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Daily functioning and health status in patients with hand osteoarthritis: Fewer differences between women and men than expected

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Alltagsfunktionen und Gesundheitszustand von PatientInnen mit Fingerpolyarthrose: Weniger Unterschiede zwischen Frauen und Männern als erwartet

Zusammenfassung. *Studienziel:* Mögliche Unterschiede zwischen Frauen und Männern mit Fingerpolyarthrose hinsichtlich Alltagsfunktionen, Gesundheitszustand und sozioökonomischen Variablen zu untersuchen und zu beschreiben.

Methode: PatientInnen einer Rheumatologischen Ambulanz in Österreich, die die ACR Kriterien für Fingerpolyarthrose erfüllten, wurden nacheinander unselektiert in die Studie eingeschlossen und einmal untersucht. Deskriptive statistische Verfahren und Sub-Gruppen-Analysen wurden durchgeführt um mögliche Unterschiede zwischen Frauen und Männern zu beschreiben. Mittels Regressionsanalyse wurde untersucht, inwieweit die Variablen Geschlecht, Sport betreiben, manuelle Aktivitäten verrichten, Ästhetischen Veränderungen und Alltagsfunktion die Ergebnismessgrößen Schmerz und Vitalität/Lebensfreude vorhersagen können.

Resultate: 223 (88,1%) Frauen und 30 (11,9%) Männer wurden in die Studie eingeschlossen. Signifikante Unterschiede zwischen Frauen und Männern konnten nur in Verrichtung von Hausarbeit, bei der Selbsteinschätzung von ästhetischen Veränderungen, sowie dem eigenen Netto-Einkommen gezeigt werden. Die Variable Geschlecht leistete zu keinem Regressionsmodell einen signifikanten Beitrag, während z.B. Sport betreiben unabhängig vom Geschlecht ein signifikanten Faktor für die Variable Selbsteinschätzung von Vitalität/Lebensfreude war. Bei der Beurteilung der Röntgenbilder wurden im bei allen Gelenken zusammen, sowie auch nur bei den CMCI-Gelenken keine Unterschiede zwischen Frauen und Männern gefunden.

Zusammenfassung: In unserer Studie wurden signifikante Unterschiede zwischen Frauen und Männern mit Fingerpolyarthrose – entgegen unseren Erwartungen – nur bei sozioökonomischen Variablen festgestellt, aber nicht bei Alltagsfunktionen oder Gesundheitszustand.

Summary. *Objective:* To explore and describe potential differences between women and men in functioning, health status and socio-economic variables in hand OA.

Methods: Unselected patients of an Austrian outpatient clinic meeting the ACR criteria for hand OA were consecutively included and assessed once. Descriptive statistics and subgroup analyses were performed for differences between women and men. By regression analysis, we explored whether the variables sex, practice of sports, manual activities, aesthetic changes and functioning in daily life predict the levels of pain and vitality.

Results: 223 (88.1%) women and 30 (11.9%) men were included in the study. Significant differences between women and men were found in involvement in housework, aesthetic changes and own net income. Sex did not contribute significantly to any of the regression models, while e.g. involvement in sports was a strong individual contributor to self-reported vitality – irrespective of sex. Total X-ray scores of both hands as well as the involvement of CMCI joints did not show significant differences.

Conclusion: Our study showed significant differences between women and men with hand OA in socio-economic variables and aesthetic changes. In contrast to our expectations, no other differences between women and men were found in functioning and health status.

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Introduction

Osteoarthritis (OA) is the most common joint disease characterised by a progressive loss of articular cartilage and most frequently involves joints of the hands [1]. The prevalence of OA is more common in women than in men [2]. In women, arthritis was found to be associated with postmenopausal status, age, high body mass index (weight may significantly increase over the menopausal transition), less interest in sex, lowered mood (in telephonically self-reported arthritis) [3] and manual activities, such as dental work tasks [4]. Women have commonly less income and spend more time for unpaid work, such as housework or caring for children which may be associated with joint involvement in the hands due to more manual and fewer leisure time tasks [5]. In contrast, men with arthritis were found to prioritise work commitments over health concerns [6] and may thus also be at risk of more serious health consequences.

The objective of the present study was thus to explore and describe potential differences between women and men in functioning, health status and socio-economic variables in patients with hand OA.

Methods

Patients

Unselected patients of an Austrian outpatient clinic meeting the ACR criteria for hand OA [7] were consecutively included. In order not to exclude patients with hand osteoarthritis in an early stage, patients were also eligible to participate in this study if they had bony swelling of at least one IP-joint of the 2nd–5th finger and/or pain or bony swelling of at least one CMC 1 joint.

