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Disabling Osteoarthritis and Symptomatic Anxiety: Impact and Implications

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1. Introduction

Psychological conditions, such as anxiety, are highly prevalent among adults in general, and among adults with a variety of medical disorders (Fava et al., 2010) and chronic physical conditions, in particular (Sareen et al., 2006; Scott et al., 2007). Anxiety, which may commonly take the form of panic attacks or generalized anxiety, is also frequently associated with depression (Burns et al., 2010; Scott et al., 2007), worse subjective physical health (Paukert et al., 2010), and chronic conditions such as arthritis (Sareen et al., 2006).

This chapter describes the literature and research evidence concerning the nature of anxiety, its prevalence among aging adults, and the impact of comorbid and/or concurrent anxiety symptoms among adults with moderate to severe osteoarthritis, a highly prevalent and painful disabling joint disease. It also highlights the implications of anxiety in the context of osteoarthritis and advocates for improved efforts to identify and treat concomitant anxiety among adults with this condition, regardless of disease stage.

To achieve these aims, the author reports data embedded in the PubMed, Scopus, Science Citation and PsychInfo data bases, as well as data extracted from records of 1,000 hip osteoarthritis surgical candidates. Divided into three parts, this evidence is used to describe the clinical syndromes of anxiety and osteoarthritis, to highlight the implications of the presence of preexisting comorbid anxiety, comorbid anxiety and depression, as well as state anxiety in adults diagnosed as having osteoarthritis, and to argue for more routine screening of anxiety among cases with osteoarthritis.

2. Anxiety and anxiety disorders

Anxiety, a generic term encompassing several common mental health disorders is a psychological syndrome associated with excess fear, and worry. Varying from mild to severe, anxiety disorders are common, costly public health problems that can affect as many as 24.9% of adults over their lifetime (Kessler et al., 1994), and can occur independently, as well as in association with many chronic health conditions (Ying et al., 2010). In addition, anxiety, which is an emotional reaction associated with a heightened state of arousal (Scopaz et al., 2009), is often associated with high rates of medically unexplained syndromes and the excessive utilization of health care resources. As well, anxiety disorders are strongly

associated with low levels of physical health and life quality (Medlowicz & Stein, 2000), as well as high levels of physical disability and functional limitations (Brenes et al., 2005). Anxiety, is also found to play a role in influencing the functional ability of persons with arthritis (Hill et al., 2007), plus the frequency and extent of athletic and sports injuries (Lavallee & Flint, 1996), a strong precursor of future osteoarthritis.

Occurring in at least 5-10% of medically ill or primary care patients (Fava et al., 2010), including those with depression (Kroenke et al., 2010), anxiety can contribute to the fear-avoidance process that can adversely impact health outcomes in people with musculoskeletal conditions (Scopaz et al., 2009). Compared to a prevalence rate for depression of 7.2% in the general population, social anxiety occurred 7% of the time, panic disorder, 4.6% of the time, and generalized anxiety disorder occurred 3.4% of the time (Wiltink et al., 2010). Indeed, despite the fact that anxiety is often overlooked in medical settings when compared to depression, anxiety disorders and their adverse health effects in adults with chronic health conditions can be demonstrated to be as great as those identified for depression (Roy-Byrne et al., 2008).

Several current researchers have consequently posed strong arguments in favor of heightened efforts to screen for the presence of an anxiety disorder in the context of primary care and related settings. In addition, some have stressed the further importance of identifying and correctly diagnosing the type(s) of anxiety syndrome (s) that prevail. In addition, most current reports stress the importance of effectively intervening to minimize the progression of anxiety disorder syndromes, all of which can have an extremely negative impact on the affected individual, including their ability to work and to carry out commonplace activities of daily living (Roy-Byrne et al., 2008; www.medicalnewstoday/info/anxiety, 2010)

In terms of classifying anxiety disorders, which are neurotic disorders where the symptom of anxiety is present or is the predominant feature (Davies & Craig, 2010), two chief categories have been delineated, namely, trait and state anxiety. Trait anxiety refers to the presence of a long-lasting disorder of excessive emotional arousal, which can get worse if not treated (National Institutes of Health, 2009). Commonly termed the generalized anxiety disorder or GAD, this well-established diagnostic disorder is associated with excessive worry about a variety of non-specific situations that are perceived as threatening. Panic disorder, another form of anxiety, is more closely related to a specific extrinsic threat and frequently occurs episodically in response to this identifiable stimulus. While both forms may have a genetic origin, suggesting they are not readily amenable to intervention, both may prevail as learned responses as a result of certain life experiences and exposures and may hence be modifiable (Thompson, 1993). Post-traumatic syndrome, obsessive-compulsive disorder, phobias, social anxiety disorder, and separation anxiety disorder are other forms of anxiety that may prevail among adult populations, and alone or in combination with other forms of anxiety and/or health conditions, all can interfere with work, school, social and work relationships, and the adoption and adherence to health-enhancing behaviors.

