

Anxiety, depression, and quality of life in patients with knee osteoarthritis before and after knee joint replacement

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Received 2 June 2016

Accepted 29 June 2016

Egyptian Journal of Psychiatry
2017, 38:8–12

Aim

The aim of this study was to investigate the psychological status and quality of life in a group of knee arthritis patients before and after knee joint replacement.

Patients and methods

A total of 26 knee osteoarthritis patients, eight women and 18 men with a mean age of 59.7±6.37 years, and 20 healthy controls, 10 women and 10 men with a mean age of 55.8±6.78 years, completed Hospital Anxiety and Depression Scale (HADS), and Short-Form 36 Health Survey (SF-36), in addition to a demographic sheet. Three months after knee joint replacement, patients refilled the same questionnaires.

Results

Before knee replacement, patients' HADS scores were 10.48±3.20 and 9.60±3.41 for anxiety and depression, respectively, and except for mental health domain all other SF-36 domain scores were less than 50. After knee replacement, HADS scores became 2.36±1.52 and 4.72±1.27, and the scores of the eight domains of SF-36 became more than 50. In comparison with controls, patients showed, before knee replacement, significantly lower scores on the eight domains of SF-36, and significantly higher HADS scores. After knee replacement and except for role limitation due to emotional health and vitality SF-36 domains, patients' scores on other domains were still significantly lower than those of controls. In spite of being within normal range, patients' depression scores were still higher than those of controls.

Conclusion

Psychological status and health-related quality of life improved significantly in osteoarthritis patients 3 months after total knee replacement (TKR). The role of psychological status on patient functioning and quality of life was evident, and their improvements after surgery were parallel.

Keywords:

anxiety, depression, osteoarthritis, quality of life

Egypt J Psychiatr 38:8–12
© 2017 Egyptian Journal of Psychiatry
1110-1105

Introduction

Osteoarthritis (OA), particularly at the knee, is a leading cause of disability in older adults characterized by progressive articular cartilage loss resulting in joint pain and disability (Farr *et al.*, 2013). Some risk factors contribute to the appearance of the disease, such as sex, age, trauma, overuse, and genetic conditions. With disease progression, patients' complaints of physical limitations, pain, and functionality restriction increase, leading to an important decrease in their quality of life (Kawano *et al.*, 2015).

A number of studies have investigated the occurrence of anxiety and depression among OA clinical populations. One study, for instance, reported a 20% prevalence of depressive mood associated with OA within a primary care population. Anxiety has been reported to occur at rates of up to 50% among OA

cases. Both anxiety and depression contribute to patient-reported functional disability associated with OA (Marks, 2011; Gandhi *et al.*, 2015).

Among suitably fit candidates, total joint replacement is the treatment of choice for end-stage OA. Many studies have confirmed the beneficial impact of total joint replacement (TJR) on pain, disability, and quality of life (Dowsey and Choong, 2013).

The aim of this study is to investigate how psychological symptoms and quality of life will change 3 months after knee joint replacement in patients with severe knee OA.

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Patients and methods

Patients

This study was carried out on 26 patients recruited from patients seeking treatment at the Orthopedics Outpatient Clinic of Menoufia University hospitals and who later underwent knee joint replacement. Nonconsenting patients and patients currently treated for psychiatric disorders or those who had a past history of psychiatric disorders were excluded.

Twenty healthy controls, who were age-matched and sex-matched, were recruited from employees working at Menoufia University hospitals.

Ethics approval

The authors obtained permission to conduct this study from the Research Ethics Committee of the Faculty of Medicine, Menoufia University. An informed consent was obtained from all the patients studied.

