på plads	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er for det meste afslappet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er ikke interesseret i abstrakte ideer	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg taler med mange forskellige mennesker, når jeg er i byen	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kan fornemme andres følelser	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg kan lide orden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg bliver nemt ked af det	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har svært ved at forstå abstrakte tanker	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg holder mig i baggrunden	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er ikke rigtig interesseret i andre	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er et rodehoved	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg er sjældent i dårligt humør	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Jeg har ikke en god fantasi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

44. Ryger du til daglig? (sæt kun ét kryds)

- Ja Nej, men jeg har røget Nej, jeg har aldrig røget

45. Hvis du skal anføre dine fysiske aktiviteter i fritiden, herunder transport til og fra arbejde indenfor det sidste år, i hvilken gruppe mener du så, du skal placeres?

(Sæt ét kryds)

- Næsten helt fysisk passiv eller let fysisk aktiv i mindre end 2 timer pr. uge (f.eks. læsning, fjernsyn, biograf)
- Let fysisk aktivitet fra 2-4 timer pr uge (f.eks. spadsereture, cykelture, let havearbejde, let motionsgymnastik)
- Let fysisk aktivitet i mere end 4 timer pr. uge eller mere fysisk anstrengende aktivitet i 2-4 timer pr. uge (f.eks. hurtig gang og/eller hurtig cykling, hvor man overhaler andre, tungt havearbejde, hård motionsgymnastik, hvor man sveder og bliver forpustet)
- Mere anstrengende fysisk aktivitet i mere end 4 timer eller regelmæssig hård træning og evt. konkurrencer flere gange pr. uge

46. Højde og vægt. (Angiv kun hele tal)

din vægt kg. din højde cm.

47. Bor du sammen med nogen?

(Sæt ét kryds)

- Ja, jeg bor sammen med ægtefælle/samlever
- Ja, jeg bor sammen med andre end ægtefælle/samlever
- Ja, jeg bor hos mine forældre
- Nej, jeg bor alene – er enke/enkemand
- Nej, jeg bor alene - er skilt/separeret/forholdet er opløst
- Nej, jeg har altid boet alene
- Andet

Hvis andet, skriv hvad

48. Hvis du har problemer, kan du så få den nødvendige hjælp og støtte fra din familie eller venner?

(Sæt ét kryds)

Altid	Næsten altid	Som regel	Ofte	Af og til	Sjældent/aldrig
<input type="checkbox"/>					

49. Har du indenfor de sidste 12 mdr. fået anmeldt en arbejdsskade vedrørende...?

(Sæt ét eller flere krydser)

- Ondt i ryggen
- Ondt i nakke, skulder, arm eller hånd
- Ondt i hofte, knæ, ben eller fod
- Andet

Hvis andet, skriv hvad

50. Har du en igangværende pensions sag?

Ja	Nej
<input type="checkbox"/>	<input type="checkbox"/>

Det var sidste spørgsmål. Tak!

Formål:

Undersøgelsens formål er at belyse arbejdsforhold, smerter i ryg, led og muskler, samt forventninger til besøg hos din læge vedrørende sådanne smerter. Det er forskernes og lægernes ønske at vi, i kontakt med patienterne, bliver

bedre rustet til at forebygge og håndtere smerteproblemer. Undersøgelsen udføres af læger fra Arbejdsmedicinsk Klinik, Regionshospitalet Herning i samarbejde med lægerne i lægehuset, Thorvald Køhlsvej 29, Odder.

Hvem deltager?

I alt har ca. 8700 borgere, der er tilmeldt som patienter i Lægehuset, Thorvald Køhlsvej 29, Odder, fået tilsendt ske-

maet. Dit bidrag er afgørende. Undersøgelsens kvalitet afhænger af en høj deltagelse.

Vedrørende databehandling og anonymitet

Alle dine personlige, helbredsrelevante og andre oplysninger behandles fortroligt og anvendes kun til statistiske formål. Ved opgørelse af materialet udarbejdes kun statistik for grupper. Ved resultaternes offentliggørelse sikres, at du som enkeltperson ikke vil kunne genkendes.

Din anonymitet er sikret ved at spørgeskemaoplysninger og andre oplysninger beskyttes med en nummerkode, som kun den dataansvarlige forsker og databehandleren har adgang til. Koblingen mellem nummerkoden og person (navn, adresse og personnummer) opbevares særskilt af den dataansvarlige forsker efter Datatilsynets anvisning. I undersøgelsen anvendes endvidere registeroplysninger, herunder oplysning fra Sygesikringen og Beskæftigelsesministeriet om brug af sundhedsydelser.

Det er frivilligt at deltage. Ønsker du ikke at deltage, får

det ingen betydning for nuværende eller fremtidig behandling hos din læge eller i anden sammenhæng. Du kan også uden begrundelse til enhver tid senere trække dig ud af undersøgelsen.

Undersøgelsen er anmeldt til Datatilsynet efter lov om behandling af personoplysninger, og Datatilsynet har fastsat de nærmere vilkår for projektet til beskyttelse af deltagerens privatliv, jf. standardvilkår for private forsknings- og statistikprojekter. Den dataansvarlige er overlæge Johan Hviid Andersen, arbejdsmedicinsk klinik, Regionshospitalet Herning.

Ved undersøgelsens start har Sygesikringen oplyst forskerne fra Arbejdsmedicinsk klinik navn, adresse og personnummer på undersøgelsens målgruppe.

For undersøgelsen står:

Johan Hviid Andersen, *Overlæge, ph.d*

Jens Peder Haahr, *Overlæge, MPH*

Jens Christian Jensen, *Læge*

Arbejdsmedicinsk Klinik,

Regionshospitalet Herning,

Gl. Landevej 61, 7400 Herning

Tlf: 99272470

Ved spørgsmål kontaktes:

Jens Christian Jensen, *Læge*

Arbejdsmedicinsk Klinik

Tlf: 9927 2470

The significance of health anxiety and somatization in care-seeking for back and upper extremity pain

Jens Christian Jensen^{a,b,*}, Jens Peder Haahr^{a,b}, Poul Frost^{a,c} and Johan Hviid Andersen^{a,b}

^aDanish Ramazzini Centre, University of Aarhus, Aarhus, Denmark, ^bDepartment of Occupational Medicine, Herning Hospital, Herning, Denmark and ^cDepartment of Occupational Medicine, Aarhus University Hospital, Aarhus, Denmark.

*Correspondence to Jens Christian Jensen, Department of Occupational Medicine, Regional Hospital Herning, Gl. Landevej 61, 7400 Herning, Denmark; E-mail: jens.christian.jensen@vest.rm.dk

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Background. Patients with musculoskeletal pain account for a large number of consultations in primary care. Improving our understanding of factors that make patients seek care could be of interest in decision making and prevention in the health care system.

Objectives. Our objectives were to examine if health anxiety, somatization and fear-avoidance beliefs were of importance for care-seeking with either back pain or upper extremity pain and to look at possible differences between the two groups.

Methods. This is a prospective study with a baseline questionnaire and 18 months follow-up. Using the International Classification for Primary Care (ICPC), we identified care-seekers with either back pain or upper extremity pain among the potential patients of eight GPs. For analysis, we used Cox proportional hazards regression analysis. Analysis was stratified by gender.

Results. We found that previous regional pain was a strong predictor of care-seeking. Somatization was associated with seeking care for back pain. Health anxiety was a predictor among women suffering from back pain. Only previous pain was a predictor of care-seeking for upper extremity pain.

Conclusion. The study implies that prevention of back pain and upper extremity pain requires different strategies and that gender and health anxieties should be taken into account.

Keywords. Consultation, occupational health, pain.

Introduction

Musculoskeletal pain (MP) is a common condition with multifactorial origin. Patients with MP form a large part of consulters in primary care, presenting a range of conditions from small self-limiting injuries to more chronic or widespread pain. Over the course of a year, it has been estimated that up to 20% of adults consulted their GP with MP.¹ Among those seeking care with MP, patients with back pain or upper extremity pain constitute a major part.² The reasons why some people with MP seek care while others do not are still poorly understood. General psychological well-being seems to be a predictor of care-seeking as such but not specifically for MP.³ On the other hand, a tendency to somatize may influence care-seeking.⁴ That pain itself is a predictor of care-seeking for musculoskeletal disorders like back pain or upper extremity pain is hardly surprising. Rather,

more astounding is the fact that only a fraction of those with pain actually seek care. A meta-analysis of eight articles reporting on seven population-based surveys found a pooled prevalence of 58% on care-seeking for back pain.⁵ However, there were large variations on reference periods, ranging from 2 weeks to 12 months. In a community-based survey, 21% of people with self-reported shoulder–neck pain consulted their GP for reasons related to their pain over a 2-year period.⁶ Previous research has dealt with associations between care-seeking and gender, pain history, disability and physical and psychological factors at the workplace, suggesting that nature and severity of pain were strong predictors, whereas well-known work-related risk factors for the occurrence for low back pain did not determine use of care.^{7,8} Other studies however did find an association between work-related factors and care-seeking.⁹ A few studies have taken health beliefs or non-physical aspects of care-seeking into

account. These studies have been cross-sectional but did suggest that health beliefs were associated with increased likelihood of seeing a health professional and that having an externalized locus of control for pain management increased the odds of consulting.^{10–12} Other cross-sectional studies have emphasized aspects of co-morbidity or general health, one drawing the conclusion that individuals seeking care for neck or back pain have worse health status than those who do not seek care, the other study finding that co-morbid back pain sufferers may not seek back care when afflicted with other disabling conditions that may be perceived more amenable to care.^{13,14}

MP may lead to disability and is a major cause of sickness absence and impaired productivity with ensuing economic consequences at both the individual and the community level. Chronic MP impacts on quality of life and is often followed by periods of depression and social isolation.¹⁵ Physical and psychosocial factors at the workplace as well as individual factors have been related to low back pain¹⁶ and upper extremity pain.¹⁷ It has been suggested that cultural differences in health beliefs may have an important influence on musculoskeletal symptoms.¹⁸ Common bodily sensations may be regarded as abnormal by some people leading to care-seeking.¹⁹ Demographic and social structure characteristics, available resources and perceived need for medical attention could all influence on care-seeking.²⁰ Health campaigns in the media may impact differences in health beliefs within the general population.²¹ Every patient brings a set of beliefs to the consulting room and the fact that they consult at all shows certain beliefs about health care.²² Despite interventions in the working environment, the expected decrease in musculoskeletal morbidity has not emerged. A better understanding of the underlying factors that leads to care-seeking could have important implications for preventive efforts and decision making in the health care system. There has been increasing attention to other factors of potential importance, such as health beliefs and health anxiety.

In this paper, we report on the importance of earlier pain, health anxiety, somatization and fear-avoidance beliefs in relation to care-seeking behaviour with either back pain or upper extremity pain among working men and women.

Methods

The study was conducted as an 18-month prospective study, with a baseline questionnaire and an ensuing registration of diagnoses given in all consultations dealing with MP over an 18-month period.

Recruitment

Almost all inhabitants in Denmark are registered with a GP. From the Public Health Insurance system,

we received information on all people between ages 17 and 65 years registered with eight GPs in the town of Odder. Age limits were chosen in order to include people most likely connected to a workplace. The Municipality of Odder is inhabited by 21 500 people, in the town of Odder and its rural surrounding, and is quite typical for the Danish population as such. The study population consisted of both men and women with an age range between 17 and 65 years, including both town and countryside inhabitants. Respondents were employed in a wide range of occupations giving a broad selection of work-related exposures. The eight GPs were independent of each other, each having their own patients but placed in the same building with a shared reception and mutual patient software.

Questionnaire

A total of 8 517 men and women were eligible from the eight selected GPs. A baseline postal questionnaire collected information on demographics, educational level, vocational situation, psychosocial and physical factors at the workplace, self-rated health, scales for somatization, depression, anxiety, perceived stress, health anxiety, fear-avoidance behaviour, personality and modern health worries, as well as pain history, pain intensity and pain generalization, social network, smoking habits and leisure time physical activity. The response rate for the questionnaire was 59.5% ($N = 5068$). Below we describe in detail only those variables included in our final statistical model.

Fear-avoidance

Five items from the Fear Avoidance Belief Questionnaire²³ were used, but we chose to paraphrase items in order to ensure that both those with and without symptoms could answer. We supplied the question: 'How much do you agree with the following statement: My work may harm my back and other parts of my body'. A sum score from the six items (Cronbach's alpha = 0.67) was dichotomized at the 75th percentile.

Health anxiety

The seven-item Whiteley Index was used to measure health anxiety. This has previously been shown to work well in primary care settings.²⁴ The Whiteley Index is a one factor index (alpha = 0.90). Items were summed and the score then dichotomized with a cut point at the 75th percentile.

Somatization

Somatization was measured by the 12 items Symptom Check List Somatization, taken from the Symptom Check List 90-items (SCL-90)²⁵ (Cronbach's alpha = 0.83). A raw score was the simple sum of item scores for this dimension. This was dichotomized with a cut point at the 75th percentile.

Pain

Previous pain was measured by the Standard Evaluation Questionnaire (SEQ-pain).²⁶ This questionnaire consists of four sections of which we only used the first section for this paper. This section consists of seven items relating to intensity of pain in different regions during the past 4 weeks. The original questionnaire was translated from English to Danish independently by the writers and two native English-speaking colleagues and consensus was reached. A sum score was calculated for upper extremity pain and this was recoded to a categorical variable with cut points at the 50th, 75th and 90th percentiles. In the same way, the score for back pain was calculated and categorized with cut points at 50, 75 and 90%.

Educational level

One of six levels of education could be chosen. These were then recoded into three groups: (i) 'no education beyond ordinary school' or 'one or more short courses', (ii) 'skilled worker' or 'short further education' and (iii) 'medium-level further education' and 'higher further education'.

Psychosocial work environment

We used four items from the Glostrup Questionnaire²⁷ and added two supplementary items, one on job demands and one on satisfaction with management. Job demands (two items), decision authority (two items), job satisfaction (one item) and satisfaction with management (one item) were scored as single items on a scale from 1 to 6. Scores were dichotomized a priori on the basis of the response option wordings to indicate a high risk. The questions were used as single items in the analysis, and analyses have shown moderate to high correlation of single item questions on job demand, job control and social support with scale constructions (S Mikkelsen, personal communication). The use of single-item questions was mainly substantiated by the purpose of creating a questionnaire that was not to comprehensive in number of questions.

Physical work environment

Monotonous repetitive work ($\alpha = 0.80$) and heavy lifting ($\alpha = 0.90$) were measured using four items from the Dutch Musculoskeletal Questionnaire.²⁸ The scores were dichotomized with a cut point at the 75th percentile.

General self-rated health

We used the SF-12© (Short Form 12-item version 2).²⁹ General Health and Mental Health scores were included in analyses. Raw scores were simple sums of items; these were then dichotomized with a cut point at the 75th percentile.

Leisure-time physical activity

We asked: 'if you should describe your physical activity during the past year, including going to and from work, which of the following groups would you consider yourself to belong to?'

1. Almost physically inactive or slightly active for <2 hours weekly;
2. Light physical activity between 2 and 4 hours weekly (walking, biking and gardening);
3. Light physical activity for >4 hours a week or heavy physically active between 2 and 4 hours weekly (fast walking or biking, overtaking others, heavy gardening, working out and getting short of breath) and
4. Vigorous physical activity > 4 hours weekly or heavy training on a regular basis and competing on weekly basis.

We dichotomized a priori between level two and three.

Follow-up data

The eight participating GPs all used the International Classification for Primary Care (ICPC) when they issued diagnoses. The ICPC has been shown to be a reliable tool when diagnosing musculoskeletal disease.³⁰ The search instrument in the patient software (AESKULAP©) retrieved lists of patients who had sought care resulting in an ICPC diagnosis for musculoskeletal disease. We only looked at face-to-face contacts between patient and GP. We made searches on two subgroups: upper extremity pain and back pain. We excluded diagnoses such as neoplasm, congenital malformations or diseases, fractures, osteoporosis and inflammatory disease. We performed the searches group-wise in weekly intervals over an 18-month period. By this method, we ensured information on all participants concerning whether they had become a case in any of the subgroups, the date of their first care-seeking, the frequency of their care-seeking and the time from their first visit to their last visit during the observation period.

Data analysis

The main outcome measure was becoming a care-seeker for either back pain or upper extremity pain in the 18 months of follow-up. For analyses of this dichotomous outcome, we used Cox regression analysis. Assumptions of proportional hazards were tested using Schoenfeld residuals. Considering the term 'working population', we asked people if they were working full time or part time, were unemployed, on long-term sick leave, on leave, on welfare, students or retired. The analysis was restricted to 4325 participants that were currently employed. We did not address missing values in any particular way since data were missing

in a random pattern and were <2% in the scales, we used to create the variables of interest. Data were analysed separately for back pain and upper extremity pain. All scales were plotted to look for distributional characteristics and potential thresholds, which we did not find. We then used distributional cut points. Cronbach alpha's measures for reliability were made on the continuous scales. We stratified on gender because this approach revealed some differences that were not fully accounted if gender was used only as a potential confounder. We tested for correlations between previous pain level and fear-avoidance but found none. Correlations between health anxiety, somatization and fear-avoidance were also tested for. The statistical model was built in a forward stepwise manner. Each predictor was examined one at the time, ending up with two models. The first model included age, educational level, job demands, decision authority, job satisfaction, satisfaction with management, heavy lifting at work, repetitive work and leisure-time physical activity level. The second model included self-rated general and mental health since we thought they might influence the decision to seek care. Thus, we calculated both crude, partly and fully adjusted hazard ratios (HRs) with 95% confidence intervals (CIs) for both outcomes. All analyses were performed using Stata 10.1 (StataCorp., College Station, TX, USA).

