Insight in the role of lipids and other systemic factors in hand and knee osteoarthritis: lessons from clinical studies

Loef, M.

Part 2

Osteoarthritis disease burden

9

Health-related quality of life in hand osteoarthritis patients from the general population and the outpatient clinic

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Abstract

Objective To investigate the association of hand osteoarthritis and concurrent hand and knee osteoarthritis with health-related quality of life (HRQoL) in the general population, and in patients consulting a rheumatology outpatient clinic.

Methods In the population-based NEO study, participants were recruited from the greater area of Leiden. In the HOSTAS study, patients with a rheumatologist's diagnosis of hand osteoarthritis were recruited from a Leiden-based hospital. In both cohorts, hand and knee osteoarthritis were defined by the ACR clinical criteria. In NEO, self-reported hospital-based specialist consultation for OA was recorded. Physical and mental HRQoL was assessed with normalised SF-36 scores. Associations were analysed using linear regression, adjusted for age, sex, education, ethnicity and BMI.

Results Hand osteoarthritis alone and concurrent hand and knee osteoarthritis was present in 8% and 4% of 6,334 NEO participants, and in 57% and 32% of 538 HOSTAS patients. In NEO, hand osteoarthritis alone, and with knee osteoarthritis was associated with lower physical component summary (PCS) scores (mean difference (95% CI)-2.4 (-3.6;-1.3)) and-7.7 (-9.3;-6.2), respectively) compared with no osteoarthritis. Consulting a specialist was associated with worse PCS scores. In the HOSTAS cohort, mean PCS scores were lower than norm values (-3.5 and-7.9 for hand osteoarthritis and combined osteoarthritis, respectively). Mental HRQoL was not clinically relevantly associated in either cohort.

Conclusion Hand osteoarthritis was associated with reduced physical, but not mental HRQoL in the general population and hospital patients. Physical HRQoL was further reduced in hospital care, and with concurrent knee osteoarthritis.

Introduction

The hand is one of the most frequently affected joint sites by osteoarthritis (OA), next to OA of the knee[1,2]. In addition, hand and knee OA frequently co-occur[3]. Hand osteoarthritis may impact the health-related quality of life, which may vary between patient populations. The impact of OA on health-related quality of life (HRQoL) is often studied in patients recruited from secondary or tertiary care. However, these patients may represent a distinct patient group that might differ from the general population. Differences between these populations might be present in symptom severity, disabilities or the co-occurrence of OA in other joints such as the knee. Studies that have investigated the impact of hand OA on physical HRQoL in the general population have shown no or very limited effect[3,4], which is in contrast to findings in patients recruited from the rheumatology clinic[5–7]. A similar difference may be present for the effect of hand OA on mental HRQoL[3–9]. While some studies have shown a high prevalence of mental disorders in hand OA patients[6,9], a recent systematic review did not support that depression and anxiety occurred more often in patients with OA than in individuals without OA[10]. This lends further support to the hypothesis that HRQoL might be affected differently in individuals with hand OA from the general population compared to patients from rheumatology clinics. However, due to a variety of OA definitions and phenotypes used by previous studies, a valid comparison of available findings is hindered, and a direct comparison of the impact of OA on HRQoL in the general population and in patients referred to secondary care is currently lacking.

In the current study, we had the unique opportunity to investigate individuals with hand OA from the general population and a rheumatology outpatient clinic in the same region. We investigated the impact of hand OA on physical and mental HRQoL in the general population, and subsequently compared the impact of hand OA between patients who have, and who have not been referred to a medical specialist. Furthermore, we investigated the added effect of concurrent knee OA on HRQoL.

Patients and methods

NEO study

Study population

The Netherlands Epidemiology of Obesity (NEO) study is a population-based cohort study, with an oversampling of individuals with overweight or obesity. Detailed description of study design has been described elsewhere[11]. In short, men and women between 45 and 65 years with a self-reported body mass index (BMI) ≥ 27 kg/m^2 living in the greater area of Leiden (The Netherlands) were eligible to participate. In addition, all inhabitants aged between 45 and 65 years from one municipality (Leiderdorp) were invited to participate irrespective of their BMI, allowing for a reference BMI distribution comparable to the general Dutch population[12]. In total 6,671 participants were included. We excluded participants with inflammatory rheumatic disease (n=157) or fibromyalgia (n=178), or with missing physical examination (n=14). The Medical Ethical Committee of the Leiden University Medical Center (LUMC) approved the design of the study (NL21981.058.08). All participants gave their written informed consent.