Methods

- (1) Demographic sheet.
- (2) Hospital Anxiety and Depression Scale (HADS): Depressive and anxiety symptoms were assessed by Arabic version of HADS (El-Rufaie and Absood, 1987). HADS is a questionnaire with the dimensions anxiety and depression containing 14 items, seven referring to anxiety and seven to depression, with a cutoff point of 8 for anxiety and 9 for depression. All items refer exclusively to the emotional state and do not reflect somatic symptoms.
- (3) Short-Form 36 Health Survey (SF-36): Health-related quality of life was assessed by applying the Arabic version of the SF-36 (Coonset *et al.*, 1998). This is a generic instrument composed of 36 items that evaluate the following: physical functioning (the ability to take care of oneself and to perform routine daily activities); role limitations due to physical health (the impact of physical health in performing activities); bodily pain (level of pain experienced while performing routine daily activities); general health perceptions (how the individual perceives his/her health); vitality (energy and fatigue); social functioning (impact of physical conditions on his/her social life); role limitations due to emotional problems (the extent to which emotional problems interfere in routine daily activities); and mental health (effect of mood on his/her life). To analyze the eight domains of

the scale, a score ranging from 0 (most affected) to 100 (not affected) is used.

Statistical analysis

All analyses were performed using the software SPSS, 20 (IBM Corp. 2011, IBM SPSS Statistics for Windows, Version 20.0, Armonk, Y: IBM Corp.). As variables were not normally distributed, Wilcoxon signed-rank test was used to compare the patients' results before and after knee joint replacement. Mann-Whitney test was used to compare the results of both genders before and after knee replacement. Statistically significant findings were determined by a two-tailed *P* value less than 0.05.

Results

Demographics

The present study included 26 patients and 20 healthy controls. Among the patients, eight were female and 18 were male, and their mean age was 59.7±6.37 years. Among the controls, 10 were female and 10 were male, and their mean age was 55.8±6.78 years.

Hospital Anxiety and Depression Scale

Before knee replacement, anxiety and depression scores were 10.48±3.20 and 9.60±3.41, respectively. After knee replacement, the scores became 2.36±1.52 and 4.72±1.27. No differences were found between male and female patients regarding anxiety or depression before or after knee replacement.

Abnormal levels of anxiety and depression, HADS 11–21, were found in 12 (46.15%) patients and nine (34.6%) patients, respectively, before knee replacement, whereas 3 months after knee replacement these percentages became 0% for both anxiety and depression.

Short-Form 36 Health Survey

Table 1 shows the scores of the eight domains of SF-36 before and after knee replacement. Except for mental health domain, all other domain scores were less than 50 before knee replacement. After knee replacement, the scores of the eight domains of SF-36 became more than 50.

In comparison with controls, patients showed, before knee replacement, significantly lower scores on the eight domains of SF-36, and significantly higher HADS scores. After knee replacement, no differences were found regarding role limitation due to emotional health and vitality SF-36 domains, whereas patients' scores on other domains were still significantly

Table 1 Comparison between Short-Form 36 Health Survey scores before and three months after knee joint replacement

SF-36 domains	Before knee replacement	After knee replacement	Wilcoxon's signed-rank test	P
Physical functioning	37.69 ±13.51	63.85±2.94	-4.47	0.0001
Role limitations due to physical health	21.15 ±28.89	50.27±1.37	-3.85	0.0001
Bodily pain	43.65 ±23.38	65.48±4.58	-3.17	0.002
General health perceptions	39.42±9.83	62.69±3.80	-4.47	0.0001
Vitality	35.58 ±16.20	69.23±4.4	-4.47	0.0001
Social functioning	38.85 ±24.07	55.28 ±14.22	-2.38	0.017
Role limitations due to emotional problems	17.95 ±32.97	96.15 ±10.86	-4.48	0.0001
Mental health	52.15 ±13.92	73.23±7.04	-4.1	0.0001
HADS anxiety	10.48±3.20	2.36±1.52	-4.29	0.0001
HADS depression	9.60±3.41	4.72±1.27	-4.22	0.0001

HADS, Hospital Anxiety and Depression Scale; SF-36, Short-Form 36 Health Survey.

lower than controls. In spite of being within normal range, patients' depression scores were still higher than those of controls (Fig. 1).

Before knee replacement, differences were found between male and female patients regarding the following SF-36 domains: pain, vitality, and emotional health (Fig. 2). These differences disappeared after knee replacement.