Results

Participation

Of the 8517 eligible participants, 88 had a missing address, 1196 did not want to participate, 2124 never returned the questionnaire, 2 died and 10 were severely mentally ill. A total of 5097 answered the questionnaire (4297 on paper and 800 on a web-based questionnaire). We further excluded 29 for various reasons. A total of 5068 respondents (59.5%) were available for analysis. Characteristics of respondents based upon previous back pain are shown in Table 1. Characteristics of respondents based upon previous upper extremity pain are shown in Table 2.

The proportion of women and the mean age was higher among respondents than non-respondents. Since information on care-seeking and diagnoses could be attained by the GP's computer system for all persons differences between responders and non-responders could be studied. There was a small, but insignificant, difference in the level of care-seeking for back pain between respondents and non-respondents, whereas there was a significant difference in care-seeking for upper extremity pain, study respondents seeking care more often than non-respondents. Differences in age, gender and care-seeking between respondents and non-respondents are shown in Table 3.

Care-seeking for back pain—partly adjusted associations

Table 4 shows associations between the predictors representing fear-avoidance behaviour, health anxiety, somatization and baseline back pain level and the event of care-seeking for back pain. No association was seen between a high level of fear-avoidance behaviour and care-seeking. A high level of health anxiety was marginally associated with care-seeking among women [HR 1.36 (95% CI 1.00–1.84)]. Somatization was significantly associated with care-seeking among men [HR 1.64 (95% CI 1.04–2.57)] as well as among women [HR 1.70 (95% CI 1.2–12.39)]. Moderate back pain level at baseline was a significant predictor of care-seeking among women [HR 1.84 (95% CI 1.22–2.78)] but not among men. High back pain level was strongly associated with care-seeking both among men [HR 2.70 (95% CI 1.68–4.33)] and among women [HR 2.00 (95% CI 1.28–3.13)].

Care-seeking for back pain—fully adjusted associations

When adjusting for self-rated general and mental health, we found no association between fear-avoidance behaviour and care-seeking for back pain. A high level of health anxiety was significantly associated with care-seeking among women [HR 1.41 (95% CI 1.03–1.92)]. Among both sexes, the highest level of somatization was associated with care-seeking, men [HR 1.68 (95% CI 1.05–2.70)] and women [HR 1.67 (95% CI 1.17–2.37)]. After adjustment, there was still a strong association between moderate level of back pain and care-seeking among women [HR 1.92 (95% CI 1.27–2.92)]. The fully adjusted model showed very little change in HR for high levels of back pain among men [HR 2.70 (95% CI 1.68–4.35)] and among women [HR 2.06 (95% CI 1.31–3.24)].

Care-seeking for upper extremity pain—partly adjusted associations

Table 5 shows the associations between the predictors representing fear-avoidance behaviour, health anxiety, somatization and baseline upper extremity pain level and the event of care-seeking for upper extremity pain. We found no association between fear-avoidance behaviour and care-seeking for upper extremity pain for either gender. No associations were seen for health anxiety. Women with high levels of somatization had a slightly increased risk [HR 1.40 (95% CI 0.97–2.04)] but it was not statistically significant. There was no statistically significant association between moderate pain levels and care-seeking for either gender, but a high level of upper extremity pain was associated with care-seeking among men [HR 2.34 (95% CI 1.58–3.49)] and although less pronounced, also among women [HR 1.64 (95% CI 1.11–2.41)].

TABLE 1 Characteristics of respondents based upon previous back pain level

	Males, N = 1934 (44.8%)				Females, N = 2380 (55.2%)			
	Previous back pain level				Previous back pain level			
	n (total)	Low (%)	Medium (%)	High (%)	n (total)	Low (%)	Medium (%)	High (%)
Health anxiety								
Low	1334	589 (44.2)	525 (39.3)	220 (16.5)	1505	527 (35.0)	615 (40.9)	363 (24.1)
High	504	114 (22.6)	174 (34.5)	216 (42.9)	711	106 (14.9)	216 (30.4)	389 (54.7)
Somatization								
Low	1467	665 (45.3)	592 (40.4)	210 (14.3)	1473	577 (39.2)	640 (43.5)	256 (17.3)
High	351	31 (8.8)	104 (29.6)	216 (61.6)	719	51 (7.1)	183 (25.4)	485 (67.5)
Fear-avoidance								
Low	1118	472 (42.3)	433 (38.7)	213 (19.0)	1628	499 (30.7)	645 (39.6)	484 (29.7)
High	731	240 (32.8)	265 (36.3)	226 (30.9)	616	143 (23.2)	200 (32.5)	273 (44.3)
Self-reported mental health								
Very good/good	1493	617 (41.3)	577 (38.7)	299 (20.0)	1603	543 (33.9)	625 (39.0)	435 (27.1)
Fair/poor	369	100 (27.1)	128 (34.7)	141 (38.2)	660	107 (16.2)	225 (34.1)	328 (49.7)
Self-reported general health								
Very good/good	1694	688 (40.6)	651 (38.4)	355 (21.0)	2019	627 (31.1)	790 (39.1)	602 (29.8)
Fair/poor	158	26 (16.5)	50 (31.6)	82 (51.9)	228	23 (10.1)	50 (21.9)	155 (68.0)
Educational level								
Low	571	242 (42.4)	234 (41.0)	95 (16.6)	890	294 (33.0)	355 (40.0)	241 (27.0)
Medium	935	337 (36.0)	343 (36.7)	255 (27.3)	912	234 (25.7)	333 (36.5)	345 (37.8)
High	281	108 (38.5)	99 (35.2)	74 (26.3)	381	100 (26.3)	142 (37.3)	139 (36.4)
Job demands								
High	1300	500 (38.5)	502 (38.6)	298 (22.9)	1431	430 (30.0)	552 (38.6)	449 (31.4)
Low	507	193 (38.1)	182 (35.9)	132 (26.0)	663	172 (26.0)	243 (36.6)	248 (37.4)
Decision authority								
High	1422	567 (39.9)	544 (38.2)	311 (21.9)	1548	473 (30.6)	594 (38.4)	481 (31.0)
Low	353	115 (32.6)	125 (35.4)	113 (32.0)	511	124 (24.3)	184 (36.0)	203 (39.7)
Job satisfaction								
High	1622	642 (39.6)	614 (37.9)	366 (22.5)	1870	564 (30.2)	709 (37.9)	597 (31.9)
Low	154	44 (28.6)	55 (33.7)	55 (33.7)	188	33 (17.6)	67 (35.6)	88 (46.8)
Satisfaction with management								
High	1267	524 (41.4)	484 (38.2)	259 (20.4)	1503	470 (31.3)	563 (37.4)	470 (31.3)
Low	486	158 (32.5)	171 (35.2)	157 (32.3)	534	122 (22.9)	200 (37.4)	212 (39.7)
Heavy lifting at work								
No	1081	452 (41.8)	412 (38.1)	217 (20.1)	1442	442 (30.6)	584 (40.5)	416 (28.9)
Yes	697	230 (33.0)	263 (37.7)	204 (29.3)	601	148 (24.6)	198 (33.0)	255 (42.4)
Repetitive work								
No	1356	559 (41.2)	515 (38.0)	282 (20.8)	1400	465 (33.2)	529 (37.8)	406 (29.0)
Yes	426	122 (28.6)	160 (37.6)	144 (33.8)	642	126 (19.6)	250 (39.0)	266 (41.4)
Leisure time physical activity								
Low	889	325 (36.6)	334 (37.6)	230 (25.8)	1321	339 (25.7)	508 (38.5)	474 (35.8)
High	930	373 (40.1)	362 (38.9)	195 (21.0)	909	295 (32.5)	336 (37.0)	278 (30.5)

Care-seeking with upper extremity pain. Fully adjusted associations

After further adjustment for self-rated general and mental health, there was no significant association between fear-avoidance and care-seeking, and the same was applicable for both health anxiety and somatization. Only the highest level of upper extremity pain had a significant association with care-seeking among men [HR 2.45 (95% CI 1.64–3.65)] and women [HR 1.58 (95% CI 1.07–2.24)].

Discussion

In this study, we examined the effects of previous pain, health anxiety, somatization and fear-avoidance beliefs on care-seeking for back pain or upper extremity

pain in a prospective cohort study of 4325 working men and women. We adjusted for possible confounders including age, educational level, work-related factors and leisure time physical activity. We included measures of general health and mental health in our analyses. We found that previous regional pain was related to care-seeking for upper extremity pain and back pain among men and women. Among patients with back pain, high levels of health anxiety were associated with care-seeking among women and high levels of somatization were associated with care-seeking in both genders. Patients suffering from upper extremity pain differed from back pain patients as neither fear-avoidance nor health anxiety nor somatization showed any association to care-seeking for upper extremity pain.

TABLE 2 Characteristics of respondents based upon previous upper extremity pain level

	Males, N = 1934 (44.8%)				Females, N = 2380 (55.2%)			
	Previous upper extremity pain level				Previous upper extremity pain level			
	n (total)	Low (%)	Medium (%)	High (%)	n (total)	Low (%)	Medium (%)	High (%)
Health anxiety								
Low	1327	935 (70.5)	235 (17.7)	157 (11.8)	1489	936 (62.9)	271 (18.2)	282 (18.9)
High	513	241 (47.0)	91 (17.7)	181 (35.3)	721	254 (35.2)	143 (19.8)	324 (45.0)
Somatization								
Low	1461	1062 (72.7)	247 (16.9)	152 (10.4)	1457	969 (66.5)	272 (18.7)	216 (14.8)
High	359	109 (30.4)	73 (20.3)	177 (49.3)	736	217 (29.5)	144 (19.6)	375 (50.9)
Fear-avoidance								
Low	1115	753 (67.5)	202 (18.1)	160 (14.4)	1613	928 (57.5)	315 (19.5)	370 (23.0)
High	736	424 (57.6)	133 (18.1)	179 (24.3)	626	271 (43.3)	115 (18.4)	240 (38.3)
Self-reported mental health								
Very good/good	1486	1023 (68.8)	252 (17.0)	211 (14.2)	1589	928 (58.4)	306 (19.3)	355 (22.3)
Fair/poor	378	166 (43.9)	82 (21.7)	130 (34.4)	669	286 (42.8)	122 (18.2)	261 (39.0)
Self-reported general health								
Very good/good	1680	1123 (66.9)	304 (18.1)	253 (15.0)	1998	1152 (57.7)	380 (19.0)	466 (23.3)
Fair/poor	173	57 (33.0)	31 (17.9)	85 (49.1)	245	56 (22.9)	43 (17.5)	146 (59.6)
Educational level								
Low	565	406 (71.9)	94 (16.6)	65 (11.5)	881	535 (60.7)	168 (19.1)	178 (20.2)
Medium	943	561 (59.5)	172 (18.2)	210 (22.3)	913	421 (46.1)	202 (22.1)	290 (31.8)
High	281	177 (63.0)	56 (19.9)	48 (17.1)	384	213 (55.5)	52 (13.5)	119 (31.0)
Job demands								
High	1304	850 (65.2)	226 (17.3)	228 (17.5)	1424	790 (55.5)	265 (18.6)	369 (25.9)
Low	503	298 (59.2)	98 (19.5)	107 (21.3)	665	309 (46.5)	147 (22.1)	209 (31.4)
Decision authority								
High	1420	940 (66.2)	244 (17.2)	236 (16.6)	1544	836 (54.1)	316 (20.5)	392 (25.4)
Low	354	183 (51.7)	76 (21.5)	95 (26.8)	513	251 (48.9)	87 (17.0)	175 (34.1)
Job satisfaction								
High	1622	1055 (65.0)	276 (17.0)	291 (18.0)	1869	1004 (53.7)	367 (19.6)	498 (26.7)
Low	155	73 (47.1)	42 (27.1)	40 (25.8)	185	82 (44.3)	36 (19.5)	67 (36.2)
Satisfaction with management								
High	1263	845 (66.9)	212 (16.8)	206 (16.3)	1504	831 (55.2)	290 (19.3)	383 (25.5)
Low	492	264 (53.7)	105 (21.3)	123 (25.0)	531	242 (45.6)	108 (20.3)	181 (34.1)
Heavy lifting at work								
No	1072	764 (71.3)	169 (15.7)	139 (13.0)	1432	825 (57.6)	295 (20.6)	312 (21.8)
Yes	707	367 (51.9)	148 (20.9)	192 (27.2)	610	252 (41.3)	107 (17.5)	251 (41.2)
Repetitive work								
No	1359	924 (68.0)	228 (16.8)	207 (15.2)	1385	831 (60.0)	259 (18.7)	295 (21.3)
Yes	423	207 (48.9)	90 (21.3)	126 (29.8)	654	241 (36.9)	144 (22.0)	269 (41.1)
Leisure time physical activity								
Low	889	542 (61.0)	173 (19.4)	174 (19.6)	1320	680 (51.5)	262 (19.9)	378 (28.6)
High	934	619 (66.3)	155 (16.6)	160 (17.1)	902	508 (56.3)	162 (18.0)	232 (25.7)

The strength of our study is the prospective design with the patients being harvested at their visit to the GPs. The number of people available for analysis, 59.5% is fairly high in our opinion, taking into consideration that we mailed the questionnaire to the general population. In many countries, there are obstacles for those who want to seek care, based on economy or availability of health care. This is not the case in Denmark where care-seeking is free of charge, and availability is good. Nearly 100% of the population is registered with a GP in Denmark.

The study has limitations. We changed the wording of original fear-avoidance questionnaire so that people with little or no pain would be able to answer the questionnaire. Since most people have experienced

some earlier pain, we do not think that this will hamper the validity in a serious way. The SEQ-pain questionnaire has been validated thoroughly on a German speaking Swiss population.²⁶ The part we used and translated consists of very simple questions. However, we cannot be sure how this affects the validity. Follow-up was limited to 18 months and changes may and will occur in the information given in the baseline questionnaire. We only have information about pain at baseline and we therefore do not know anything about the intensity of pain at the time of care-seeking. On this basis, it is not possible to distinguish between chronic and acute pain. We did include pain in all our analysis, analysing our risk factors of main interest, adjusted for pain.

TABLE 3 Age and care seeking among all eligible respondent and non-respondent males and females

	Males			Females		
	Respondents, n = 2254	Non-respondents, n = 1949	All, n = 4203	Respondents, n = 2814	Non-respondents, n = 1500	All, n = 4314
Mean age (years)	47 SD* = 12.87	40 SD* = 13.63	44 SD* = 13.63	45 SD* = 12.85	41 SD* = 13.65	44 SD* = 13.28
Care-seeking in 18 months follow-up, back pain ^a	233 (10.34%)	200 (10.26%)	433 (10.30%)	374 (13.29%)	194 (12.93%)	568 (13.17%)
Care-seeking in 18 months follow-up, upper extremity pain ^a	261 (11.58%)	160 (8.21%)	421 (10.02%)	300 (10.66%)	137 (9.13%)	437 (10.13%)

^aCare-seeking at least one time in 18 months follow-up.

*SD, standard deviation.

TABLE 4 Hazard ratios for care-seeking with back pain in a working population, stratified by gender

Risk factor	Males				Females			
	n = 1934 (44.8%), included in all models				n = 2380 (55.2%), included in all models			
	Cases, n (%)	Hazard ratio, crude (95% CI)	Hazard ratio, partly adjusted (95% CI)*	Hazard ratio, fully adjusted (95% CI) ^a	Cases, n (%)	Hazard ratio, crude (95% CI)	Hazard ratio, partly adjusted (95% CI)*	Hazard ratio, fully adjusted (95% CI) ^a
Fear-avoidance level								
Low	105 (9.2)	1.0	1.0	1.0	187 (11.2)	1.0	1.0	1.0
High	84 (11.2)	1.23 (0.92–1.63)	0.91 (0.65–1.29)	0.92 (0.65–1.29)	109 (17.1)	1.57 (1.24–1.99)	1.22 (0.91–1.65)	1.21 (0.89–1.64)
Health anxiety level								
Low	114 (8.4)	1.0	1.0	1.0	153 (9.9)	1.0	1.0	1.0
High	72 (13.6)	1.69 (1.26–2.28)	0.88 (0.59–1.33)	0.86 (0.59–1.33)	136 (18.3)	1.93 (1.53–2.43)	1.36 (1.00–1.84)	1.41 (1.03–1.92)
Somatization level								
Low	113 (7.6)	1.0	1.0	1.0	143 (9.5)	1.0	1.0	1.0
High	70 (18.9)	2.70 (2.01–3.64)	1.64 (1.04–2.57)	1.68 (1.05–2.70)	145 (19.1)	2.12 (1.64–2.67)	1.70 (1.21–2.39)	1.67 (1.17–2.37)
Back pain level								
Low	42 (5.8)	1.0	1.0	1.0	48 (7.33)	1.0	1.0	1.0
Medium	62 (8.7)	1.52 (1.03–2.25)	1.33 (0.85–2.10)	1.31 (0.83–2.05)	107 (12.4)	1.73 (1.23–2.44)	1.84 (1.22–2.78)	1.92 (1.27–2.92)
High	80 (18.1)	3.38 (2.33–4.91)	2.70 (1.68–4.33)	2.70 (1.68–4.35)	132 (17.2)	2.49 (1.79–3.46)	2.00 (1.28–3.13)	2.06 (1.31–3.24)

Hazard ratios, with 95% confidence intervals, obtained by cox regression. Assumption of proportional hazard ratios tested by Schoenfeldts residuals.

