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The incidence and risk factors for falls in adults with rheumatoid arthritis: A systematic review

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ABSTRACT

Objective: To conduct a systematic review of the incidence and risk factors for falls in people with rheumatoid arthritis (RA).

Methods: A search was conducted of the electronic databases AMED, CINAHL, MEDLINE, Scopus and The Cochrane Library. Study participants were adults with RA. Outcome measures were falls experienced in the preceding 6–12 months or prospective falls over a 12-month period. Articles were scored for quality using a modified version of the Downs and Black Quality Index Tool.

Results: Nine articles were included with mean (range) quality scores 72% (43–93%). The quality assessment revealed inconsistency in falls data attainment. Falls incidence ranged from 10% to 50% and was independent of age, gender or RA disease duration. History of a prior fall (odds ratio (OR) = 3.6 and 9.8) and increasing number of medications (OR = 1.4 and 2.1) were consistently associated with falls in RA. Number of co-morbid conditions, swollen and tender lower extremity joints, anti-depressants, anti-hypertensives, psychotropics, pain intensity and static balance were also identified as significant fall risk factors in at least one study. However, the evidence was limited to a single study or conflicted with other studies.

Conclusion: In studies of falls in people with RA, there is a wide range in reported falls incidence, which may be due to inconsistency in falls data attainment. Numerous potential fall risk factors have been evaluated, producing limited or conflicting evidence. It is recommended that future studies follow previous consensus guidelines for collecting and reporting falls data.

Introduction

Falls represent an important burden to healthcare resources worldwide [1]. The aetiology of falls is multifactorial and can result from a complex interaction of intrinsic, behavioural or environmental risk factors [2]. The consequences of falls include loss of confidence, injury and death. People with rheumatoid arthritis (RA) may be at greater risk of falling than the non-RA population [3]. This increased falls risk may be due to RA disease-related impairments including pain, deformity and decreased muscle strength, as well as reduced functioning such as altered gait and a decline in postural stability. The risk of hip fractures, as a result of a fall, is threefold in people with RA and may be due to disease-related reduced bone mass [4]. Therefore, falls awareness and the prevention of falls are important to guide management of people with RA. The aim of this review was to determine the incidence and risk factors for falls in people with RA.

Materials and methods

Search strategy for identification of articles

To identify studies concerning falls in people with RA, a primary literature search was conducted using electronic databases (from 1980 to 2013) such as AMED, CINAHL, MEDLINE, Scopus and The Cochrane Library online databases under the following terms: “rheumatoid arthritis,” “inflammatory arthritis,” “polyarthritis,” “rheumatic disease,” “falls,” “falls risk” and “falls incidence.” Search terms were applied to title and/or abstract, and

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all studies were obtained from English-language peer-reviewed journals. Citations from retrieved publications were examined to obtain further references, and English text-only hard copy journals were also searched for relevant articles.

We included studies with a primary or secondary outcome measure of falls in the preceding 6–12 months and/or prospective falls over a 12-month period in adult participants (18 years or older) with diagnosed RA. Studies that investigated fear of falling as a primary outcome, in addition to current falls or fall history, were also included in order to capture falls data. Studies that included participants with other forms of inflammatory arthritis, such as undifferentiated polyarthritis, were excluded. Where two articles were published from the same study, only one was selected for inclusion in the review to avoid duplication of results. One reviewer undertook the searches and assessed potential studies against the inclusion criteria (A.B.R.). The review was conducted with reference to the PRISMA statement [5].

Data extraction

The following data were extracted from the articles reviewed: study design, participant characteristics (sample size, geographic location, mean age and gender), method of falls attainment, fall definition and falls incidence. Odds ratios (ORs), 95% confidence intervals (95% CIs) and *P* values were also extracted for potential fall risk factors.

