

# Prevalence of Anxiety Symptoms and its Impact in People with Osteoarthritis: An Update

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## Abstract

Anxiety, a very common psychological syndrome in the aging population, is a potential moderating factor in the context of disabling osteoarthritis, the most common joint disorder affecting the older population. This narrative review examines the extent to which anxiety may preside among adults with a diagnosis of osteoarthritis, regardless of site, and its linkage to the disabling process. Drawn largely from English language peer reviewed publications over the last 35 years, articles that discussed the topic of anxiety among cases with osteoarthritis were examined to demonstrate that this correlate is very important to evaluate and is amenable to treatment. Although not well represented in the vast body of literature, ample evidence implies untreated anxiety is likely to produce excess pain, and less optimal outcomes than that which is treated. It is concluded that more attention to this correlate in the clinical realm is highly desirable to offset the deleterious outcomes associated with one or more forms of anxiety, regardless of joint site, or disease duration.

**Keywords:** Anxiety; Disability; Osteoarthritis; Outcomes; Surgery; Treatment

## Introduction

Anxiety, a state of apprehension and distress occurring in different forms, including pre-existing trait anxiety, generalized anxiety disorder, and state anxiety is widespread among adults in general, as well as adults with a variety of health conditions [1-4]. Commonly affecting the individual's physical, functional, and social well-being, as well as their overall health status and life quality significantly and adversely [5], it is our view that the presence of this condition is often overlooked in general among the aging adult population. Moreover, we believe this mental correlate does not receive the same attention as those physical correlates that accompany the disabling long-term health condition known as osteoarthritis, an irreversible chronically painful destructive musculoskeletal condition of one or more joints (Table 1 and Table 2). This brief was designed to update the extent to which anxiety has been observed to prevail in cases diagnosed as having osteoarthritis, the impact of anxiety in the context of osteoarthritis, and the implications of this information in the context of optimizing outcomes for adults with osteoarthritis, and for reducing the immense overall burden associated with osteoarthritis.

## Methods

To provide a comprehensive understanding of this topic, we focused on retrieving all relevant papers published between 1980 and Jan 2016 in the major data bases. To explore to what degree anxiety is likely to prevail in osteoarthritis, we specifically sought clinical studies that addressed this question in some way, regardless of instrument used. To ascertain the possible impact of anxiety on health status and/or health outcomes among people with osteoarthritis we examined correlational

or prospective studies that embedded some related details in this respect.

S.No	Sites that can be affected by osteoarthritis
1	Neck
2	Low back
3	Knee
4	Hip
5	Hands
6	Ankles
7	Knee + hip
8	Knee + hand
9	Hip + hand
10	Knee + hip + hand
11	Acromioclavicular joint
12	Shoulder
13	Elbow
14	Wrist
15	Thumb
16	Jaw

**Table 1:** Sites that can be affected by osteoarthritis.

To this end, we sought and utilized reports embedded in the Academic Search Complete, PubMed, Scopus, Web of Science, Science Citation Index, and PsychInfo data bases using the key words, anxiety and osteoarthritis.

S.No	Symptoms
1	Anxiety
2	Body image distortions
3	Bone crepitus on movement
4	Depression
5	Functional Limitations
6	Impaired joint Range of Motion
7	Inflammation
8	Joint deformity
9	Joint hypertrophy
10	Joint laxity
11	Muscle atrophy
12	Muscle weakness
13	Obesity
14	Pain, aching and/or swelling
15	Poor proprioception
16	Poor self-efficacy
17	Postural problems
18	Reduced fitness
19	Sleep problems
20	Social functioning impaired
21	Stiffness
22	Work Disability

**Table 2:** Typical symptoms experienced by adults with osteoarthritis, a chronic disabling musculoskeletal health condition.

Only English language peer reviewed publications were deemed acceptable and all selected papers had to focus on osteoarthritis patients, rather than other forms of rheumatic disease. The key findings were categorized into three key topics: those examining the presence of anxiety in the context of osteoarthritis, the impact of anxiety on osteoarthritis disability, and the implications of these findings. No meta-analyses were conducted due to the limited number of publications in this realm, and papers retrieved were not constrained to any stage of the disease process, such as pre or post-surgical anxiety observations. All research articles that addressed one or more of the topics of interest were first carefully examined, and only included in a related narrative if they provided information on prevalence, disease severity, and/or treatment implications.

