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VALIDATION STUDIES

Validity and psychometric characteristics of the self-administered comorbidity questionnaire in patients with psoriatic arthritis

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Abstract

The study aimed to translate and cross-culturally adapt the self-comorbidity questionnaire (SCQ) into Turkish and investigate the validity and reliability of SCQ and its modified version (mSCQ) in psoriatic arthritis (PsA). Psoriatic arthritis quality of life (PsAQoL) and short form 36 (SF-36) were used to assess the quality of life. The physical disability was evaluated with the health assessment questionnaire (HAQ). The reliability of the SCQ scale was assessed by test–retest reliability. For construct validity, the correlations of SCQ with the HAQ, SF-36, PsAQoL, age, body mass index (BMI), disease duration, disease activity in psa (DAPSA), Bath Ankylosing Spondylitis Disease Activity Index (BASDAI), Psoriasis Area and Severity Index (PASI), dactylitis and enthesitis were evaluated. The mSCQ was also used by removing the items related to rheumatic conditions. For the test–retest reliability of the Turkish version of SCQ, the intraclass correlation coefficient was 0.965, $p < 0.001$. The SCQ and mSCQ had significant correlations with HAQ, PsAQoL, some subscales of SF-36, and age ($p < 0.05$), but not with disease duration, BASDAI, PASI and dactylitis ($p > 0.05$). Although SCQ had a low correlation with DAPSA (rho = 0.262, $p = 0.031$), mSCQ was not correlated with DAPSA ($p > 0.05$). mSCQ was significantly correlated with BMI (rho = 0.233, $p = 0.016$), but SCQ was not ($p > 0.05$). The Turkish version of SCQ had adequate reliability and validity, and the mSCQ improved the validity of the scale in patients with PsA.

Keywords Psoriatic arthritis · Comorbidity · Psychometrics · Questionnaires

Introduction

Psoriatic arthritis (PsA) is chronic, inflammatory arthritis classified as spondyloarthritis and associated with inflammation of the joints and entheses [1]. Patients with PsA are often affected by multiple comorbidities. The most prevalent comorbidities in PsA are hypertension, metabolic syndrome, obesity, hyperlipidemia and any cardiovascular diseases, and these comorbidities are more common in PsA patients than controls [2]. Other comorbidities reported in PsA include diabetes mellitus, osteoporosis, depression, infection, and gout [3]. The comorbidities in PsA impact disease activity, function, work disability, and quality of life [2, 4, 5]. Therefore, evaluating comorbidities in PsA is important as its effects on clinical outcomes and treatment options.

There are several instruments to evaluate comorbidities in clinical research [6, 7]. However, using medical records to collect data about comorbidity has some limitations, such as poor quality of documentation, incomplete medical records, and being expensive and time-consuming [8, 9]. The patient-reported comorbidity tools are increasingly used today as an alternative method to medical record screening or standardise data collection, and one of the most widely used tools is the self-administered comorbidity questionnaire (SCQ) [9, 10].

The self-administered comorbidity questionnaire (SCQ) has been developed as an alternative to medical record-based

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comorbidity measures to assess the comorbidities in clinical trials. This scale is a short and simple scale that an individual can complete without any medical background. It also evaluates the treatment received and the impact on patients' activities for each comorbid condition separately [9].

The validity of the SCQ has been demonstrated in patients with ankylosing spondylitis (AS) and early inflammatory arthritis [11, 12]. As the scale contains items related to rheumatic conditions such as rheumatoid arthritis (RA), back pain, and osteoarthritis (OA), the modified versions of the SCQ were used in these studies. The SCQ was adapted by removing the item 'RA' from the scale in the validation study in patients with early inflammatory arthritis [12]. A modified version of the SCQ (mSCQ) was used in the validation study of SCQ in AS patients by removing items 'rheumatoid arthritis (RA), back pain, and osteoarthritis (OA)' [11]. The validity of this modified version of SCQ in patients with spondyloarthritis (SpA) has also been confirmed recently, and adding extraarticular manifestations [anterior uveitis, inflammatory bowel disease (IBD) and psoriasis] or osteoporosis and fractures to the mSCQ did not improve the validity of the scale in patients with SpA [13]. The French-Canadian and German versions of the SCQ have been developed from the original English version until now [14, 15].

