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Prevalence of selected musculoskeletal conditions in Germany

Results of the German Health Interview and Examination Survey for Adults (DEGS1)

Background and purpose

Inflammatory and degenerative conditions affecting the musculoskeletal system rank among the most frequently occurring, chronic conditions. They are subsumed under the term musculoskeletal condition (MSKC). MSKC affect the majority of the older and aged population and are worldwide the leading cause of chronic pain, physical impairment and decrease in quality of life [1, 2, 3].

According to estimates by the World Health Organisation (WHO) the number of persons affected by a bone or joint condition will double between the year 2000 and 2020 [4]. Consequently, many efforts are being made internationally to effectively deal with musculoskeletal conditions and the burden of associated diseases. To this end, the WHO for example launched the Bone and Joint Decade 2000–2010 in order to improve the research and care situation.

In Germany, MSKC rank among the most frequent health conditions [5]. They cause high economic costs through expenses incurred for illness-specific treatments and as a consequence of incapacity for work and forced early retirement [6, 7].

Population-representative data on the prevalence of MSKC in Germany are largely disease-specific and mostly based on surveys in small areas or claims data and other routine data [7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17]. MSKC comprise degenerative joint disorders (e.g. osteoarthritis), inflammatory joint disorders (e.g. rheumatoid arthritis) and skeletal disorders (e.g. osteoporosis). The present paper describes the current distribution of the three aforementioned conditions in the German population.

Osteoarthritis

Worldwide, osteoarthritis is the most frequently occurring joint disorder [4, 18] and causes more limitations and disabilities in the older population than any other disease [3]. Osteoarthritis is characterized by degenerative changes in the joints. These start with the successive loss of articular cartilage and may even lead to the exposure of the bone surface. Damage to neighbouring structures such as bone, muscles and ligaments are also frequently observed. Osteoarthritis can be diagnosed through pathological changes in the X-ray image but also via joint complaints. Immutable risk factors are increasing age, female sex and genetic pre-disposition [19, 20, 21]. In addition there are acquired causes or contributory causes such as overloading or inappropriate straining of the joints due to congenital deformities (e.g. axial misalignment, hip dysplasia), following injuries and accidents or by being overweight [22].

Rheumatoid arthritis (RA)

The term arthritis is used to group chronic inflammatory, systemic joint disorders which occur on the basis of auto-immune processes that have not been completely clarified yet. The most important risk factors for these chronic inflammatory joint disorders are female sex, high age, environmental factors such as smoking and a multitude of genetic factors [23, 24, 25].

Inflammatory joint disorders proceed mostly in stages and progressively. They often involve chronic functional impairment accompanied by pain and reduced quality of life. The most frequent inflammatory joint condition is rheumatoid arthritis (RA) [3, 26]. RA is characterised clinically by swelling of the joints and pain and leads to erosive destruction of the joints and functional impairment [27]. Diagnosis is based on classification criteria which were updated in 2010 with the aim of improved early diagnosis and treatment [28]. The criteria refer to the number of joints affected, serology, inflammation markers and the duration of symptoms.

Osteoporosis

Osteoporosis is a systemic skeletal disorder which is characterised by low bone mass and microarchitectural deterioration of bone tissue [29], which increases