Moreover, since many forms of anxiety are accompanied by physical symptoms such as pain and heart palpitations, breathlessness, hyperventilation, headaches, nausea, tiredness, and tension, tremor, parasthesia, irritability, and gastrointestinal disturbances (Tyrer, 1984), the presence of an anxiety disorder can significantly influence one's physical health status in an adverse manner. Physical illnesses, in turn, can readily precipitate psychological distress in

the form of state anxiety, a transitory emotional state of apprehension, especially prevalent among older adults (Paukert et al., 2010). Moreover, the presence of such a transitory state of anxiety, may indicate the underlying presence of GAD in the geriatric medically ill patient, and according to Wetherell et al. (2010) should not be discounted simply as a by-product of medical illnesses or depression, because left untreated, could significantly heighten the severity of the prevailing health condition(s). A persistent state of transitory anxiety can also serve as a precursor for subsequent depression (VanDyke et al., 2004).

Because all anxiety disorders have such an immense personal and social cost, the ability to accurately measure these states is crucial. Among the validated inventories described in the literature for detecting and classifying the presence, type, and magnitude of anxiety are: the Structured Clinical Interview for DSM-IV (SCID) and Diagnostic Criteria for Psychosomatic Research (DCPR) (Fava et al., 2010); the Beck Anxiety Scale (Ozcetin et al., 2007), the Generalized Anxiety Disorder (GAD) Scale (Kroenke et al. 2010; Wetherell et al., 2010); the Brief Symptom Inventory-18, Mini International Neuropsychiatric Interview; the Anxiety Disorders Interview Schedule (Wetheral et al., 2010); the Hospital Anxiety and Depression Scale (HADS) (Axford et al., 2010); the Hopkins Symptom Checklist (Brennes et al., 2005); The Zung Depression and Anxiety Inventory (Salafi et al., 1991), The Mental Health Inventory (Smith & Zautra, 2008), the State Trait Anxiety Inventory (Montin et al., 20070, and the Spielberger State and Trait Anxiety Inventory (Giraudet-Le Quintrec et al., 2003). It should be noted though that while all of these instruments provide measures of the extent of anxiety, they have often been used without specification of their circumstances, all use self-report and commonly differ in terms of the particular form of anxiety that is included (McCracken et al., 1996).

However, using the DSM-IV inventory, studies have shown a significant linear relationship between the presence of anxiety and depressive disorders and the presence of medically unexplained physical symptoms, and more medical symptoms in adults with chronic medical illnesses (Katon et al., 2007). In addition, among most common medical disorders, pain is as consistently associated with anxiety as objective disease indicators are (Katon et al.). Potential causes and predictors of anxiety in addition to medical illnesses and pain include: genetics, the environment, including the physical, psychological and dietary environment, trauma (National Institutes of Health, 2009), obesity and a high fat diet (Van Der Kraan, 2010), being female, having low perceived health and high levels of disability (Wu et al., 2002), and possible brain biochemistry abnormalities. Potential determinants of excess disability due to anxiety may include: suboptimal physical activity levels, benzodiazepine and psychotropic medication usage, and insufficient levels of social support (Brenes et al., 2005).

3. Osteoarthritis

Osteoarthritis, a highly prevalent chronic health condition affecting many older adults commonly results in progressively destructive changes in one or more joints and its surrounding tissues. Often associated with other chronic health conditions, most commonly, cardiovascular diseases and obesity, the disease produces varying degrees of chronic and acute pain, plus disability. The disease specifically limits the ability to function physically, as well as the chances of experiencing a high life quality (Montin et al., 2007).

Although often described solely as a physically disabling syndrome, amenable largely to pharmacologic interventions (Tallon et al., 2000), a reasonable body of research shows behavioral conditions such as anxiety can occur at rates of up to 50% among osteoarthritis

cases (Mella et al., 2010). In addition, the importance of identifying and acknowledging this possibility is supported by recent evidence showing adults with knee osteoarthritis report considerable anxiety (Tallon et al., 2000), and tend to have poorer function if they exhibit high rather than low anxiety rates (Scopaz et al., 2009). The osteoarthritic patient with high anxiety levels is also found to experience higher disability rates than those with lower anxiety levels (Creamer et al., 2000). At the hip, where the disease affects 3/100 men and women between 55-74 years of age (Whittle et al., 1990), it is anticipated that existential anxiety (Gustafsson et al., 2010) and/or comorbid anxiety and depression are likely to co-exist (Ying et al., 2010), and contribute to its severity (Scott et al., 2007). Yet interventions to minimize anxiety have traditionally played a very limited role in the case management process for this condition.

Indeed, despite the immense impact of osteoarthritis on the national health expenditures of the United States (Weinberger et al., 1989), very little specific information about the role of anxiety and poor psychological health on the magnitude of the disability experienced by adults with this condition exists, when compared to the plethora of research on the physical problems accompanying the disease. In addition, reports that do exist are conflicting. For example, while one highlighted a need for an evaluation of mental health status at time of surgery for purposes of maximizing functional status following hip replacement surgery (Bischoff et al., 2004), another found no immediate impact on this (Caracciolo & Giaquinto, 2005).