^aAdjusted by all above mentioned, in addition to self-rated general health and self-rated mental health.

*Adjusted by age, educational level, job demand, decision authority, job satisfaction, satisfaction with management, heavy lifting at work, repetitive work, leisure physical activity level.

It is not surprising that non-respondents at baseline were mainly young men, which means that there is some selection bias among care-seekers with upper extremity pain, respondents seeking care more often than non-respondents leading to overestimation. The difference was however small.

The ICPC which was used for identifying cases of care-seeking has its limitations when studying detailed morbidity since specific diagnoses can be coded as such or as a symptom diagnosis.³¹ By grouping both symptom and specific diagnoses for one region, we tried to overcome this.

This study only involves care-seeking from GPs. From other studies, we know that patients with MP also seek care from chiropractors and physiotherapists.³² In Denmark, use of the GP is free, whereas consulting a chiropractor or a physiotherapist is

subject to payment. Some patients seek care from more than one provider. We chose the GP as our subject of interest because of the ICPC coding which makes it easy to identify cases and subgroups of cases. This was not possible with other providers.

We did not include an indicator of the general availability of health care as we believe that this is not a problem in a welfare state with a solid infrastructure like in Denmark. Our results show that having experienced pain in the past, and the more intense this pain was, the larger is the chance of becoming a care-seeker in the future. This is in line with findings in previous studies, where pain level was strongly associated with care-seeking.^{5,7–9,11,12,14,33} This was true for both back pain and upper extremity pain.

Based on the literature where important gender-based differences in explanatory variables have been

TABLE 5 Hazard ratios for care-seeking with upper extremity pain in a working population, stratified by gender

Risk factor	Males				Females			
	<i>n</i> = 1931 (44.8%)				<i>n</i> = 2380 (55.2%)			
	Cases, <i>n</i> (%)	Hazard ratio, crude (95% CI)	Hazard ratio, partly adjusted (95% CI)*	Hazard ratio, fully adjusted (95% CI) ^a	Cases, <i>n</i> (%)	Hazard ratio, crude (95% CI)	Hazard ratio, partly adjusted (95% CI)*	Hazard ratio, fully adjusted (95% CI) ^a
Fear-avoidance level								
Low	115 (10.1)	1.0	1.0	1.0	163 (9.8)	1.0	1.0	1.0
High	87 (11.6)	1.16 (0.88–1.53)	1.12 (0.82–1.54)	1.11 (0.81–1.53)	72 (11.3)	1.17 (0.88–1.54)	0.85 (0.60–1.21)	0.84 (0.59–2.00)
Health anxiety level								
Low	143 (10.6)	1.0	1.0	1.0	146 (9.5)	1.0	1.0	1.0
High	60 (11.4)	1.08 (0.80–1.46)	0.91 (0.60–1.37)	0.98 (0.63–1.48)	85 (11.4)	1.21 (0.93–1.59)	0.83 (0.58–1.19)	0.79 (0.54–1.15)
Somatization level								
Low	152 (10.2)	1.0	1.0	1.0	121 (8.1)	1.0	1.0	1.0
High	45 (12.1)	1.20 (0.86–1.70)	0.82 (0.51–1.33)	0.90 (0.55–1.49)	108 (14.1)	1.81 (1.39–2.34)	1.40 (0.97–2.04)	1.35 (0.91–1.99)
Back pain level								
Low	67 (9.3)	1.0	1.0	1.0	89 (7.3)	1.0	1.0	1.0
Medium	72 (10.2)	1.23 (0.84–1.81)	1.17 (0.76–1.81)	1.22 (0.80–1.88)	40 (9.2)	1.29 (0.89–1.87)	1.08 (0.70–1.66)	1.02 (0.66–1.59)
High	59 (13.3)	2.17 (1.58–2.99)	2.34 (1.5–8 3.49)	2.45 (1.64–3.65)	103 (16.6)	2.44 (1.84–3.24)	1.64 (1.11–2.41)	1.58 (1.07–2.24)

Hazard ratios, with 95% confidence intervals, obtained by cox regression. Assumption of proportional hazard ratios tested by Schoenfeldts residuals.

^aAdjusted by all above mentioned, in addition to self-rated general health and self-rated mental health.

*Adjusted by age, educational level, job demand, decision authority, job satisfaction, satisfaction with management, heavy lifting at work, repetitive work, leisure physical activity level.

described,¹⁰ we decided to stratify our analyses by gender. We found that among women with back pain, health anxiety was associated with seeking care. We treated the health anxiety variable, which was based on the seven-item Whiteley Index, in a dichotomous way, but we also tested the variable as a continuous predictor using fractional polynomials, and this did not change associations (data not shown). We did not find the same association with health anxiety for women with upper extremity pain, suggesting that health beliefs could play an important role in the decision for care-seeking with back pain, a point that has been made previously.¹² We also found that somatization was a predictor in the case of back pain but not for upper extremity pain, which supports the assumption that the two groups differ, and perhaps preventive measures should take this into account.

Fear-avoidance behaviour was not a predictor of care-seeking as such but could be a predictor of continued care-seeking or taking sick leave, neither of which we have looked at in this study.

Other studies have found that health conditions and co-morbidity were indices of care-seeking.^{13,14} We did not ask for information about specific co-morbidity but asked about general health and general mental health from SF-12, which have been shown to be good indicators of health status. We did not find that any of these were predictors of care-seeking with back pain or upper extremity pain. This might be different for care-seeking in a general sense.³

The study implies that different musculoskeletal conditions might need different preventive measures, and that gender, health beliefs and anxieties should be taken into account in strategies of prevention and treatment. Notwithstanding its limitations, this study also adds to the multidimensional aspects of care-seeking with MP. Looking beyond pain as the prime reason for care-seeking is a challenge for the GP. In the consultation room, this calls for elucidating various aspects of MP such as number of symptoms, regional or widespread; pathophysiological changes, e.g. inflammation, other organic disease; mental health, e.g. depression and anxiety; beliefs and behaviour, e.g. fear avoidance, catastrophizing and other behaviours; work ability and functioning, prognosis and return to work. In conclusion, if health anxiety and somatization make a difference in the decision of care-seeking, GPs should take the importance of these into account when treating patients with MP. Information and reassurance of the benign nature of most MP in primary care could be the first step in this process.

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References

- Jordan K, Clarke AM, Symmons DP *et al*. Measuring disease prevalence: a comparison of musculoskeletal disease using four general practice consultation databases. *Br J Gen Pract* 2007; **57**: 7–14.
- Jordan KP, Kadam UT, Hayward R *et al*. Annual consultation prevalence of regional musculoskeletal problems in primary care: an observational study. *BMC Musculoskelet Disord* 2010; **11**: 144.
- van der Windt D, Croft P, Penninx B. Neck and upper limb pain: more pain is associated with psychological distress and consultation rate in primary care. *J Rheumatol* 2002; **29**: 564–9.
- Frostholm L, Fink P, Christensen KS *et al*. The patients' illness perceptions and the use of primary health care. *Psychosom Med* 2005; **67**: 997–1005.
- Ferreira ML, Machado G, Latimer J *et al*. Factors defining care-seeking in low back pain—a meta-analysis of population based surveys. *Eur J Pain* 2010; **14**: 747.
- Badcock LJ, Lewis M, Hay EM, Croft PR. Consultation and the outcome of shoulder-neck pain: a cohort study in the population. *J Rheumatol* 2003; **30**: 2694–9.
- Molano SM, Burdorf A, Elders LA. Factors associated with medical care-seeking due to low-back pain in scaffolders. *Am J Ind Med* 2001; **40**: 275–81.
- IJzelenberg W, Burdorf A. Patterns of care for low back pain in a working population. *Spine (Phila Pa. 1976)* 2004; **29**: 1362–8.
- Tornqvist EW, Kilbom A, Vingard E *et al*. The influence on seeking care because of neck and shoulder disorders from work-related exposures. *Epidemiology* 2001; **12**: 537–45.
- Hagen KB, Bjorndal A, Uhlig T, Kvien TK. A population study of factors associated with general practitioner consultation for non-inflammatory musculoskeletal pain. *Ann Rheum Dis* 2000; **59**: 788–93.
- Waxman R, Tennant A, Helliwell P. Community survey of factors associated with consultation for low back pain. *BMJ* 1998; **317**: 1564–7.
- Szpalski M, Nordin M, Skovron ML, Melot C, Cukier D. Health care utilization for low back pain in Belgium. Influence of socio-cultural factors and health beliefs. *Spine (Phila Pa 1976)* 1995; **20**: 431–42.
- Hurwitz EL, Morgenstern H. The effect of comorbidity on care seeking for back problems in the United States. *Ann Epidemiol* 1999; **9**: 262–70.
- Cote P, Cassidy JD, Carroll L. The treatment of neck and low back pain: who seeks care? Who goes where? *Med Care* 2001; **39**: 956–67.
- Rudy TE, Kerns RD, Turk DC. Chronic pain and depression: toward a cognitive-behavioral mediation model. *Pain* 1988; **35**: 129–40.
- Harkness EF, Macfarlane GJ, Nahit ES, Silman AJ, McBeth J. Risk factors for new-onset low back pain amongst cohorts of

- newly employed workers. *Rheumatology (Oxford)* 2003; **42**: 959–68.
- ¹⁷ Andersen JH, Kaergaard A, Mikkelsen S *et al*. Risk factors in the onset of neck/shoulder pain in a prospective study of workers in industrial and service companies. *Occup Environ Med* 2003; **60**: 649–54.
- ¹⁸ Madan I, Reading I, Palmer KT, Coggon D. Cultural differences in musculoskeletal symptoms and disability. *Int J Epidemiol* 2008; **37**: 1181–9.
- ¹⁹ Fink P, Rosendal M, Olesen F. Classification of somatization and functional somatic symptoms in primary care. *Aust N Z J Psychiatry* 2005; **39**: 772–81.
- ²⁰ Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav* 1995; **36**: 1–10.
- ²¹ Buchbinder R, Jolley D. Population based intervention to change back pain beliefs: three year follow up population survey. *BMJ* 2004; **328**: 321.
- ²² Main CJ, Waddell G. Beliefs about back pain. In: Waddell G (ed). *The Back Pain Revolution*. 2nd edn. Oxford, UK: Churchill Livingstone, 2004. pp. 221–39.
- ²³ Waddell G, Newton M, Henderson I, Somerville D, Main CJ. A Fear-Avoidance Beliefs Questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain* 1993; **52**: 157–68.
- ²⁴ Fink P, Ewald H, Jensen J *et al*. Screening for somatization and hypochondriasis in primary care and neurological in-patients: a seven-item scale for hypochondriasis and somatization. *J Psychosom Res* 1999; **46**: 261–73.
- ²⁵ Derogatis LB, Cleary PA. Confirmation of the dimensional structure of the scl-90: a study in construct validation. *J Clin Psychol* 1977; **33**: 981–9.
- ²⁶ Muller U, Tanzler K, Burger A *et al*. A pain assessment scale for population-based studies: development and validation of the pain module of the Standard Evaluation Questionnaire. *Pain* 2008; **136**: 62–74.
- ²⁷ Brauer C, Mikkelsen S. The influence of individual and contextual psychosocial work factors on the perception of the indoor environment at work: a multilevel analysis. *Int Arch Occup Environ Health* 2010; **83**: 639–51.
- ²⁸ Hildebrandt VH, Bongers PM, van Dijk FJ, Kemper HC, Dul J. Dutch Musculoskeletal Questionnaire: description and basic qualities. *Ergonomics* 2001; **44**: 1038–55.
- ²⁹ Ware J Jr, Kosinski MM, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. [article] *Med Care* 1996; **34**: 220–33.
- ³⁰ Nielsen MN, Aaen-Larsen B, Vedsted P, Nielsen CV, Hjøllund NH. [Diagnosis coding of the musculoskeletal system in general practice]. *Ugeskr Laeger* 2008; **170**: 2881–4.
- ³¹ Feleus A, Bierma-Zeinstra SM, Miedema HS *et al*. Incidence of non-traumatic complaints of arm, neck and shoulder in general practice. *Man Ther* 2008; **13**: 426–33.
- ³² Cote P, Baldwin ML, Johnson WG. Early patterns of care for occupational back pain. *Spine (Phila Pa 1976)* 2005; **30**: 581–7.
- ³³ Linton SJ, Helsing AL, Hallden K. A population-based study of spinal pain among 35-45-year-old individuals. Prevalence, sick leave, and health care use. *Spine (Phila Pa 1976)* 1998; **23**: 1457–63.

Do work-related factors affect care-seeking in general practice for back pain or upper extremity pain?

Jens Christian Jensen · Jens Peder Haahr ·
Poul Frost · Johan Hviid Andersen

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Abstract

Objectives Musculoskeletal pain conditions remain a major cause of care-seeking in general practice. Not all patients with musculoskeletal pain (MP) seek care at their general practitioner (GP), but for those who do, the GP's knowledge of what work-related factors might have influenced the patient's decision to seek care could be important in order to give more well-founded advice to our patients. The objective of this study was to elucidate the effects of workloads on care-seeking for back pain or upper extremity pain during an eighteen-month follow-up period. **Methods** This is a prospective study with a baseline questionnaire and eighteen-month follow-up. Among the registered patients of 8 GPs, we identified 8,517 persons between 17 and 65 years of age, who all received the questionnaire. A total of 5,068 (59.5 %) persons answered. During the eighteen months of follow-up, we used the International Classification for Primary Care (ICPC) to identify all care-seekers with either back pain or upper extremity pain. Of these, all currently employed persons were included in our analysis, in all 4,325 persons. For

analysis, we used Cox proportional hazards regression analysis. Analyses were stratified by gender.

Results High levels of heavy lifting, defined as the upper tertile on a categorical scale, were associated with care-seeking for back pain (HR 1.90 [95 % CI: 1.14–3.15]) and upper extremity pain (HR 2.09 [95 % CI: 1.30–3.38]) among males, but not in a statistically significant way among females. Repetitive work and psychosocial factors did not have any statistically significant impact on care-seeking for neither back pain nor upper extremity pain.

Conclusion Work-related factors such as heavy lifting do, to some extent, contribute to care-seeking with MP. We suggest that asking the patient about physical workloads should be routinely included in consultations dealing with MP.

Keywords Musculoskeletal · Work-related · Primary care · Epidemiology

Introduction

Visiting your general practitioner with a musculoskeletal pain condition (MP) remains the second most important reason for care-seeking only surpassed by upper airway infections (Grimsmo et al. 2001). As many as 20 % of the adult population have visited their general practitioner (GP) with MP in the previous year (Jordan et al. 2007). Among care-seekers for MP, back pain and upper extremity pain constitute a major part of the complaints (Ballina Garcia et al. 1994). Care-seeking for MP is often followed by sick leave for a shorter or longer period (Leboeuf-Yde et al. 2011). Sick leave and early retirement due to MP have major impacts on the economy and consequently have drawn attention from legislators. In

J. C. Jensen · J. P. Haahr · P. Frost · J. H. Andersen
Danish Ramazzini Centre, Aarhus, Denmark

J. C. Jensen · J. P. Haahr · J. H. Andersen
Department of Occupational Medicine, Herning Hospital,
Herning, Denmark

J. C. Jensen (✉)
Department of Occupational Medicine, Regional Hospital,
Gl. Landevej 61, 7400 Herning, Denmark
e-mail: jens.christian.jensen@vest.rm.dk

P. Frost
Department of Occupational Medicine, Aarhus University
Hospital, Aarhus, Denmark

Denmark, the emphasis of preventive measures and legislation regarding the physical working environment has been on heavy lifting, repetitive movements, monotonous work and working postures (Jensen 2011). Yet, musculoskeletal morbidity shows no tendency to diminish (Koch et al. 2011).

Research in work-related musculoskeletal disease (WMSD) has mainly dealt with causation, asking the question whether specific work tasks were related to musculoskeletal disorders (Andersen et al. 2003). Whereas some of the factors predicting MP, care-seeking for MP and taking sick leave due to MP might be overlapping, others may differ (IJzelenberg et al. 2004). The individual patient's perceived need for care-seeking for MP might be modified by individual factors such as health anxiety and somatisation (Jensen et al. 2012). Pain intensity and disability have been shown to be strong predictors of seeking health care, whereas findings on work-related related exposures are contradictory, some showing an association while others do not (IJzelenberg and Burdorf 2004; Molano et al. 2001; Tornqvist et al. 2001). Not all patients experiencing back pain actually seek care. For back pain, recent work has shown a pooled prevalence of around 58 % (Ferreira et al. 2010). In the case of upper extremity pain, it has been reported that around 21 % of people with self-reported shoulder–neck pain sought care in a 2-year period (Badcock et al. 2003). Not only physical, but also psychosocial factors at the work place could be important for the choice of care-seeking. It is known that psychosocial factors have an influence on sickness absence (IJzelenberg et al. 2004). Coping with musculoskeletal pain could be hampered by conditions at the workplace and might lead to the misconception by both patient and the physician, that work caused the present complaint. Suggestions have been made that GPs find it difficult to define their role in rehabilitation back to work (Rasanen et al. 1993; Sen and Osborne 1997). Assuming that work-related factors do play a role when deciding to seek care, it would be important for the GPs to know to what extent they play a role.