Clinical assessment
Measurement of height (cm) and weight (kg), allowed for calculation of BMI (kg/m^2). In addition, trained research nurses examined the hands and knees, using a standardized scoring form. Of both hands, bony and soft swellings and deformities of distal interphalangeal (DIP), proximal interphalangeal (PIP), metacarpophalangeal (MCP), carpometacarpal (CMC) and wrist joints were assessed. Regarding the knees, presence of bony swellings, palpable pain and warmth, crepitus and movement restriction were assessed. Hand and knee OA were defined according to the American College of Rheumatology (ACR) clinical classification criteria[13,14] and in patients with an prosthesis or arthrodesis.

Questionnaires
Questionnaires included demographic information, as well as presence of rheumatic diseases other than OA, and whether patients consulted a hospital-based medical specialist for OA (specification of OA type was not available). Education was reported in categories according to the Dutch education system and grouped into high (including higher vocational school, university, and post-graduate education) vs low education (reference). The Australian/Canadian hand OA index (AUSCAN)[15] was used to determine self-reported hand pain and function. Higher scores indicate greater disease burden. Furthermore, the Medical Outcomes Study Short Form-36 (SF-36) was used to assess HRQoL[16]. We calculated separate subscale and summary component scores: physical health (PCS) and mental health (MCS), and standardized scores on a scale of 0 to 100. Age- and sex-specific Dutch population-based norm scores[17,18] were used to derive norm-based scores with a mean of 50 and a SD of 10. Higher SF-36 scores represent better quality of life.

HOSTAS study

Study population
The Hand OSTeoArthritis in Secondary care (HOSTAS) study included consecutive patients from the LUMC rheumatology outpatient clinic between June 2009 and October 2015, based on the rheumatologist's diagnosis of primary hand OA. The LUMC serves both as a secondary and tertiary referral centre for rheumatic diseases. Exclusion criteria included presence of other rheumatic diseases or secondary OA (including inflammatory joint diseases such as rheumatoid arthritis (RA), psoriatic arthritis, spondyloarthritis, and current sarcoidosis; bone diseases such as osteitis deformans and osteochondritis, intraarticular fractures; metabolic diseases associated with joint diseases such as hemochromatosis, Wilson's disease, and ochronosis; endocrine diseases such as acromegaly, major congenital or developmental diseases, bone dysplasias; and major local factors such as hypermobility and severe gout). The study was approved by the LUMC medical ethical committee (NL26201.058.08) and written informed consent was obtained from all participants.

Clinical assessment
Physical examination was performed by trained research nurses. BMI was calculated using measured weight and height (kg/m^2). Physical examination of hands and knee was performed similar as described in the NEO study; the ACR clinical classification criteria for hand and knee OA were applied to define clinical OA phenotypes[13,14]. Also, joints with a prosthesis were regarded as having end-stage OA.

Questionnaires

Demographic data were collected using standardized questionnaires. Education level was grouped into high vs low education, similar to the NEO study methods. The AUSCAN was used to determine hand OA specific disease burden. HRQoL was measured with the Dutch Research and Development translation (version 1) of the SF-36[17]. Similar to the NEO study, we used the scoring algorithm and age- and sex-specific Dutch population-based norm scores from the Dutch SF-36 translation to apply norm-based scoring[18] for the summary component scores and subscales with a mean of 50 and SD of 10.

Statistical analyses

In the NEO study there is an oversampling of individuals with BMI ≥27 kg/m^2. Adjustments were made for the oversampling by weighing all individuals towards the BMI distribution of participants from the Leiderdorp municipality (n=1,671)[19], with a BMI distribution similar to the general Dutch population[12]. All results presented are based on weighted analyses, using probability weights. Consequently, results from the NEO study apply to a population-based study without oversampling. Multivariable linear regression analysis, adjusting for age, sex, education, ethnicity and BMI, was used to study cross-sectional associations of hand and concurrent hand and knee OA with HRQoL in both study populations. We verified absence of multicollinearity, normality and homoskedasticity and using a correlation matrix, Quantile-Quantile plots and residual vs fitted plots, respectively. Data are presented as regression coefficients with 95% confidence intervals (CI).The mean differences in SF-36 scores were compared with the minimal clinically important difference of 2 points to evaluate clinical relevance[20]. All analyses were performed using STATA V14.1 (StataCorp LP, TX, USA).