Tab. 1 Lifetime prevalence of osteoarthritis by sex, age group and social status

		Age group (years)							Osteoarthritis, unweighted case numbers	
		18–29 (%)	30–39 (%)	40–49 (%)	50–59 (%)	60–69 (%)	70–79 (%)	Overall (%)	Yes	No
Women										
Social status	**Low**	0.7	3.7	8.7	31.1	49.0	46.3	24.1	170	440
	95% CI	0.1–4.6	1.2–11.2	4.7–15.8	21.3–42.9	38.9–59.3	36.7–56.1	20.4–28.3		
	Middle	2.0	3.6	14.1	29.9	47.3	49.5	22.7	637	1814
	95% CI	0.8–4.6	1.7–7.1	10.6–18.5	25.4–34.7	41.8–52.9	43.0–56.1	20.6–24.9		
	High	1.8	3.7	10.5	29.1	42.2	67.7	19.0	211	660
	95% CI	0.4–7.0	1.8–7.2	6.4–17.0	22.1–37.2	32.8–52.3	54.3–78.7	16.3–22.0		
	Overall	1.6	3.7	12.6	29.9	46.9	49.9	22.3	1018	2914
	(95% CI)	0.8–3.2	2.3–6.1	10.1–15.7	26.6–33.5	42.6–51.2	45.2–54.5	20.8–23.8		
Men										
Social status	**Low**	5.5	4.5	17.0	32.0	34.7	24.7	18.7	117	434
	95% CI	2.4–12.3	1.1–16.2	10.0–27.5	23.3–42.3	23.8–47.6	16.2–35.8	15.1–22.9		
	Middle	0.5	10.8	14.3	28.9	33.5	36.6	18.6	411	1611
	95% CI	0.1–2.0	6.7–17.1	10.7–18.9	23.8–34.5	27.9–39.7	30.4–43.3	16.6–20.7		
	High	1.8	11.0	9.0	20.7	33.0	33.8	16.6	187	802
	95% CI	0.3–11.7	5.8–20.1	5.5–14.3	14.2–29.1	25.6–41.3	24.8–44.2	13.7–19.9		
	Overall	1.8	9.6	13.2	27.5	33.8	33.3	18.1	715	2847
	95% CI	0.9–3.5	6.4–14.0	10.5–16.4	23.9–31.5	29.5–38.4	28.8–38.2	16.6–19.7		
Overall										
Social status	**Low**	3.0	4.2	13.2	31.6	42.5	38.7	21.5	287	874
	95% CI	1.4–6.5	1.6–10.4	8.8–19.4	25.0–39.0	35.1–50.2	31.0–47.0	18.7–24.5		
	Middle	1.2	7.1	14.2	29.4	41.1	43.6	20.7	1048	3425
	95% CI	0.6–2.5	4.7–10.6	11.7–17.2	26.0–33.1	36.9–45.4	39.0–48.3	19.3–22.2		
	High	1.8	7.6	9.7	24.8	36.4	45.8	17.6	398	1462
	95% CI	0.5–5.9	4.6–12.2	6.7–13.6	20.1–30.2	30.3–43.0	37.2–54.7	15.6–19.9		
	Overall	1.7	6.7	12.9	28.7	40.4	42.4	20.2	1733	5761
	95% CI	1.0–2.7	4.9–9.2	11.1–15.0	26.3–31.3	37.4–43.6	38.8–45.9	19.2–21.2		

bone fragility [30]. This leads to a higher susceptibility to fractures even in minor external events (fragility fractures). Typical areas for fragility fractures are primarily the vertebral body, sections close to the femur (femoral neck and the region of trochanter) as well as the section of the radius close to the wrist (distal radius).

A multitude of factors contribute to the development of osteoporosis. These include non-modifiable factors such as increasing age, female sex and family predisposition, as well as underlying conditions and medication, which can be treated causally or adapted, and behavioural risk factors that can be modified such as lack of exercise or malnutrition [29].

Osteoporosis is highly relevant for health policy due to the close link with older age and the consequences of fractures. Hip and vertebral fractures in particular, lead to reduced quality of life and losses in independent living. Since hip fractures in contrast to vertebral fractures are always diagnosed and treated operatively, they cause the highest direct treatment costs [31, 32].

Methods

Study design and sample

The German Health Interview and Examination Survey for Adults ("Studie zur Gesundheit Erwachsener in Deutschland", DEGS) is part of the health monitoring system of the Robert Koch Institute (RKI). The concept and design of DEGS are described in detail elsewhere [33, 34, 35, 36, 37]. The first wave (DEGS1) was conducted from 2008–2011 and comprised interviews, examinations and tests [38, 39]. The target population comprises the residents of Germany aged 18–79 years. DEGS1 has a mixed design which permits both cross-sectional and longitudinal analyses. For this purpose, a random sample from the local population registries was drawn to complete participants of the German National Health Interview and Examination Survey 1998 (GNHIES98), who re-participated. A total of 8,152 persons participated, including 4,193 first-time participants (response rate 42%) and 3,959 revisiting participants of GNHIES98 (response rate 62%).

There were 7,238 persons who attended one of the 180 examination centres, and 914 were interviewed only. The net sample (n=7,988) permits representative cross-sectional and time trend analyses for the age range of 18–79 years in comparison with GNHIES98 [34]. The data of the revisiting participants can be used for longitudinal analyses. A non-

response-analysis and a comparison of selected indicators with data from census statistics indicate a high level of representativity of the net sample for the residential population in Germany [34].

Variables

The analyses of lifetime prevalence for osteoarthritis, RA and osteoporosis were based on self-report of physician-diagnosed conditions as part of a computer-aided interview administered by a specifically trained physician. Because of the known, very low prevalence for osteoporosis among younger and middle-aged adults, only participants aged 50 years and older were asked about osteoporosis.