In this population-based cohort study, we aimed to elucidate the effects of physical and psychosocial workloads on primary medical care-seeking for back pain and upper extremity pain during an eighteen-month follow-up period.

Methods

Participants

We performed a cohort study of subjects connected to a primary medical health care centre with 18 months of follow-up. We obtained information from the Danish

Public Health Insurance System on all persons of 17–65 years of age registered with eight GPs in the town of Odder, Denmark. The eight GPs did not share patients, but were sharing facilities as well as mutual patient software, thus facilitating data collection. In February 2008, a baseline questionnaire was posted to all eligible patients registered with the eight GPs offering them to either answer and return the questionnaire by mail or use a similar web-based questionnaire, as we thought this might add to the response rate. During the ensuing 18 months, all consultations resulting in a diagnosis of MP were registered. A total of 8,517 men and women were eligible from the eight selected GPs and received the baseline questionnaire. All persons agreeing to participate signed written informed consent forms.

Baseline data

The questionnaire collected information on demographics, educational level, vocational situation, psychosocial and physical factors at the workplace, self-rated health, scales for somatisation, depression, anxiety, perceived stress, health anxiety, fear-avoidance behaviour, personality, and modern health worries, as well as pain history, pain intensity and pain generalisation, social network, smoking habits, and leisure-time physical activity. Variables connected to the working environment were of special interest to us. For the physical work environment, we used four items from the Dutch Musculoskeletal Questionnaire, DMQ (Hildebrandt et al. 2001). The Glostrup Questionnaire was used to describe the psychosocial work environment (Brauer and Mikkelsen 2010). Previous pain was measured by the Standard Evaluation Questionnaire (SEQ-pain) (Muller et al. 2008). For measuring general self-rated health and mental health, we used the SF-12[®] (Short Form 12-item version 2) (Ware et al. 1996) Table 1 shows an outline of the variables of most interest and how these were treated for analyses. A more exhaustive description of the questionnaire and the possible confounding variables that were used in our analysis can be found in the previous work (Jensen et al. 2012).

Follow-up data

The GPs all used the International Classification for Primary Care (ICPC) which has been shown to be a reliable tool when diagnosing musculoskeletal disorders (Nielsen et al. 2008). The list of patients who had an ICPC diagnosis for musculoskeletal disease or pain during follow-up were retrieved on a weekly basis by searching the GP's filing system (AESKULAP[®]). We used all ICPC diagnosis related to either back pain or upper extremity pain but excluded diagnoses such as neoplasm, congenital

Table 1 An outline of variables of most interest

Variable	Means of measurement	Dimensions and number of items	Scale/pre-analytic approach
Physical work environment	Dutch Musculoskeletal questionnaire	Heavy lifting (2 items, Cronbach's alpha 0.90) and monotonous repetitive work (2 items, Cronbach's alpha 0.80)	Each item was scored (0–5) and for each dimension a sum was made. This was then categorised with cut points at the 50th and 75th percentile
Psychosocial work environment	The Glostrup Questionnaire	Job demands, decision authority, job satisfaction, satisfaction with management (1 item each)	The items were scored on a scale from 1 to 6. Scores were dichotomised a priori on the basis of response wordings to indicate a high risk
Previous pain level	Standard Evaluation Questionnaire (SEQ-pain)	7 items related to intensity of previous pain in different regions	Each item was scored on a scale from 1 to 7, and sum scores for back pain and upper extremity pain were recoded into categorical variables with cut points at the 50th, 75th and 90th percentiles
Self-reported general and mental health	Short form 12-item version 2 (SF-12 [®])	Two items for general health and mental health were included	Raw scores were simple sums of items; these were then dichotomised with a cut point at the 75th percentile
Age	Years (time of registration—time of birth). Age between 17 and 64 years		Continuous variable

malformations or diseases, fractures, osteoporosis and inflammatory disease. Thus, we ended up having two distinct patient groups, one for back pain and another for upper extremity pain. We performed the searches groupwise in weekly intervals over an 18-month period. By doing so, we ensured information on all patients concerning the date of their first care-seeking for either back pain or upper extremity pain in the primary care centre. No efforts were undertaken to retrieve information on care-seeking in secondary health care or at other primary health care providers besides the GP setting.

Data analysis

As work-related factors were our main subject of interest, we restricted the analysis to 4,325 respondents currently employed at baseline. Questionnaire scales were examined by plots showing distributional characteristics in order to reveal any thresholds. Thresholds were not found, thus leading us to use cut-off points defined by percentiles. The continuous scales were tested for reliability by using Cronbach's alpha's measures. For analyses, we used Cox proportional hazard regression analysis. The main outcome was time to first visit at the GP with either back pain or upper extremity pain in the 18 months of follow-up reported as hazard ratio. Only the first visit was used in our analysis, censoring thereafter. The proportional hazards assumption was tested on the basis of Schoenfeld residuals (Schoenfeld 1982). Analysis were done separately for back pain and upper extremity pain and outcomes were stratified

by gender to explore differences between genders that would not be revealed had gender only been used as a confounder. The regression model was built in a forward stepwise manner with each predictor being examined one at the time to reveal interactions. It was our choice to include all work-related predictors. We ended up with two models; the first including and mutually adjusting for heavy lifting at work, repetitive work, job demands, decision authority, job satisfaction, satisfaction with management, fear-avoidance beliefs, somatisation, health anxiety, previous pain, age, educational level and leisure-time physical activity. The second model added self-rated general health and self-rated mental health with a purpose of including an indicator of comorbidity. In each step, we calculated both crude, model 1 and model 2 hazard ratios (HR) with 95 % confidence intervals (CIs) for both outcomes. Since information on care-seeking and diagnoses could be attained by the GP's computer system for all persons, differences between responders and non-responders could be studied. We calculated incidence-rates pr. 1,000 days for both genders and for both back pain and upper extremity pain. All analyses were made using Stata 11 (Stata Corp., College Station, TX, USA).

Results

Of the 8,517 eligible participants, 88 had a missing address, 1,196 did not want to participate, 2,124 never returned the questionnaire, 2 died and 10 were severely mentally ill. A

total of 5,097 participants answered the questionnaire (4,297 on paper, 800 on an identical web-based questionnaire). We excluded 29 persons who had removed the id-labels on their questionnaires. Thus, 5,068 respondents (59.5 %) were available for analysis, but as our main interest was work-related factors, we restrained the analysis to participants employed at baseline resulting in a final number of 4,325. During follow-up, 509 (11.8 %) cases of care-seeking for back pain and 459 (10.7 %) cases of care-seeking for upper extremity pain appeared among the 4,325 men and women. Incidence-rates pr. 1,000 days for back pain were 0.1961 [95 % CI: 0.1703–0.2259] for males and 0.2578 [95 % CI: 0.2305–0.2884] for females. For upper extremity pain, the incidence-rates pr. 1,000 days were 0.2125 [95 % CI: 0.1854–0.2436] for males and 0.1982 [95 % CI: 0.1746–0.2250] for females. Work-related characteristics of respondents included in the analyses who became cases with back pain are shown in Table 2. Work-related characteristics of respondents who became cases with upper extremity pain are shown in Table 3.

The proportion of women was higher among respondents (56 %) than non-respondents (43 %). Mean age among female respondents was 45 years (standard deviation (SD) = 12.85), and among female non-respondents, it

was 41 years (SD = 13.65). Among males, we found a larger difference in age between respondents (47 years, SD = 12.87) and non-respondents (40, SD = 13.63). For both genders, we found a small, but insignificant difference in care-seeking for back pain between respondents and non-respondents, respondents being slightly more likely to seek care. As for care-seeking with upper extremity pain, we found that study respondents, especially among males, sought care more often than non-respondents. This has been described in detail in a previous paper (Jensen et al. 2012).

Table 4 shows the main findings among care-seekers with back pain. Regarding the physical work environment, we found that high levels of heavy lifting at work resulted in an increased hazard ratio for males (HR 1.90 [95 % CI 1.14–3.15]). Adjusting for self-rated general and mental health did not make any difference. For females heavy lifting at any level did not result in an increased HR. Repetitive work had no impact on care-seeking.

Among psychosocial work environment factors, low level of job satisfaction resulted in an increased HR for both genders, but not in a statistically significant way. Other psychosocial work environment factors did not seem to contribute to the decision of care-seeking with back pain.

Table 2 Work-related characteristics of respondents based upon previous back pain level

	Males <i>N</i> = 1,934 (44.8 %)				Females <i>N</i> = 2,380 (55.2 %)			
	Previous back pain level				Previous back pain level			
	<i>n</i> (total)	None/low	Medium	High	<i>n</i> (total)	None/low	Medium	High
<i>Job demands</i>								
High	1,300	500 (38.5 %)	502 (38.6 %)	298 (22.9 %)	1,431	430 (30.0 %)	552 (38.6 %)	449 (31.4 %)
Low	507	193 (38.1 %)	182 (35.9 %)	132 (26.0 %)	663	172 (26.0 %)	243 (36.6 %)	248 (37.4 %)
<i>Decision authority</i>								
High	1,422	567 (39.9 %)	544 (38.2 %)	311 (21.9 %)	1,548	473 (30.6 %)	594 (38.4 %)	481 (31.0 %)
Low	353	115 (32.6 %)	125 (35.4 %)	113 (32.0 %)	511	124 (24.3 %)	184 (36.0 %)	203 (39.7 %)
<i>Job satisfaction</i>								
High	1,622	642 (39.6 %)	614 (37.9 %)	366 (22.5 %)	1,870	564 (30.2 %)	709 (37.9 %)	597 (31.9 %)
Low	154	44 (28.6 %)	55 (33.7 %)	55 (33.7 %)	188	33 (17.6 %)	67 (35.6 %)	88 (46.8 %)
<i>Satisfaction with management</i>								
High	1,267	524 (41.4 %)	484 (38.2 %)	259 (20.4 %)	1,503	470 (31.3 %)	563 (37.4 %)	470 (31.3 %)
Low	486	158 (32.5 %)	171 (35.2 %)	157 (32.3 %)	534	122 (22.9 %)	200 (37.4 %)	212 (39.7 %)
<i>Heavy lifting at work</i>								
Low	895	387 (43.2 %)	341 (38.1 %)	167 (18.7 %)	1,192	371 (31.1 %)	489 (41.0 %)	332 (27.9 %)
Moderate	640	224 (35.0 %)	246 (38.4 %)	170 (26.6 %)	632	179 (28.3 %)	222 (35.1 %)	231 (36.6 %)
High	243	71 (29.2 %)	88 (36.2 %)	84 (34.6 %)	219	40 (18.3 %)	71 (32.4 %)	108 (49.3 %)
<i>Repetitive work</i>								
Low	610	298 (48.9 %)	215 (32.2 %)	97 (15.9 %)	636	226 (35.5 %)	263 (41.4 %)	147 (23.1 %)
Moderate	746	261 (35.0 %)	300 (40.2 %)	185 (24.8 %)	764	239 (31.3 %)	266 (34.8 %)	259 (33.9 %)
High	426	122 (28.6 %)	160 (37.6 %)	144 (33.8 %)	642	126 (19.6 %)	250 (38.9 %)	266 (41.4 %)

Back pain as reported in the last 4 weeks before baseline

Table 3 Work-related characteristics of respondents based upon previous upper extremity pain level

	Males <i>N</i> = 1,934 (44.8 %)				Females <i>N</i> = 2,380 (55.2 %)			
	Previous upper extremity pain level				Previous upper extremity pain level			
	<i>n</i> (total)	None/low	Medium	High	<i>n</i> (total)	None/low	Medium	High
<i>Job demands</i>								
High	1,304	850 (65.2 %)	226 (17.3 %)	228 (17.5 %)	1,424	790 (55.5 %)	265 (18.6 %)	369 (25.9 %)
Low	503	298 (59.2 %)	98 (19.5 %)	107 (21.3 %)	665	309 (46.5 %)	147 (22.1 %)	209 (31.4 %)
<i>Decision authority</i>								
High	1,420	940 (66.2 %)	244 (17.2 %)	236 (16.6 %)	1,544	836 (54.1 %)	316 (20.5 %)	392 (25.4 %)
Low	354	183 (51.7 %)	76 (21.5 %)	95 (26.8 %)	513	251 (48.9 %)	87 (17.0 %)	175 (34.1 %)
<i>Job satisfaction</i>								
High	1,622	1,055 (65.0 %)	276 (17.0)	291 (18.0 %)	1,869	1,004 (53.7 %)	367 (19.6 %)	498 (26.7 %)
Low	155	73 (47.1 %)	42 (27.1 %)	40 (25.8 %)	185	82 (44.3 %)	36 (19.5 %)	67 (36.2 %)
<i>Satisfaction with management</i>								
High	1,263	845 (66.9 %)	212 (16.8 %)	206 (16.3 %)	1,504	831 (55.2 %)	290 (19.3 %)	383 (25.5 %)
Low	492	264 (53.7 %)	105 (21.3 %)	123 (25.0 %)	531	242 (45.6 %)	108 (20.3 %)	181 (34.1 %)
<i>Heavy lifting at work</i>								
Low	889	642 (72.2 %)	134 (15.1 %)	113 (12.7 %)	1,183	690 (58.3 %)	238 (20.1 %)	255 (21.6 %)
Moderate	640	374 (58.4 %)	133 (20.8 %)	133 (20.8 %)	630	327 (51.9 %)	122 (19.4 %)	181 (28.7 %)
High	250	115 (46.0 %)	50 (20.0 %)	85 (34.0 %)	229	60 (26.2 %)	42 (18.3 %)	127 (55.5 %)
<i>Repetitive work</i>								
Low	615	448 (72.9 %)	96 (15.6 %)	71 (11.5 %)	629	415 (66.0 %)	108 (17.2 %)	106 (16.8 %)
Moderate	744	476 (64.0 %)	132 (17.7 %)	136 (18.3 %)	756	416 (55.0 %)	151 (20.0 %)	189 (25.0 %)
High	423	207 (48.9 %)	90 (21.3 %)	126 (29.8 %)	654	241 (36.9 %)	144 (22.0 %)	269 (41.1 %)

Upper extremity pain as reported in the last 4 weeks before baseline

Table 5 presents the main findings among care-seekers with upper extremity pain. The highest level of heavy lifting at work resulted in an increased risk among males (HR 2.09 [95 % CI 1.30–3.38]), and marginally among females (HR 1.54 [95 % CI 0.96–2.49]). Repetitive work had no impact among males. We found a slightly increased risk among females. Concerning psychosocial work-related factors, low level of decision authority among females, low levels of job satisfaction among males and females and low levels of satisfaction with management among males were slightly associated with increased risk for care-seeking, but the associations did not reach our chosen level for statistical significance. There were no noticeable differences between statistical model 1 and 2.

Discussion

Key results

Models for health care use are complicated (Andersen 1995). In this study, we focused on primary care offering a

simple model, examining the impact of work-related factors on care-seeking in general practice with two of the most common types of MP, namely back pain and upper extremity pain. We used two statistical models, the first model adjusting for possible confounders like fear-avoidance, somatisation, health anxiety, previous pain, age, educational level and leisure-time physical activity, the second statistical model furthermore including self-rated general and mental health. We found that heavy lifting increased the hazard ratio for care-seeking for back pain among males, but not for females. Repetitive work and psychosocial work environment factors did not contribute to care-seeking for low back pain in any significant way. As for seeking care for upper extremity pain, we found again that heavy lifting was associated with an increased risk, but only statistically significant among men. Even though we did find slightly raised HRs for some of the psychosocial factors and for repetitive work among females, there was no statistically significant impact on care-seeking for upper extremity pain for any of these factors. Finally, we did not find any noticeable differences between the two statistical models for neither back pain nor upper extremity pain.