Results

Study populations

The NEO study population consisted of 6,671 participants. After exclusion of participants with missing physical examination or presence of concomitant other rheumatic diseases, the study population consisted of 6,334 participants, with 55% women and a mean age of 56 years. Eight percent fulfilled only the ACR criteria for hand OA and an additional 4% of participants for both hand and knee OA (table 1). Compared with participants without hand and knee OA, participants with OA were more frequently women, older and less educated. The HOSTAS cohort consisted of 538 hand OA patients with 86% women and a mean age of 61 years. All patients from the HOSTAS cohort were diagnosed with hand OA by the rheumatologist. In 57% of patients only the ACR criteria for hand OA was fulfilled and 171 (32%) were classified with hand and knee OA. In 11% of patients assessment of the ACR clinical criteria was not possible or they did not fulfil the criteria, therefore these patients were not included in the current analyses.

Table 1. Demographics and hand OA specific disease burden

	NEO			HOSTAS	
	n = 6,334			n = 538*	
	No hand/knee OA	**Hand OA**	**Hand/knee OA**	**Hand OA**	**Hand/knee OA**
	78%	8%	4%	57%	32%
Demographic					
Age	55 (6)	58 (5)	58 (5)	61 (9)	62 (8)
Sex, % women	52	74	86	86	87
Height, cm	174 (10)	169 (9)	169 (7)	168 (8)	167 (9)
Weight, kg	79 (16)	77 (16)	78 (15)	75 (15)	76 (14)
BMI, kg/m^2	26 (4)	27 (5)	27 (5)	27 (5)	27 (5)
Education level, % high	48	40	36	36	31
Ethnicity, % white	95	94	92	98	96
AUSCAN#					
Total	0 (0-2)	7 (3-15)	13 (8-23)	20 (12-25)	20 (15-27)
Pain	0 (0-0)	3 (0-6)	6 (3-9)	9 (6-12)	10 (7-12)
Function	0 (0-2)	3 (1-10)	7 (3-14)	8 (4-12)	9 (6-12)

Results from the NEO study are based on weighted analyses of the study population. Numbers represent mean (SD) unless otherwise specified, #median (interquartile range). Higher AUSCAN scores reflect higher hand OA specific burden. *11% did not fulfill ACR criteria or were missing data. Abbreviations: OA = osteoarthritis, BMI = body mass index, AUSCAN = Australian/Canadian hand osteoarthritis index

The association of hand OA with health-related quality of life in the general population

The mean SF-36 scores in the NEO study are shown in figure 1. Table 2 shows the mean differences in participants with hand OA compared with participants without hand and knee OA. In participants with only hand OA the PCS was 2.4 points (-3.6;-1.3) lower than in participants without OA. The subscales bodily pain and physical functioning showed greatest differences of -3.4 (-4.6; -2.2) and -2.1 (-3.0; -1.1), while vitality was the least different in participants with hand OA compared to participants without hand OA. Mental HRQoL was not reduced in participants with hand OA compared with participants without OA. Relative to participants without OA, the PCS was-7.7 (-9.3;-6.2), and all physical subscales were reduced below the clinically relevant threshold in participants with concurrent hand and knee OA. The subscales mental health and social functioning were lower with mean differences of-1.7 (-3.1;-0.3) and-1.9 (-3.4;-0.5), respectively. However, these differences were smaller than the minimal clinically important difference of 2 points.

Comparison with hand OA patients referred to secondary care

Of all participants classified with hand OA in the general population, 14% reported to have visited a medical specialist for OA. The participants with hand OA who had not been referred to secondary care reported a median (IQR) AUSCAN total score of 7 (3-13), compared to 14 (4-27) in participants who visited a specialist. Comparison of the HRQoL in participants with hand OA who had been referred to the medical specialist with participants with hand OA who had not reported consulting secondary care for OA showed a lower physical HRQoL with a mean difference in the PCS of -3.9 (-6.7;-1.2). The subscales bodily pain and physical functioning showed the greatest mean differences of -4.9 (-7.6; -2.1) and -4.3 (-7.0; -1.7). In the group classified with concurrent hand and knee OA 38% reported to have visited a specialist for OA. In these participants the greatest difference with participants who had not consulted secondary care was seen in the subscale physical functioning. Mental HRQoL did not differ between participants with hand OA who had, and had not been referred to the medical specialist (table 3).