There is currently no Turkish version of the SCQ, and the validity of the SCQ has not been demonstrated in patients with PsA. We have suggested that investigating the validity and reliability of the Turkish version of SCQ in patients with PsA would provide an easy and rapid data collection about comorbidities in clinical trials and practice in the Turkish population. Although validation of mSCQ has been shown in patients with SpA, we considered that it is important to evaluate the validation of SCQ in patients with PsA. Because, with different subtypes, periarticular manifestations, and extra-musculoskeletal manifestations, PsA has a high degree of heterogeneity in the presentation of the disease. In this context, the aims of the study are (i) translation and cross-cultural adaptation of the SCQ scale into Turkish and (ii) investigating the validity and reliability of the Turkish version of SCQ in patients with Psoriatic Arthritis.

Methods

Study design and patients

This study was designed as a Psychometrics study and included 106 patients with PsA according to classification criteria for psoriatic arthritis (CASPAR) [16] in the Rheumatology Division, Marmara University Faculty of Medicine. Patients who presented to the rheumatology outpatient clinic between November 2018 and December 2019 were invited consecutively to participate in this study. The exclusion criteria were as follows: having serious psychiatric or neurologic diseases preventing understanding/answering the questions, being illiterate or not accepting to participate in the study.

The "subject to item ratio" method is mostly used in calculating the sample size in validation studies and ranges from 2 to 20 subjects per item [17]. Our study planned to recruit at least five patients per item.

The study was approved by the Ethical Committee of Marmara University Faculty of Medicine (insert number: 09.2018.731 and date of approval: 02.11.2018). Informed consent was obtained from all participants included in the study.

Assessments

We collected data about age, gender, body mass index (BMI), and disease duration (month). The patients with PsA were classified as axial and peripheral predominant involvement. The disease activity in psa (DAPSA) and Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) have been used to measure disease activity in peripheral and axial PsA, respectively. The Psoriasis Area and Severity Index (PASI) has been used to assess the severity of psoriasis [18]. The presence and number of dactylitis were evaluated. The Leeds Enthesitis Index was used to assess the enthesitis in patients with PsA [19].

The physical disability was evaluated with the health assessment questionnaire (HAQ), and the quality of life (QoL) was assessed with the psoriatic arthritis quality of life (PsAQoL) scale and short form 36 (SF-36) [20–22]. The patient global assessment of general health (PGA) was assessed on the visual analogue scale (VAS).

Self-administered comorbidity questionnaire

The self-administered comorbidity questionnaire (SCQ) is a self-report questionnaire [9] that assesses 13 common medical conditions and the impact of comorbidities on function. These conditions are heart disease, high blood pressure, lung disease, diabetes, ulcer or stomach disease, kidney disease, liver disease, anaemia or other blood diseases, cancer, depression, osteoarthritis (OA), back pain, RA, and three optional health conditions. OA and RA are listed separately but are scored as one. For each condition, the patient is asked to indicate yes/no whether it is present, currently treated, and causes functional limitation. 'Yes,' responses are scored as one point for a maximum score of 45. A modified version of the SCQ (mSCQ) has been used by removing the items related to rheumatic conditions (RA, back pain, and OA) in the validation study of SCQ in patients with AS and SpA [11, 13]. For the present study, 13 common and three

optional health conditions were used with a maximum score of 45 for SCQ. For the mSCQ, we used the instrument by removing the item 'RA, back pain and OA'. The mSCQ is scored similarly to the SCQ, but the score ranges from 0 to 39.

Procedures

The English version of SCQ was used for translation and cross-cultural adaptation of the scale. Translation and cross-cultural adaptation of the SCQ scale into Turkish were made according to the standard procedure [23]. This process consisted of translation, back translation, and committee review. In the first stage, for forward translation, translation from English to Turkish was done by two authors proficient in English and Turkish native speakers. In the second stage, English back-translation from Turkish was done by two authors who are proficient in English and have no prior knowledge of the original version of the SCQ. In the third stage, a committee composed of three health professionals reviewed the translations and finally developed the Turkish version of the SCQ. In the fourth stage, the final Turkish version of SCQ was tested by individuals to determine whether they could understand all the items. All the questions and answer options were fully understood by 20 individuals, including PsA patients and healthy subjects.