The participants were asked whether they had ever been diagnosed by a doctor of having the respective condition and if yes, when this diagnosis took place, by what type of doctor (GP, specialist), whether they currently receive any treatment, and the kind of treatment (for example, medication or physiotherapy). In the case of queries the physician gave standardised information on the individual conditions. For example, with regard to RA the physician explained that RA is a serious inflammatory joint disorder, mostly occurring on both sides and almost always affecting the finger joints. People who indicated a physician-diagnosed osteoarthritis were asked to indicate in which joint or joints the osteoarthritis is located.

In cross-sectional analyses the lifetime prevalence for all three conditions are reported overall, and by age, sex, and socioeconomic status.

Socioeconomic status (SES) was determined using an index which includes information on school education and vocational training, professional status and net household income (weighted by household needs) and which enables a classification into low, middle and high status groups [40].

Statistical analysis

The results concerning the individual MSKCs were calculated with 95% confidence intervals (95% CI) according to sex, age group and SES. Participants with missing data were excluded from the analyses.

The cross-sectional analyses in DEGS1 are conducted with a weighting factor, which corrects deviations in the sample from population structure (as of 31 Dec 2010) with regard to age, sex, region and nationality, as well as community type and education [34]. A separate weighting factor was prepared for the examination part. Calculating of the weighting factor also considered re-participation probability of GNHIES98 participants, based on a logistic regression model.

Considering the weighting factor as well as the correlation of the participants within a community, the confidence intervals were determined with the survey procedures for complex samples in SPSS-20. Differences are regarded as statistically significant if the respective 95% confidence intervals do not overlap or if

Abstract · Zusammenfassung

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Prevalence of selected musculoskeletal conditions in Germany. Results of the German Health Interview and Examination Survey for Adults (DEGS1)

Abstract

The term musculoskeletal condition (MSKC) comprises inflammatory and degenerative diseases of joints and bones. They are among the most common conditions in older age and cause of severe long-term pain, physical disability, and decrease in quality of life. Data from the German Health Interview and Examination Survey for Adults (DEGS1) were used to estimate the life-time prevalence of osteoarthritis, rheumatoid arthritis (RA) and osteoporosis in Germany. A total of 7,988 persons aged 18–79 years (osteoporosis 50–79 years) were asked to report doctor-diagnosed MSKC in face-to-face interviews. Women were more likely to report all MSKC and all prevalences increase with age. Osteoarthritis is reported by 22.3% of women and 18.1% of men, RA by 3.2% of women and 1.9% of men, and osteoporosis by 13.1% of women and 3.2% of men. MSKC are of great relevance for older adults in Germany. Data from DEGS1 provide a lot of information along to MSKC and hereby allow a closer description of the health situation of older adults.

Keywords

Prevalence · Osteoarthritis · Rheumatoid arthritis · Osteoporosis · Health survey

Prävalenz ausgewählter muskuloskelettaler Erkrankungen. Ergebnisse der Studie zur Gesundheit Erwachsener in Deutschland (DEGS1)

Zusammenfassung

Der Begriff muskuloskelettale Erkrankungen (MSKE) umfasst unter anderen entzündliche und degenerative Erkrankungen des Bewegungsapparats. MSKE sind weltweit häufig bei Älteren und stellen die führende Ursache von chronischen Schmerzen, körperlichen Funktionseinschränkungen und Verlust an Lebensqualität dar. In der Studie zur Gesundheit Erwachsener in Deutschland (DEGS1) wird die aktuelle Verbreitung der häufigsten MSKE Arthrose, rheumatoide Arthritis (RA) und Osteoporose in Deutschland erfasst. Die Auswertungen basieren auf den Angaben von 7988 Personen im Alter von 18 bis 79 Jahren (Osteoporose ab 50 Jahren), die in einem persönlichen Interview angaben, ob die jeweilige Erkrankung bei ihnen jemals ärztlich diagnostiziert wurde. Arthrose liegt bei 22,3% der Frauen und 18,1% der Männer vor, RA bei 3,2% der Frauen und 1,9% der Männer. 13,1% der Frauen und 3,2% der Männer geben eine Osteoporose an. Bei allen MSKE sind Frauen signifikant häufiger betroffen als Männer. Die Schätzungen für beide Geschlechter steigen mit zunehmendem Alter an. MSKE spielen daher für die ältere und alte Bevölkerung in Deutschland eine bedeutende Rolle. DEGS1 bietet eine Vielfalt von Möglichkeiten, MSKE in Zusammenhang mit relevanten Einflussgrößen zu setzen und somit den Gesundheitszustand der zu Hause lebenden Bevölkerung präzise zu beschreiben.