In the HOSTAS study, no reference group without OA was available. Comparison of the HRQoL in patients with only hand OA from the rheumatology outpatient clinic to the reference group without hand or knee OA in the NEO study showed a mean difference in the PCS of -7.8 (-8.8;-6.8). Similar to the comparisons within the NEO study population, the subscales bodily pain and physical functioning were lowered most (data not shown). The MCS did not differ between patients with hand OA from the HOSTAS study and the NEO study reference group. However, since the mean scores of the reference group in the NEO study were higher than the normative values we deemed this was an unsuitable reference group for the HOSTAS cohort. Therefore, table 4 shows the mean SF-36 scores of the HOSTAS patients compared with the normative value of 50. In patients with only hand OA, the PCS (-3.5), bodily pain (-4.9), vitality (-2.5) and role functioning – physical (-2.2) scales were clinically relevantly lower, but mental HRQOL was not associated with hand OA alone. In patients with concurrent hand and knee OA, all physical HRQoL scales were clinically relevantly lower, as well as the mental HRQoL scale social functioning, with a difference of-2.9.

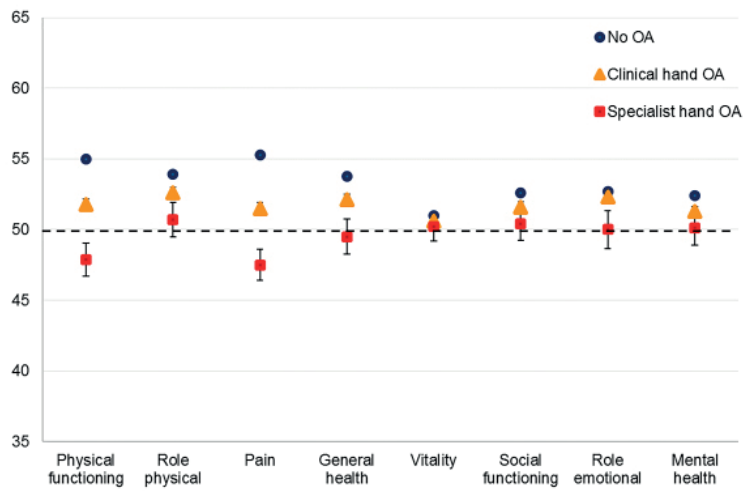

Figure 1. Health-related quality of life in individuals classified with hand OA in the general population.
Results from the NEO study are based on weighted analyses of the study population. The data points reflect mean scores of the SF-36 scales, stratified by hand OA group. SF-36 scores of 50 are the norm, higher/lower values indicate better/worse quality of life. The "No hand/knee OA" group are participants not fulfilling either the ACR criteria for hand or knee OA. The "clinical hand OA" group fulfilled only the ACR criteria for hand OA, and the "specialist hand OA group" is comprised of participant fulfilling the ACR criteria for hand OA, as well as reporting to have visited a hospital-based medical specialist for OA. Error bars represent SEM.

Table 2. Health-related quality of life in the general population

	NEO n = 6,334				
	No hand/knee OA 78%	**Hand OA** 8%	Mean difference (95% CI)	**Hand/knee OA** 4%	Mean difference (95% CI)
Physical component score	**55.1 (7.6)**	**52.0 (8.7)**	**-2.4 (-3.6; -1.3)**	**45.9 (9.7)**	**-7.7 (-9.3; -6.2)**
General health	53.8 (8.1)	52.1 (8.6)	-1.5 (-2.6;-0.3)	49.4 (9.6)	-3.4 (-4.9;-1.8)
Bodily pain	55.3 (8.4)	51.5 (8.9)	-3.4 (-4.6;-2.2)	46.3 (7.6)	-8.1 (-9.4;-6.8)
Vitality	51.0 (8.8)	50.6 (8.6)	-0.6 (-1.6; 0.5)	47.4 (9.3)	-3.2 (-4.8;-1.7)
Physical functioning	55.0 (7.0)	51.8 (8.0)	-2.1 (-3.0;-1.1)	45.3 (9.7)	-7.8 (-9.4;-6.2)
Role functioning- physical	53.9 (7.6)	52.6 (8.8)	-0.9 (-2.0; 0.2)	48.9 (10.5)	-4.1 (-5.8;-2.3)
Mental component score	**51.1 (8.8)**	**51.3 (8.9)**	**0.2 (-1.0; 1.3)**	**51.7 (9.4)**	**0.9 (-0.5; 2.3)**
Mental health	52.4 (7.8)	51.3 (7.8)	-0.8 (-1.7; 0.2)	49.9 (8.6)	-1.7 (-3.1;-0.3)
Social functioning	52.6 (8.0)	51.6 (8.4)	-0.6 (-1.7; 0.4)	49.7 (9.2)	-1.9 (-3.4;-0.5)
Role functioning- emotional	52.7 (8.0)	52.3 (8.6)	-0.2 (-1.3; 0.8)	51.8 (8.9)	-0.5 (-1.7; 0.8)