Statistical analysis

The reliability of the SCQ scale was assessed by test–retest reliability. Test–retest reliability of the total scores of the SCQ was assessed with the intraclass correlation coefficient (ICC). Kappa statistics were used for the test–retest reliability of each item. The values of ICC greater than 0.90 indicate excellent, between 0.75 and 0.9 indicate good, between 0.5 and 0.75 indicate moderate, and less than 0.5 indicates poor reliability [24]. Kappa-values of 0–0.20 indicate poor agreement, 0.21–0.40 indicate fair agreement, 0.41–0.60 indicate moderate agreement, 0.61–0.80 indicate good agreement and 0.81–1.0 indicate very good agreement [25]. The minimum sample size to measure test–retest reliability was determined as 20 [12, 26]. Test/retest was performed with a 1–2-week interval, such that patients would not remember their initial responses but would not have changed in clinical status. Participants were questioned whether there was any change in their general health during this period, and those who had any health changes within a 1–2-week period were not included in the analysis.

For construct validity, the correlations of the SCQ and mSCQ with the HAQ, SF-36, PsAQoL, PGA, age, BMI, disease duration, PASI, dactylitis, and enthesitis were evaluated. The correlations of the SCQ and mSCQ with DAPSA scores in patients with peripheral predominant involvement and with BASDAI in patients with axial predominant involvement were evaluated. We hypothesised that both the SCQ and mSCQ should be correlated with age, BMI, quality of life, physical function, and PGA, but not with PsA-related factors, including disease duration, disease activity, PASI score, dactylitis, and enthesitis. We also hypothesised that using the modified version of the SCQ by removing the items related to rheumatic conditions (RA, back pain, and OA) would improve the construct validity of the scale.

Spearman's correlation coefficient was used to determine the construct validity of the SCQ scale. We qualified the strength of the correlation using the guide. Accordingly, a correlation coefficient between 0.1 and 0.3 indicates weak, 0.4 and 0.6 indicates moderate, and 0.7 and 0.9 indicates strong correlation. [27]. Descriptive statistics, including frequencies, percentages, mean, standard deviation (SD), and median (min–max), were calculated. $P < 0.05$ is accepted as significant. SPSS Statistics for Windows (version 25.0; IBM) program was used to analyse all data.

Results

The mean age of 106 patients (65 female, 41 male) with PsA was 47.15 (SD = 13.06) years. The median (min–max) duration of the disease was 36 (2–384) months. The patients' mean BMI was 28.40 (SD = 4.88). The demographic and clinical characteristics of the participants are given in Table 1. Peripheral involvement was detected in 64.2% of the patients and axial involvement in 35.8% of the patients. The mean SCQ score of the patients was 5.91 (SD = 4.27), and the median (min–max) mSCQ score was 2 (0–13). The most frequently self-reported comorbidities were hypertension (23.6%) and ulcer/stomach disease (26.4%). The most frequently reported 'other medical conditions' were thyroid disease (13.2%) and hypercholesterolaemia (5.6%). Uveitis was reported in 4.71% of patients, while IBD was detected in one patient.

Reliability

The test–retest reliability that assessed with the intraclass correlation coefficient for the SCQ and mSCQ were 0.965, $p < 0.001$ (95% confidence interval (CI) 0.914–0.986) and 0.983, $p < 0.001$ (95% CI 0.956–0.993), respectively. Kappa values for the test–retest reliability of each item were high, ranging from 0.813 to 1.000 (Table 2).

Validity

Both the SCQ and mSCQ scores had significant correlations with HAQ, PsAQoL scales, some subscales of the SF-36, and PGA ($p < 0.05$), indicating construct validity.

Table 1 Demographic and clinical characteristics of the patients with PsA ($N=106$)

Gender (*n*, %)	
Female	65 (61.3)
Male	41 (38.7)
Age (mean ± SD)	47.15 ± 13.06
Educational status (*n*, %)	
Primary school	31 (29.2)
Middle school	12 (11.3)
High school	38 (35.9)
University	25 (23.6)
Body Mass Index, kg/m^2, (mean ± SD)	28.40 ± 4.88
Duration of disease, months, (median, min–max)	36 (2–384)
DAPSA (mean ± SD)	14.02 ± 6.68
BASDAI (mean ± SD)	4.78 ± 2.30
PASI (median, min–max)	1.80 (0–39)
The number of dactylitis (median, min–max)	0 (0–2)
Leeds Enthesitis Index (median, min–max)	0 (0–6)
Subgroups in PsA (*n*, %)	
Peripheral predominant involvement	68 (64.2)
Axial predominant involvement	38 (35.8)
VAS-PGA (mean ± SD)	5.09 ± 2.29
HAQ (median, min–max)	0.3 (0–2.35)
PsAQoL (mean ± SD)	7.60 ± 6.29
SCQ (mean ± SD)	5.91 ± 4.27
mSCQ (median, min–max)	2 (0–13)

