


## ORIGINAL ARTICLE

# Self-assessed foot health in older people with rheumatoid arthritis—A cross-sectional study

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**Abstract**

**Background:** Foot and ankle problems are especially common in patients with RA, causing significant disability and limitation in daily activities. Previous studies have mainly focussed on foot problems in the adult population whilst the evidence of foot health in the older population is scarce.

**Objectives:** The aim of the study was to analyse self-assessed foot health and associated factors in older people with rheumatoid arthritis (RA).

**Methods:** The study applied a descriptive cross-sectional survey design and recruited older people with RA from the member register of one patient association. We collected the data in January 2019 with the Self-administered Foot Health Assessment Instrument, and sociodemographic and foot-related background questions and analysed the data with descriptive and inferential statistics.

**Results:** Older people with RA had many self-reported foot problems. The most common problems were foot pain, dry skin and thickened toenails. In addition, structural deformities of the foot were prevalent. The level of foot health associated with the amount of daily walking or standing, and using walking or running shoes outdoors. Individuals who had consulted a physician due to their foot problems had more structural deformities in the foot. Foot problems limited their ability to perform daily activities.

**Conclusions:** This study demonstrates that older people with RA not only live with a long-term health condition, but they also live with complex foot problems. Older people with RA need healthcare services due to their foot problems. There is a need to develop and implement care practices to alleviate foot pain and support and promote foot health and functional ability in older people with RA.

**Implication for practice:** Understanding the nature and consequences of foot problems in older people with RA allows healthcare professionals to perform more accurate clinical foot evaluations and develop effective interventions to prevent further foot problems.

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## KEYWORDS

foot health, older people, rheumatoid arthritis, self-assessment, survey

## 1 | INTRODUCTION

Rheumatoid arthritis (RA) is a multisystemic, long-term inflammatory disease and the most common inflammatory arthritis in older people (Kobak & Bes, 2018; Rasch et al., 2003). The likelihood of being diagnosed with RA increases with age (van Onna & Boonen, 2016). In RA, typical symptoms and signs are joint damage and polyarthritis, particularly in the forefoot due to chronic inflammation (McInnes and Schett, 2011). Among older people, RA negatively affects functional capacity and quality of life and increases morbidity and mortality (Otter et al., 2012; Tutuncu & Kavanaugh, 2007). A holistic gerontological nursing approach to the evaluation of health in older people, including foot health assessment, is needed to identify foot problems and provide care for promotion of active and independent living (James et al., 2021).

Foot problems, in general, are prevalent in older people and have a significant impact on their functional status (Keenan et al., 2019). In the ageing population, almost 50% suffer from joint complaints during one-year period (Thiem et al., 2013). In particular, pain in one knee joint or both knee joints is often most reported (Thiem et al., 2013). Moreover, plantar heel pain is common and often reported as a disabling symptom (Thomas et al., 2019). In general, pain and musculoskeletal complaints seem to be more often reported by females (Thiem et al., 2013). Foot problems may be a consequence of lack of foot care knowledge and poor foot self-care practice (Bonner et al., 2016) or external factors such as ill-fitting footwear (Buldt & Menz, 2018). Additionally, long-term health conditions, such as RA, cause foot deformities. However, the assessment of foot problems is often a low priority (Hendry et al., 2013) and foot problems can, therefore, go unrecognised for a long time. To overcome this and promote timely care for older people with foot problems, effective ways to assess foot health in older people with RA are needed.

Foot and ankle problems are especially common in patients with RA, causing significant disability and limitation in daily activities. For example, from a population-based sample of 413 patients in the UK (mean age 63.5, SD 12.8), a total of 92.1% reported having at least one current foot problem (Wilson et al., 2017). The most common problems were articular (Wilson et al., 2017), such as foot structural deformities and foot pain (Stolt et al., 2017). Therefore, the European League Against Rheumatism (EULAR) recommends frequent assessment of patient's health status and disease activity, preferably every 3 months, complemented with functional assessments (Combe et al., 2017).