Schlüsselwörter

Prävalenz · Arthrose · Rheumatoide Arthritis · Osteoporose · Gesundheitssurvey

Tab. 2 Lifetime prevalence of RA by sex, age group and social status

		Age group (years)							RA, unweighted case numbers	
		18–29 (%)	30–39 (%)	40–49 (%)	50–59 (%)	60–69 (%)	70–79 (%)	Overall (%)	Yes	No
Women										
Social status	**Low**	2.5		8.6	6.9	9.1	5.3	5.5	33	614
	95% CI	0.6–9.9		3.3–20.5	3.0–14.9	4.4–18.0	2.6–10.2	3.6–8.4		
	Middle	1.8	1.1	1.7	4.1	3.6	4.5	2.7	78	2450
	95% CI	0.8–4.1	0.3–3.9	0.8–3.5	2.5–6.8	2.2–5.9	2.8–7.2	2.1–3.5		
	High			1.6	3.2	4.0	4.1	1.8	22	862
	95% CI			0.5–5.4	1.5–6.5	1.7–8.8	1.5–10.3	1.1–2.9		
	Overall	1.7	0.6	2.9	4.6	4.9	4.9	3.2	133	3926
	95% CI	0.8–3.5	0.2–2.3	1.7–5.0	3.2–6.7	3.3–7.3	3.4–6.9	2.6–4.0		
Men										
Social status	**Low**	1.9	4.2	3.2	2.4	2.1	12.5	4.0	24	562
	95% CI	0.3–12.2	0.7–20.3	0.7–12.8	0.6–8.8	0.8–5.9	5.4–26.4	2.3–6.8		
	Middle		0.5	0.5	1.7	2.8	4.1	1.3	32	2064
	95% CI		0.1–2.4	0.1–1.5	0.7–4.0	1.6–4.9	1.9–8.7	0.9–1.9		
	High	0.5		0.6	1.9	3.7	2.0	1.3	15	1001
	95% CI	0.1–3.5		0.2–2.1	0.6–5.9	1.1–11.6	0.5–7.3	0.7–2.5		
	Overall	0.5	1.0	0.9	2.0	2.9	5.8	1.9	71	3627
	(95% CI)	0.1–2.6	0.3–3.4	0.4–2.4	1.1–3.6	1.8–4.7	3.4–9.6	1.4–2.5		
Overall										
Social status	**Low**	2.2	2.4	5.7	4.4	6.0	7.8	4.8	57	1176
	95% CI	0.7–6.8	0.4–12.5	2.6–12.1	2.2–8.6	3.2–11.1	4.5–13.3	3.4–6.6		
	Middle	0.8	0.8	1.1	2.9	3.2	4.3	2.0	110	4514
	95% CI	0.4–2.0	0.3–2.2	0.6–2.1	1.8–4.6	2.3–4.6	2.8–6.5	1.6–2.6		
	High	0.3		1.0	2.5	3.8	2.8	1.5	37	1863
	95% CI	0.0–1.8		0.4–2.6	1.4–4.6	1.7–8.1	1.2–6.0	1.0–2.4		
	Overall	1.1	0.8	1.9	3.3	3.9	5.3	2.5	204	7553
	95% CI	0.5–2.1	0.3–2.0	1.2–3.0	2.4–4.6	2.9–5.3	3.9–7.1	2.1–3.0		

the p-values are smaller than 0.05 in logistic regression analyses.

Results

Osteoarthritis

An overview of the results for lifetime prevalence of osteoarthritis by sex, age group and SES can be found in **Tab. 1**. Of all participants aged 18–79 years, 20.2% indicate that they ever had a physician-diagnosed osteoarthritis. Women are significantly more often affected by osteoarthritis (22.3%) than men (18.1%). The percentage of people that report having a physician-diagnosed osteoarthritis increases significantly with age both in women and in men. Among 18- to 29-year-old women, 1.6% report osteoarthritis, whilst among 70- to 79-year-old women it is 49.9%. Among men, the prevalence in these respective age groups increases from 1.8 to 33.3%.