PsA Psoriatic Arthritis, *DAPSA* disease activity in psoriatic arthritis, *BASDAI* bath ankylosing spondylitis disease activity index, *PASI* Psoriasis Area and Severity Index, *VAS* visual analog scale, *PGA* patient global assessment of general health, *HAQ* health assessment questionnaire, *PsAQoL* psoriatic arthritis quality of life, *SCQ* self-administered comorbidity questionnaire, *mSCQ* modified version of the self-administered comorbidity questionnaire, SCQ: range 0–45, mSCQ: range 0–39

Table 2 Kappa values for each item of the SCQ

	Kappa	*P*	Overall agreement (%)
Item 1 (Heart disease)	1.00	< 0.001	100.0
Item 2 (High blood pressure)	1.00	< 0.001	100.0
Item 3 (Lung disease)	1.00	< 0.001	100.0
Item 4 (Diabetes)	1.00	< 0.001	100.0
Item 5 (Ulcer/stomach disease)	1.00	< 0.001	100.0
Item 6 (Kidney disease)	1.00	< 0.001	100.0
Item 7 (Liver disease)	1.00	< 0.001	100.0
Item 8 (Anaemia/other blood disease)	1.00	< 0.001	100.0
Item 9 (Cancer)	1.00	< 0.001	100.0
Item 10 (Depression)	1.00	< 0.001	100.0
Item 11 (OA/degenerative arthritis)	1.00	< 0.001	100.0
Item 12 (Back pain)	0.921	< 0.001	93.3
Item 13 (Rheumatoid arthritis)	0.930	< 0.001	93.3
Item 14 (Other medical problems)	0.813	< 0.001	93.3
Item 15 (Other medical problems)	NC	–	100.0
Item 16 (Other medical problems)	NC	–	100.0

NC not calculable because the prevalence was 0%, *SCQ* self-administered comorbidity questionnaire

The SCQ score had moderate, positive correlations with HAQ (rho = 0.488, $p < 0.001$). A statistically significant low correlation was detected between SCQ and PsAQoL (rho = 0.398, $p < 0.001$). With regard to correlations between the SCQ and SF-36 subscales, low-moderate negative correlations were detected ($p < 0.05$), except for mental health and role emotional subscales ($p > 0.05$). There was also a low significant correlation between SCQ and PGA (rho = 0.231, $p = 0.017$) (Table 3).

On the other hand, the SCQ and mSCQ scores had significant positive correlations with age (rho = 0.308, $p = 0.001$; rho = 0.354, $p < 0.001$, respectively). Although SCQ had no correlation with BMI ($p > 0.05$), mSCQ was significantly correlated with BMI (rho = 0.233, $p = 0.016$). Additionally, the SCQ and mSCQ scores had no correlations with disease duration, PASI score, and the number of dactylitis ($p > 0.05$), indicating construct validity. There were low correlations between SCQ/mSCQ and Leeds Enthesitis Index (rho = 0.320, $p = 0.001$; rho = 0.314, $p = 0.001$, respectively). Although SCQ had a low correlation with DAPSA in patients with peripheral involvement (rho = 0.262, $p = 0.031$), mSCQ was not significantly correlated with DAPSA ($p > 0.05$). The SCQ and mSCQ had no significant correlations with BASDAI in patients with axial involvement ($p > 0.05$). The correlations of the SCQ and mSCQ scores with the functional/non-functional parameters for the construct validity are given in Table 3.

Discussion

The primary aim of this study was to determine the psychometric properties of the Turkish version of SCQ in patients with PsA. We have demonstrated that the Turkish version of SCQ and mSCQ have adequate reliability and validity in patients with PsA.

In our study, the mean total score of SCQ was 5.91, and the median score of mSCQ was 2. The mean total score of SCQ was 5.61 in the original study [9], 3.7 in patients with early inflammatory arthritis [12], and 7.1 in patients with SSc and SLE [28]. In the validation study of SCQ in patients with AS, the mean total scores of SCQ and mSCQ were 5.4 and 2.9, respectively [11]. The mean SCQ scores were higher in our study with PsA than in other studies in patients with AS and early inflammatory arthritis. However, the demographic distributions of patient groups were different in these studies, such as the majority of early arthritis and