In patients with RA, the status of foot health fluctuates due to the inflammatory nature of the disease. For example, hallux valgus and flatfoot may be consequences of joint dislocation and erosion (Louwerens & Schrier, 2013), which can further cause callosities to the forefoot (Mochizuki et al., 2020). Moreover, higher plantar pressures are associated with foot problems and deformities in the

### Summary Statement of Implications for Practice

#### What does this research add to existing knowledge in gerontology?

- Provides a description of foot health in older people with rheumatoid arthritis.
- Reinforces evidence related to foot problems in older people.
- Points out the need to provide timely and effective healthcare services, particularly foot care services to older people with rheumatoid arthritis, to promote their foot health and to support their functional ability.

#### What are the implications of this new knowledge for nursing care for older people?

- Gerontological nursing care for older people must meet the needs related to foot health including regular assessment, care and prevention of foot problems.
- Patient education focusing on foot health together with assessment of a person's foot self-care abilities should be provided in order to support living with a long-term health condition.
- Teaching about foot health in nursing education and in education for other health professionals is important to understand the relationship between foot health and overall health and to ensure health care professionals' competence in foot health care.

#### How could the findings be used to influence policy, practice, research or education?

- Findings can guide the further development of health-care services targeted at older people with rheumatoid arthritis.
- Understanding the nature and prevalence of foot problems in older people with rheumatoid arthritis helps to design and test new care methods.
- Promotion of foot health in older people with rheumatoid arthritis should be a policy priority when facing the challenges of an ageing population.

forefoot (Konings-Pijnappels et al., 2019). Foot and ankle problems can be serious and often cause difficulties for patients in taking care of their feet and finding proper footwear (Stolt et al., 2017). In addition, foot problems are a potential factor for increasing the risk of a fall (Brenton-Rule et al., 2015, 2016; Mikos et al., 2020) and for

increasing the fear of falling (Morpeth et al., 2016). Previous studies have mainly focussed on foot problems in the adult population whilst the evidence of foot health in the older population is scarce. From the gerontological nursing perspective, the early recognition of threats to foot health in older people by regular foot health assessments is of the utmost importance as foot problems may hamper functioning and well-being (Stolt et al., 2010). RA is certainly an example of such a threat to foot health (Stolt et al., 2017).

There is a wealth of published guidelines related to the care and treatment of RA (Mian et al., 2019). However, these guidelines focus predominantly on the medical and pharmacological treatment of RA. Only a few recommendations emphasise the assessment of disability. However, there is no focus on the assessment of foot health as a component of general health and functioning. There are very few studies of foot health in patients with RA. The prevalence and impact of foot problems in patients with RA must be quantified (Wilson et al., 2017) in order to inform the development of gerontological nursing and healthcare services, especially podiatric care.

## 1.1 | Aim

The aim of the study was to analyse self-assessed foot health and associated factors in older people with RA.

Research questions were:

1. What is the level of foot health in older people with RA?
2. What background factors are associated with foot health in older people with RA?

The goal was to provide evidence to develop foot health care and services targeted at older people with RA and to promote their functional ability and well-being.

## 2 | METHODS

The study applied a descriptive cross-sectional survey design.

### 2.1 | Sample

The sample consisted of older people (65 years and older) diagnosed with RA recruited from the member register of one patient association in Southwest Finland. The association has approximately 1500 members and serves at local level providing guidance and support for people with rheumatic diseases.

### 2.2 | Data collection

We collected the data by a postal survey using the Self-administered Foot Health Assessment Instrument (S-FHAI, Stolt et al., 2017) plus

questions related to the respondent's sociodemographic information. The S-FHAI measures self-assessed foot health at the time of response. The S-FHAI consists of 22 items divided into four subscales: skin health (12 items), nail health (four items), foot structure (five items) and lower extremity pain (one item). The response scale is dichotomous (no/yes). S-FHAI originates from the Foot Health Assessment Instrument (FHAI) which was developed for objective foot health assessment (Stolt et al., 2013). S-FHAI was modified from the FHAI to provide a subjective assessment of foot health. The use of S-FHAI does not require professional education or competence. The purpose is to observe the feet and identify possible foot problems. The S-FHAI has previously been used in assessing foot health in nurses and its internal consistency has been evaluated as satisfactory (Kuder-Richardsson formula 0.721, Stolt et al., 2017).