The prevalence of osteoarthritis is neither associated with SES nor with the size of the municipality (rural, small town, medium town or large town). Among men, however, there are regional influences: in the North Rhine-Westphalia and eastern regions (new federal states and Berlin) fewer men reported osteoarthritis than in the southern regions (Bavaria, Baden-Wuerttemberg) and northwest/central (Schleswig-Holstein, Bremen, Hamburg, Lower Saxony, Hesse, Rhineland Palatinate, Saarland).

Common sites of osteoarthritis are shown in **Fig. 1**. In both sexes the knee is affected among more than half of the participants, and approximately one quarter reports osteoarthritis of the hip. Significantly more women than men report osteoarthritis in the finger joints (36.6% versus 15.7%). In addition, half of the people with osteoarthritis report osteoarthritis in other joints with no further localisation details.

Rheumatoid arthritis (RA)

Estimates of the prevalence of lifetime RA by sex, age group and SES are presented in **Tab. 2**. A physician-diagnosed RA is reported by 2.5% of all 18–79 year olds. Women report significantly more often RA (3.2%) than men (1.9%). The percentage of persons with RA increases significantly in both sexes with age. In the youngest age group the prevalence is low at 1.7% among women and 0.5% in men. It increases steadily until the age group 60–69 years in both sexes, with women reporting a higher prevalence (4.9%) than men (2.9%). In the highest age group of 70–79 years olds there is an unchanged

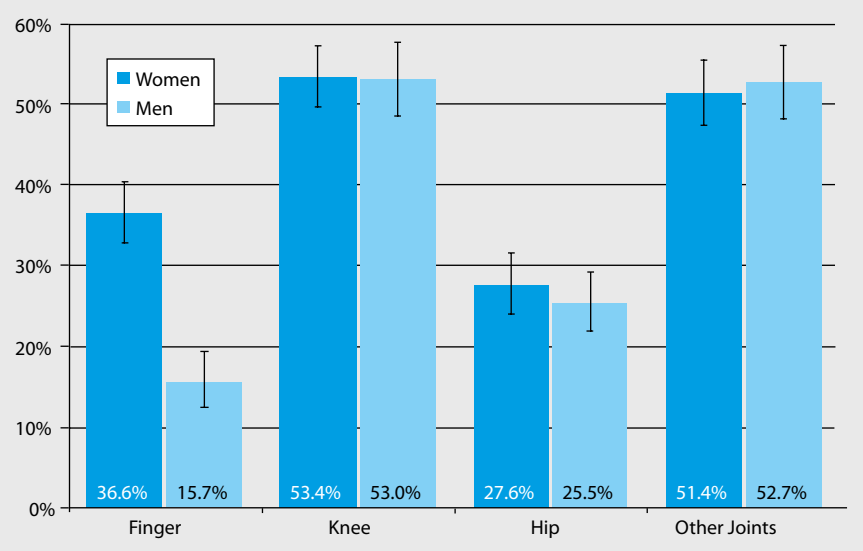

Fig. 1 ▲ Common sites of osteoarthritis by sex (n=1,746)

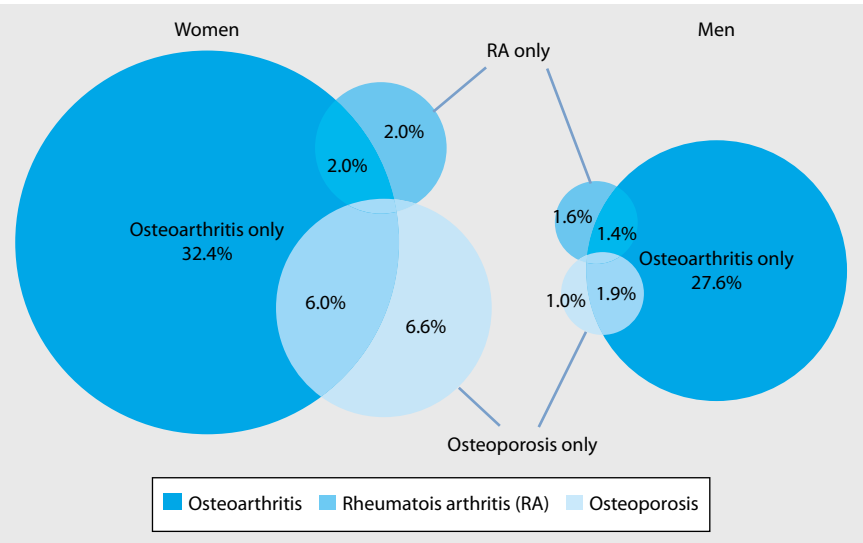

Fig. 2 ▲ Prevalence estimation regarding simultaneous occurrence of osteoarthritis, rheumatoid arthritis (RA) and osteoporosis for people aged 50 years and older by sex, n=4,240

prevalence among women of 4.9% yet in men it increases to 5.8%.