Table 3 The correlations of SCQ and mSCQ with the parameters

Variables	SCQ		mSCQ	
	Rho	*P*	Rho	*P*
HAQ	**0.488**	< 0.001	**0.374**	< 0.001
PsAQoL	**0.398**	< 0.001	**0.348**	< 0.001
SF-36				
Physical function	**− 0.522**	< 0.001	**− 0.443**	< 0.001
Physical role	**− 0.359**	< 0.001	**− 0.289**	0.003
Bodily pain	**− 0.212**	0.029	− 0.099	0.315
General health	**− 0.394**	< 0.001	**− 0.356**	< 0.001
Vitality	**− 0.260**	0.007	**− 0.248**	0.010
Mental health	− 0.144	0.141	− 0.107	0.275
Role emotional	− 0.178	0.068	− 0.109	0.268
Social function	**− 0.203**	0.037	− 0.151	0.122
PGA	**0.231**	0.017	**0.200**	0.040
Age	**0.308**	0.001	**0.354**	< 0.001
BMI	0.146	0.137	**0.233**	0.016
Disease duration	0.027	0.783	− 0.19	0.846
DAPSA	**0.262**	0.031	0.125	0.310
BASDAI	0.218	0.189	0.241	0.145
PASI	− 0.048	0.624	− 0.129	0.189
The number of dactylitis	− 0.187	0.055	− 0.187	0.056
Leeds Enthesitis Index	**0.320**	0.001	**0.314**	0.001

Significant *P* values were presented in bold

SCQ self-administered comorbidity questionnaire, *mSCQ* modified version of the self-administered comorbidity questionnaire, *HAQ* health assessment questionnaire, *PsAQoL* psoriatic arthritis quality of life, *SF-36* short form 36, *PGA* patient global assessment of general health, *BMI* body mass index, *DAPSA* disease activity in psoriatic arthritis, *BASDAI* Bath Ankylosing Spondylitis Disease Activity Index, *PASI* Psoriasis Area and Severity Index

PsA patients were women (70.6% and 61.3%, respectively), while 70.4% of AS patients were men and the mean age of patients in our study was lower than other two studies [11, 12]. These diseases are similarly related to the increased risk of comorbidities due to systemic inflammation. Recent reports suggested that comorbidity is increased even in early inflammatory arthritis [29, 30]. However, some differences were observed between PsA, AS and rheumatoid arthritis (RA). A previous study reported more prevalent hypercholesterolemia and high BMI in patients with PsA than in AS [31]. The prevalence of depression and cardiovascular risk factors was higher in PsA than in RA in another study [32].

We found that the intraclass correlation coefficient for the SCQ and mSCQ were 0.965 and 0.983, respectively. Similarly, the intraclass correlation coefficient was 0.94 in the original study [9]. Kappa values for the test–retest reliability of each item were high, ranging from 0.813 to 1.000 in our study. The test–retest reliability of items ranged from 0.40 to > 0.9 in the original SCQ study [9]. Our study's results demonstrated that the Turkish version of SCQ and mSCQ have good reliability.

We found both the SCQ and mSCQ significantly correlated with PsAQoL. There were also significant low-moderate correlations with some subgroups of the SF-36. In our study, the SCQ was not correlated with mental health and role emotional subscales of SF-36. The mSCQ had no significant correlations with bodily pain, mental health, role emotional, and social function subscales of SF-36. Sangha et al. [9] also reported no significant correlations between SCQ and mental function, role emotional, vitality, and mental component summary (MCS) of SF-36 in the original study of SCQ. In the validation study of the SCQ in AS, SCQ and mSCQ were correlated with the physical component summary score (PCS) of SF-36 and the AS Quality of Life (ASQoL), but there were no correlations with the MCS of SF-36 [11]. Additionally, most studies about comorbidities in PsA reported that PsA patients with comorbidity had poorer quality of life [2]. Recently, Bavière et al. [33] reported that the MCS of the SF-36 was related to the comorbidities in PsA. The associations of comorbidities with PCS and MCS of SF-36 have been reported in different studies, suggesting that comorbidity in PSA is related to health-related quality of life.

There was also a significant correlation between SCQ/mSCQ and PGA of general health in our study. Similarly, the low correlations of SCQ with the PGA have been reported in patients with AS and SpA [11, 13]. Furthermore, we found both the SCQ and mSCQ significantly correlated with HAQ. The SCQ and mSCQ were also significantly associated with the function assessed with Bath Ankylosing Spondylitis Functional Index (BASFI) in patients with AS and SpA [11, 13]. In a previous study among patients with early inflammatory arthritis, the SCQ was correlated weakly with some aspects of function [12]. Besides that, recent studies reported that the number of comorbidities impacts function in patients with PsA [4, 5]. These observations suggest that comorbidities may be related to function in patients with PsA.