Table 4 Hazard ratios for care-seeking at the general practitioner for back pain in a working population, stratified by gender

Risk factor	Males <i>n</i> = 1,934 (44.8 %), included in all models			Females <i>n</i> = 2,380 (55.2 %), included in all models		
	Cases (<i>n</i> %)	Hazard ratio, crude (95 % CI)	Hazard ratio, model 1 ^a (95 % CI)	Hazard ratio, model 2 ^b (95 % CI)	Hazard ratio, crude (95 % CI)	Hazard ratio, model 1 ^a (95 % CI)
<i>Heavy lifting at work</i>						
Low	73 (8.0 %)	1.0	1.0	1.0	1.0	1.0
Moderate	70 (10.7 %)	1.35 (0.97–1.87)	1.28 (0.85–1.93)	1.26 (0.84–1.91)	1.01 (0.77–1.31)	0.86 (0.63–1.17)
High	37 (14.5 %)	1.89 (1.27–2.81)	1.86 (1.12–3.08)	1.90 (1.14–3.15)	1.07 (0.74–1.56)	0.73 (0.45–1.21)
<i>Repetitive work</i>						
Low	63 (10.1 %)	1.0	1.0	1.0	1.0	1.0
Moderate	69 (9.0 %)	0.89 (0.63–1.25)	0.72 (0.48–1.08)	0.75 (0.50–1.13)	0.83 (0.62–1.11)	0.72 (0.51–1.00)
High	54 (12.3 %)	1.25 (0.87–1.80)	0.90 (0.57–1.42)	0.93 (0.59–1.48)	1.10 (0.82–1.46)	0.83 (0.59–1.18)
<i>Job demands</i>						
Low	135 (10.1 %)	1.0	1.0	1.0	1.0	1.0
High	54 (10.3 %)	1.02 (0.75–1.41)	0.80 (0.55–1.18)	0.81 (0.55–1.19)	1.03 (0.80–1.32)	0.94 (0.70–1.27)
<i>Decision authority</i>						
High	148 (10.1 %)	1.0	1.0	1.0	1.0	1.0
Low	39 (10.7 %)	1.06 (0.75–1.51)	0.84 (0.55–1.30)	0.84 (0.54–1.30)	0.98 (0.74–1.29)	0.76 (0.54–1.07)
<i>Job satisfaction</i>						
High	164 (9.8 %)	1.0	1.0	1.0	1.0	1.0
Low	23 (14.4 %)	1.49 (0.96–2.31)	1.47 (0.85–2.55)	1.44 (0.83–2.51)	1.36 (0.95–1.96)	1.20 (0.76–1.92)
<i>Satisfaction with management</i>						
High	128 (9.8 %)	1.0	1.0	1.0	1.0	1.0
Low	53 (10.6 %)	1.08 (0.78–1.48)	0.80 (0.54–1.20)	0.81 (0.54–1.20)	1.28 (0.99–1.65)	1.01 (0.73–1.40)

^a As obtained by Cox proportional hazard regression mutually adjusted and adjusted by age, previous pain, educational level and leisure-time physical activity^b Adjusted by all above mentioned, in addition to self-rated general health and self-rated mental health

Table 5 Hazard ratios for care-seeking at the general practitioner with upper extremity pain in a working population, stratified by gender

Risk factor	Males n = 1,934 (44.8 %), included in all models				Females n = 2,380 (55.2 %), included in all models			
	Cases (n/%)	Hazard ratio, crude (95 % CI)	Hazard ratio, Model 1 ^a (95 % CI)	Hazard ratio, Model 2 ^b (95 % CI)	Cases (n/%)	Hazard ratio, crude (95 % CI)	Hazard ratio, Model 1 ^a (95 % CI)	Hazard ratio, Model 2 ^b (95 % CI)
<i>Heavy lifting at work</i>								
Low	77 (8.5 %)	1.0	1.0	1.0	103 (8.5 %)	1.0	1.0	1.0
Moderate	76 (11.5 %)	1.38 (1.00–1.89)	1.36 (0.93–1.99)	1.35 (0.92–1.99)	78 (11.8 %)	1.42 (1.05–1.90)	1.29 (0.92–1.82)	1.32 (0.94–1.86)
High	39 (15.2 %)	1.86 (1.27–2.74)	2.09 (1.30–3.35)	2.09 (1.30–3.38)	37 (15.4 %)	1.89 (1.30–2.75)	1.56 (0.97–2.50)	1.54 (0.96–2.49)
<i>Repetitive work</i>								
Low	60 (9.6 %)	1.0	1.0	1.0	56 (8.6 %)	1.0	1.0	1.0
Moderate	94 (12.3 %)	1.29 (0.93–1.79)	1.10 (0.77–1.58)	1.11 (0.78–1.60)	75 (9.5 %)	1.11 (0.78–1.57)	0.86 (0.57–1.28)	0.83 (0.56–1.25)
High	38 (8.7 %)	0.91 (0.61–1.37)	0.75 (0.47–1.19)	0.77 (0.48–1.22)	88 (13.1 %)	1.58 (1.13–2.21)	1.18 (0.79–1.77)	1.14 (0.75–1.71)
<i>Job demands</i>								
Low	152 (11.4 %)	1.0	1.0	1.0	152 (10.3 %)	1.0	1.0	1.0
High	44 (8.4 %)	0.73 (0.52–1.02)	0.63 (0.43–0.92)	0.65 (0.44–0.96)	77 (11.2 %)	1.09 (0.83–1.44)	1.02 (0.73–1.41)	1.04 (0.75–1.45)
<i>Decision authority</i>								
High	157 (10.8 %)	1.0	1.0	1.0	161 (10.0 %)	1.0	1.0	1.0
Low	38 (10.4 %)	0.97 (0.68–1.39)	0.75 (0.49–1.15)	0.72 (0.47–1.10)	60 (11.3 %)	1.13 (0.85–1.53)	1.18 (0.82–1.69)	1.19 (0.83–1.71)
<i>Job satisfaction</i>								
High	173 (10.4 %)	1.0	1.0	1.0	201 (10.4 %)	1.0	1.0	1.0
Low	22 (13.8 %)	1.34 (0.86–2.09)	1.41 (0.82–2.42)	1.48 (0.85–2.87)	21 (10.7 %)	1.02 (0.65–1.60)	0.76 (0.51–1.60)	0.90 (0.50–1.62)
<i>Satisfaction with management</i>								
High	132 (10.2 %)	1.0	1.0	1.0	161 (10.3 %)	1.0	1.0	1.0
Low	62 (12.4 %)	1.23 (0.91–1.67)	1.09 (0.76–1.57)	1.10 (0.76–1.57)	58 (10.5 %)	1.01 (0.75–1.37)	0.76 (0.52–1.11)	0.73 (0.49–1.08)

^a As obtained by Cox proportional hazard regression mutually adjusted and adjusted by age, previous pain, educational level and leisure-time physical activity

^b Adjusted by all above mentioned, in addition to self-rated general health and self-rated mental health

Strengths and weaknesses

We believe that the major strength of our study is the prospective design with cases being harvested when visiting their GPs. Obstacles in care-seeking, such as availability or the individual patient's health insurance, are not an issue in Denmark where patients can see their GP free of charge and availability is good. Considering that we addressed the general population with our baseline questionnaire, we find that 59.5 % answering is acceptable. The study population, including both men and women and covering both town and countryside inhabitants, revealed a wide range of occupations thus ensuring a large variation in work-related exposures.

On the other hand, the study has weaknesses and limitations. In the questionnaire, we changed the wording of the original fear-avoidance questionnaire (Waddell et al. 1993), enabling people with only little or no pain to answer. Well aware that most people have experienced pain previously, we assumed that this would not impede the validity. The part of the SEQ-pain questionnaire (Muller et al. 2008) we used has been validated thoroughly in German, and we translated it and we cannot be absolutely sure how this affects the validity. But given it was a very simple question, we believe that the impact on validity was very small if any. As in all prospective studies, the information given in the baseline questionnaire may have changed during follow-up. The 18-month follow-up period was a compromise between weighing the validity of the original information and ensuring enough cases.

Interpretation

Earlier research has shown differences in exposures, interactions, and reporting between men and women (Messing et al. 2009), and we decided to stratify our statistical analysis by gender, thereby losing some statistical power. We decided to do so since previous work has shown that stratifying by gender is necessary if the full range of associations between exposure and MP is to be detected and understood (Messing et al. 2009). Taking the loss of statistical power in account, we find that our results, especially those regarding physical work environments, should be interpreted with some precaution since the numbers of those exposed are small. The percentage of males and females reporting high levels of heavy lifting are nearly the same, but it was only among males that we found a statistically significant raise in HR for care-seeking. We used the DMQ (Hildebrandt et al. 2001) for assessing heavy lifting, but this questionnaire does not put actual numbers in kilograms on the amount lifted. Thus, the term heavy lifting could, among males and females, correspond to loads with different characteristics, since what is

considered heavy by a female might not necessarily be considered heavy by males (Messing et al. 2009). In this way, there is a chance that women might have overestimated their level of heavy lifting, thus concealing differences in true exposure between genders.

When considering the association between heavy lifting and care-seeking for MP, it is worth noticing that tending to work might be harder if you have a back pain condition and your work includes heavy lifting, thereby making it more likely that you will see your GP. It is known that patients with MP also consult other health care providers such as chiropractors and physiotherapists (Cote et al. 2005). For this reason, we cannot claim to have a complete follow-up. We still believe that GPs shoulder most of the burden of care-seeking with MP. A major reason for choosing care-seeking from GPs as our main outcome was their use of ICPC, making it easy to identify cases. This was not the case among other providers. As opposed to consulting a GP, patients are charged a fee when seeing a chiropractor or a physiotherapist. This could influence their inclination to seek this type of care, and the pattern of care-seeking could be skewed by socioeconomic status.

In another study, we looked at health anxiety, somatisation and fear-avoidance as predictors of care-seeking with MP taking previous pain into account (Jensen et al. 2012). In accordance with other studies (Cote et al. 2001; Ferreira et al. 2010; IJzelenberg and Burdorf 2004; Linton et al. 1998; Molano et al. 2001; Szpalski et al. 1995; Tornqvist et al. 2001; Waxman et al. 1998), we found that having experienced pain in the past, and the more intense this pain was, the larger was the risk of becoming a care-seeker in the future.

The questionnaire did not contain any specific questions on comorbidity, but we did ask about self-rated general and mental health, and when we included them in the models, there were no more explanatory power.

Back pain and upper extremity pain are both very common disorders, and during a lifetime, most people will experience both, and often in a recurrent way. Even though approximately half of the patients with back pain seek care (Ferreira et al. 2010), this still indicates that just as many do not. In this study, only 12 % of the population sought care for back pain. The difference between the proportions seeking care can be explained by the fact that we found our cases among a population consisting of people with and without back pain. Furthermore, we only included those who used their GP while other studies often include all kinds of health care providers such as chiropractors and physiotherapists (Cote et al. 2001).

For a long period, there has been an implicit consensus that reducing the occurrence of MP should be obtained by focusing on well-known risk factors. However, the important risk factors leading to MP and those leading to

health care use and sick leave may be different (IJzelenberg et al. 2004). Many GPs might not have the knowledge necessary to understand their patients work life (Elms et al. 2005). This could be overcome by a closer cooperation between the GP, the patient and the patient's employer. In 2009, Danish authorities introduced a new concept of a fitness for work note, meant to replace the former sick note. The fitness note involves the employer and the employee, requiring them both to contribute in finding solutions in order to keep the employee at work if possible. The GP's role is to consider whether these solutions are compatible with the character of the patient's disease. The fitness for work note has recently been evaluated and was found to be successful, but it calls for the GP to carefully consider all obstacles for each individual patient that could delay or obstruct return to work (Slotsholm A/S 2011). This assumes that the GP has some previous knowledge of factors of importance. In this study, we found that heavy lifting was associated with care-seeking with both back pain and upper extremity pain, but only among males and only at the highest level of heavy lifting. This implies that some men in jobs with heavy lifting should be supported in job modifications, and that gaining knowledge about the physical loads should routinely be included in the consultation with patients with musculoskeletal pain. Given the relatively good prognosis of common musculoskeletal pain, and the low level of the knowledge base on risk as well as prognostic factors for such pain, extensive advice by GPs to overcome obstacles at work should probably be avoided, in order not to stigmatise their patients more than necessary. Rather the GP should contribute to and support in keeping the patients options on returning to work open.

Conclusion

This study implies that work-related factors to some extent contribute to care-seeking with MP, but further research with a more detailed description of patient's beliefs of the collaboration between work and MP should be performed.

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Conflicts of interest The authors declare they have no conflict of interest.

Ethical approval This work has been approved by the Danish Data Protection Agency.

References

- Andersen RM (1995) Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav* 36(1):1–10
- Andersen JH, Kaergaard A, Mikkelsen S, Jensen UF, Frost P, Bonde JP, Fallentin N, Thomsen JF (2003) Risk factors in the onset of neck/shoulder pain in a prospective study of workers in industrial and service companies. *Occup Environ Med* 60(9):649–654
- Badcock LJ, Lewis M, Hay EM, Croft PR (2003) Consultation and the outcome of shoulder-neck pain: a cohort study in the population. *J Rheumatol* 30(12):2694–2699
- Ballina Garcia FJ, Hernandez MR, Martin LP, Fernandez SJ, Cueto EA (1994) Epidemiology of musculoskeletal complaints and use of health services in Asturias, Spain. *Scand J Rheumatol* 23(3):137–141
- Brauer C, Mikkelsen S (2010) The influence of individual and contextual psychosocial work factors on the perception of the indoor environment at work: a multilevel analysis. *Int Arch Occup Environ Health* 83(6):639–651
- Cote P, Cassidy JD, Carroll L (2001) The treatment of neck and low back pain: who seeks care? who goes where? *Med Care* 39(9):956–967
- Cote P, Baldwin ML, Johnson WG (2005) Early patterns of care for occupational back pain. *Spine (Phila Pa 1976)* 30(5):581–587
- Elms J, O'Hara R, Pickvance S, Fishwick D, Hazell M, Frank T, Henson M, Marlow P, Evans G, Bradshaw L, Harvey P, Curran A (2005) The perceptions of occupational health in primary care. *Occup Med (Lond)* 55(7):523–527
- Ferreira ML, Machado G, Latimer J, Maher C, Ferreira PH, Smeets RJ (2010) Factors defining care-seeking in low back pain—a meta-analysis of population based surveys. *Eur J Pain* 14(7):747
- Grimsmo A, Hagman E, Faiko E, Matthiessen L, Njalsson T (2001) Patients, diagnoses and processes in general practice in the Nordic countries. An attempt to make data from computerised medical records available for comparable statistics. *Scand J Prim Health Care* 19(2):76–82
- Hildebrandt VH, Bongers PM, van Dijk FJ, Kemper HC, Dul J (2001) Dutch Musculoskeletal questionnaire: description and basic qualities. *Ergonomics* 44(12):1038–1055
- IJzelenberg W, Burdorf A (2004) Patterns of care for low back pain in a working population. *Spine (Phila Pa 1976)* 29(12):1362–1368
- IJzelenberg W, Molenaar D, Burdorf A (2004) Different risk factors for musculoskeletal complaints and musculoskeletal sickness absence. *Scand J Work Environ Health* 30(1):56–63
- Jensen J (2011) Work-related musculoskeletal discomfort. The Danish Working Environment Authority. The Danish Working Environment Authority, 23-8-2011
- Jensen JC, Haahr JP, Frost P, Andersen JH (2012) Looking beyond pain. The significance of health anxiety and somatisation in care-seeking for back and upper extremity pain. *Fam Pract* 29:86–95
- Jordan K, Clarke AM, Symmons DP, Fleming D, Porcheret M, Kadam UT, Croft P (2007) Measuring disease prevalence: a comparison of musculoskeletal disease using four general practice consultation databases. *Br J Gen Pract* 57(534):7–14
- Koch MB, Davidsen M, Juel K (2011) The societal costs in Denmark related to diseases of the back and back pain. <http://www.sifolkesundhed.dk>. Statens Institut for Folkesundhed, 18-7-2011
- Leboeuf-Yde C, Fejer R, Nielsen J, Kyvik KO, Hartvigsen J (2011) Consequences of spinal pain: do age and gender matter? A Danish cross-sectional population-based study of 34, 902 individuals 20–71 years of age. *BMC Musculoskelet Disord* 12:39
- Linton SJ, Hellsing AL, Hallden K (1998) A population-based study of spinal pain among 35–45-year-old individuals. Prevalence,

- sick leave, and health care use. *Spine (Phila Pa 1976)* 23(13): 1457–1463
- Messing K, Stock SR, Tissot F (2009) Should studies of risk factors for musculoskeletal disorders be stratified by gender? Lessons from the 1998 Quebec Health and Social Survey. *Scand J Work Environ Health* 35(2):96–112
- Molano SM, Burdorf A, Elders LA (2001) Factors associated with medical care-seeking due to low-back pain in scaffolders. *Am J Ind Med* 40(3):275–281
- Muller U, Tanzler K, Burger A, Staub L, Tamcan O, Roeder C, Juni P, Trelle S (2008) A pain assessment scale for population-based studies: development and validation of the pain module of the Standard Evaluation Questionnaire. *Pain* 136(1–2):62–74
- Nielsen MN, Aaen-Larsen B, Vedsted P, Nielsen CV, Hjollund NH (2008) Diagnosis coding of the musculoskeletal system in general practice. *Ugeskr Laeger* 170(37):2881–2884
- Rasanen K, Notkola V, Kankaanpaa E, Peurala M, Husman K (1993) Role of the occupational health services as a part of illness-related primary care in Finland. *Occup Med (Lond)* 43(suppl 1): S23–S27
- Schoenfeld D (1982) Residuals for the proportional hazards regression model. *Biometrika* 69(1):239–241
- Sen D, Osborne K (1997) General practices and health and safety at work. *Br J Gen Pract* 47(415):103–104
- Slotsholm A/S (2011) Midway evaluation of the fitness for work note. <http://www.ams.dk/Aktuelt/Nyheder/2011/06-21-evalueringmulighedserklaering.aspx>. The National Labour Market Authority, 3-6-2012
- Szypalski M, Nordin M, Skovron ML, Melot C, Cukier D (1995) Health care utilization for low back pain in Belgium. Influence of sociocultural factors and health beliefs. *Spine (Phila Pa 1976)* 20(4):431–442
- Tornqvist EW, Kilbom A, Vingard E, Alfredsson L, Hagberg M, Theorell T, Waldenstrom M, Wiktorin C, Hogstedt C (2001) The influence on seeking care because of neck and shoulder disorders from work-related exposures. *Epidemiology* 12(5):537–545
- Waddell G, Newton M, Henderson I, Somerville D, Main CJ (1993) A fear-avoidance beliefs questionnaire (FABQ) and the role of fear-avoidance beliefs in chronic low back pain and disability. *Pain* 52(2):157–168
- Ware J, Kosinski M, Keller S (1996) A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 34(3):220–233
- Waxman R, Tennant A, Helliwell P (1998) Community survey of factors associated with consultation for low back pain. *BMJ* 317(7172):1564–1567

Paper III. Fortroligt – under review

Does number of pain sites and comorbidity predict consultation for back pain and upper (body) pain in general practice? A Danish population- based cohort study.