Patients with evidence of rheumatoid arthritis or any rheumatic disease other than OA were excluded. Furthermore, persons with elevated C-reactive protein levels (>0.5 mg/dl) as a sign of active inflammation at the test visit and/or with soft tissue swelling of any of the finger joints were excluded.

Participants were informed in detail about the study procedures. All patients had to give oral and written informed consent. The institutional ethical committee approved the study.

Sample size

Tabachnick & Fidell [8] recommend to include $N > 50 + 8\,m$ persons (where m = number of independent variables) for multiple regression modelling. In this study, 7 questionnaires (AIMS2-SF, AUSCAN, Cochin, FIHOA, HAQ, SACRAH, SF-36), 2 hand function tests (grip strength, picking-up test) and 2 visual analog scales (pain, global) were used, AUSCAN has 3 additional subscales, SF-36 has 8 additional subscales, and age and gender were put into the regression model as control variables. We expected to put up to 2 variables from the epidemiological questionnaire into the regression model. The sample size was therefore calculated as follows: $(24 \times 8) + 50 = 242$.

Assessments

For the present study, assessments were carried out once. The following data were obtained: demographic and socioeconomic data, self-reported worsening or improvement of and satisfaction with recent aesthetic changes and appearance of the hands, Medical Short Form 36 (SF-36) [9] bodily pain and vitality subscales, satisfaction with health status and functioning, satisfaction with health professionals and with being involved in medical decisions, morning stiffness, 2 hand function tests (Moberg Picking-Up Test, grip strength measurement), the AUSCAN questionnaire [10], the Score for Assessment and Quantification of Chronic Rheumatoid Affections of the Hands (SACRAH) questionnaire [11] and other functioning questionnaires. Because no standard assessment exists for aesthetic changes in hand OA, this assessment was therefore based on two self-developed questions on the amount of worsening or improvement of and the satisfaction with recent aesthetic changes and appearance of the hands. X-rays of hands were taken and scored by two trained assessors (ES & TD) using the method described by Kellgren and Lawrence [12].

Sub-group analyses

Descriptive statistics were calculated for demographic variables such as the number of women and men, age and body weight. Each variable was tested with Kolmogorov–Smirnov Test for normal distribution. Depending on the distribution of each variable, median or mean values and standard deviations were calculated.

Subgroup analysis was performed for sex differences by applying either Student's *t*-tests, Mann-Whitney *U*-Tests or Chi-Square tests depending on the distribution of each variable. Ordinal variables with Likert-Type scales were tested with Chi-Square Tests. Where appropriate, a Bonferroni correction for multiple comparisons was employed.

Regression analyses

By regression analysis [8], we explored whether the variables sex, self-reported practice of sports, manual activities, possible aesthetic changes and self-reported functioning in daily life predict the levels of pain and vitality. The selection of these variables was based on a consensus statement on the outcomes used in hand OA [13] and the preferences and concepts mentioned by patients in a focus group study [14]. Because of the different variables used and the dependent variables being the SF-36 subscales for pain and vitality, linear models were calculated. All variables mentioned above were entered into the first model; then step-wise, the variables with the least contribution to a certain model were left out for the calculation of the next model.

All statistical analyses were performed using Statistical Package for Social Sciences (SPSS) 15.0 (SPSS GmbH, Munich, Germany) and MedCalc software package (http://www.medcalc.be/) on a personal computer.

Results

Socio-economic variables and sub-group analyses

223 (88.1%) women and 30 (11.9%) men were included in the study. Mean age (±SD) for women was 61.0 (±9.7) years compared to 71.82 (±14.09) for men. After Bonferroni correction was applied (the corrected significance level was set at $p < 0.0024$), significant differences between women and men were found in involvement in housework (measured as average hours per week), current level of own net income and self-reported aesthetic changes (Table 1). Body weight was significantly higher in men (84.4 [±12.0] kg) compared to women (69.2 [±12.8] kg;

Table 1. Significant differences between women and men with hand OA

Women	Men	*p*-value
Involvement in housework [average hours per week (± SD)]		
20.1 (± 14.5)	10.1 (± 10.0)	0.001
Current level of own net income		
52% <1000 EUR 34% 1000–1500 EUR 10% 1500–2000 EUR 4% >2000 EUR	16% <1000 EUR 40% 1000–1500 EUR 24% 1500–2000 EUR 20% >2000 EUR	0.0001
Self-reported incidence of recent aesthetic changes		
1% strong improvement 4% mild improvement 22% same 48% mild worsening 24% strong worsening	0% strong improvement 3% mild improvement 43% same 43% mild worsening 10% strong worsening	0.0001

Significant differences between women and men with hand OA were found in socio-economic variables and aesthetic changes.