In our study, the SCQ and mSCQ scores had significant positive correlations with age. As expected, the correlation of SCQ with age has been demonstrated in previous validation studies of SCQ [11–13, 28] because age directly accrues an increased risk of comorbidity [34]. On the other hand, we have hypothesised that SCQ would correlate with BMI because the prevalence of obesity is high in patients with psoriatic disease [35], and obesity has an impact on morbidity in PsA, primarily cardiovascular and metabolic [36]. We found that the mSCQ but not the SCQ had a significant correlation with BMI.

In the present study, the SCQ and mSCQ were not correlated with disease duration, severity of psoriasis, dactylitis, and BASDAI, as we expected not to be associated with

PsA-related factors. While the mSCQ was not significantly correlated with DAPSA, SCQ showed a weak correlation with DAPSA. This indicates that the mSCQ may better distinguish comorbidities from disease activity. Contrary to our hypothesis, both the SCQ and mSCQ had low correlations with Leeds Enthesitis Index. These results may be related to the inability of patients to distinguish activity limitation due to enthesitis or comorbidities. Mease et al. [37] reported that patients with enthesitis had worse functional status and more activity impairment but no difference in comorbidities.

The validation study of SCQ in SLE and SSc reported that the scale could not differentiate the comorbidities and index disease [28]. This supports that overlapping comorbidity should be excluded from the scale. The adapted versions of the SCQ have been used for this purpose in other studies [11–13]. Removing rheumatic items from the SCQ has been shown to increase the validity of the scale in AS [11]. Similarly, our study results demonstrated better validity by using the modified version of SCQ in patients with PsA.

An important limitation of our study may be the unequal ratio of men and women. This may be related to the inclusion of patients with PsA from the outpatient clinic with a simple consecutive sampling. Another limitation is that we could not evaluate the criterion validity of the scale by comparing it with other comorbidity indexes, as the original SCQ study has already demonstrated it [9].

In conclusion, the Turkish version of the SCQ allows us to document the comorbidities in the Turkish population with a simple, short, easily understood, not time-consuming self-report instrument without the need for medical records. It also assesses the impact of comorbidities on the patients' function. On the other hand, due to the association of comorbidities with quality of life and function, it is important to determine the comorbidities in patients with PsA. According to the results of our study, the mSCQ is a valid and reliable tool for evaluating comorbidities in patients with PsA.

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Author contributions All authors contributed to the study design, material preparation, data collection, analysis, interpretation and writing of the manuscript and take full responsibility for the integrity of the study and the final manuscript. All authors read and approved the final manuscript.

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Data availability The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Conflict of interest The authors declare no conflict of interest.

Ethical approval The study was approved by the Ethical Committee of Marmara University Faculty of Medicine (insert number: 09.2018.731 and date of approval: 02.11.2018).

Informed consent Informed consent was obtained from all individual participants included in the study.