Results are based on weighted analyses of the study population. Higher SF-36 scores represent a better HRQoL. Numbers represent mean (SD). Results are adjusted for age, sex, BMI, education and ethnicity. Abbreviations: CI = confidence interval, OA = osteoarthritis

Table 3. HRQoL in participants who have, and have not been referred to the medical specialist.

	NEO n = 6,334					
	Hand OA spec$^-$ 6.6%	**Hand OA spec$^+$** 1.0%	Mean difference (95% CI)	**Hand/knee OA spec$^-$** 2.5%	**Hand/knee OA spec$^+$** 1.5%	Mean difference (95% CI)
Physical component score	**52.6 (8.4)**	**48.5 (9.4)**	**-3.9 (-6.7; -1.2)**	**48.5 (9.4)**	**41.7 (8.8)**	**-5.9 (-8.5; -3.4)**
General health	52.5 (8.3)	49.5 (10.0)	-2.6 (-6.2; 0.9)	50.7 (9.7)	47.2 (8.9)	-2.2 (-4.8; 0.5)
Bodily pain	52.2 (8.8)	47.5 (8.9)	-4.9 (-7.6;-2.1)	47.4 (8.1)	44.4 (6.3)	-2.6 (-4.6;-0.5)
Vitality	50.7 (8.7)	50.2 (8.1)	-0.6 (-3.2; 1.9)	47.8 (9.3)	46.8 (9.5)	-0.4 (-3.6; 2.7)
Physical functioning	52.5 (7.6)	47.9 (9.5)	-4.3 (-7.0;-1.7)	48.2 (9.1)	40.7 (9.1)	-7.1 (-9.8;-4.4)
Role functioning- physical	52.9 (8.6)	50.7 (9.9)	-2.1 (-5.0; 0.8)	50.8 (9.8)	45.8 (11.0)	-4.3 (-7.7;-0.8)
Mental component score	**51.3 (8.5**	**50.9 (11.3)**	**-0.6 (-5.0; 3.8)**	**50.9 (9.9)**	**53.0 (8.6)**	**2.0 (-0.7; 4.8)**
Mental health	51.5 (7.4)	50.1 (9.8)	-1.5 (-5.2; 2.1)	50.0 (9.2)	49.6 (7.5)	-0.3 (-2.8; 2.2)
Social functioning	51.8 (8.2)	50.4 (9.6)	-1.4 (-4.8; 2.0)	50.2 (9.4)	48.9 (8.9)	-0.8 (-3.5; 1.9)
Role functioning- emotional	52.6 (8.2)	50.0 (10.8)	-2.5 (-6.3; 1.3)	51.5 (9.2)	52.2 (8.5)	0.6 (-1.9; 3.1)

Results are based on weighted analyses of the study population. Higher SF-36 scores represent a better HRQoL. Numbers represent mean (SD). Results are adjusted for age, sex, BMI, education and ethnicity. Abbreviations: CI = confidence interval, OA = osteoarthritis, spec = referred to specialist