$p = 0.000$), while body mass index was not significantly different (women 26.6 [± 9.5]; men 27.7 [± 3.9]; $p = 0.650$).

All other variables including satisfaction with the appearance of the hands ($p = 0.026$), household income ($p = 0.0025$), functioning questionnaires (p-values are described in Appendix 1), involvement in manual activities ($p = 0.437$), SF-36 bodily pain ($p = 0.009$) and vitality ($p = 0.009$) subscales were not significantly different between women and men, although a trend was found for women having higher pain scores and lower functioning and vitality scores. Furthermore, grip strength (dominant hand $p = 0.214$; non-dominant hand $p = 0.861$) and hand function as measured on MPUT (dominant hand $p = 0.224$; non-dominant hand $p = 0.160$) did not show significant differences between women and men. Joint counts were not significantly different (data not shown), as well as Kellgren and Lawrence total scores of the X-rays of both hands ($p = 0.100$) and scores of CMCI joints (women 3.4 [± 4.8]; men 3.0 [± 4.7]; $p = 0.73$).

Regression analyses

The first series of regression models was calculated with the SF-36 bodily pain subscale being the dependent variable (DV); in the second series of models, the SF-36 vitality subscale was the DV (Table 2). In the series of models which used vitality as dependent variable, involvement in sports showed the highest individual contribution that reached significance in all models. Involvement in sports was not significantly different between women and men ($p = 0.437$) and may thus be regarded as important contributor to vitality independent of sex.

Discussion

Our study showed significant differences of socio-economic variables between women and men with hand OA, such as net income and involvement in housework. This corresponds well to the patriarchal society and tradition-sensible culture as evident in a conservative corporatist welfare state as Austria. Furthermore, the mean age of the participants was around 60 years. However, from the literature, we had expected to find more differences between women and men with hand OA in our study, such as in

Table 2. Regression models with SF-36 bodily pain score (model 1–6) and SF-36 vitality score (model 7–12) as dependent variables

Model	1	2	3	4	5	6	7	8	9	10	11	12
Signifi cance	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Adjusted R2	0.41	0.28	0.43	0.29	0.43	0.30	0.35	0.35	0.35	0.35	0.34	0.34
Gender β	0.07	0.11	0.09	0.12	0.10	0.13	–0.05	–0.03	–	–	–	–
Age β	0.06	–0.00	–	–	–		0.14	0.13	0.12	0.12	–	–
AUSCAN-F β	–0.40*	–	–0.41*	–	–0.43*	–	–0.18	–	–0.17*	–	–0.17*	–
SACRAH-F β	–	–0.29*	–	–0.29*	–	–0.31*	–	–0.17	–	–0.17*	–	–0.17*
Manual activities β	–0.05	–0.08	–	–	–	–	–0.04	–0.06	–	–	–	–
Sports β	0.06	–0.01	–	–	–	–	0.28*	0.33*	0,30*	0.35*	0.29*	0.35*
Aesthetic changes β	–0.12	–0.12	–0.08	–0.06	–	–	–0.09	–0.04	–	–	–	–
SF-36 vitality β	0.29*	0.31*	0.33*	0.34*	0.34*	0.33*	DV	DV	DV	DV	DV	DV
SF-36 bodily pain β	DV	DV	DV	DV	DV	DV	0.32*	0.28*	0.32*	0.35*	0.35*	0.29*

In the first 6 models, the vitality sub-scale of SF-36 was used as dependent variable (DV), while in models 7–12, bodily pain was the DV. One column represents the results of one model. "Significance" in the second row of the first column refers to the significance of the model as a whole, while the numbers given for each variable are the "beta" scores which represent the individual contribution of this particular variable to the model. If a variable contributed significantly to a model, an asterisk is shown after the beta score. Because the total scores of AUSCAN and SACRAH include pain, stiffness and functioning subscales, only the functioning subscale of these questionnaires was used for the regression analyses instead of the total score to avoid any redundancies of variables. Model 6 showed the highest individual contribution of gender (beta = 0.13), although no significant individual contribution of gender to bodily pain or vitality could be seen in any of the models. Models 3 and 5 predicted the highest amount of variance of the dependent variable (43%).

hand function and grip strength (e.g. due to manual activities), in the functioning questionnaires (e.g. due to housework) and in pain (e.g. due to more severe disease). X-ray scores as well as possible patterns, such as involvement of CMCI joint due to manual activities such as housework were also not significantly different between women and men. Especially for health professionals who work with patients with hand OA based on activities of daily functioning which can be used either as means (functional therapy) or as outcome of the treatment, it is important to know whether there are any differences between women and men in order to plan the appropriate individual treatment modalities.