Jens Christian Jensen, MD^{a,b}). Jens Peder Haahr, MPH^a). Poul Frost, PhD^b). Johan Hviid Andersen, PhD^a).

- a) Danish Ramazzini Centre, Department of Occupational Medicine, Regional Hospital, Herning, Denmark.
- b) Danish Ramazzini Centre Department of Occupational Medicine, Aarhus University Hospital, Denmark.

Corresponding author: Jens Christian Jensen, MD

tel: +45 7843 3500,

fax: +45 7843 3518.

e-mail: jens.christian.jensen@vest.rm.dk

Danish Ramazzini Centre, Department of Occupational Medicine, Regional Hospital, Herning, Gl. Landevej 61, 7400 Herning, Denmark.

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Abstract

OBJECTIVES: Musculoskeletal problems are one of the most common reasons for seeking primary care, up to 20 % over the course of a year. Regional pain is often accompanied by other symptoms such as multisite pain (MSP), psychiatric ailments, headache, abdominal symptoms and other diseases. The goals of the present study were to elucidate whether previous musculoskeletal multisite pain (MSP) and common comorbidities predicts care-seeking with either back pain or upper extremity pain.

METHODS: The study was performed as a cohort study including 5,068 participants (60 %) aged 17-65 years at a primary health care centre who had completed a questionnaire. All first time consultations for ICPC -diagnoses from the back and the upper extremity were followed for up to 18 months in registers. Number of pain sites reported at baseline and visits for common symptoms the year preceding baseline and other factors was analysed as predictors of consultation for either back pain or upper extremity pain.

RESULTS: We used Cox regression analysis stratified by gender. Number of pain sites predicted consultation for back pain for both men and women, and for upper extremity pain only among women with pain in more than 3 other sites. Having attended the general practitioner in the preceding year for other symptoms than musculoskeletal pain was associated more with consultation for back pain and to lesser extend also for upper extremity pain, emphasizing a more complex nature of back pain.

DISCUSSION: Enlightenment of musculoskeletal multisite pain and other common symptoms in the consultation should be done routinely by the general practitioner, who is the first entry for most patients.

Introduction

In countries like Denmark and the UK, general practice is the primary point of entry into the health care system for people with a new symptom or illness and the major source of care for chronic conditions. Musculoskeletal problems are one of the most common reasons for seeking primary care, with estimates of up to 20% of adults consulting their general practitioner with a musculoskeletal problem over the course of a year (1, 2). Regional low back pain (BP) and upper extremity pain (UEP) are the two most common complaints. Regional pain is often accompanied by other symptoms such as multisite pain (MSP), psychiatric ailments, headache, abdominal symptoms and diseases such as diabetes and cardiovascular disease. (3-13). In earlier analysis of primary care-seeking in a 18- month follow up cohort of 5,068 adults 17-65 years of age, we investigated the role of previous pain, health anxiety, somatisation and fear avoidance beliefs on care-seeking for back pain or upper extremity pain (14). We found that previous regional pain was related to care-seeking for upper extremity pain and back pain among men and women. Among women with back pain, high levels of health anxiety were associated with care-seeking, and high levels of somatisation were associated with care-seeking for back pain in both genders. Patients suffering from upper extremity pain differed from back pain patients, as neither fear-avoidance nor health anxiety nor somatisation showed any association to care-seeking for upper extremity pain. In analysis of the effect of occupational factors on primary care seeking, we found that heavy lifting increased the hazard ratio for care-seeking for back pain among males, but not for females (J.C. Jensen et al., M.D., unpublished data, June, 2012). Repetitive work and psychosocial work environment factors did not contribute to care-seeking for low back pain in any significant way. Concerning

seeking care for upper extremity pain we found again, that heavy lifting was associated with an increased risk, but only statistically significant among men. Even though we did find slightly raised HRs for some of the psychosocial factors and for repetitive work among females, there was no statistically significant impact on care-seeking for upper extremity pain for any of these factors. Care seeking is thus a complex practice encompassing the domains of environmental factors, population characteristics, health behaviour, and health outcomes (15). Environmental factors include organisation and access to the health care system and external environmental factors such as occupational factors. Population characteristics include predisposing factors as gender, age, and genetic factors. Health behaviour is determined by personal health practices and the use of health services. Health outcomes embrace perceived health status, evaluated health status and expectations from care seekers. Up to now all the four abovementioned domains has been reported to be associated with health services' use. In care seeking with musculoskeletal pain, several studies have revealed that multisite pain often exists among a large part of patients seeking care with regional pain as their primary predicament (16-18).

The aim of this paper is to elucidate whether previous musculoskeletal multisite pain (MSP) and common comorbidities predicts care-seeking with either back pain or upper extremity pain.

Materials and Methods

The study was performed as a cohort study of participants registered at a primary health care centre with eight general practitioners (GPs). It was part of a larger study on the role of musculoskeletal pain, health behaviour, personal characteristics, and occupational factors in relation to care-seeking with BP and neck and upper extremity pain in a 18-month follow-up period. We identified all women and men between 17 to 65 years of age registered with the GPs by obtaining information from the Danish Public Health Insurance System. A baseline questionnaire was posted to 8,517 persons, and of a total of 5,068 participated (59.5 %) (14).

For elucidating comorbidity we retrieved data from the GP's journals covering the year before baseline providing information on pre-baseline ICPC-diagnosis (19) grouped into five different fields: psychiatric disorders (covering perceived stress, anxiety and depression), headache, abdominal pain/symptoms, cardiovascular conditions/symptoms and diabetes. The main outcomes were first time consultation for either back pain or upper extremity pain. We used ICPC-diagnosis covering back pain and neck and upper extremity pain symptoms, to define our outcomes. For a complete list of the ICPC diagnosis used in the study see [List 1](#).

To assess number of pain sites (NPS) we used the SEQ-pain (20) manikin, and divided the body into 20 sites. By using tertiles we categorized NPS into pain in 0-1 site, 2-3 sites and > 3 sites. For each of the two outcomes we excluded back pain and upper extremity pain from the MSP measure.

Data on social benefits was obtained from the DREAM register (21), a national register on all transfer payments made in Denmark. The data was merged with

responders and non-responders in this study to examine if participation rate at the labour market was different between responders and non-responders.

Analysis

Data were analysed separately for back pain and upper extremity pain and stratified by gender. For analyses of this dichotomous outcome we used Cox regression analysis with time to first consultation after the date that the questionnaire was completed. We used Schoenfeld residuals to test the assumption of proportional hazards. Correlations between multi-site pain and various comorbidity variables were tested but none were at the size of implying strong co linearity ($r < 0.50$). We calculated both crude and adjusted hazard ratios (HR) mutually adjusting each variable for the others and age by group. We used 95 % confidence intervals. All analyses was performed using Stata 11.2 (StataCorp., College Station, TX, USA).

Results

There were 8517 eligible participants out of which 88 had a missing address, 1196 returned the questionnaire not wanting to participate, 2124 never returned the questionnaire, 2 were dead, 10 were severely mentally ill, and thus a total of 5097 answered (4297 on paper and 800 on an identical web-based questionnaire). We excluded a further 29 for various reasons, leaving 5068 (59.5 %) in the cohort.

Characteristics of respondents based on care seeking for back pain and upper extremity is shown in table 1 and table 2. A total of 3,969 participants (78.3 %) consulted their GP in the 18-month follow up (57.5 % women and 42.5 % men), of whom 607 (15.3) consulted for back pain and 561 (14.1 %) with upper extremity pain. Women consulted more often than men, for back pain 61.6 % were women, and for upper extremity pain 53.5 % were women.

Non-responders had a slightly lower (1-2%) participation rate at the labour market at the time of answering the questionnaire. Overall, the participation rate on the labour market was higher than 80 % in both groups. Non-responders also were younger and there were more men among non-responders.

Multisite pain was strongly associated with future consultation for BP and this association persisted at around the same level when adjusted for other symptoms and age (table 1). For men the adjusted hazard ratio was 2.34; 95 % CI 1.69-3.27 and for women 2.20; 95 % CI 1.66-2.89. Prior headache, psychiatric symptoms, and abdominal symptoms also predicted consultation for LBP for both men and women, but with some differences in effect size between the two genders. Diabetes and cardiovascular symptoms only had minor and hardly significant associations. Age was

strongest associated with care seeking for LBP among men, whereas age declined as a predictor for women more than 59 years of age.

MSP was of less importance for care seeking with upper extremity pain (table 2); men (HR 1.35 (0.99 - 1.85) and women 1.55 (1.16 - 2.06). Abdominal pain and diabetes among women both increased the risk of care seeking with upper extremity pain. Age contributed strongly among women with an increased HR for women between 40-49 years (2.99 (1.72 - 5.17)), and 3.65 (2.11 - 6.30) among women between 50-59 years old.

Discussion

In the total study population 607 (12 %) consulted their GP for back pain, and 561 (11.1 %) consulted for upper extremity pain within the 18 month follow-up period from the date of answering a questionnaire. More women consulted for both outcomes. Multisite pain at baseline was a risk factor for care seeking with back pain for both men and women, but MSP was not significantly associated with care seeking with upper extremity pain. Care seeking with back pain was also associated with headache, psychiatric conditions, abdominal pain and age in an inverse U-shaped pattern with highest attendance rate among participants between 30 and 59, and age contributed more to care seeking with back pain among men. For upper extremity pain MSP contributed less to care seeking and also other symptoms and diseases showed a smaller association with care seeking for upper extremity pain, even though abdominal pain and diabetes predicted care seeking with upper extremity pain among women. Age again was a risk factor at middle age, but only for women. We have reported the diagnostic codes by which we identified upper extremity, back pain and other consultations in the general practitioners' computerized records. These simply represent how the general practitioners classified the problem, and were not based on standardized diagnostic criteria. From the point of view of the study, the

important distinction was between consultations versus no consultation for any of these problems.

Major strength of this study were the use of ICPC-codes, the prospective harvesting of care seeking patients with back pain and upper extremity pain, and the obtainment of questionnaire data from a large group of participants before they consulted their GP. Also, almost everyone in Denmark registers with a family doctor, and services for back and upper extremity pain are free of charge at the point of delivery, making the registers of general practices a valid attractive sampling frame for such inquiries. The response rate on 60 % was satisfactory, but incomplete response raises questions about representativeness and bias. The responders of the questionnaire were a little older, and included more women than were in the group of non-responders.

Furthermore non-responders slightly more often were currently not active in the labour market. Still, we don't think that these small differences influenced neither the representativeness of the study nor introduced severe bias in the associations between predictors and outcomes. Socioeconomic status was measured from educational level, and we found no skewness in care seeking (14) for our pain related outcomes.

Most people having musculoskeletal pain reported pain from a number of sites. Furthermore, experiencing single site pain did not have a large impact on physical fitness, feelings, or daily and social activities. Functional problems increased markedly, in an almost linear way with increasing number of pain sites (22). These findings suggest that musculoskeletal pain usually coexists with pain in other body regions and that the functional consequences are highly dependent on how widespread the pain is (22). The same group found a strong "dose-response" relationship between number of pain sites and future disability in a 14-year prospective study, and suggested a high predictive validity of the number of pain sites in determining future

disability (23). Number of pain sites also was strongly related to number of comorbid physical conditions and depression/anxiety in an Australian cross-sectional study (24). A study of care seeking with arm pain suggests that those who consult a doctor with arm pain are more likely than other similar practice registered patients to have CFS (chronic fatigue syndrome), and a high score on scales of health anxiety, depression, chronic widespread pain and somatization (25).

In a review of comorbidities with low back pain there were positive associations to all disorders investigated (headache/migraine, respiratory disorders, cardiovascular disease, general health, and others) with the exception of diabetes. There was very little information regarding temporality, therefore there were no clues as to causal mechanisms. (6). A Norwegian study showed that overall health, sleep quality, and gender demonstrated the strongest associations with increasing number of pain sites (26). In this cohort we have earlier reported on the effect of somatization on care seeking for back pain (14), and the role of MSP seen in this study could be ascribed to somatization. But including somatization into the statistical models in this study did not eliminate the importance of MSP for care seeking with back pain (results not shown). Also for care seeking with upper extremity pain, MSP contributed in a model including somatization, which in itself did not predict care seeking with upper extremity pain. So, there is an independent effect of MSP, which is not mediated by somatization. Consulting with back pain was in general more influenced by MSP and other symptoms than attending with upper extremity pain. This difference could be related to a more multifactorial character of back pain than for upper extremity pain. Diabetes was stronger associated with upper extremity pain, which could be explained by higher risk for carpal tunnel syndrome and tendopathies in the upper extremity in diabetic patients (27). The independent role of abdominal pain for care seeking with

both outcomes could be ascertained to somatization tendency, but somatization and abdominal pain was only minor correlated ($r=0.08$). Another explanation could be some common inflammatory components for regional musculoskeletal pain and abdominal pain, but this is pure speculative and cannot be verified by our data. A third explanation could be that MSP and abdominal pain in some circumstances run along in chronic widespread pain (28).

Psychiatric conditions were associated with subsequent care seeking for back pain among women. Several studies have shown comorbidity between depression/anxiety and back pain (3,4,8,12,23). The inverse U-shaped associations between age and care seeking for both pain outcomes were probably due to higher attendance among working participants for whom regional pain poses a problem in fulfilling their work tasks.

Overall, in this population we found that consulting the GP with back and upper extremity pain in an 18 month follow up was associated with MSP at baseline and consulting with a number of other complaints in the preceding year. Together with our earlier findings in this cohort of an effect for care seeking from somatization, earlier regional pain, health anxiety (14), heavy lifting and job satisfaction (J.C. Jensen et al., M.D., unpublished data, June, 2012) the present findings add to the complex and multifactorial nature of back pain, and care seeking with back pain, and to a lesser extent care seeking with upper extremity pain.

In the consultation room this study points to the importance of including other symptoms than the ones, which are the main cause for attendance. Routinely, attendees to general practice with complaints of regional pain should be screened for the presence of other physical and mental symptoms. This screening should be delicately performed with the purpose to illuminate and enlighten the consultation

without amplifying anxiety and health beliefs among care seekers. In countries where the GP is the primary point of entry we think this could be done in a proper way.

References:

1. Jordan K, Clarke AM, Symmons DP et al. Measuring disease prevalence: a comparison of musculoskeletal disease using four general practice consultation databases. *Br J Gen Pract* 2007, 57:7-14.
2. Jordan KP, Kadam UT, Hayward R et al. Annual consultation prevalence of regional musculoskeletal problems in primary care: an observational study. *BMC Musculoskeletal Disorders* 2010, 11:144.
3. Bair MJ, Wu J, Damush TM et al. Association of depression and anxiety alone and in combination with chronic musculoskeletal pain in primary care patients. *Psychosom Med* 2008;70(8):890-897.
4. Britt HC, Harrison CM, Miller GC et al. Prevalence and patterns of multimorbidity in Australia. *Med J Aust* 2008;189(2):72-77.
5. Coronado RA, Alappattu MJ, Hart DL et al. Total number and severity of comorbidities do not differ based on anatomical region of musculoskeletal pain. *J Orthop Sports Phys Ther* 2011;41(7):477-485.
6. Hestbaek L, Leboeuf-Yde C, Manniche C. Is low back pain part of a general health pattern or is it a separate and distinctive entity? A critical literature review of comorbidity with low back pain. *J Manipulative Physiol Ther* 2003;26(4):243-252. Review.

7. Jiménez-Sánchez S, Jiménez-García R, Hernández-Barrera V et al. Has the prevalence of invalidating musculoskeletal pain changed over the last 15 years (1993-2006)? A Spanish population-based survey. *J Pain* 2010;11(7):612-20.
8. Khlát M, Chau N; Lorhandicap Group et al. Social disparities in musculoskeletal disorders and associated mental malaise: findings from a population-based survey in France. *Scand J Public Health* 2010;38(5):495-501.
9. Lindgren H, Bergman S. Chronic musculoskeletal pain predicted hospitalisation due to serious medical conditions in a 10 year follow up study. *BMC Musculoskelet Disord* 2010;11:127.
10. Nimgade A, McNeely E, Milton D et al. Increased expenditures for other health conditions after an incident of low back pain. *Spine (Phila Pa 1976)*. 2010;35(7):769-777.
11. Reme SE, Tangen T, Moe T, Eriksen HR. Prevalence of psychiatric disorders in sick listed chronic low back pain patients. *Eur J Pain* 2011;15(10):1075-1080.
12. Ritzwoller DP, Crounse L, Shetterly S et al. The association of comorbidities, utilization and costs for patients identified with low back pain. *BMC Musculoskelet Disord* 2006;7:72.
13. Slater M, Perruccio AV, Badley EM. Musculoskeletal comorbidities in cardiovascular disease, diabetes and respiratory disease: the impact on activity limitations; a representative population-based study. *BMC Public Health* 2011;11:77.