The survey included questions on sociodemographic background (e.g. age, gender, education). The foot-related background factors were: type of footwear used indoors, type of footwear used outdoors, perceived importance of foot health, the amount of walking or standing per day, consultation with a physician due to foot problems, impact of foot health in daily activities, and a self-assessed score for current foot health (response scale 0 = poorest foot health to 10 = best possible foot health).

We sent the postal survey to all adult members of the association ( $n = 1318$ ) in January 2019. Reminders to respond to the survey were posted on the website, on social media and in the association's members' magazine. We received altogether 504 anonymous responses (response rate 38%). However, this study only reports a subset of data from participants aged 65 years and older ( $n = 148$ ).

### 2.3 | Data analysis

The data were analysed statistically with SPSS 25.0 software (SPSS Inc.). First, we used descriptive statistics (frequency, percentage, mean, range, standard deviation) to describe the data. Second, we calculated the total index of foot health and sum variables in each subscale by counting up the items and dividing by the number of items. Third, we analysed the associations between foot health and background factors using Multifactor Analysis of Variance (Main effect model: continuous variables used as covariates and categorical variables used as fixed factors). For pairwise comparisons, we used Sidak adjustments for multiple comparisons, and for assessment of the internal consistency of the S-FHAI, we used Kuder-Richardson formula. The level of statistical significance was  $p \leq 0.05$ .

### 2.4 | Ethical considerations

The study followed good scientific practice in every phase (ALLEA 2017). We obtained ethical approval (code 8/2018) and permission to collect the data prior to the study. Potential participants received an information letter describing the purpose of the study, anonymity, data use and handling, confidentiality in reporting and possibility

to withdraw from the study at any point. Responding to and returning the questionnaire was considered as an informed consent.

### 3 | RESULTS

#### 3.1 | Participants

Participants ( $n = 148$ ) were predominantly female (87%,  $n = 128$ ) with a mean age of 74 years (66–86, SD 5.2). Educational background was, for the majority, basic education in a comprehensive school (79%,  $n = 118$ ) or high school (20%,  $n = 30$ ). Most of the participants used walking shoes outdoors (76%,  $n = 112$ ) and sandals indoors (23%,  $n = 34$ ). They considered foot health into very important (76%,  $n = 112$ ), important (22%,  $n = 32$ ) or somewhat important (3%,  $n = 4$ ). The majority of respondents reported their daily amount of walking or standing as moderate (45%,  $n = 68$ ). Over half of participants (58%,  $n = 86$ ) had consulted a physician due to foot problems. Most of the respondents considered foot health to have had a great effect or very great effect on their daily activities (58%,  $n = 86$ ). On a scale from 0 to 10, the mean score for current self-reported foot health was 6 (range 0–9, SD 1.9).

#### 3.2 | Foot health in older people with RA

Participants reported many problems with their foot health. The mean of the total score for foot health was 8.3 (SD 3.3.) In the area of foot skin health, dry skin (60%) was the most commonly reported problem, followed by cold feet (56%) and corns and calluses (54%). In toenail health, thickened toenails were reported most often (57%). For foot structure, hallux valgus (51%) and hammertoes (51%) were the most common complaints.

The majority of the respondents experienced lower extremity pain (70%,  $n = 104$ ). The location of pain varied. Slight or moderate pain was most often experienced in the toes ( $n = 64$ ), ankle ( $n = 49$ ), knee ( $n = 57$ ) and hip ( $n = 55$ ). Strong pain focusing on the ankle ( $n = 19$ ) and worst imaginable pain on the knee ( $n = 2$ ) and hip ( $n = 1$ ; Tables 1 and 2).