Persons of low SES report the existence of RA significantly more often than people of middle to high social status. The lifetime prevalence of RA is neither influenced by region nor by size of municipality.

Osteoporosis

An overview of the results for lifetime prevalence of osteoporosis for participants aged 50 years and older by sex, age group and SES can be found in **Tab. 3**; 8.5% of all participants between 50 and 79 years old report that they ever had a physician-diagnosed osteoporosis. Women report more frequently osteoporosis (13.1%) than men (3.2%). In women the lifetime prevalence increases significantly from 4.1% in the age group 50–59 years to 25.2% among the age group 70–79 years. Among men there is no such significant increase. Only among women is there an association of osteoporosis with SES: women of low SES report higher rates of osteoporosis (18.5%) than women of middle (12.0%) and higher SES (8.4%).

Neither among women nor men region or size of municipality shows an association with lifetime prevalence of osteoporosis.

In comparison with the results of GNHIES98 among men the prevalence of osteoporosis in the age group 50–64 years has not changed. There is a slight increase in prevalence among men in the age group 65–79 years, but prevalence rates are low (between 3 and 4%). Among women there has been a decrease in the age group 50–64 years from 10.4 to 6.0%. In contrast, in the age group 65–79 years the percentage has risen from 20.4 to 23.3%.

Prevalence of concurrent MSKCs

There were 33.9% of men and 50.1% of women between 50 and 79 years of age reporting at least one of the three MSKCs mentioned. **Fig. 2** shows to what extent the participants aged 50 years and older are affected by dual or multiple conditions.

Osteoarthritis combined with one of the two other conditions is found in a total of 8.2% of women and 3.4% of men. Of those people who reported RA, half report that they are also simultaneously suffering from osteoarthritis. Half of the women and two thirds of the men affected by osteoporosis also report that they suffer from osteoarthritis. Less than 1% of the participants report a simultaneous occurrence of all three conditions.

If only those persons reporting osteoporosis are examined, there is a clear association with RA among this group of people (data not shown).

Discussion

The results of DEGS1 show that osteoarthritis, RA and osteoporosis are frequent among older people and prevalences differ between men and women. Nevertheless there are a couple of limitations when prevalence estimates are compared. First different terminology is used in English and German. For example, the term "arthritis" in English is a generic term for all joint disorders (osteoarthritis, RA, gout, systemic lupus erythematosus fibromyalgia, or other joint complaints) and includes both degener-

Tab. 3 Lifetime prevalence of osteoporosis by sex, age group and social status—only participants of 50 years or older

		Age group (years)				Osteoporosis, unweighted case numbers	
		50–59 (%)	60–69 (%)	70–79 (%)	Overall (%)	Yes	No
Women							
Social status	**Low**	7.4	11.5	29.9	18.5	65	321
	95% CI	3.3–15.6	6.8–18.8	22.0–39.3	14.2–23.7		
	Middle	3.5	13.2	22.7	12.0	178	1199
	95% CI	2.1–5.7	9.9–17.5	18.0–28.2	10.0–14.4		
	High	3.3	12.0	19.7	8.4	41	389
	95% CI	1.3–8.1	7.0–19.8	11.3–32.0	6.1–11.6		
	Overall	4.1	12.7	25.2	13.1	284	1909
	95% CI	2.7–6.0	10.2–15.6	21.2–29.8	11.3–15.1		
Men							
Social status	**Low**	4.3	2.8	3.3	3.6	11	312
	95% CI	1.3–13.3	0.8–8.9	0.8–11.9	1.7–7.3		
	Middle	3.5	2.7	3.5	3.3	46	1066
	95% CI	1.9–6.2	1.5–5.0	1.9–6.7	2.3–4.6		
	High	1.9	1.9	5.3	2.6	13	559
	95% CI	0.5–7.0	0.7–4.9	1.6–16.2	1.3–5.0		
	Overall	3.3	2.6	3.8	3.2	70	1937
	95% CI	2.0–5.3	1.6–4.1	2.3–6.3	2.4–4.2		
Overall							
Social status	**Low**	5.7	7.7	20.6	11.9	76	633
	95% CI	2.9–10.9	4.8–12.0	15.2–27.2	9.4–15.1		
	Middle	3.5	8.4	13.9	7.9	224	2265
	95% CI	2.3–5.1	6.4–10.9	11.0–17.3	6.7–9.3		
	High	2.6	5.7	10.4	5.0	54	948
	95% CI	1.2–5.4	3.6–8.8	6.3–16.7	3.7–6.9		
	Overall	3.8	7.6	16.1	8.5	354	3846
	95% CI	2.7–5.4	6.1–9.6	13.4–19.2	7.3–9.9		