To provide a more comprehensive understanding of this topic than is presently available, all relevant papers published between 1976 and Jan 2011 in the major data bases were extracted and reviewed. In addition, related data from this researcher's clinical observations were scrutinized. These data were specifically explored to examine if pain, the problem of most significance to people with osteoarthritis, is significantly heightened by the presence of excessive anxiety as observed early on by Lunghi et al. They were also explored to identify if higher levels of anxiety are likely to be associated with higher degrees of functional impairment among this patient population as discussed by Lunghi et al.

3.1 Key research findings

In support of the findings by Lunghi et al. Summers et al. who examined cases of primary hip or knee osteoarthritis using outpatient department computer lists showed higher levels of state anxiety were significantly correlated with higher pain scores on all dimensions of the McGill Pain Questionnaire, except the evaluation dimension. In addition, high levels of trait anxiety were significantly associated with higher levels of affective pain and pain intensity scores. State anxiety was also significantly and positively correlated with all measures on the Sickness Impact Profile Inventory, and high levels of trait anxiety were associated with greater functional impairment on several of the Sickness Impact Profile subscales, and the overall score. This research was consistent with findings by Salafi et al. (1991) who examined the relationship between disability and psychological variables of anxiety and depression among 61 women with symptomatic knee osteoarthritis. Using an anxiety inventory, and a pain and disability index, they found disability and pain correlated with the degree of psychological involvement.

Similarly, a more recent paper that focused on psychological factors and their relation to osteoarthritis pain in a sample of 266 cases with hip and/or knee osteoarthritis, revealed a strong association between worsened measures of mental health and pain and risk of pain flares (Wise et al., 2009). This finding was consistent with work by Creamer et al. who examined the relationship of anxiety and depression among cases with knee osteoarthritis and found anxiety as assessed using the trait section of the Speilberger State Trait Anxiety

Inventory was associated with self-reported disability as measured using the Western Ontario Measurement Assessment tool (Creamer et al., 2000).

While Creamer et al. felt it was unclear from their cross-sectional study whether anxiety is a risk factor for subsequent disability or whether disability is, itself, a reason why subjects become more anxious, anxiety could provoke the onset of degenerative joint changes if after an acute injury for example, pain and fear triggered anxiety and movement limitations that lead to loss of muscle bulk, generalized deconditioning and loss of confidence. Although only prospective studies can potentially clarify this issue, anxiety can foster injury (Lavallee and Flint, 1996), and injury can lead to osteoarthritic joint damage. Especially in the context of total hip replacement for severe hip osteoarthritis where many candidates have previously fallen and fractured their hips, it seems patients who demonstrate declining, rather than improved functional ability following this procedure, may do so as a result of factors related to their mental health status, rather than their physical status (Badura-Brzoza et al., 2008). In this regard, Rolfson et al. (2009) found pre-operative anxiety/depression was a strong predictor of pain relief and patient satisfaction, in that those who were less anxious had less pain and were more satisfied with the surgical procedure and its outcome. Similarly, Badura-Brzoza et al. (2009) who conducted a longitudinal investigation concerning the relation between some psychological and psychiatric factors and their influence on health-related quality of life in 102 patients after total hip replacement, found trait anxiety was significantly associated with postoperative mental as well as physical performance.

Likewise, Smith and Zautra (2008) who examined the effects of anxiety on pain in women with osteoarthritis and rheumatoid arthritis found anxiety was related to elevations in current and forthcoming pain estimates, suggesting anxiety is important in explaining the progression of the disease, and in provoking a fear of participating in those physical activities that are essential for minimizing overall disability. In particular, when studying the differential effects of depression and anxiety on pain, it was noted that the effects were nearly twice as large for anxiety compared to depression, suggesting the mechanism of action is unique, and needs much more emphasis in the clinical arena than is presently evidenced.

These data were further substantiated by Axelrod et al. (2010) who undertook to ascertain the prevalence of anxiety and depressive disorders in an outpatient population with osteoarthritis. This group also examined the interrelationships between the severity of the disease, pain, disability, and depression, using the Hospital Anxiety and Depression Scale (HADS), along with a structured clinical interview. Among the 54 patients studied, the majority of whom were women, the prevalence of clinically significant anxiety and/or depression was 40.7%. In addition, this group found pain correlated with the prevailing anxiety and depression scores and disability was greater in patients with a combined depression and anxiety history.

3.2 Additional research findings

Since anxiety can undoubtedly contribute to a poor treatment response, if unrecognized and/or untreated (Katon et al., 2007), we recently elected to conduct a retrospective review of the available records of 1,000 hip osteoarthritis surgical candidates to ascertain whether anxiety is a prevalent feature of this condition, and if so, what implications, if any, does the presence of anxiety have for this population. Additional data on medical comorbidities, pain, and function before surgery, and discharge destination after surgery, which is a proxy for functional achievement was also extracted. As outlined in a previous publication (Marks, 2009), the peri-operative data showed approximately nine percent (92 cases) of the cohort

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 Anxiety and/or State Anxiety, 9 cases reported having both of these conditions, and a further 9 with Depression histories reported State Anxiety. However, most of the 90 cases experiencing State Anxiety had no prior anxiety history (See Table 1).