Discussion

Total knee replacement (TKR) surgery is one of the most common and successful surgical interventions, providing substantial relief from pain and improvement in functional disability in patients with knee arthritis (Judge *et al.*, 2012).

Previous studies have reported a high prevalence of psychological symptoms in patients with end-stage knee OA (Duivenvoorden *et al.*, 2013), which agrees with results of the present study.

According to Ferreira *et al.* (2015), anxiety and depressive disorders can affect patients with a diagnosis of OA, as the chronic pain, physical

disability, and loss of autonomy caused by the disease increase the risk of emergence of these comorbidities. In addition to pain, anxiety and depression negatively affect the quality of life of OA patients. Although frequently found among OA patients, anxiety and depression do not receive the same attention as the physical correlates of the disease, even though they are inextricably linked (Marks, 2015).

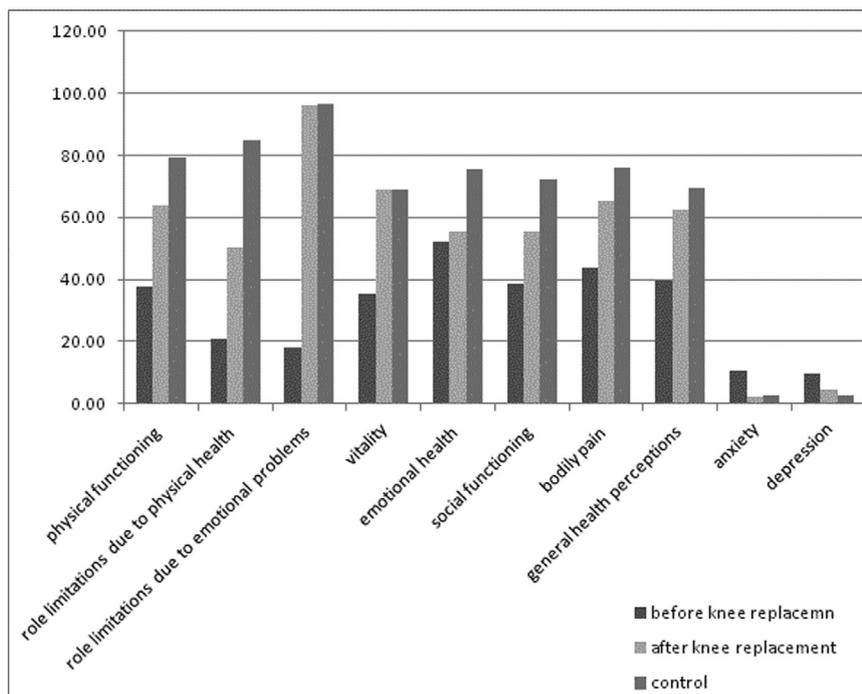
In the present study and before TKR, the lowest SF-36 domains scores were for role limitation due to emotional health and role limitation due to physical health, which themselves were much lower than scores for mental and physical health, respectively. After TKR, the score of role limitation due to emotional health domain showed the highest increase among other SF-36 domains, followed by role limitation due to physical health domain. In parallel with this improvement was the improvement of HADS anxiety and depressive symptoms, which highlights the role of psychological status, especially anxiety, on knee OA patients' functioning and quality of life.

According to Marks (2015), premorbid or state-related comorbid anxiety and depression influence OA disease outcomes adversely, as they can provoke or exacerbate OA progression. Patients' perceptions, interpretations, and reactions to their impairment can interact with peripheral pain processes to produce or heighten the painful experience, as well as the extent of prevailing disability, even if there is little painful source that can be demonstrated objectively (Marks, 2014).

In their systematic review about the impact of psychological functioning on knee pain, PhyoMaung *et al.* (2014) found that psychological functioning has an important role in knee pain, with strong evidence for an association between depression and knee pain. This may help explain why the pain experienced by many patients with OA looks more than one would expect based on the extent of their bony pathology or their radiographs. Developed as a result of depression, cognitive issues such as learned helplessness, job dissatisfaction, and an adverse disease outcome could also lead to activity avoidance in OA patients (Marks, 2014).