ative ("osteoarthritis") as well as inflammatory disorders. In German, "Arthritis" is commonly used for inflammatory joint disorders only. A comparison of estimates on "arthritis" has to be done carefully, because estimates might result from different conditions.

When comparing the prevalence estimates of MSKC from DEGS1 with those of other studies, is must be taken into account that direct comparisons are difficult due to differences in age group and range, inclusion and diagnosis criteria. For example, there are considerable variations in prevalence estimates on osteoarthritis between self-reported or symptomatic reports or on x-ray findings. For reasons of comparability in the following primarily estimates of prevalence based on self-reported physician diagnosis are used. By referring to physician-diagnosis it is guaranteed that we are not dealing with pure self-assessments of MSKC and so, for example, joint complaints that have not been diagnosed by a doctor are not included. However, studies that are based on clinical or radiological diagnosis criteria in part show differing results. The differences are discussed in the respective chapters.

Because of the differences in question formulation for osteoarthritis[1] and arthritis[2] in GNHIES98 and DEGS1, trend analyses are not possible for these two conditions. The medical interview in GNHIES98 included a broad spectrum of conditions. DEGS1 assessed some conditions more in detail. For example, after the introductory question regarding osteoarthritis it is recorded which joints are affected (finger, knee, hips, others).

Osteoarthritis

The results of the first wave of the European Health Interview Surveys (EHIS) [41] in seven countries show a broad variation in the prevalence of self-reported physician-diagnosed osteoarthritis [3]. It ranges from below 5% in Rumania to approximately 25% in Hungary. In addition, the results provide evidence that in all countries, women more often report physician-diagnosed osteoarthritis than men [3]. In all studies, the prevalence of osteoarthritis increases with age. The prevalence of self-reported osteoarthritis in Germany varies between 20 and 25% [42]. The overall prevalence in DEGS1 of 20.3% lies within this range. A comparison with the data from the survey German Health Update 2010 (GEDA10)[3] by the RKI shows that the lifetime prevalence of osteoarthritis in DEGS1 among women aged 18–79 years is 22.5% and somewhat lower than in GEDA10 (25.6%). Among men it is slightly higher (18.0%) than in GEDA10 (17.3%). This can probably be explained due to the different survey methods (face-to-face versus by telephone) or differences in sample composition. Population-related prevalence estimates based on clinical or radiological diagnosis are only available to a limited extent for Germany. In a meta-analysis, Spahn et al. [14] report a higher prevalence of radiological osteoarthritis of the knee in women (32.6%) than in men (24.3%). The higher prevalence in DEGS1 can probably be explained by

[1] GNHIES98: Joint wear, osteoarthritis of the hip or knee joints and/or the spine; DEGS1: Osteoarthritis or degenerative joint disorder.

[2] GNHIES98: Inflammatory joint or spinal disorder (for example chronic polyarthritis, rheumatoid arthritis, Bekhterev's disease); DEGS1: rheumatoid arthritis (if necessary with explanation "a serious inflammatory joint disorder, mostly occurring on both sides and almost always including the finger joints").

[3] Own calculations for the 18- to 79 year-old age group.

the fact that typical signs of osteoarthritis are often already visible in X-ray images, without the person affected experiencing any pain [16].

Heavy, physical, job-related load is associated with the origin of osteoarthritis [42]. The higher prevalence of osteoarthritis among women of low educational status could be due to working conditions. In addition, the known higher prevalence of obesity among persons of low social status [43] may plays also a role in the frequency of osteoarthritis in this population group.

Rheumatoid arthritis (RA)

Different estimates on the prevalence of RA result from the formulation of the question. They differ if the question quotes arthritis in general or "rheumatoid arthritis" in particular. For this reason, the question in DEGS1 explicitly referred to "rheumatoid arthritis"; nevertheless, misclassifications by the participants cannot be excluded. In the German Rheumatoid Arthritis Population Survey (GRAPS) conducted by the German Rheumatism Research Centre ("Deutsches Rheuma-Forschungszentrum", DRFZ) 70% of people with a clinically confirmed RA reported correctly a RA in the written survey. People with other joint disorders however, very frequently incorrectly report a RA diagnosis [44]. It can therefore be assumed that in DEGS1 the prevalence for chronic inflammatory and rheumatic joint conditions is overestimated on the basis of the formulation of the question.