	Depr Hx	Dep+SA	Dep/Anx Hx	TA	SA	SA+ TA
N	50	9	20	22	90	9
%	5	0.9	2.0	2.2	9.0	0.9

Abbreviations: Dep=depression; Hx=history; SA=state anxiety; TA=trait anxiety

Table 1. Distribution of mental health status of 92 cases with pre-existing Depression and/or Anxiety and 90 reporting State Anxiety among 1,000 hip osteoarthritis cases requiring hip replacement related surgery and percentage of these cases in each observed diagnostic category.

When analyzed further to examine the implications of the presence of anxiety on the presentation of the surgical patients' health status, more women than men with hip osteoarthritis were found to suffer from either trait depression and anxiety, trait anxiety, and/or state anxiety ($p < 0.001$), and those with depression and anxiety histories tended to be more impaired before surgery in terms of numbers of blocks they were able to walk than those with no mental health condition (See Table 2).

Condition	N	Mean	SEM	F	p
Depression+Anxiety	17	2.94	.9	1.94	.12
Trait Anxiety	22	4.05	1.1		
Otherwise Healthy	40	5.04	.8		
State Anxiety	29	3.14	.5		

Table 2. Table showing mean and standard error of the mean (SEM) numbers of blocks walked prior to surgery as reported by 108 cases with different categories of mental health status about to undergo hip surgery for hip osteoarthritis related problems.

In addition, those with concomitant depression and anxiety histories also tended to recover more slowly than those with no such history ($p < 0.001$) and had higher levels of pain on a visual analogue scale than those with anxiety alone or those with no such history ($p < 0.008$) (See Table 3).

From the data reviewed, it was also shown that those with anxiety histories tended to be heavier on average than those with no anxiety history with body mass indices of 28.5±8.0 compared to 27.2±3.9, respectively, and on average most had at least one comorbid health condition, even though the sub-group representing those with a Trait Anxiety history tended to be younger than those with depression, those with no anxiety or depression history, and those exhibiting State Anxiety (58.1±11.9 versus 62.5±10.7, 62.5±11.5 and 64.6±12.5 years of age, respectively).

By contrast, those patients expressing State Anxiety tended to be slightly older than the average otherwise healthy patient, and not surprisingly therefore, this subgroup presented with higher numbers of comorbid illnesses on average than those with Trait Anxiety or No Anxiety (1.6 versus 1.22 versus 0; $p < 001$).

Condition	N	Day 1 Post Surgery	Day 3 Post Surgery	Extent of Improvement	% Change
Depression +Anxiety	17	7.5+13.1	74.5+65.9	67	90
Trait Anxiety	18	9.8+18.5	68.7+48.6	58.9	85
Otherwise Healthy	37	13.5+21.7	116.2+65.6	102.7	112
State Anxiety	19	50.9+45.4	70.6+44.1	19.7	27
p		0.001	0.046		

Table 3. Table showing Day 1 and Day 3 recovery rates in distance walked in feet after surgery for 91 cases with hip osteoarthritis as assessed by analysis of variance.

In terms of discharge destination, a surrogate functional measure of outcome, the discharge site correlated with the presence or absence of an anxiety history, and in a comparative subsample analysis, 25% of 42 cases with an anxiety history were discharged to Rehabilitation Centers, compared to 10.6 percent of 47 cases with no pre-existing anxiety history ($p < 001$).

Finally, the State Anxiety perceptions expressed by patients prior to surgery were highly variable even though several broad categories or several themes could be identified among these as outlined in Table 4.

In addition to the variety of issues perceived as threatening to several cases of hip osteoarthritis undergoing surgery who had had no prior background history of anxiety, among patients who expressed feelings of anxiety before their surgery and who had either a pre-existing anxiety or depression history, there were the following comments:

2 cases said they were generally anxious about surgery

1 case said they were very nervous about surgery

1 other case said they were anxious about rehabilitation and scarring

1 further case said they were very anxious and despondent over pain and immobility to walk and care for grandchildren

Finally, one said they were anxious about experiencing excessive pain and had a fear of the hospital.

Thus no specific pattern of fears or anxiety were evident, and clearly some were worried about pending events, and some were more apprehensive over future events.

4. Implications of anxiety in the context of osteoarthritis

Osteoarthritis is a common painful disease affecting many older adults. Associated with functional limitations and pain, the problem of major concern to patients, the disease is often progressive and requires extensive self-management.

Although there is no hard evidence the assessment and treatment of anxiety will reduce the burden of osteoarthritis, it is the author's view that the aforementioned research provides a fairly solid argument for intervening to prevent and treat both trait and state anxiety that may detrimentally handicap a patient's ability to maximize their own health. That is, as outlined by Summers et al. (1988), there is little doubt that psychological factors such as the presence of anxiety and/or anxiety and depression are of significance in pathogenesis of osteoarthritis, and are especially likely to influence pain and the degree of functional impairment experienced by this patient group, both negatively and significantly (Hochberg