14. Jensen JC, Haahr JP, Frost P, Hviid Andersen J. Looking beyond pain. The significance of health anxiety and somatization in care-seeking for back pain and upper extremity pain. *Fam Pract* 2012; 29(1):86-95.
15. Andersen RM. Revisiting the behavioral model and access to medical care: Does it matter? *Journal of Health and Social Behavior* 1995;36:1-10.
16. Carnes D, Parsons S, Ashby D et al. Chronic musculoskeletal pain rarely presents in a single body site: results from a UK population study. *Rheumatology (Oxford)* 2007, 46:1168-1170.
17. Rohrbeck J, Jordan K, Croft P: The frequency and characteristics of chronic widespread pain in general practice: a case-control study. *Br J Gen Pract* 2007, 57:109-115.
18. Croft P. The epidemiology of widespread pain. *J Musculoskeletal Pain* 2002;10:191–199.
19. Nielsen MN, Aaen-Larsen B, Vedsted P et al. [Diagnosis coding of the musculoskeletal system in general practice]. *Ugeskr Laeger* 2008; 170: 2881–2884.
20. Muller U, Tanzler K, Burger A et al. A pain assessment scale for population-based studies: development and validation of the pain module of the Standard Evaluation Questionnaire. *Pain* 2008;136(1-2):62-74.
21. Hjollund NH, Larsen FB, Andersen JH. Register-based follow-up of social benefits and other transfer payments: accuracy and degree of completeness in a Danish interdepartmental administrative database compared with a population-based survey. *Scand J Public Health* 2007;35(5):497-502.

22. Kamaleri Y, Natvig B, Ihlebaek CM et al. Localized or widespread musculoskeletal pain: Does it matter? *Pain* 2008; 138(1): 41-46.
23. Kamaleri Y, Natvig B, Ihlebaek CM et al. Does the number of musculoskeletal pain sites predict work disability? A 14-year prospective study. *Eur J Pain* 2009;13(4):426-430.
24. Dominick CH, Blyth FM, Nicholas MK. Unpacking the burden: understanding the relationships between chronic pain and comorbidity in the general population. *Pain* 2012;153(2):293-304.
25. Ryall C, Coggon D, Peveler R et al. A case-control study of risk factors for arm pain presenting to primary care services. *Occup Med (Lond)* 2006; 56(2):137-143.
26. Kamaleri Y, Natvig B, Ihlebaek CM et al. Number of pain sites is associated with demographic, lifestyle, and health-related factors in the general population. *Eur J Pain* 2008;12(6):742-748.
27. M. Chammas, P. Bousquet, E. Renard, J.L. Poirier, C. Jaffiol, Y. Allieu. Dupuytren's disease, carpal tunnel syndrome, triggers finger and diabetes. *J Hand Surg (Am)* 1995;(20):109–114.
28. Hunt IM, Silman AJ, Benjamin S et al. The prevalence and associated features of chronic widespread pain in the community using the 'Manchester' definition of chronic widespread pain. *Rheumatology* 1999;38:275–279.

List 1. ICPC -1 diagnosis used for outcome and comorbidity variables.

Outcome:

Upper extremity:

- L01: Neck symptoms/complaints excl. headache
- L08: Shoulder symptoms/complaints
- L09: Arm symptoms/complaints
- L10: Elbow symptoms/complaints
- L11: Wrist symptoms/complaints
- L12: Hand & finger symptoms/complaints

Back:

- L02: Back Symptoms/complaints
- L03: Low back complaints excl. radiation
- L04: Chest symptoms/complaints
- L05: Flank symptoms/complaints
- L86: Lumbar disc lesion/radiation

Comorbidity Variables:

Psychiatric disorders:

- P01: Feeling anxious/nervous/tense
- P02: Acute stress/trans/situate disturb
- P03: Feeling depressed
- P06: Disturbances of sleep/insomnia
- P74: Anxiety disorder/anxiety state
- P76: Depressive disorder

Headache:

- N01: Headache (excl N02 N89 R09)
- N02: Tension headache
- N89: Migraine
- N90: Cluster headache

Abdominal pain/symptoms:

- D01: Generalized abd. pain/cramps
- D02: Stomach pain/ache
-
- D06: Other localized abd pain
- D09: Nausea
- D11: Diarrhea
- D12: Constipation
- D18: Change in feces/bowel movements
- D26: Fear of cancer in digest system
- D85: Duodenal ulcer
- D86: Other peptic ulcers
- D93: Irritable bowel syndrome

Cardiovascular conditions/symptoms:

- K01: Pain attributed to heart
- K02: Pressure/tightness attributed to heart
- K04: Palpitations/aware of heartbeat
- K05: Other abn/irreg heartbeat/pulse
- K24: Fear of heart attack
- K74: Angina Pectoris
- K76:Other/chron ischaemic heart dis
- K77: Heart Failure
- K78: Atrial fibrillation/flutter
- K79: Paroxysmal tachycardia
- K86: Uncomplicated hypertension
- K87: Hypertension with involvement of target organs
- K89: Transient cerebral ischaemia
- K90: Stroke/cerebrovasc accident

Diabetes:

- T90: Diabetes mellitus

TABLE 1. Characteristics of comorbidity among respondents based upon MSP level among males and females.

Consultations	Males N = 2254 (44.5 %)				Females N = 2814 (55.5%)			
	Reported multi site pain (MSP)				Reported multi site pain (MSP)			
	n total	0-1 region	2-3 regions	> 3 regions	n total	0-1 region	2-3 regions	> 3 regions
Psychiatric condition								
<i>None</i>	2098 (93.1%)	998 (94.4%)	659 (93.3%)	511 (90.4%)	2434 (86.5%)	850 (90.2%)	656 (87.0%)	928 (83.0%)
<i>Yes</i>	156 (6.9%)	55 (5.6%)	47 (6.7%)	54 (9.6%)	380 (13.5%)	92 (9.8%)	98 (13.0%)	190 (17.0%)
Headache								
<i>None</i>	2138 (94.9%)	943 (95.9%)	670 (94.9%)	525 (92.9%)	2441 (86.7%)	828 (87.9%)	646 (85.7%)	967 (86.5%)
<i>Yes</i>	116 (5.1%)	40 (4.1%)	36 (5.1%)	40 (7.1%)	373 (13.3%)	114 (12.1%)	108 (14.3%)	151 (13.5%)
Abdominal pain								
<i>None</i>	2122 (94.1%)	934 (95.0%)	667 (94.5%)	521 (95.2%)	2477 (88.0%)	851 (90.3%)	650 (86.2%)	976 (87.3%)
<i>Yes</i>	132 (5.9%)	49 (5.0%)	39 (5.5%)	44 (7.8%)	337 (12.0%)	91 (9.7%)	104 (13.8%)	142 (12.7%)
Cardiovascular disease								
<i>None</i>	1942 (86.2%)	864 (87.9%)	604 (85.6%)	474 (83.9%)	2441 (86.7%)	839 (89.1%)	672 (89.1%)	930 (83.2%)
<i>Yes</i>	312 (13.8%)	119 (12.1%)	102 (14.4%)	91 (16.1%)	373 (13.3%)	103 (10.9%)	82 (10.9%)	188 (16.8%)
Diabetes								
<i>None</i>	2135 (94.7%)	939 (95.5%)	671 (95.0%)	525 (92.9%)	2708 (96.2%)	922 (97.9%)	726 (96.3%)	1060 (94.8%)
<i>Yes</i>	119 (5.3%)	44 (4.5%)	35 (5.0%)	40 (7.1%)	106 (3.8%)	20 (2.1%)	28 (3.7%)	58 (5.2%)

TABLE 2. Hazard ratios* for care-seeking for back pain based on multi-site pain level, comorbidity and age group. Stratified by gender.

Variable	Males N = 2249 (44.5%)			Females N = 2808 (55.5%)		
	Cases (n/%)	Crude HR (95 % CI)	Adjusted HR (95% CI)	Cases (n/%)	Crude HR (95 % CI)	Adjusted HR (95% CI)
Multi-Site pain level						
<i>0 -1 region</i>	61 (26.8 %)	ref	ref	72 (19.6 %)	ref	ref
<i>2-3 regions</i>	82 (35.9 %)	1.93 (1.39 - 2.69)	1.86 (1.34 - 2.59)	106 (28.8 %)	1.91 (1.42 - 2.58)	1.83 (1.35 - 2.47)
<i>> 3 regions</i>	85 (37.3 %)	2.56 (1.84 - 3.56)	2.34 (1.69 -3.27)	190 (51.6 %)	2.35 (1.79 - 3.09)	2.20 (1.66 - 2.89)
Psychiatric condition						
<i>None</i>	205 (89.9 %)	ref	ref	292 (79.4%)	ref	ref

<i>Yes</i>	23 (10.1 %)	1.57 (1.02 - 2.42)	1.24 (0.80 - 1.93)	76 (20.6 %)	1.74 (1.35 - 2.24)	1.35 (1.04 - 1.76)
Headache						
<i>None</i>	200 (87.7 %)	ref	ref	296 (80.4 %)	ref	ref
<i>Yes</i>	28 (12.3 %)	2.83 (1.90 - 4.20)	2.45 (1.64 - 3.67)	72 (19.6 %)	1.66 (1.28 - 2.15)	1.46 (1.12 - 1.90)
Abdominal pain						
<i>None</i>	205 (89.9 %)	ref	ref	296 (80.4 %)	ref	ref
<i>Yes</i>	23 (10.1 %)	1.86 (1.21 - 2.86)	1.59 (1.02 - 2.47)	72 (19.6 %)	1.90 (1.47 - 2.46)	1.67 (1.28 - 2.18)
Cardiovascular disease						
<i>None</i>	190 (83.3 %)	ref	ref	314 (85.3 %)	ref	ref
<i>Yes</i>	38 (16.7 %)	1.25 (0.89 - 1.77)	0.97 (0.66 - 1.41)	54 (14.7 %)	1.13 (0.85 - 1.51)	0.98 (0.72 - 1.33)

Diabetes

<i>None</i>	213 (93.4 %)	ref	ref	347 (94.3 %)	ref	ref
<i>Yes</i>	15 (6.6 %)	1.29 (0.76 - 2.17)	1.13 (0.65 - 1.95)	21 (5.7 %)	1.58 (1.02 - 2.45)	1.55 (0.98 - 2.45)

Age group (years)

<i>17 - 29</i>	14 (6.1 %)	ref	ref	36 (9.8 %)	ref	ref
<i>30 - 39</i>	33 (14.5 %)	1.82 (0.98 - 3.41)	1.84 (0.98 - 3.44)	67 (18.2 %)	1.43 (0.96 - 2.15)	1.47 (0.98 - 2.21)
<i>40 - 49</i>	60 (26.3 %)	2.19 (1.14 - 2.41)	2.05 (1.14 - 3.68)	113 (30.7 %)	1.66 (1.14 - 2.41)	1.54 (1.05 - 2.24)
<i>50 - 59</i>	79 (34.7 %)	2.35 (1.33 - 4.14)	2.11 (1.19 - 3.76)	108 (29.4 %)	1.57 (1.08 - 2.30)	1.45 (0.98 - 2.13)
<i>60 - 65</i>	42 (18.4 %)	2.08 (1.13 - 3.82)	1.95 (1.05 - 3.62)	44 (11.9 %)	1.20 (0.77 - 1.86)	1.08 (0.69 - 1.70)

* As obtained by Cox proportional hazards regression analysis with 95 % confidence intervals (95 % CI).

TABLE 3. Hazard ratios* for care-seeking for upper extremity pain based on multi-site pain level, comorbidity and age group. Stratified by gender.

Variable	Males N = 2245 (44.5%)			Females N = 2806 (55.5%)		
	Cases (n/%)	Crude HR (95 % CI)	Adjusted HR (95% CI)	Cases (n/%)	Crude HR (95 % CI)	Adjusted HR (95% CI)
Multi-Site pain level						
<i>0-1 region</i>	90 (35.7 %)	ref	ref	72 (24.7 %)	ref	ref
<i>2-3 regions</i>	89 (35.3 %)	1.41 (1.05 - 1.89)	1.39 (1.04 - 1.87)	73 (25.0 %)	1.28 (0.92 - 1.77)	1.21 (0.87 - 1.68)
<i>> 3 regions</i>	73 (29.0 %)	1.44 (1.06 - 1.96)	1.35 (0.99 - 1.85)	147 (50.3 %)	1.79 (1.35 - 2.37)	1.55 (1.16 - 2.06)
Psychiatric condition						
<i>None</i>	231 (91.7 %)	ref	ref	241 (82.5 %)	ref	ref
<i>Yes</i>	21 (8.3 %)	1.25 (0.80 - 1.96)	1.14 (0.72 - 1.79)	51 (17.47 %)	1.39 (1.03 - 1.88)	1.12 (0.82 - 1.53)
Headache						
<i>None</i>	237 (94.1 %)	ref	ref	244 (83.6 %)	ref	ref
<i>Yes</i>	15 (5.9 %)	1.18 (0.70 - 1.99)	1.11 (0.65 - 1.88)	48 (16.4 %)	1.31 (0.96 - 1.78)	1.30 (0.94 - 1.78)
Abdominal pain						
<i>None</i>	234 (92.9 %)	ref	ref	241 (82.5 %)	ref	ref

<i>Yes</i>	19 (7.1 %)	1.26 (0.78 - 2.04)	1.19 (0.73 - 1.93)	51 (17.5 %)	1.60 (1.18 - 2.16)	1.55 (1.14 - 2.11)
Cardiovascular disease						
<i>None</i>	210 (83.3 %)	ref	ref	241 (82.5 %)	ref	ref
<i>Yes</i>	42 (16.7 %)	1.26 (0.91 - 1.76)	1.02 (0.71 - 1.46)	51 (17.5 %)	1.42 (1.05 - 1.93)	1.06 (0.77 - 1.46)
Diabetes						
<i>None</i>	231 (91.7 %)	ref	ref	271 (92.8 %)	ref	ref
<i>Yes</i>	21 (8.3 %)	1.67 (1.07 - 2.60)	1.47 (0.92 - 2.35)	21 (7.2 %)	2.08 (1.33 - 3.25)	1.75 (1.11 - 2.78)
Age group (years)						
<i>17 - 29</i>	23 (9.2 %)	ref	ref	15 (5.1 %)	ref	ref
<i>30 - 39</i>	29 (11.5 %)	0.96 (0.55 - 1.66)	0.93 (0.54 - 1.61)	38 (13.0 %)	1.94 (1.06 - 3.52)	1.95 (1.07 - 3.54)
<i>40 - 49</i>	63 (25.0 %)	1.37 (0.85 - 2.20)	1.30 (0.81 - 2.11)	89 (30.5 %)	3.18 (1.84 - 5.49)	2.99 (1.72 - 5.17)
<i>50 - 59</i>	84 (33.3 %)	1.50 (0.95 - 2.38)	1.39 (0.82 - 2.21)	110 (37.7 %)	3.98 (2.32 - 6.83)	3.65 (2.11 - 6.30)
<i>60 - 65</i>	53 (21.0 %)	1.62 (0.99 - 2.64)	1.47 (0.89 - 2.42)	40 (13.7 %)	2.67 (1.47 - 4.38)	2.34 (1.28 - 4.29)

* As obtained by Cox proportional hazards regression analysis with 95 % confidence intervals (95 % CI).



Modern health worries and visits to the general practitioner in a general population sample: An 18 month follow-up study

Johan Hviid Andersen ^{*}, Jens Christian Jensen

Danish Ramazzini Centre, Department of Occupational Medicine, Regional Hospital Herning, Denmark

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ABSTRACT

Objective: Modern health worries (MHW) are concerns about health risks from features of modern life (e.g. additives in food, contaminated water supply, drug resistant bacteria, etc.). We investigated the role of MHW for care seeking for all purposes at the general practitioner (GP) and studied the role of neuroticism, symptoms of anxiety and somatization, other health anxiety, self-rated health, age, education and gender on the association between MHW and care-seeking.

Methods: A representative sample from eight GPs ($n=5068$) completed a baseline questionnaire on MHW, symptoms of health and personality, and was followed for visits to the GP for the next 18 months in the registers from the GP.

Results: Modern health worries were common, and higher levels were seen among women and in higher age. Care seeking at the GP was associated with MHW, and this association was maintained after adjusting for age, gender, neurotic traits, symptoms of anxiety, somatization, other health anxieties and self-rated health.

Conclusion: Over and beyond health related factors and personality, MHW had an independent role for future visits to the GP in the magnitude of 20% more visits among the participants in the highest quartile of the MHW-scale.

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Introduction

Health care use has been growing in most western countries, and already in 1988 Barsky pointed to the “paradox of health”, depicting that this rise in the demand for health care has occurred despite overall improvements in objective health and overall lifespan [1]. This increase in health care use has been coupled with a rise in symptoms for which there are no objective explanations [2]. Many of these symptoms appear unrelated to known diseases, but have psychological origins, and are typically defined as subjective health complaints [3,4].