For the age group 18–44 years the estimated prevalence for RA in DEGS1 corresponds with the estimates for self-reported RA from GRAPS and is lower for the other age groups [45]. In GEDA10, 7.1% of women and 4.1% of men report that they had at some point been diagnosed by a doctor as having "arthritis, rheumatoid arthritis or chronic polyarthritis" (lifetime prevalence). Overall both the estimates from GEDA10 and DEGS1 are significantly higher than the estimates from population-related surveys on RA prevalence with specific information regarding the diagnosis [3, 46, 47]. Based on clinical classification criteria of RA, Wasmus et al. [48] estimate the prevalence of RA in Germany from 0.5 to 0.8% in the adult population. The prevalence based on clinical criteria is lower than the prevalence estimates based on self-reports. Misclassifications by the participants are possibly the explanation for this.

A series of studies shows the relationship between RA and low social status [49, 50]. The higher prevalences for men seen in DEGS1 correspond to these results.

Osteoporosis

Similar to osteoarthritis and RA, the prevalence estimates for osteoporosis differ by type and source of the data and the composition of the study population. In addition, international prevalence estimates regarding osteoporosis are often based on measurement of bone density. This was not possible within DEGS1. Because of the different method used, prevalence estimates based on measurements are not comparable with those of DEGS1.

The age and sex differences in the prevalence of osteoporosis in DEGS1 are comparable to various studies in Germany. In the Augsburg MONICA Study, Meisinger et al. [51] describe the lifetime prevalence of self-reported osteoporosis in the 25- to 74-year-old age group as 7% for women and 1% for men based on the 1994/1995 survey. Using claims data from the "Gmünder Ersatzkasse" (diagnoses and prescriptions) Häussler et al. [52] report an osteoporosis prevalence of 23.3% among women and 7.1% in men in the age group 50–64 years and 46.7% in women and 11.4% for men among 65–74 year olds.

Details regarding physician-diagnosed osteoporosis are available from various other surveys conducted by the RKI. In their 2003 telephone survey the lifetime prevalence among women aged 45 and older was 14.2% [11],[4] in GEDA10 (participants aged 50 and older) it was 15.7% in women and 4.1% among men. The prevalence increased significantly among women with age; from 7.6% among 50–59 year olds to 23.7% for 70–79 year olds. No such age-dependency was observed in men. In the EVOS Study the prevalence of clinically diagnosed, manifest osteoporosis is 13.0% among 60- to 69-year-old women and 22.8% in 70–79 year olds, whilst in men it is 5.1 and 5.8% respectively [53]. In spite of different methods, the results established as part of DEGS1 match these results.

In national comparisons it must be considered that in recent years in Germany the guideline recommendations and accounting modalities have changed [29]. Consequently consideration of the survey period is of particular significance with regard to comparisons. Among 50- to 65-year-old women there has been a decrease in osteoporosis rates according to DEGS1 when compared to GNHIES98. This can possibly be attributed to the fact that bone density measurements are conducted less frequently among younger people in line with current guideline recommendations, which means diagnoses are not forthcoming or are not made until subsequent years once osteoporosis manifests itself.

[4] Osteoporosis was only surveyed among women in this study.

Conclusion and outlook

MSKCs play a prominent role especially for the older and aged population in Germany. The results presented here confirm the socio-medical significance of these conditions. DEGS1 offers various possibilities of analysing single MSKCs or in combination under consideration of relevant influencing factors such as receipt of medical care, current medication, frequency of artificial joints and other chronic diseases. In addition it is possible to explain the interrelation with physical disability. Further analyses are planned on the known association between obesity and osteoarthritis. In addition, analyses regarding joint pain, a fundamental symptom of osteoarthritis and RA, shall provide information on the current impairments as a result of MSKC.
With regard to osteoporosis, future analyses will consider information on low trauma fractures and their location. These factors may serve as indicators for reduced bone density and the existence of undiagnosed osteoporosis. Furthermore, analyses that include falls and fear of falls are planned.

Overall DEGS1 offers a variety of possibilities to put MSKC in context with relevant influencing factors and thus precisely describes the health situation of the community-dwelling population in Germany.

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