Types of Anxiety Expressed	Examples and Numbers of Patients Experiencing these Feelings
General anxiety	*"Anxious to get condition corrected"-1* *"I feel very anxious"-3* *"I feel anxious and want to speak to a nurse"-1*
Pain and mobility	"*I am anxious about pain*"-4 "*I am anxious because I can't convey information about pain*" -1 "*1 am anxious about whether pain will go away*" – 1
Surgery	"*I am anxious about surgery in view of age*" – 1 "*I am anxious about recovery and surgery going well -2*" "*Anxious about work after surgery*" - 2 "*Worried operation will have complications*" -1 "*Anxious about operation*" -1 *"I am feeling anxious and nervous about the surgery"-14*
Other	"*Anxious about* m*edications and food*" – 1 "*Anxious about surgery and* h*istory of phlebitis*" – 1 "*Anxious because of dependency for activities of daily living*" - 1 "*Anxious about physical limitations*" – 1 "*Anxious about limited function-walking and shopping*" -1 "*Anxious about physical condition*" -1 "*Anxious about being released to early*" -1 "*Anxious about extent of disability*" -1
Anxious about post-operative situation	"*Very worried about post-operative pain*"-1 "*Anxious and scared about surgery and ability to move around afterwards*"-2 "*Anxious about returning to normal*" -1

Table 4. Table showing a selected variety of anxiety perceptions and their sub-themes as expressed by adults undergoing hip joint surgery for hip osteoarthritis before surgery.

et al., 1989). More specifically, psychological factors, such as anxiety, which is amenable to intervention, can potentially predict early warning signs of hypertension/heart disease, a common comorbid condition observed in people with osteoarthritis that increases the prevailing disability quite considerably (Marks & Allegrante, 2002; Weinberger et al., 1989). Moreover, as argued by Summers et al. (1988) variables such as anxiety may have a negative impact on the adult with osteoarthritis, because anxiety may reduce pain tolerance, thus contributing to an ongoing cycle of inactivity and further pain.

Not surprisingly, Davis et al. (1992) who examined the associations of various health indicators and the psychological well-being of adults with and without radiographic knee osteoarthritis found psychological well-being and health status were consistently associated with knee pain, regardless of whether the individual had evidence of radiographic knee osteoarthritis or not. That is, self-reported knee pain correlated significantly with the presence of psychological distress, rather than visible joint destruction, a finding also noted for 61 women with knee osteoarthritis by Salafi et al. (1991) and by Creamer et al. (2000).

Similarly Van Baar et al. (1998) found that after controlling for other characteristics, the psychological characteristics of patients with osteoarthritis, contributed as much as the more traditional kinesiological measures to the patient's disability.

These findings of Van Baar et al. (1998) were consistent with those of Sareen et al. who examined the relationship between comorbid anxiety disorders and the presence of various physical conditions. This group found the presence of anxiety was associated with poorer levels of physical functioning, and past 30-day disability scores due to physical problems. It was concluded that anxiety disorders are independently associated with several physical conditions including arthritis, and as such can significantly impact quality of life and disability, and perceived barriers to care (Weinberger et al., 1989). Not unexpectedly, a related prospective study by Dieppe et al. (2000) 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, and a high level of healthcare resource utilization, especially if they had knee osteoarthritis.

The high rate of anxiety symptoms in people with osteoarthritis, and its strong negative correlation with their functional scores (Ozcetin et al., 2007) is not unexpected given its association with both pain and with obesity (Witlink et al., 2010), and avoidance behaviors (Scopaz et al., 2009). Indeed allied research shows obesity, a highly prevalent condition observed among adults with osteoarthritis can significantly increase the risk for mental illness, and the finding that the cohort studied by Marks (2007) tended to show higher body mass indices in those with anxiety histories supports this relationship. Moreover, as discussed by Chan et al. (2008), adults with mental illnesses, including anxiety, obesity and one or more physical illness, such as osteoarthritis, are more likely to be impaired than those without any mental illnesses.

New evidence from an animal model of arthritis, further suggests arthritis is likely to be accompanied by both heightened anxiety responses, as well as a locomotor impairment in its early phases (Skulova et al., 2010), thus stressing the importance of early treatment of osteoarthritis, in general to allay reactive anxiety that can trigger movement avoidance, loss of muscle bulk, generalized deconditioning and loss of confidence (Creamer et al., 2000). Strengthening this argument is evidence from several clinical studies that reveal that negative affective states, such as anxiety, are strongly associated with pain, disability and poor life quality among people with osteoarthritis (e.g., Creamer et al., 2000; Keefe et al., 2002; Ozcetin et al., 2007), and level of pain and pain-related fear are correlated with functional limitations (Heuts et al., 2004). Anxiety and depression can also co-exist among adults with osteoarthritis and this could have an even greater influence on their ability to function physically than those with only one of these conditions, as identified by Axelrod et al. (20010).

This link between anxiety, pain, and disability in people with osteoarthritis, which was also observed by Marks (2007) in almost 9.5% of end-stage hip osteoarthritis cases suggests ample numbers of adults with disabling osteoarthritis may have mood and/or anxiety disorder histories that may often go undetected or overlooked in the treatment schedule being offered. An equal number may exhibit prevailing symptoms of emotional distress that may occur simultaneously or independently, either before or after surgery, or both, as well, and this can magnify pre-operative osteoarthritis disability and slow the post-operative recovery process (Badura-Brzoza et al., 2008), thus strengthening the case for preventing and treating anxiety in adults with osteoarthritis at all disease stages. Indeed, even though surgery for osteoarthritis is usually successful, it has been observed that even the presence of moderate trait anxiety can significantly impair the hip osteoarthritis surgical

candidates health quality of life both before, as well as after surgery (Montin et al., 2007), even though this is often believed to return the patient to optimal function. The cumulative effect of anxiety on osteoarthritis outcomes is conceptualized in Figure 1.