#### 3.3 | Factors associated with foot health

Some of the background factors associated with foot health. The S-FHAI total score of foot health associated with the amount of daily walking and/or standing ( $p = 0.046$ ), using walking shoes ( $p = 0.020$ ) or running shoes ( $p = 0.002$ ) outdoors. We found similar associations with background factors as mentioned earlier for the foot skin sum variable ( $p = 0.051$ ,  $p = 0.034$ ,  $p = 0.015$ ), respectively. For toenail health sum variables, the associating factors were gender ( $p = 0.046$ ) and wearing running shoes outdoors ( $p = 0.027$ ). The sum variable for foot structure associated with consulting a physician ( $p = 0.046$ )

TABLE 1 Participants' ( $n = 148$ ) self-assessed foot health

Variable	Yes	
	f	%
Foot skin		
Skin breaks or maceration between toes	22	15
Dry skin	88	60
Cracks in the heel	36	24
Corns or calluses	80	54
Warts	10	7
Blisters	4	3
Swelling	74	50
Sweating feet	25	17
Burning feet	37	25
Cold feet	83	56
Cramps	61	41
Foot ulcers	6	4
Toenails		
Ingrown toenail	28	19
Thickened nail	85	57
Colour changes of the nails	44	30
Nail fungus	20	14
Foot structure		
Hallux valgus	75	51
Taylor bunion	47	32
Hammer toe	75	51
Flat foot (low foot arch)	56	38
High foot arch	24	16

and using walking shoes ( $p = 0.049$ ) or running shoes ( $p = 0.013$ ) indoors.

### 4 | DISCUSSION

This study demonstrates that older people with RA not only live with a long-term health condition but also with complex foot problems. Foot pain was the most common problem followed by dry skin and thickened toenails. The findings underline the importance of prevention and care of foot problems in older people with RA.

Most of the older people with RA (70%) reported having lower extremity pain. The rate of foot pain was much higher compared to the general population (Thomas et al., 2011), but rather similar to adults aged 50 years and older (Menz, 2016; Roddy, 2011). The high prevalence of pain in this sample could be explained by RA-specific factors. RA causes joint damage and deformities which alter foot function, resulting in increased foot pain (Turner et al., 2006). However, there are several care methods to stabilise foot function and alleviate foot pain, such as foot orthoses and customised footwear (Frecklington et al., 2018; Whittaker et al., 2018).

**TABLE 2** Participants' ( $n = 148$ ) self-assessed lower extremity pain

Location of pain	No pain		Slight pain		Moderate pain		Strong pain		Worst imaginable pain	
	f	%	f	%	f	%	f	%	f	%
Sole of the foot	31	21	23	16	17	12	12	8	0	0
Toes	11	8	38	26	26	18	11	7	0	0
Heel	49	33	15	10	6	4	9	6	0	0
Ankle	18	12	31	21	18	12	19	13	0	0
Knee	22	15	31	21	26	18	9	6	2	1
Thigh	41	28	23	16	15	10	6	4	0	0
Hip	27	18	29	20	26	18	9	6	1	1

Comprehensive assessment methods and nursing interventions in gerontological nursing are needed to ensure that older people with RA can live meaningful and active lives with the best possible foot health.

Identification of foot problems is crucial. Older people with RA could benefit from regular foot health assessments where their level of foot health and footwear is examined. At the same time, their ability to conduct foot self-care could be evaluated. Based on this information, individual and tailored foot care services could be offered to older people with RA that correspond to their foot health needs. Moreover, podiatric care should be offered to people with RA. However, based on previous evidence, the provision of podiatric care to patients with RA is fragmented and unequal (Hendry et al., 2013; de Souza et al., 2016; Laitinen et al., 2020). In the future, reframing healthcare services is necessary to guarantee timely and effective services for older people with RA.