Table 4. HRQoL of patients with hand OA in the rheumatology clinic

	HOSTAS n = 538*			
	Hand OA 57%	**Δ**	**Hand/knee OA** 32%	**Δ**
Physical component score	**46.5 (8.1)**	**-3.5**	**42.1 (7.7)**	**-7.9**
General health	49.2 (6.3)	-0.8	46.5 (6.6)	-3.5
Bodily pain	45.1 (7.7)	-4.9	42.6 (6.7)	-7.4
Vitality	47.5 (8.8)	-2.5	46.0 (8.4)	-4.0
Physical functioning	48.8 (9.2)	-1.2	43.3 (9.3)	-6.7
Role functioning- physical	47.8 (10.2)	-2.2	44.5 (10.4)	-5.5
Mental component score	**51.7 (8.8)**	**1.7**	**51.2 (8.8)**	**1.2**
Mental health	51.0 (8.3)	1.0	49.4 (8.3)	-0.6
Social functioning	50.1 (9.1)	0.1	47.1 (9.5)	-2.9
Role functioning- emotional	51.1 (9.5)	1.1	49.6 (10.3)	-0.4

Higher SF-36 scores represent a better health-related quality of life. Results are adjusted for age, sex, BMI, education and ethnicity. In HOSTAS the delta (Δ) between population scores and norm scores were calculated. *11% did not fulfill ACR criteria or were missing data. Abbreviations: CI = confidence interval, OA = osteoarthritis

The added burden of concurrent knee OA

Concurrent hand and knee OA was associated with a lower physical HRQoL compared to only hand OA, with mean differences (95% CI) in the PCS of-5.3 (-7.2;-3.4) in the NEO cohort and -3.9 (-5.4;-2.4) in the HOSTAS cohort. Table 5 shows that the observed mean differences were above the minimal clinical important difference in both populations, indicating a clinically relevant lower HRQoL in patients with concurrent hand and knee OA compared to patients with only hand OA. Physical functioning showed the greatest mean differences in patients with additional knee OA, with mean differences of -5.7 (-7.5; -3.9) in the NEO cohort and -4.7 (-6.4; -3.0) in the HOSTAS cohort. No differences in mental HRQoL were observed in participants of the NEO study classified with concurrent hand and knee OA compared to participants with only hand OA. In the HOSTAS study social functioning was significantly and clinically relevantly lower in the presence of concurrent hand and knee OA compared to hand OA alone with a mean difference of-3.0 (-4.8;-1.2).

Table 5. The impact of concurrent knee OA on HRQoL compared to hand OA alone

	NEO Mean difference (95% CI)	**HOSTAS** Mean difference (95% CI)
Physical component score	**-5.3 (-7.2; -3.4)**	**-3.9 (-5.4; -2.4)**
General health	-1.9 (-3.8;-0.0)	-2.6 (-3.8;-1.3)
Bodily pain	-4.7 (-6.4;-3.1)	-2.2 (-3.6;-0.9)
Vitality	-2.7 (-4.4;-0.9)	-1.5 (-3.2; 0.1)
Physical functioning	-5.7 (-7.5;-3.9)	-4.7 (-6.4;-3.0)
Role functioning- physical	-3.2 (-5.2;-1.2)	-3.1 (-5.1;-1.1)
Mental component score	**0.7 (-1.0; 2.5)**	**-0.7 (-2.4; 1.0)**
Mental health	-0.9 (-2.5; 0.7)	-1.5 (-3.1; 0.1)
Social functioning	-1.3 (-3.0; 0.4)	-3.0 (-4.8;-1.2)
Role functioning- emotional	-0.2 (-1.8; 1.3)	-1.3 (-3.2; 0.6)

Results from the NEO study are based on weighted analyses of the study population. Higher SF-36 scores represent a better health-related quality of life. Results are adjusted for age, sex, BMI, education and ethnicity. CI = confidence interval, OA = osteoarthritis. Mean SF-36 scores for the OA phenotypes of NEO and HOSTAS can be found in table 2 and 4, respectively.

Discussion

In the current study, we investigated the association of hand OA with HRQoL in the general population and in patients with hand OA referred to the medical specialist. Furthermore, we investigated the association of concurrent knee OA with HRQoL, and compared this between the general population and patients from the rheumatology outpatient clinic. In participants with hand OA in the general population, physical HRQoL was modestly, but clinically relevantly lower than in participants without OA. Moreover, physical HRQoL was lower in patients with hand OA who had consulted a medical specialist. Mental HRQoL was not associated with hand OA alone, neither in the general population nor in patients in secondary care. In both patient groups we observed a lower physical HRQoL in patients with concurrent hand and knee OA, compared with patients with hand OA alone. Furthermore, concurrent hand and knee OA was weakly associated with mental HRQoL; however, besides the effect on social functioning in the HOSTAS cohort, the impact on mental HRQoL was below the minimal clinically important difference threshold in both populations.