References

1. Veale DJ, Fearon U (2018) The pathogenesis of psoriatic arthritis. Lancet 391:2273–2284. https://doi.org/10.1016/S0140-6736(18)30830-4
2. Gupta S, Syrimi Z, Hughes DM, Zhao SS (2021) Comorbidities in psoriatic arthritis: a systematic review and meta-analysis. Rheumatol Int 41:275–284. https://doi.org/10.1007/s00296-020-04775-2
3. Perez-Chada LM, Merola JF (2020) Comorbidities associated with psoriatic arthritis: review and update. Clin Immunol 214:108397. https://doi.org/10.1016/j.clim.2020.108397
4. Lubrano E, Scriffignano S, Azuaga AB, Ramirez J, Cañete JD, Perrotta FM (2020) Impact of comorbidities on disease activity, patient global assessment, and function in psoriatic arthritis: a cross-sectional study. Rheumatol Ther 7:825–836. https://doi.org/10.1007/s40744-020-00229-0
5. Cañete JD, Tasende J, Laserna F, Castro SG, Queiro R (2020) The impact of comorbidity on patient-reported outcomes in psoriatic arthritis: a systematic literature review. Rheumatol Ther 7:237–257. https://doi.org/10.1007/s40744-020-00202-x
6. Imamura K, McKinnon M, Middleton R, Black N (1997) Reliability of a comorbidity measure: the Index of Co-Existent Disease (ICED). J Clin Epidemiol 50:1011–1016. https://doi.org/10.1016/s0895-4356(97)00128-5
7. Charlson ME, Pompei P, Ales KL, MacKenzie CR (1987) A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis 40:373–383. https://doi.org/10.1016/0021-9681(87)90171-8
8. Olomu AB, Corser WD, Stommel M, Xie Y, Holmes-Rovner M (2012) Do self-report and medical record comorbidity data predict longitudinal functional capacity and quality of life health outcomes similarly? BMC Health Serv Res 12:398. https://doi.org/10.1186/1472-6963-12-398
9. Sangha O, Stucki G, Liang MH, Fossel AH, Katz JN (2003) The Self-Administered Comorbidity Questionnaire: a new method to assess comorbidity for clinical and health services research. Arthritis Rheum 49:156–163. https://doi.org/10.1002/art.10993
10. Oemrawsingh A, Swami N, Valderas JM, Hazelzet JA, Pusic AL, Gliklich RE, Bergmark RW (2020) Patient-reported morbidity instruments: a systematic review. Value Health 23:791–811. https://doi.org/10.1016/j.jval.2020.02.006
11. Stolwijk C, van Tubergen A, Ramiro S, Essers I, Blaauw M, van der Heijde D, Landewé R, van den Bosch F, Dougados M, Boonen A (2014) Aspects of validity of the self-administered comorbidity questionnaire in patients with ankylosing spondylitis. Rheumatol (Oxf) 53:1054–1064. https://doi.org/10.1093/rheumatology/ket354
12. Baron M, Schieir O, Hudson M et al (2009) Evaluation of the clinimetric properties of the early inflammatory