Assessment of methodological quality

The Quality Index Tool, developed by Downs and Black [6], was used to assess the methodological quality of each article and has been reported to have high internal consistency, good test–retest reliability and good inter-rater reliability [6]. Clear guidelines are provided for use, enabling the tool to be applied and interpreted in a standardised manner [6]. The Quality Index Tool consists of 27 items that allow for the assessment of internal and external validity, reporting and power [6]. The quality index was modified to meet the aims of the study, with 10 items excluded from the analysis (items 4, 8, 13–15, 17, 19, 23, 24 and 27) as they relate specifically to intervention studies. The first eight items relate to reporting and include the aims, outcome measures and results of the study. Items 11 and 12 relate to external validity and assess the representativeness of the study findings and whether they could be generalised to the wider population of interest. The last seven items relate to internal validity (bias and confounding). Items 9 and 26 were applied to prospective studies only. Item 10 was applied only to studies that reported probability values, and items 5, 21 and 22 were applied only to case–control studies. Item 20 relates to validity and reliability of outcome measures. To score positively on this item, a study must describe the main outcome measures of interest or reference other work. As “falls” was the primary focus of the review, item 20 was scored “yes” only if a fall definition was provided and method of falls data attainment was described. Each item was scored as yes = 1 and no/unable to determine = 0, with the exception of item 5, which was scored as yes = 2, partially = 1 and no/unable to determine = 0. To take into account the varying number of Quality Index Tool items used for the assessments of articles, quality assessment results are presented as percentages. Methodological quality was assessed by two reviewers (A.B.R. and K.R.).

Results

A total of 124 articles were retrieved and nine met the inclusion criteria for the analysis (Fig. 1). The nine articles represented five cross-sectional studies, three prospective cohort studies and one case–control study. There was wide variation in study size, with number of participants ranging between 78 [7] and 4996 [8]. Two studies included females only [9,10], with the remainder including both males and females. The mean age of participants ranged from 54 [11] to 65 years [10,12]. Articles reviewed are summarised in Table 1.

Study quality

Table 2 presents the results of the methodological quality assessment. Quality assessment scores ranged from 43% to 93% (mean = 72%). Reporting within studies was generally consistent, although three studies did not clearly describe the study aim/objective/hypothesis [8,10,13] and four studies did not include a clear description of patient characteristics and/or inclusion/exclusion criteria [7,12–14]. External validity was varied, with two-thirds of the studies identifying the source population and methods of patient selection [3,7,8,10–12] but only one study demonstrating that the patients who agreed to participate were representative of the source population [12]. Internal validity was inconsistent across the studies. While all studies outlined the statistical analysis for the main outcomes, adjustment for confounding factors was not evident in three studies [7,9,13] and the case–control study did not report on patient source or time frame for recruitment [9]. All prospective studies accounted for losses of patients to follow-up [3,10,13], but only four studies included a fall definition and reported the methodology for determining and recording falls incidence [3,10–12]. When interpreting the results of this review, the quality and rigour of included studies should be taken into account. It should also be noted that the lowest scoring article was published as a letter [13].

Falls incidence

In this review, falls incidence refers to the number (%) of people who fell during the study period. Retrospective falls (i.e., fall history) incidence ranged from 10% to 43% and prospective falls incidence ranged from 35% to 50%. Methodology for collecting falls data varied between studies and included the use of questionnaires [8], interviews [3,9,11,12,14], interview-assisted questionnaires [7] and prospective monthly reporting via calendars or registration cards [3,10,13]. Falls data from all studies was “self-reported.” However, five studies did not include a fall definition [7–9,13,14] and there was inconsistency in fall definition across the remaining studies [3,10–12].

Risk factors

Seven studies investigated factors associated with falls in RA [3,8–11,13,14]. Risk factors were classified into (1) physiological, (2) pharmacological, (3) extrinsic and (4) measures of RA disease activity. Multivariate logistic regression analysis was used to identify factors associated with falls history in cross-sectional studies [8,11,14] and to identify independent predictors of falls in prospective studies [3,10,13]. In addition, one prospective study [3] also used bivariate logistic regression analysis to identify risk factors associated with falls, not taking into account confounding variables. The case–control study analysed potential falls risk factors using multiple stepwise linear regression and reported *R* values [9]. Results are summarised in Table 3.

Physiological risk factors

All studies assessed age as a risk factor for falls and found no significant association between age and falls frequency. There was no gender difference between fallers and non-fallers in five studies