Modern health worries (MHW) are defined as the concerns individuals have regarding the health consequences of modern living (e.g., air pollution, traffic fumes, cell phones, amalgam in dental fillings, etc. [5]). Worries about risks for health in modern life may drive the perception that routine daily symptoms are caused by physiological consequences of environmental factors. In addition, these concerns about health have been proposed to be aggravated by the media's growing awareness of all kind of risks and diseases [6,7]. In the public, this attention on potential risks of modernity has created an explanatory room for everyday predicaments to be nominated as new environmental diseases. Modern health worries have been associated to symptom complaints as well as the use of both traditional [5] and alternative health care services [8,9].

Most studies of MHW have been cross-sectional, and have shown that MHW are common in the general population [9], and even among young healthy samples [9], and MHW have been associated with depression, symptom reporting and quality of life [10]. We hypothesized that worries about the risks for health from features of modern life are likely to lower the thresholds to seeking care over and beyond the effect of perception of symptoms and ill health.

The present study investigates the role of modern health worries (MHW) for care seeking for all purposes at the general practitioner (GP) in an 18 month follow-up period and to study the effect of neuroticism, somatization, health anxiety, symptoms of anxiety, self-rated general health, age, education and gender on the association between the MHW scale and care-seeking.

Method

We performed a cohort study of subjects connected to a primary medical health care centre with 18 months of follow up. We obtained information from the Danish Public Health Insurance System on all persons of 17 to 65 years of age registered with eight GPs in the town of Odder, Denmark. The eight GPs did not share patients, but were sharing facilities as well as mutual patient software, thus facilitating data collection. A total of 8517 men and women were eligible from the eight selected GPs and received the baseline questionnaire, which were answered by 5068 (59.5%) [11].

^{*} Corresponding author at: Department of Occupational Medicine, Regional Hospital Herning, Gl. Landevej 61, 7400 Herning, Denmark. Tel.: +45 22600666; fax: +45 7843 3518. E-mail address: joande@rm.dk (J.H. Andersen).

Procedures

February 2008 a baseline questionnaire was posted to all eligible patients registered with the eight GPs. During the ensuing 18 months all consultations were electronically registered by the GPs, and for this analysis we harvested all consultations ($n = 3669$) during the follow-up. All 5068 participants signed written informed consent forms.

Measures

Modern health worries

The scale assesses how concerned respondents are about the health consequences of modern life [5]. A 21 item version of the scale was used, with answer categories from 1 (no concern) to 5 (extreme concern). We adapted 14 items of the original 25 items, and omitted the item “depletion of ozone layer”, and instead we included an overall question on “climate changes”. We omitted “pesticides in food”, “overuse of antibiotics”, “hormones in food”, “bacteria in air condition systems”, “pesticide spray”, “poor building ventilation”, “leakage from microwave ovens”, “fluoridation of water”, “radio of cell phone towers” and “medical and dental x-rays”, which have not been discussed as dangers in our country in recent years. We further included six new items on “radioactive emission”, “toxic chemicals in toys”, “stress”, “use of computer mouse”, “moulds in buildings”, and “terrorism”, which have been heavily discussed in the public as potentially detrimental for health. Cronbach's alpha for the MHW scales scale was 0.95.

Neuroticism

This was rated through the Mini International Personality Item Pool—Five Factor Model measure (Mini-IPIP-FFM Scales), where the scale for neuroticism included five items with a Cronbach's alpha of 0.74 [12].

Symptoms of anxiety and depression

The CMD-SQ (Common Mental Disorder screening questionnaire) was used to assess symptoms of anxiety (SCL-ANX4) and depression (SCL-DEP6) [13]. Cronbach's alpha was 0.87 and 0.91, respectively. The anxiety scale used four questions asking about “feeling scared”, “nervous”, “panic” and “worry”.

Somatization

Somatization was measured by the 12 items SCL-SOM, taken from the Symptom Check List 90-items (SCL-90) [14] (Cronbach's alpha = 0.83). A raw score was the sum of item scores for this dimension. This was dichotomized with a cut point at the 75th percentile.

Health anxiety

The seven-item Whiteley Index was used to measure health anxiety. This has previously been shown to work well in primary care settings [15]. The Whiteley Index is a one factor index ($\alpha = 0.90$). Items were summed and the score dichotomized with a cut point at the 75th percentile.

Self-rated health

We used one question from the SF-12 to assess self-rated general health [16].

Educational level

Education was divided into three groups: (i) no education beyond ordinary school or “one or more short courses”, (ii) “skilled worker”

or “short further education” and (iii) “medium-level further education” and “higher further education”.

Analysis

In the analysis we divided consultations at the GP into 0, 1–5, and more than 5 consultations in the follow-up period of 18 month. The associations between baseline measures and future consultations were analyzed by multiple ordinal logistic regression proportional odds models, and the proportional odds/ parallel lines assumption was tested with gologit2 (STATA® statistical package). The MHW scale was divided into quartiles, self-rated health into tertiles. The scales for neuroticism, anxiety, somatization and health anxiety were dichotomized with a cut point at the 75th percentile. Depression was excluded because of collinearity with anxiety. They were strongly correlated ($r = 0.80$). We performed the analysis in three steps with model 1 including self-rated health, neuroticism, anxiety, somatization and health anxiety, model 2 included the MHW scale, adjusted for age and gender, and the fully adjusted model 3 included all the variables from model 1 and model 2.

Results

Eight out of ten respondents visited their GP at least once in the 18 month follow-up period; a quarter visited the GP more than six times (Table 1). A major proportion of the participants were concerned about a number of modern health worries (Fig. 1). The highest concern was about additives in food, contaminated water supply, drug resistant bacteria and antibiotics in food, but there was also concern about air pollution, and stress. The lowest concerns were from cell phones, vaccination programs and high tension power lines.

Women (mean 33.6, SD 20.1) reported higher concerns than men (mean 27.5, SD 19.2), $t = 6.05$, $p < 0.000$, and women also consulted their GP more frequently (Tables 1 and 2). There was a linear association between the MHW scale and age, and participants aged 60+ ($n = 796$) revealed an odds ratio of 2.4 (95% CI: 1.9–2.9) compared to 17–29 year old participants ($n = 659$).

Table 2 shows the association between the series of independent variables and consultations with the GP. Model 1 reveals an exposure response relationship between self-rated health, and consulting the GP, and effect of somatization and general health worries as measured by Whiteley-7. The effect of MHW was small, but remained significant when all other variables were included in model 3. Estimates for the health related variables did not change when MHW was included and this suggests an independent small effect of MHW for care-seeking. The highest quartile of participants with modern health worries still had a 20% higher attendance rate for each step from zero to 1–5 and more than 6 consultations. Educational level did not predict future care-seeking in this population.

Table 1
Descriptive statistics in relation to number of consultations at the GP in a follow up for 18 month among a Danish population sample

	Number of consultations			
	0	1–5	> 5	Total
	$N = 1099$	$N = 2639$	$N = 1330$	$N = 5068$
	(21.7%)	(52.1%)	(26.2%)	
Age; mean (SD)	42.9 (14.6)	46.7 (12.0)	47.5 (12.7)	46.1 (12.9)
Gender (% female)	48.4	51.1	70.2	55.5
Education				
No (%)	24.7	14.1	20.9	18.1
Short (%)	42.4	48.7	46.5	46.7
Middle to long (%)	32.9	37.3	32.6	35.1
SF 12 (SRH); 0–100, mean(SD)	70.7 (22.7)	71.6 (20.8)	59.8(25.5)	68.3 (23.1)
SCL SOM;0–100, mean(SD)	13.0 (12.6)	12.0 (10.5)	18.3 (14.2)	13.8 (12.3)
Whiteley-7;0–100, mean(SD)	9.6 (14.7)	9.3 (13.4)	16.2 (18.5)	11.2 (15.4)
SCL anxiety;0–100, mean(SD)	10.1 (14.4)	8.8 (13.0)	15.7 (19.0)	10.8 (15.3)
Neuroticism;0–16, mean(SD)	6.4 (3.0)	6.1 (2.9)	7.3 (3.2)	6.5 (3.0)
MHW; 1–5, mean (SD)	2.3 (0.9)	2.4 (0.9)	2.6 (0.9)	2.4(0.9)

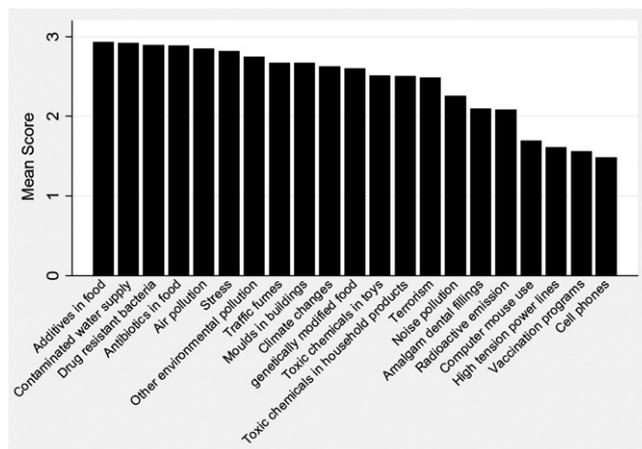


Fig. 1. Mean scores on Modern Health Worries (MHW) Scale items (rated from 1 “no concern” to 5 “extreme concern”).

Discussion

The results from this population sample of adults show that a high proportion of the population reports high concerns about modern life affecting their health. The concerns are about food and pollution, but also stress is a major concern in this study for which we have included some novel items compared with earlier studies of modern health worries [5,9,10]. Self-rated health, neuroticism, somatization and other health worries were associated with future care seeking at the GP, and MHW showed an independent contribution to the statistical model after adjusting for all the other factors. As expected the health related factors were stronger predictors of future care seeking than MHW. Adjusting for all included variables left an increased risk of

around 20 % for each step in the number of consultations among those in the highest quartile on the MHW scale.

Our findings are in accordance with a recent German population sample [9], which also found that changes to food production were of major concern, and that cell phones and high tension power lines were of less concern. But the mean MHW scale score for concern was higher in the German sample than in our Danish population, and as a novel finding we also found a strong relation with increasing age. The concerns more frequent among the elderly were antibiotics in food, toxic chemicals in household, drug resistant bacteria, additives in food, and amalgam in dental fillings, whereas no differences in relation to age were found for stress, climate changes and cell phones. The lower mean MHW scale score in the Danish population sample compared to the German sample could partly be explained by different items, but we do not think that this explanation is important, because on the same items used in both samples, the German population scored higher. The most likely explanation would be that in most surveys of the European population, the Danish population seems to be the most optimistic about their life situation and satisfaction [17], and Denmark still has one of the lowest Gini coefficients for inequality in the world [18]. Furthermore, care seeking from the GP in Denmark is free from direct costs for the patients.

This study benefits from prospective registration of care seeking from the GP and a large representative population sample. We treated consultations without discriminating different reasons for care seeking, which certainly is a shortcoming of the study. Modern health worries would possibly be more important for symptom based conditions than for some established diseases, but our purpose was to elucidate the overall importance of modern health worries for general care-seeking as a burden in modern societies. Our adjustments for health parameters will probably diminish the importance of different diseases and symptoms in care seeking. Another shortcoming is that all of the independent variables for MHW were measured at the same time. There were strong correlations between neuroticism, anxiety, somatisation, and other health worries, but they all were minor correlated to the MHW scale (r ranged from 0.15 to 0.20), so causal pathway between MHW and symptoms could not be elucidated, but would call for longitudinal studies with repeated measurements of MHW and symptoms, which to our knowledge, have never been performed. Despite the shortcomings this study extends to the importance of MHW found in earlier studies, and gives support to the MHW scale as an independent predictor for future care seeking at the GP. In dealing with patients with medically unexplained symptoms, information about worries for health could probably enlighten the consultation.

Table 2

Predictors for consultations at the GP (0, 1–5 and >6 times) in a follow up for 18 month among the general Danish population. Odds ratios (OR) with 95% confidence intervals (95% CI) obtained by ordinal logistic regression. $N = 4409$ –5058

	Model 1 ^a	Model 2 ^b	Model 3 ^c
	OR (95% CI)	OR (95% CI)	OR (95% CI)
	$N = 5068$	$N = 4791$	$N = 4409$
Modern health worries(MHW)			
Quartile 1, low		1.0	1.0
Quartile 2		1.1 (0.9–1.3)	1.1 (0.9–1.4)
Quartile 3		1.1 (0.9–1.3)	1.1 (0.9–1.2)
Quartile 4, high		1.3 (1.1–1.5)	1.2 (1.0–1.4)
Age-continuous	1.02 (1.01–1.02)	1.02 (1.01–1.02)	1.02 (1.01–1.02)
Female versus male	1.8 (1.6–2.0)	1.8 (1.7–2.1)	1.7 (1.5–2.0)
Education			
High	1.0		1.0
Middle	1.1 (0.9–1.2)		1.1 (0.9–1.2)
Low	1.0 (0.8–1.2)		1.0 (0.8–1.2)
Self-rated health–SF 12			
High	1.0		1.0
Medium	1.2 (0.9–1.5)		1.2 (0.9–1.4)
Low	1.8 (1.4–2.4)		1.8 (1.4–2.4)
Neuroticism	1.2 (1.0–1.4)		1.2 (1.0–1.4)
Anxiety	1.1 (0.9–1.3)		1.1 (0.9–1.3)
Somatization SCL-SOM	1.2 (1.0–1.4)		1.2 (1.0–1.4)
Whiteley-7	1.3 (1.1–1.5)		1.2 (1.1–1.4)
Test for proportional odds/ parallel lines assumption			$p = 0.69$

^a Model 1: mutual adjustment for all covariates besides MHW.

^b Model 2: effect of MHW, adjusted for age and gender.

^c Model 3: model 1 and MHW included.

Conflict of interest

Johan Hviid Andersen; None. Jens Christian Jensen; None.

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References

- [1] Barsky AJ. The paradox of health. *N Engl J Med* 1988;318:414–8.
- [2] Eriksen HR, Hellesnes B, Staff P, Ursin H. Are subjective health complaints a result of modern civilization? *Int J Behav Med* 2004;11:122–5.
- [3] Nimnuan C, Hotopf M, Wessely S. Medically unexplained symptoms: how often and why are they missed? *Q J Med* 2000;93:21–8.
- [4] Ursin H. Sensitization, somatization and subjective health complaints. *Int J Behav Med* 1997;4:105–16.

- [5] Petrie KJ, Sivertsen B, Hysing M, Broadbent E, Moss-Morris R, Eriksen HR, et al. Thoroughly modern worries: the relationship of worries about modernity to reported symptoms, health and medical care utilization. *J Psychosom Res* 2001;51:395-401.
- [6] Frost K, Frank E, Maibach E. Relative risk in the news media: a quantification of misrepresentation. *Am J Public Health* 1997;87:842-5.
- [7] Hofmann B. The paradox of health care. *Health Care Anal* 2001;9:369-86.
- [8] Furnham A. Are modern health worries, personality and attitudes to science associated with the use of complementary and alternative medicine? *Br J Health Psychol* 2007;12:229-43.
- [9] Rief W, Glaesmer H, Baehr V, Broadbent E, Brähler E, Petrie KJ. The relationship of modern health worries to depression, symptoms reporting and quality of life in a general population survey. *J Psychosom Res* 2012;72:318-20.
- [10] Filipkowski KB, Smyth JM, Rutchick AM, Santuzzi AM, Adya M, Petrie KJ, et al. Do healthy people worry? Modern health worries, subjective health complaints, perceived health, and health care utilization. *Int J Behav Med* 2010;17:182-8.
- [11] Jensen JC, Haahr JP, Frost P, Hviid Andersen J. Looking beyond pain. The significance of health anxiety and somatization in care-seeking for back pain and upper extremity pain. *Fam Pract* 2012;29:86-95.
- [12] Donnellan MB, Oswald FL, Baird BM, Lucas RE. The Mini-IPIP Scales: tiny-yet-effective measures of the big five factors of personality. *Psychol Assess* 2006;18:192-203.
- [13] Christensen KS, Fink P, Toft T, Frostholm L, Ornbøl E, Olesen F. A brief case-finding questionnaire for common mental disorders: the CMDQ. *Fam Pract* 2005;22:448-57.
- [14] Derogatis LR, Cleary PA. Confirmation of the dimensional structure of the SCL-90: a study in construct validation. *J Clin Psychol* 1977;33:981-9.
- [15] Fink P, Ewald H, Jensen J, Sorensen L, Engberg M, et al. Screening for somatization and hypochondriasis in primary care and neurological in-patients: a seven-item scale for hypochondriasis and somatization. *J Psychosom Res* 1999;46:261-73.
- [16] Ware Jr J, Kosinski MM, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. *Med Care* 1996;34:220-33.
- [17] http://ec.europa.eu/public_opinion/index_en.htm (04.04.2012).
- [18] Holstein BE, Currie C, Boyce W, Damsgaard MT, Gobina I, Kökönyei G, et al. Social inequalities focus group. Socio-economic inequality in multiple health complaints among adolescents: international comparative study in 37 countries. *Int J Public Health* Sep 2009;54:260-70.