## Results

Over the course of time, when utilizing the key words anxiety and osteoarthritis, the numbers of studies located in: Academic Search Complete were 139, CINAHL-117, PsychInfo had 137 articles listed, Science Citation Index cited 308 items, Web of Science listed 371 items, Scopus listed 851 items, and numbers in PubMed as of Jan 30, 2016 were 348 [equal to only 5% of all osteoarthritis publications]. Types of studies included: cross-sectional clinical studies, presurgical, post-surgical treatment, and rehabilitation studies. Joints studied included the hip, knee, hand, and temporomandibular joints, but many papers on osteoarthritis were not related in any way to the present topic. The Hospital Anxiety and Depressions [HAD-A] and Spielberger Anxiety Scales were most commonly used, even though these do not prove anxiety is clinically present.

## Prevalence Findings

In terms of identifying whether anxiety in any form is a consistent correlate among people suffering with definitive osteoarthritis, we found no major study has specifically sought to estimate anxiety in a large cohort of well-defined osteoarthritis sufferers. Most studies that have attempted to provide information on this correlate were limited in size and the primary purpose was generally to examine osteoarthritis in general, or anxiety as a correlate of pain or function. Despite the paucity of studies on this present topic, when compared to studies on depression, and especially to other commonly measured osteoarthritis correlates such as obesity [see Box 2] one can potentially expect approximately one quarter of adults with painful osteoarthritis to present with some form of anxiety, as outlined by Castano et al. [5] and Stubbs et al. [6]. This former group found anxiety to occur at high rates of 24.7% among a cohort of 1258 cases, and the latter group indicated that almost 20% of cases with osteoarthritis have anxiety symptoms. In an earlier study, Axelrod et al. [7] found that among 54 patients with osteoarthritis, the majority of whom were women, the prevalence of clinically significant anxiety and/or depression was 40.7%. Marks [8] showed approximately nine percent (92 cases) of 1000 disabled hip osteoarthritis cases awaiting surgery had a prior mental health disorder, and among these patients, 5.5% (44 cases) reported trait anxiety histories, alone or in combination with trait depression. Among the 112 cases reporting either the presence of trait and/or state anxiety, nine cases reported both knee osteoarthritis of these conditions and a further nine with depression histories reported state anxiety. However, most of the 90 cases experiencing state anxiety had no prior anxiety history. Memel et al. [9] found 24.4% of patients with osteoarthritis exhibited anxiety in some form, which the general practitioner did not always recognize, and more recently Wong et al. [10] found a high prevalence of psychiatric morbidity, including anxiety among cases with knee osteoarthritis visiting an orthopedic clinic. Most of these data concur with findings of Perrot et al. [11] who observed many patients with either hip or knee osteoarthritis had mild anxiety as recorded using the HADS.

Unsurprisingly, Duivenvoorden et al. [12] who examined a sub-set of total hip or knee arthroplasty patients found high anxiety prevalence preoperatively. Moreover, those with preoperative anxiety had worse patient reported outcomes at 3 and 12 months after surgery and these patients were less satisfied than those with no anxiety. Thus, even though anxiety prevalence may vary, depending on nature of sample, the instrument used to assess this, the type of anxiety present, and the overall osteoarthritis disease and health status, most available studies exemplify the negative role anxiety might play in the disabling process

of osteoarthritis. For example, in a study of osteoarthritis cases, even though Hayashi et al. [13] found a low rate of anxiety in their cohort study, anxiety was a negative disease correlate. Rates were also low in the study by Hsieh et al, [14] although as outlined by this group, pain is generally associated with increased psychological distress. Many, if not the majority of published studies on the clinical presentation of the adult with osteoarthritis have not measured or reported on anxiety however, or if they have, they have measured this alongside depression and reported this as a mental health variable, the samples have often been highly heterogeneous, the measurement tools inconsistent, not all joints have been studied, and hence the data and their results are clearly limited in their generalizability, at present. They may also be underestimates of the presence of anxiety in osteoarthritis in general, as most surgical studies until recently did not examine this correlate. Most studies too are only indicators of anxiety symptoms, and are not based on confirmatory clinical diagnoses.