arthritis-self-administered comorbidity questionnaire. Rheumatol (Oxf) 48:390–394. https://doi.org/10.1093/rheumatology/ken504
13. Stolwijkv C, Essers I, van den Bosch F, Dougados M, Etcheto A, van der Heijde D, Landewé R, Molto A, van Tubergen A, Boonen A, ASAS-COMOSPA Study Group (2020) Validation of the self-administered comorbidity questionnaire adjusted for spondyloarthritis: results from the ASAS-COMOSPA study. Rheumatol (Oxf) 59:1632–1639. https://doi.org/10.1093/rheumatology/kez482
14. Pacheco-Brousseau L, Poitras S, Savard J, Varin D, Moreau G, Matar WY, Beaulé P (2020) Development of the French-Canadian version of the self-administered comorbidities questionnaire (SCQ) in a hospital population undergoing hip or knee arthroplasty. Orthop Traumatol Surg Res 106:557–561. https://doi.org/10.1016/j.otsr.2019.12.022
15. Streibelt M, Schmidt C, Brünger M, Spyra K (2012) Komorbidität im Patientenurteil—geht das? Validität eines Instruments zur Selbsteinschätzung der Komorbidität (SCQ-D) [Comorbidity from the patient perspective—does it work? Validity of a questionnaire on self-estimation of comorbidity (SCQ-D)]. Orthopade 41:303–310. https://doi.org/10.1007/s00132-012-1901-3
16. Taylor W, Gladman D, Helliwell P, Marchesoni A, Mease P, Mielants H, CASPAR Study Group (2006) Classification criteria for psoriatic arthritis: development of new criteria from a large international study. Arthritis Rheum 54:2665–2673. https://doi.org/10.1002/art.21972
17. Anthoine E, Moret L, Regnault A, Sébille V, Hardouin JB (2014) Sample size used to validate a scale: a review of publications on newly-developed patient-reported outcomes measures. Health Qual Life Outcomes 12:176. https://doi.org/10.1186/s12955-014-0176-2
18. Feldman SR, Fleischer AB Jr, Reboussin DM, Rapp SR, Exum ML, Clark AR, Nurre L (1996) The self-administered psoriasis area and severity index is valid and reliable. J Invest Dermatol 106:183–186. https://doi.org/10.1111/1523-1747.ep12329912
19. Healy PJ, Helliwell PS (2008) Measuring clinical enthesitis in psoriatic arthritis: assessment of existing measures and development of an instrument specific to psoriatic arthritis. Arthritis Rheum 59:686–691. https://doi.org/10.1002/art.23568
20. Fries JF, Spitz P, Kraines RG, Holman HR (1980) Measurement of patient outcome in arthritis. Arthritis Rheum 23:137–145. https://doi.org/10.1002/art.1780230202
21. McKenna SP, Doward LC, Whalley D, Tennant A, Emery P, Veale DJ (2004) Development of the PsAQoL: a quality of life instrument specific to psoriatic arthritis. Ann Rheum Dis 63:162–169. https://doi.org/10.1136/ard.2003.006296
22. Ware JE Jr, Sherbourne CD (1992) The MOS 36-item short-form health survey (SF-36). I. Conceptual framework and item selection. Med Care 30:473–483
23. Beaton DE, Bombardier C, Guillemin F, Ferraz MB (2000) Guidelines for the process of cross-cultural adaptation of self-report measures. Spine 25:3186–3191. https://doi.org/10.1097/00007632-200012150-00014
24. Koo TK, Li MY (2016) A guideline of selecting and reporting intraclass correlation coefficients for reliability research. J Chiropr Med 15:155–163. https://doi.org/10.1016/j.jcm.2016.02.012
25. Misra DP, Zimba O, Gasparyan AY (2021) Statistical data presentation: a primer for rheumatology researchers. Rheumatol Int 41:43–55. https://doi.org/10.1007/s00296-020-04740-z
26. Bonett DG (2002) Sample size requirements for estimating intraclass correlations with desired precision. Stat Med 21:1331–1335. https://doi.org/10.1002/sim.1108
27. Schober P, Boer C, Schwarte LA (2018) Correlation coefficients: appropriate use and interpretation. Anesth Analg 126:1763–1768. https://doi.org/10.1213/ANE.0000000000002864
28. Hudson M, Bernatsky S, Taillefer S et al (2008) Patients with systemic autoimmune diseases could not distinguish comorbidities from their index disease. J Clin Epidemiol 61:654–662. https://doi.org/10.1016/j.jclinepi.2007.08.010
29. Hitchon CA, Boire G, Haraoui B et al (2016) Self-reported comorbidity is common in early inflammatory arthritis and associated with poorer function and worse arthritis disease outcomes: results from the Canadian Early Arthritis Cohort. Rheumatol (Oxf) 55:1751–1762. https://doi.org/10.1093/rheumatology/kew061
30. Ursum J, Korevaar JC, Twisk JW, Peters MJ, Schellevis FG, Nurmohamed MT, Nielen MM (2013) Prevalence of chronic diseases at the onset of inflammatory arthritis: a population-based study. Fam Pract 30:615–620. https://doi.org/10.1093/fampra/cmt037
31. Fernández-Carballido C, Martín-Martínez MA, García-Gómez C et al (2020) Impact of comorbidity on physical function in patients with ankylosing spondylitis and psoriatic arthritis attending rheumatology clinics: results from a cross-sectional study. Arthrit Care Res (Hoboken) 72:822–828. https://doi.org/10.1002/acr.23910
32. Sinnathurai P, Buchbinder R, Hill C, Lassere M, March L (2018) Comorbidity in psoriatic arthritis and rheumatoid arthritis. Intern Med J 48:1360–1368. https://doi.org/10.1111/imj.14046
33. Bavière W, Deprez X, Houvenagel E, Philippe P, Deken V, Flipo RM, Paccou J (2020) Association between comorbidities and quality of life in psoriatic arthritis: results from a multicentric cross-sectional study. J Rheumatol 47:369–376. https://doi.org/10.3899/jrheum.181471
34. Fragoulis GE, Nikiphorou E, McInnes IB, Siebert S (2021) Does age matter in psoriatic arthritis? A narrative review. J Rheumatol. https://doi.org/10.3899/jrheum.210349
35. Queiro R, Lorenzo A, Tejón P, Coto P, Pardo E (2019) Obesity in psoriatic arthritis: comparative prevalence and associated factors. Med (Baltim) 98(28):e16400. https://doi.org/10.1097/MD.0000000000016400
36. Kumthekar A, Ogdie A (2020) Obesity and psoriatic arthritis: a narrative review. Rheumatol Ther 7:447–456. https://doi.org/10.1007/s40744-020-00215-6
37. Mease PJ, Karki C, Palmer JB et al (2017) Clinical characteristics, disease activity, and patient-reported outcomes in psoriatic arthritis patients with dactylitis or enthesitis: results from the corrona psoriatic arthritis/spondyloarthritis registry. Arthrit Care Res (Hoboken) 69:1692–1699. https://doi.org/10.1002/acr.23249