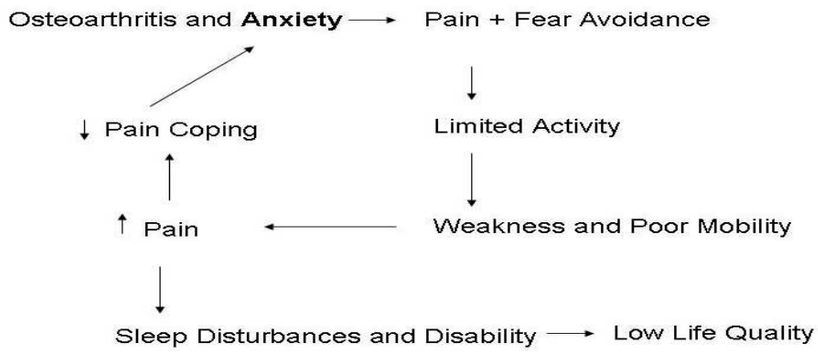

Fig. 1. Schematic representation of problems heightened by anxiety among cases with osteoarthritis.

Unfortunately, as Memel (2000) argued more than 10 years ago, general practitioners and other health providers have commonly lacked knowledge about either the importance of and/or the need to assess and treat the presence of anxiety in their osteoarthritis patients, even though data to this effect has prevailed. This need to enhance screening efforts and foster optimal psychological health among cases with osteoarthritis is becoming increasingly clear however, as outlined in Table 5 and Figure 1 above.

Additionally, data by Vrizekolk et al. (2010) provide further support for 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. This group, who examined the psychological health status of patients with a variety of rheumatic conditions including osteoarthritis, found 64 percent of the sample met criteria for psychological distress at baseline. Although treatment improved this, 69 percent still experienced elevated distress levels and maladaptive illness cognitions after rehabilitation. These data are not surprising given findings that clearly show adults with trait anxiety are likely to experience worse outcomes than those who are not anxious, as well as higher pain levels, poorer coping behaviors, lower levels of physical activity participation, lower levels of social support, and poor sleep patterns, which in turn, could increase their pain and disablement experience adversely (Dekker et al., 2009; Khuwaje et al., 2010; Louie et al., 2010., Montin et al., 2007).

Moreover, since distinctive anxiety disorder subtypes prevail among adults with osteoarthritis, the specific type of anxiety disorder may contribute differentially or incrementally to the overall health related situation, plus the extent and rate of recovery, and may hence require specific, rather than the more common generic intervention approaches. In addition, to support and promote optimal health outcomes for the individual osteoarthritis sufferer, recent findings by Burns et al. (2010) suggest there may be advantages to assessing and categorizing any prevailing anxiety into either a distress or a fear disorder. This is because they found the generalized anxiety or distress disorder was associated with elevated anxiety symptoms during and after treatment. In contrast, fear disorders (i.e., panic disorder, agoraphobia, social phobia, specific phobia) were linked to depression. It could thus be of interest to examine these two specific anxiety-associated

subcategories among cases of osteoarthritis, and as Burns suggests develop interventions to specifically target the type of prevailing distress observed.

Authors	Study procedures	Key findings
Axford et al. (2010)	54 cases with lower limb OA were studied	Anxiety is common in OA and is related to pain and disability
Badura-Brzoza et al. (2008)	Longitudinal study of 103 cases undergoing hip replacement surgery	Total hip replacement outcomes are influenced by trait anxiety
Creamer et al. (2000)	Cross-sectional study of 69 knee OA cases	Disability was associated with anxiety
Montin et al. (2007)	Longitudinal study hip OA cases before + after surgery	Pre-operative trait anxiety predicted health quality of life before and after surgery
Salmon et al. ((2001)	Longitudinal study of 102 cases undergoing hip Replacement surgery	Recovery at follow-up was slower in those with greater anxiety
Smith & Zautra, (2008)	88 cases of women with OA were studied	Anxiety was related to elevations in current and future pain at twice the rate for depression

Table 5. Overview of key findings linking anxiety to osteoarthritis outcomes over the past decade.

Furthermore, since a reasonable proportion of adults with both severe disabling osteoarthritis and GAD may be abusing addictive chemical substances to overcome their anxiety and/or pain (Alegria et al., 2010), this phenomenon should be specifically sought and treated accordingly, because this situation can significantly increase the chances of excess disability (Patten et al., 2006). Other evidence suggests that if either or both of these behavioral syndromes are not clearly distinguished, and adequately treated, their presence could result in higher levels of pain, slower recovery rates at follow-up if surgery is indicated (Salmon et al., 2001), more intense disease activity, and lower health quality of life than is desirable (James et al., 2005; Montin et al., 2007).