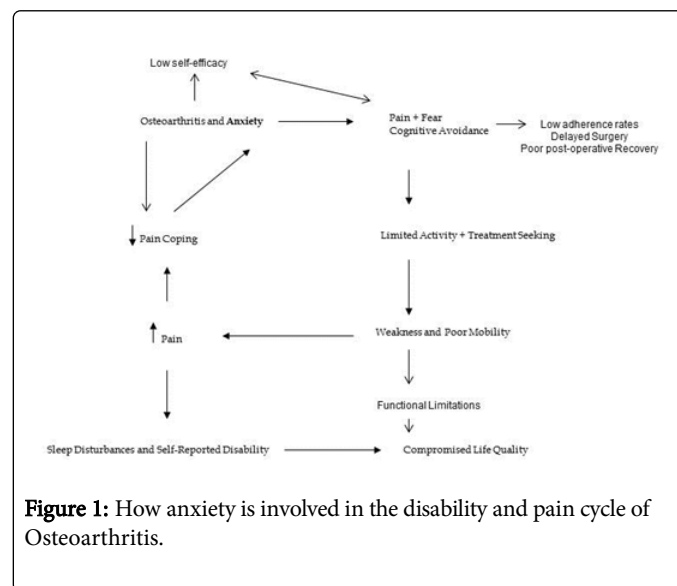
### Impact

The fact that anxiety may be more common than not among cases with osteoarthritis is important to consider given that anxiety has been observed to be associated with more severe pain and less than optimal functional assessments [15-18]. Hayishi et al. [13] too noted anxiety-related responses to pain were significant correlating factors for gait speeds, in patients with osteoarthritis of lower limbs, while Ozcetin et al. [19] found anxiety impacted overall function among knee osteoarthritis cases.

Blackburn et al. [20] in examining the influence of preoperative anxiety on satisfaction after total knee replacement similarly found a positive correlation between preoperative anxiety and levels of knee disability, as did Summers et al. [21] who examined cases of primary hip or knee osteoarthritis using outpatient department computer lists. Similarly, a more recent paper by Wise et al. [22] revealed a strong

association between worsened measures of mental health and pain and risk of pain flares.

Likewise, McHugh et al. [23] who examined predictors of outcomes of recovery following total hip replacement surgery found anxiety was a significant factor influencing the degree of recovery.



**Figure 1:** How anxiety is involved in the disability and pain cycle of Osteoarthritis.

As outlined above, the presence of anxiety, while not always assessed or considered as a component of osteoarthritis disability, is a potentially highly important independent determinant of the disease severity and outcomes such as pain, function, and life quality [24], as well as functional declines [25] (Table 3 and Figure 1).

Authors	Study approach	Key results
Axford et al. [7]	54 cases with lower limb OA were studied	Anxiety is common in OA and is related to pain and disability
Badel et al. [26]	16 patients with temporo mandibular joint OA 20 controls	Patients with chronic pain had high anxiety levels before treatment
Badura-Brzoza et al. [27]	Longitudinal study of 103 cases undergoing hip replacement surgery for primary OA	Total hip replacement outcomes are influenced by trait anxiety
Blackburn et al. [20]	40 knee arthroplasty patients	The severity of preoperative anxiety and depression was associated with higher levels of knee disability (coefficient = 0.409; p = 0.009).
Chen et al. [28]	Cross sectional study of 192 out patients	Key predictors of sleep were high anxiety levels
Creamer et al. [29]	Cross-sectional study of 69 knee OA cases	Disability was associated with anxiety
Eliis et al. [30]	154 indigent patients undergoing total knee	11% have pre surgical anxiety arthroplasty Anxious patients reported lower patient perceived outcome scores at 1 year
Ferreira et al. [24]	40 women with knee OA; 25 controls	Women with OA have higher anxiety rates than women with no OA
French et al. [18]	1010 hip OA cases after treatment	Anxiety was predictive of a positive outcome at 9 weeks
Fujita et al. [31]	Qualitative report related to hip surgery for OA	Some patients expressed anxiety over limited mobility, body image and prosthesis
Hernandez et al. [32]	Systematic review of 37 studies	Anxiety influences post op. pain
Hirshman et al. [33]	104 knee OA cases undergoing surgery were studied	Patients with higher state and trait anxiety had worse function before and after surgery

Jacobs et al. [34]	1020 knee OA surgeries followed for 2 years	41.9% of less severe cases, reported anxiety, and were more dissatisfied than more severe cases
McHugh et al. [23]	206 patients awaiting hip arthroplasty	Anxiety influenced recovery at 6m
Montin et al. [35]	Longitudinal study hip OA cases before + after surgery	Pre-operative trait anxiety predicted health quality of life before and after surgery
Pinto et al. [17]	92 total hip and knee arthroplasty patients	Anxiety at 4-6 months was a predictor of persistent post-surgical pain
Salmon et al. [36]	Longitudinal study of 102 cases undergoing hip replacement surgery	Recovery at follow-up was slower in those with greater anxiety
Scopaz et al. [37]	182 cases with knee OA	Higher anxiety scores rates were associated with worse function scores
Sinikallio et al. [38]	Examined 111 cases of OA, 35-75 years with knee OA	Negative emotions impact pain and disability
Smith and Zautra, [39]	88 cases of women with OA	Anxiety was related to elevations in current and future pain at twice the rate for depression
Wong et al. [10]	115 knee OA cases	Anxiety was found in 24% cases

**Table 3:** Selected findings in the available literature linking anxiety to adverse clinical and surgical outcomes over the past 15 years; OA: Osteoarthritis.