Interestingly, sex did not contribute significantly to any of the regression models, while for example involvement in sports was a strong individual contributor to self-reported vitality – irrespective of sex. Involvement in sports may thus be regarded as an important factor to increase levels of vitality in both women and men with hand OA. Women did also not report significantly higher pain or functioning scores, although the strongest individual contribution of sex was on pain which did however not reach statistical significance. Sub-group and regression analyses revealed the same findings; we thus suggest that differences between women and men with hand OA in functioning and health status should probably not be overestimated.

While women reported a significantly higher amount of worsening in aesthetic changes, women and men were equally (dis-) satisfied with aesthetic changes of the hands. Aesthetic changes of the hands may thus be more important to women and may be a reason why patients seek help and support for their health condition. However, men in general may be less concerned with their health. This may reflect why more women and fewer men with hand OA present themselves in the outpatient clinic. Unselected patients were included consecutively in the present study. Thus, the number of women and men who participated was not equal, but rather followed the usual sex distribution in patients with hand OA at our outpatient clinic. These unequal numbers were acknowledged in the statistical analyses by calculating non-parametric tests.

Conclusion

Our study showed significant differences between women and men with hand OA in socio-economic variables – such as net income and involvement in housework – and self-reported aesthetic changes. In contrast to our expectations, no other differences between women and men with hand OA were found in functioning and health status.

Conflict of interest

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References

1. Creamer P, Hochberg MC. Osteoarthritis [see comments]. Lancet 1997; 350(9076):503–8.
2. Szoeke CE, Cicuttini FM, Guthrie JR, Clark MS, Dennerstein L. Factors affecting the prevalence of osteoarthritis in healthy middle-aged women: data from the longitudinal Melbourne Women's Midlife Health Project. Bone 2006;39(5):1149–55.
3. Szoeke CE, Cicuttini F, Guthrie J, Dennerstein L. Self-reported arthritis and the menopause. Climacteric 2005;8(1):49–55.
4. Ding H, Solovieva S, Vehmas T, Riihimaki H, Leino-Arjas P. Finger joint pain in relation to radiographic osteoarthritis and joint location – a study of middle-aged female dentists and teachers. Rheumatology (Oxford) 2007;46(9):1502–5.
5. Stamm TA, Lovelock L, Stew G, Nell V, Smolen JS, Jonsson H, et al. I have mastered the challenge of living with a chronic disease: the life stories of people with rheumatoid arthritis. Qual Health Res 2008;18(5):658–69.
6. Gibbs L. Identifying work as a barrier to men's access to chronic illness (arthritis) self-managment programs. International Journal of Men's Health 2007;6(2):143–55.
7. Altman R, Alarcon G, Appelrouth D, Bloch D, Borenstein D, Brandt K, et al. The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hand. Arthritis Rheum 1990;33(11):1601–10.
8. Tabachnick BG, Fidell LS. Using Multivariate Statistics. 3rd ed. New York: Harper Collins; 1996.
9. Ware JE, Sherbourne CD. The MOS 36-item Short-form Health Survey (SF-36). A conceptual framework and item selection. Med Care 1992;30:473–83.
10. Bellamy N, Campbell J, Haraoui B, Buchbinder R, Hobby K, Roth JH, et al. Dimensionality and clinical importance of pain and disability in hand osteoarthritis: development of the Australian/Canadian (AUSCAN) Osteoarthritis Hand Index. Osteoarthritis Cartilage 2002;10(11):855–862.
11. Leeb BF, Sautner J, Andel I, Rintelen B. SACRAH: a score for assessment and quantification of chronic rheumatic affections of the hands. Rheumatology (Oxford) 2003;42(10):1173–8.
12. Kellgren JH, Lawrence JS. Radiological assessment of osteo-arthrosis. Ann Rheum Dis 1957;16(4):494–502.
13. Kloppenburg M, Stamm T, Watt I, Kainberger F, Cawston TE, Birrell FN, et al. Research in hand osteoarthritis: time for re-appraisal and demand for new strategies. An opinion paper. Ann Rheum Dis 2007;66(9):1157–61.
14. Stamm TA, Van der GF, Thorstensson CA, Steen E, Birrell F, Bauernfeind B, et al. Patient perspective of hand osteoarthritis in relation to concepts covered by instruments measuring functioning – a qualitative European multi-centre study. Ann Rheum Dis 2008.