In sum, as outlined in Table 5, sufficient past and emerging evidence supports the view that in addition to examining the physical status of adults in routine clinical settings, primary care providers should go beyond their usual medical history to identify and diagnose the presence of psychological symptoms such as anxiety among their osteoarthritis patients. Those with low perceived health, those in pain, those who are overweight, those who have

comorbid conditions, and those with high disability levels who are female should be especially targeted to avoid the adverse impact of anxiety on their health outcomes (Wu et al., 2002).

Similar assessments of the patient's needs and characteristics conducted in the context of the surgical setting, followed by tailored and targeted interventions with follow-up visits to re-examine their levels of anxiety with validated tests would also be highly desirable as outlined by Montin et al. (2007). Here again, women in the higher age categories, those with trait anxiety histories who are more likely to experience state anxiety (Montin et al., 2007), those who are overweight, those who exhibit excessively high anxiety levels (Daltroy et al., 1998), as well as those using narcotics should be specifically targeted. Available treatment options include the use of video information (Ayral et al. 2002), serotonin-reuptake inhibitors (Wu et al., 2002), benzodiazepines applied in therapeutic doses, pre-operative education (Bondy et al., 1999; Giraudet-Le Quintrec et al., 2003; Lin et al., 1997), guided imagery (Montin et al., 2007), anxiety management (Feeney, 2004), social rehabilitation (Badura-Brzoza et al., 2008), and Cognitive Behavioral Therapy (Davis al., 2010) and the mode of intervention should take into account the diagnostic category and its severity.

Indeed, it seems imperative to do this for two reasons. First, because research shows adults with osteoarthritis who are found to suffer from trait anxiety are likely to experience worse outcomes than those who are not anxious, as well as higher current and future pain levels, poorer coping behaviors, lower levels of physical activity participation, lower levels of social support, and poor sleep patterns, which in turn, could increase their pain and disablement experience adversely (Dekker et al., 2009; Khuwaje et al., 2010; Louie et al., 2010., Montin et al., 2007; Smith & Zautra, 2008). Second, pre-operative state anxiety, which is associated with post-operative state anxiety is a significant predictor of pain among patients undergoing knee or hip replacements (Feeney (2004), and those who exhibit state anxiety are also likely to recover more slowly after surgery in the absence of intervention.

5. Conclusion

Anxiety is a serious health condition that may impact the extent of a chronic medical condition (Katon et al., 2007), as well as life quality and the ability to function optimally. Similarly, osteoarthritis, a progressive joint disease associated with pain and disability among aging adults (Hochberg et al., 1989, 1995) has been linked to a poor health outcome and excessive usage of health resources. Commonly described as a physical problem, premorbid or state-related affective comorbid conditions such as anxiety, which significantly increases the progression of disability among older adults (Brenes et al., 2005) may similarly influence osteoarthritis disease outcomes adversely. In particular, anxiety is commonly associated with poor adherence to self-care regimens and increased symptom burden and these factors can provoke or exacerbate osteoarthritis progression as suggested by findings of Katon et al. (2007). Not surprisingly, although often neglected in the context of primary care, an increasing body of emerging data shows consistent evidence of pre-morbid and/or concurrent psychiatric health conditions in sub-populations of adults with one or more medical diagnoses such as osteoarthritis that should be diagnosed and treated accordingly (Keefe et al., 2002). In addition, those with anxiety disorder histories appear to experience a lower life quality (Hopman-Rock et al., 1997), higher rates of pain and disability (Axford et al., 2010), and a lower ability to recover rapidly after joint replacement

surgery when compared to their non-affected counterparts, plus less satisfaction with their intervention.

Yet, in the case of osteoarthritis, it is more common than not for practitioners to focus on the physical aspects of the disease and its medical management rather than on its psychological correlates, and thus no efforts may be forthcoming to implement anxiety reducing treatments that could positively affect functional outcomes later on. This specific situation may need to be remediated at the training level because it may be that primary care providers are unaware of the current research in this area showing psychosocial factors such as anxiety, which can predate the disease or can result from the condition, can determine the extent of the disability that arises over time. They may also be unaware of the methods of assessing anxiety clinically, and of the diverse modes of intervention that can alleviate anxiety. They may also assume that the level of anxiety that may prevail in cases with osteoarthritis of one or more joints is simply to be expected. Similarly adults with arthritis may be reticent to express their fears, thus remaining untreated.

Nonetheless, as outlined by Abrams et al. (2010) and Kim et al. (2010), because anxiety is an important health variable as far as increasing premature mortality and morbidity rates among the older chronically ill and disabled adult, especially the female osteoarthritis patient who is overweight and in the higher age range (Montin et al., 2007), psychometric tests for anxiety should be routinely applied, and those at risk should be treated accordingly, rather than overlooked, in both clinical and surgical settings (Axford et al., 2010). Other evidence shows that even if pain-relieving surgery is undertaken, patients with anxiety may not respond as well to surgery as those with no anxiety (Salmon et al., 2001), and their complexity of care may be increased (Montin et al., 2007), especially if cases with mixed anxiety states and or/anxiety and depression are not identified.