### Discussion and Conclusion

As outlined above, people with osteoarthritis may exhibit various degrees of anxiety, an important mental health symptom, at all stages of the disease process. Moreover, the presence of anxiety in any form clearly heightens pain and disability levels, while retarding short term and long term outcomes, including optimal recovery rates after conservative, as well as surgical interventions. Pain and disability in turn, may invoke anxiety, increased fear, and a spiral of adverse functional outcomes. Not surprisingly, Davis et al. [40] who examined the associations of various health indicators and the psychological well-being of adults with and without radiographic knee osteoarthritis found self-reported knee pain correlated significantly with the presence of psychological distress, rather than visible joint destruction. Similarly Van Baar et al. [41] found that after controlling for other characteristics, the psychological characteristics of patients with osteoarthritis, such as anxiety, contributed as much as the more traditional kinesiological measures to the patient’s disability. A related prospective study by Dieppe et al. [42] found adults with osteoarthritis examined over an eight year period generally had a poor outcome with high levels of physical disability, as well as anxiety, especially if they had knee osteoarthritis. In addition, anxiety can clearly heighten osteoarthritis disability, while lowering quality of life [19,43,44], and can slow the post-operative recovery process [17] quite considerably.

Consequently, efforts to routinely examine both the physical as well as the mental health status of this patient group followed by tailored and targeted interventions with periodic follow-up visits to re-examine levels of anxiety are strongly indicated for decreasing the osteoarthritis burden as outlined by Montin et al. [35]. That is, despite the problems in the reported literature, and lack of depth, the possibility that anxiety is an important element in the disease process should not be ignored and appears highly worthy of attention in the clinic and surgical setting to offset the adverse impact of anxiety on health status and intervention efforts [45].

Among those who recognize this imperative, Vrizekolk et al. [46] stress the importance of examining and diagnosing the presence of an anxiety related syndrome among cases with osteoarthritis, as well as among the general primary care population of adults. Hill et al. [47]

too emphasized that physicians need to recognize as well as address the significant additional negative impact anxiety can render on the patients’ physical well-being, while Dorr and Chao [48] advocated for appropriate pre-operative education to allay any unwarranted negative impact attributable to anxiety. For Ferreira et al. [24] the treatment of patients with osteoarthritis should thus include a combination of pharmacotherapy, psychotherapy, counselling and family support, given the high percentage of people with osteoarthritis who may be experiencing anxiety symptoms [6].

Other available treatment options include guided imagery [35] the application of video technology [49] pharmacologic interventions [50] well designed pre-operative education [51] anxiety management approaches [52] social rehabilitation [53] Cognitive Behavioral Therapy [54] and a patient-centered approach [45]. Those with trait anxiety histories who may also experience state anxiety [46], those who are overweight, those with excessively high anxiety levels [55] as well as those with multiple morbidities, and those living within an indigent population [30] should be specially assessed to minimize adverse outcomes. These include, but are not limited to: a slower recovery rate after surgery [36] high current and future pain levels [35,39,56], disability scores [57] slower walking speeds [13], distress over body image following surgery [31] post-operative pain and lower perceived self-efficacy [58] and life quality [59] reduced patient satisfaction after total hip or knee replacement surgery [33,60] and revision surgery [61] and distress in general [45]. Screening as a routine practice, followed by carefully tailored and targeted interventions that take into account the diagnostic category of anxiety, as well as the overall coping mechanisms of the patient, plus the degree of distress exhibited is hence of key importance in clinical and surgical settings in efforts to offset the complex adverse associations depicted in figure 1. Accordingly, Rolfson et al. [60] stated surgeons need to be aware of the ramifications of mental health concerns that may influence post-operative pain and outcomes after arthroplasty surgery. In agreement, Ellis advocate patients awaiting surgery be routinely assessed and the impact of any observed anxiety or distress and its negative effect on surgical outcomes should be discussed with patient prior to surgery [30].

As well, since anxiety may complicate the post-operative recovery process, patients exhibiting anxiety during hospitalization might benefit from appropriate treatment and follow-up [62]. Possible instruments that have been used successfully to assess the presence of anxiety in people with osteoarthritis are the: Hospital Anxiety and Depression Scale [HADS] [16-18,63,64]; Pain Anxiety Symptoms Scale [PASS] [64,65]; Beck Anxiety Inventory [19,66].

The State Trait anxiety Inventory [67] and integrated service delivery efforts to detect and treat Anxiety in this group may provide more timely and efficacious osteoarthritis outcomes, rather than adverse outcomes and prognoses of this widespread disabling condition [68].

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