Our findings disprove the misconception that hand OA in the general population has no relevant impact on HRQoL. Although hand OA was not significantly associated with a reduced physical HRQoL in a Spanish population-based cohort[3], they used the less extensive SF-12, which might explain the discordance with our findings. In line with our results, hand OA patients in the population-based MUST cohort experienced a reduction in general health[4]. However, in our cohort bodily pain and physical functioning was more strongly associated with hand OA. In the current study, we did not observe an association of hand OA with mental HRQoL. This is supported by other population-based studies[3,4]. Moreover, a systematic review also did not support that depression and anxiety occurred more often in OA patients compared to individuals without OA[10].

Furthermore, we investigated whether HRQoL was associated with hand OA in secondary care patients. We showed that within the population-based NEO study, participants with hand OA who consulted a hospital-based specialist had a lower physical HRQoL than participants classified with hand OA who had not been referred to the medical specialist. In addition, we found that patients with hand OA in the HOSTAS study also experienced a lower physical HRQoL. Previous research in another cohort from our outpatient clinic supports our findings[5], as well as results from a Norwegian study, that showed that hand OA patients from the rheumatology department had a lower physical HRQoL compared to healthy controls. In contrast to our findings, they also observed worse mental health in hand OA patients recruited from their specialized clinic[6]. We did not see an association with lower mental HRQoL in patients referred to the medical specialist in a population-based cohort, nor in patients recruited from the rheumatology outpatient clinic. A number of other studies are in line with our findings, showing no association of hand OA with mental HRQoL in patients from outpatient clinics[5,7].

The additional presence of knee OA was associated with an even lower physical HRQoL in hand OA patients from the general population, as well as in patients from the outpatient clinic. This is supported by previous studies, that all conclude that polyarticular OA has a greater influence on physical HRQoL compared to patients with only hand OA[3,4,6,7]. Furthermore, we observed that the additional presence of knee OA was also associated with a lower score on the social functioning subscale in patients from the rheumatology clinic.

Comparison of HRQoL with other study cohorts should be made with caution due to differences in patient selection, OA definitions, and reference groups. In addition, some studies lacked the use of norm-based scoring, further hampering the comparison. These obstacles highlight the importance of research that compares the general population with patients from specialized care. To our knowledge we are the first to make a comparison between patients from the general population and patients referred to secondary care. Since these cohorts were selected from the same area in the Netherlands, the NEO study population is likely a proper representative for the population of which the patients from our outpatient clinic are sampled. Furthermore, both our cohorts are of substantial size, resulting in well powered analyses and thus allowing robust conclusions.

However, our study also has some limitations. The reported HRQoL of the NEO study participants without OA was higher than the normative value of 50. This may indicate a healthy candidate bias, which is commonly seen in population-based studies. In addition, we cannot exclude that some NEO study participants whom reported to have consulted a hospital-based specialist for OA may have also been included in the HOSTAS study. Unfortunately, we were not able to asses if, or to what extent this may have happened. For this reason, we focussed on within-cohort differences, and in addition compared the mean scores from the HOSTAS cohort to the normative values. Therefore, we deem it unlikely this will have affected our conclusions. Furthermore, in the NEO study no distinction could be made in the type of OA that was the indication for specialist consultation, which may have led to misclassification. Also, the intra- and interobserver agreement for the scoring of OA signs on physical examination of the hands and knees was not assessed. However, since these scores were obtained by trained research nurses in a standardized way, we do not expect that this will have affected our results. Lastly, the cross-sectional study design does not allow exploration of how the effect of OA on HRQoL develops over time and hinders causal interpretations. Future research is needed to investigate the association between OA progression and the effect this may have on HRQoL.

In conclusion, hand OA is associated with a clinically relevant lower physical, but not mental HRQoL in both the general population as in patients referred to secondary care. In patients in secondary care HRQoL was lower compared to patients with hand OA from the general population. In addition, co-occurrence of knee OA was associated with an even lower physical HRQoL than hand OA alone. The burden of hand and knee OA on the quality of life in the general population as well as in hospital care should be carefully considered in the management of patient care.

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