Foot problems in older people with RA exist and they are visible. Based on the results in this study, it is evident that older people with RA need gerontological nursing and healthcare services to care for their foot problems. Half of the participants consulted healthcare services for their foot problems. This indicates the need to provide timely foot care services for older people with RA. Moreover, patient associations could offer foot health education services such as foot health information kiosks and counselling or infographics in social media. Patient associations could also collaborate with local podiatrists to provide appointments where individuals could discuss their foot problems.

Foot health is associated with some of the participants' background variables. Foot health, in general, was poorer among participants who used walking or running shoes indoors. Wearing walking or running shoes could indicate that, because of foot problems, patients prefer using footwear with adequate shock absorption, width and comfort (Tehan et al., 2019). Walking and running shoes are often made of soft and flexible materials which enable the shoes to fit the shape of the foot better. Participants who had foot structural deformities had consulted a physician. Foot structural problems are disabling and limit daily activities (Mickle et al., 2011). Therefore, it is natural that older people with RA seek healthcare services for their foot problems.

Due to the disabling nature of foot problems, older people with RA need support and education about living with foot problems. Based on previous studies, patient education related to foot health and foot self-care is rarely provided during medical appointments (Graham et al., 2017; Graham & Williams, 2016). There is a wide variety of foot health educational interventions (Ahmad Sharoni et al., 2016; Stolt et al., 2020), but their application to patients with RA is limited. These interventions focus for example on foot skin and nail care, selection of proper footwear and foot exercises which all could provide a potential way to influence patients' foot health in gerontological nursing.

Foot health is important for older people with other long-term health conditions, such as diabetes mellitus. When an older individual has comorbidities, therefore, in older people care regular assessment of foot health is necessary to identify potential foot problems from skin, nails, foot structure and to provide timely and accurate care. In order to respond to older individuals' foot health needs, nurses and other health care professionals in older people care need the education to support their competence to conduct foot health assessment, prepare a care plan and provide evidence-based basic foot care. The education could be provided through continuing training in the workplace (Beuscher et al., 2019) or by developing foot health-related courses for nursing education curricula. Caring for foot problems in older people with long-term health problems requires interprofessional collaboration (Nayeri et al., 2020), therefore nurses in older people care need also know when older individuals' foot problems need consultation from physician, podiatrist or orthotic specialist. The ultimate aim of the foot care is to maintain mobility among older individuals mobile and assure their independence in daily activities (James et al., 2021). In older people care, the professionals need to be aware of the benefits of proactive actions in foot health care because untreated foot problems can influence rapidly functional ability and independence.

#### 4.1 | Limitations and strengths

The results of this study need to be interpreted in the light of some limitations. First, the data were collected from one regional patient

association which limits the generalisability of the results. Second, those who responded to the survey could have been more motivated and interested in foot health. Third, the questionnaire did not ask the date of RA diagnosis. The date of the diagnosis would have enabled further statistical analysis, for example, to analyse foot health in those with a longer disease history compared with newly diagnosed patients. Fourth, foot health in people with RA was examined using self-assessment. Self-assessment has been criticised for providing better foot health levels compared with objective assessment (Hébert et al., 2008). However, patients with RA could be assumed to provide accurate responses. The number of missing values was low, indicating that the S-FHAI was clear and easy to administer. Internal consistency of the S-FHAI was 0.67, that is, slightly below the recommended value of 0.70 (Allen, 2017). However, all items of the S-FHAI are simple and easy to understand and its administration does not require any healthcare education.

## 5 | CONCLUSIONS

This study reveals that foot problems in older people with RA are prevalent. The majority of older people experienced lower extremity pain in particular. Foot problems affected their ability to perform daily activities. Care practices to alleviate foot pain and to promote foot health and functional ability in older people with RA need to be developed and tested. Furthermore, large-scale longitudinal research studies could be beneficial to investigate the possible changes in foot health among patients with RA.

### DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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