Indeed, the identification and accurate diagnosis of the presence of anxiety, plus the timely implementation of appropriate interventions to alleviate or minimize anxiety, might not only improve upon current health related outcomes, but might also serve to lower health service utilization and costs associated with the overall management of progressively disabling osteoarthritis. Moreover, timely intervention that maximizes function might also reduce symptoms of hypertension and heart disease and asthma caused by psychological distress, as well as any tendency to excess body weight, and pain that independently contributes to osteoarthritis disability. As well, the need for joint replacement surgery may be reduced or delayed by incorporating effective behavioral and psychological approaches into conservative treatment plans (Keefe et al., 2002). Finally, people with advanced osteoarthritis may benefit from joint replacement surgery to a greater extent than those treated solely in the biomedical model-if at the time of hospital referral - those with anxiety histories and those who express pre-surgical anxiety are identified, and precautions are taken to offset these risks as discussed by Giraudet-Le Quintrec et al. (2003).

In the interim, given that anxiety is commonly associated with chronic physical conditions such as osteoarthritis (Scott et al., 2007; Wu et al., 2002), and that anxiety may contribute to pain, pain-related fears and negative functional outcomes (Heuts et al., 2004), as well as indirectly to some forms of osteoarthritis as a result of injury (Lavallee & Flint, 1996), there is clearly a strong to prevent anxiety where this can be predicted, as well as a strong imperative to identify anxiety where it exists, and as to clearly characterize its specific nature, and better understand its etiology and temporal dimensions, in order to intervene effectively in the context of this disease. To this end Hill et al. (2007) emphasized that

physicians need to recognize as well as address the significant additional negative impact anxiety can render on the patients' physical well being. In addition, Dorr and Chao (2007), who found that the pre-surgical emotional state of the patient undergoing joint replacement surgery affected their feelings of satisfaction after surgery, advocated for appropriate pre-operative education to allay any unwarranted negative impact. In addition, Dorr and Chao advocated for the implementation of an active physical therapy program individualized for the abilities and goals of the patient, rather than pharmaceutical approaches to aid recovery post-surgery. They also stressed the need for surgeons to understand the expectations of the patient, and to direct them to realistic goals, in order to allow patients to exceed their expectations.

In addition to this, to offset excess state or situational anxiety and/or distress in the surgical setting, there is a need to carefully examine the nature of the threat being perceived by those with clear state anxiety, as these issues vary widely, and cannot be dealt with in a uniform way. To this end, more research conducted on patients with different forms of osteoarthritis, more research to clarify the distinction between depression and anxiety, and anxiety and fear, and its relationship to osteoarthritis, plus more efforts to uncover the types of anxiety that most influence key features of the condition is clearly indicated. A greater ability to minimize pain experienced as a result of osteoarthritis pathology through non-pharmacologic management strategies is also indicated to reduce reactive anxiety states and their adverse effects on the existing disease process and its functional outcomes. As well, more careful study of the differential effects of depression and anxiety, the link between anxiety, obesity, and osteoarthritis pain, as well as heart disease and osteoarthritis, plus training clinicians and support staff to recognize and diagnose anxiety disorders and to tailor their treatments in light of their diagnoses is highly recommended. The use of both pharmacologic as well as non-pharmacologic strategies that can successfully target the mechanisms underlying the prevailing problem is strongly indicated as well (Smith & Zautra, 2008).

It is recognized this multi-pronged approach of routinely examining psychological variables including anxiety among patients with osteoarthritis, trying to minimize pain, while intervening as indicated to minimize the adverse effect of anxiety on functional outcomes might increase medical costs, as well as provider time initially. However, cost savings and vastly improved health outcomes including physical health, social functioning, and increased health-related quality of life are predicted in the long term (Katon et al., 2007). Indeed, as outlined by Hill et al. (2007) and Perrucio et al. (2011), because optimal mental well-being is critical for maximizing conservative as well as replacement surgery outcomes for patients with osteoarthritis, an exclusive focus on physical health that leads to missed opportunities for recognizing and successfully enhancing opportunities to improve the patient's overall health status, will not only increase economic costs, but the immense social costs of the disease, as well.

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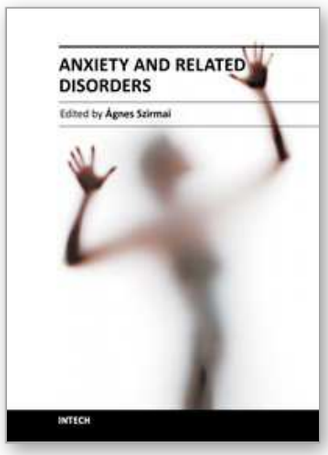

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Anxiety disorders are one of the most common psychiatric disorders worldwide and many aspects of anxiety can be observed. Anxious patients often consult primary care physicians for their treatment, but in most cases they do not accept the diagnosis of anxiety disorder. Anxiety is a symptom that could be seen in many organic disorders and can accompany almost any psychiatric disorder. Anxiety disorders are frequent and are associated with significant distress and dysfunction. Stigmatization is an important factor in insufficient diagnosis. The problems of anxiety cover all fields of life. This book intends to describe the epidemiological aspects and the main co-morbidities and consecutive diseases of the anxiety disorders.

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