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Depression and inflammatory arthritis are associated in both Western and Non-Western countries: Findings from the World Health Survey 2002

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ABSTRACT

Objectives: Epidemiological studies have linked arthritis to depression. However, it remains unclear to what degree the association between arthritis and depression extends to low income countries and whether it can be replicated for inflammatory arthritis (IA). We aimed to address these knowledge gaps based on a large multi-national sample.

Methods: Cross-sectional data was drawn from the 2002 World Health Survey. IA was defined as reports of either a diagnosis or treatment of arthritis and morning stiffness for >30 min. Self-reported depression was defined as positive if participants reported its prior diagnosis or treatment or if they were classified as suffering from a major depressive episode by a seven-item screening instrument. Multivariable logistic regression analysis was used to estimate odds ratios (ORs) and 95% confidence intervals (CI) for the entire sample and stratified by sex and continent.

Results: The odds of IA was 2.6-fold increased in those with depression compared to those without (OR = 2.64, 95% CI 2.18–3.21) in the entire sample. This association was observed in both men (OR = 3.06, 95% CI 2.19–4.27) and women (OR = 2.50, 95% CI 1.95–3.21). Similar associations were found on the continent level, but were generally stronger for the Americas and Asia compared to Africa and Europe.

Conclusions: Although our definition of IA was limited by the use of self-reported morning stiffness, this study suggests that there is a positive association between inflammatory arthritis and depression in Western and Non-Western countries, suggesting that this relationship represents a universal phenomenon.

1. Introduction

"Arthritis" constitutes a broad diagnostic label encompassing any form of joint disease or related suggestive symptoms, in particular osteoarthritis (OA) and inflammatory arthritis (IA) entities such as rheumatoid arthritis (RA) or psoriatic arthritis (PsA). The etiology and therefore the indicated therapeutic approaches differ between OA and IA: while OA is currently thought to be a primarily degenerative disease, IA is generally viewed as an autoimmune mediated disease [1]. Therefore, OA does not, but IA does respond to treatment with immunosuppressive therapies. In clinical practice, physicians rely on a variety of sources for diagnostic information (e.g., reported joint symptoms, physical examination of joints and tendons, laboratory tests, and imaging methods) to distinguish OA from IA. While untreated or poorly treated OA patients tend to report a short episode of severe joint symptoms after rest in the morning and at other times during the day, patients with untreated or insufficiently controlled IA often report a painful stiffness of affected joints primarily in the morning, often lasting for several hours. Due to these properties, self-reported "morning stiffness" of a certain duration (often 30 min or more) is often employed in epidemiological studies with limited resources to distinguish inflammatory from non-inflammatory forms of arthritis.

The body of literature on the relationship between inflammatory forms of arthritis and depression or depressive symptoms comprises studies conducted in clinical samples as well as population-based studies. For instance, a study investigating the relationship between remission of rheumatoid arthritis (RA) and symptoms of depression or anxiety found that patients with RA who achieved clinical remission reported significantly less symptoms of depression or anxiety compared with non-remitters [2]. Another study followed a cohort of RA patients

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over an observation period of 11 years and found that co-morbid depression was negatively associated with physical functioning over that period [3]. A longitudinal study in patients with psoriatic arthritis (PsA) reported a bidirectional association between pain and depressive symptoms [4]. A recent systematic review and meta-analysis including 13.189 RA patients from 72 studies reported a prevalence of major depressive disorder of 16.8 (10–24)% and that depression was associated with poorer RA outcomes [5]. A further systematic review including seven articles which evaluated the temporal relationship between depression and RA outcomes found that co-morbid depression may exacerbate pain and disease activity and decrease the efficacy of pharmacological and non-pharmacological RA treatments [6].

While the interrelationship of depression and arthritis outcomes in clinical samples appears well–established, population-based epidemiological studies remain sparse and are limited to developed countries. Both a study from the Netherlands [7] and a study from Taiwan [8] demonstrated that the risk of developing any mood disorder or depressive disorders was twice as high in individuals with pre-existing arthritis compared to those without. Approximately the same estimate was found in a large multinational sample from the multicountry World Mental Health Survey (WMHS) [9]. The data pertain to 18 surveys carried out in 17 countries in the Americas, Europe, the Middle East, Africa, Asia and the South Pacific. It must be noted, that only seven of the 17 countries included in the WMHS were from South America, Asia and Africa, and that low-income countries were not included at all. All the existing studies have performed limited adjustments and are restricted to middle and high income countries.

On a global level, both arthritis (non-inflammatory and inflammatory) and depression have been assessed in the World Health Organization (WHO)'s World Health Survey (WHS) [10]. Measuring self-reported subjective health on a scale from 0 to 100, people reporting depression had a greater health decrement compared with people reporting arthritis (72.9 vs 79.3), and both subgroups had greater health decrements than individuals without any chronic condition (90.6) [11]. Notably though, individuals reporting both arthritis and depression had a mean health score of 67.1, indicating that reporting both conditions is linked to a substantially greater health decrement than reporting either depression or arthritis. Overall, the prevalence of depression was significantly higher in people with arthritis (10.7 (9.1–12.3) %) as compared to the whole sample (3.2 (3.0–3.5)%). Although this finding provides initial evidence for a strong association between depression and arthritis, the prevalence of depression needs to be compared between people with and without arthritis and adjustment of confounders is desirable if the aim is to investigate the association between depression and arthritis in a valid manner. Furthermore, it is unclear, to what degree that association is consistent around the globe. Although somatic presentations such as tiredness seem to be universal core features of depression [9], its cultural manifestations do vary. For instance, it has been suggested that Chinese people do not express sadness, but may express pain, dizziness, fatigue, or discomfort [12]. A study exploring the lived experience of major depression in Javanese people found that depression was strongly connected to "discouragement" [13]. Further, access to and level of health care in relation to both depression and arthritis likely vary across countries. Such contextual factors (e.g., culture and health care) can potentially modify the association between depression and arthritis. It further remains unknown how robust the association is when confounding variables such as socio-economic status, lifestyles and co-morbidities are taken into account. Finally previous investigations have focused on the broad diagnostic label "arthritis". However, since osteoarthritis and inflammatory arthritis are different diseases, it is warranted to extend the existing evidence through focussing on inflammatory arthritis (IA).

The aim of this study was therefore to estimate the association between inflammatory arthritis and depression in 47 countries around the globe, adjusting for important covariates.

2. Methods

2.1. Study population

Cross-sectional representative population samples from 70 countries had been included in the 2002 WHS [10]. In brief, sampling of study participants involved either a single-stage random process or multi-stage procedures stratified by age, sex, and residential area. Within identified households, any individual aged ≥ 18 years was eligible and each household member had an equal opportunity of being approached for participation. It has been reported that informed consent was obtained from all study participants and that ethical approval was obtained at each study site [11]. Response rates ranged from 63% in Israel to 99% in the Philippines.

For the current investigation, we excluded countries with missing data on sampling weights required for the statistical analyses ($n = 11$). In addition, samples were excluded if data on any of the key variables of interest, including confounders (see below) had not been collected ($n = 12$). On the individual level, persons were excluded in case of missing data for any the variables of interest to us. The final analytic sample included 208,660 women and men from 47 countries. The flow chart in Fig. 1 demonstrates how we arrived at the final analytical sample.

2.2. Depression

In line with prior approaches [14], we used all available information on depression in our primary analyses. Depression was defined as present if any of the following criteria was met: 1) a self-reported diagnosis of depression ("Have you ever been diagnosed with depression?"), or 2) self-reported treatment of depression ("Have you ever been treated for it?") or 3) categorization as an MDE (major depression episode) case. To define MDE, a 7-item screening questionnaire was used applying a standardized DSM-IV-based (Diagnostic and Statistical Manual of Diseases, 4th edition) scoring algorithm. Five of those items addressed whether depression-like affective ("Have you had a period lasting several days when you felt sad, empty or depressed?" "[…] when you lost interest

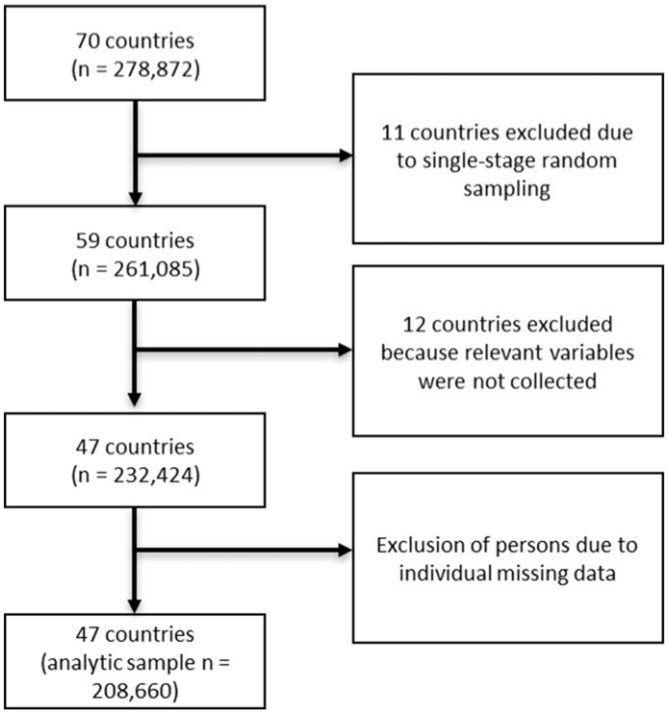

Fig. 1. Flow chart depicting the flow from the number of people originally interviewed and the final analytical sample for this study.