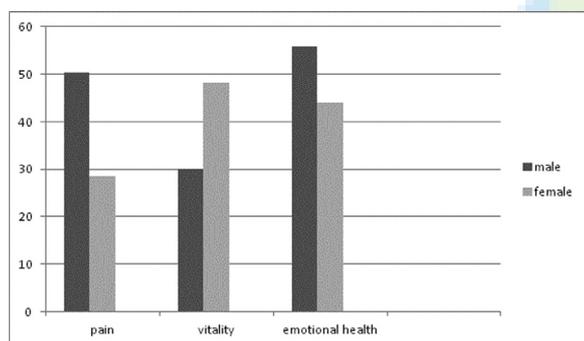
According to Skou *et al.* (2014), worse knee confidence was associated with fear of moving and also lower self-rated health. They stated that this problem troubles most patients with knee OA, underlining its importance in this group of patients. The association of psychological status with pain has been much

Figure 1



Comparison between patient and control scores on both Hospital Anxiety and Depression Scale and Short-Form 36 Health Survey before and after TKN.

Figure 2



Differences between men and women regarding some Short-Form 36 Health Survey domains.

studied. According to Judge *et al.* (2012), worse preoperative anxiety/depression led to worse pain.

In the study by Duivenvoorden *et al.* (2013), knee OA patients were assessed preoperatively while on the waiting list, 3 and 12 months after TKA. Patients filled in HADS, Knee injury and Osteoarthritis Outcome Score (KOOS), and a satisfaction questionnaire. Before TKA, mean anxiety and depression scores were 4.2 ± 3.6 and 4.3 ± 3.8 , and the scores for prevalence of anxiety and depressive symptoms, HADS greater than and equal to 8, were 26 (20.3%) and 29 (22.7%), respectively. These results are much lower than the results of the present study; however, the study by Duivenvoorden *et al.* (2013)

study states that seven (5.5%) patients were receiving antidepressants, which may partially explain this difference.

In contrast, the results of the present study were much better than the results in the study by Duivenvoorden *et al.* (2013) when compared 3 months after TKA. Although the anxiety and depression mean scores were more or less similar, in the study by Duivenvoorden *et al.* (2013) 18 (14.1%) and 21 (16.4%) patients were still having significant anxiety and depressive symptoms, respectively, whereas these percentages dropped to zero in the present study. This can be explained by the fact that in the present study those with a history of psychiatric disorders were excluded, which was not done in the other study.

Despite the fact that there were no differences between male and female patients regarding anxiety or depression before knee replacement, female patients had significantly worse outcomes on SF-36 emotional health domain.

In agreement with the present study, Tonelli *et al.* (2011) found no differences between male and female patients regarding anxiety or depression before knee replacement. In addition, in both studies female patients had significantly worse pain than male patients on the SF-36 pain domain.

Although after knee replacement no differences were found between OA patients and controls regarding role limitation due to emotional health and vitality domains of SF-36, patients' scores on other domains were still significantly lower than controls. In addition, patients' depression scores were still higher than those of controls despite being within normal range.

This study followed up the patients only up to three months after knee replacement. In the study by Duivenvoorden *et al.* (2013), no further decrease was seen in the prevalence of anxiety and depressive symptoms 12 months after TKN when compared with 3 months postoperatively. Thus, it seems that improvement is maintained until at least 12 months after surgery.

Besides the short follow-up duration, another important limitation was the small sample size of the present study.

Conclusion

Psychological status and health-related quality of life improved significantly in OA patients 3 months after TKN. However, when comparing patients' results with those of controls, the improvement of SF-36 was still incomplete in some domains. The role of psychological status on knee OA patients' functioning and quality of life was evident, and their improvements after surgery were parallel.

There is a need to address the psychological aspect when approaching chronic OA patients. A traditional approach minimizing the importance of patients' psychological burden is deficient in improving their quality of lives, leaving them with unexplained pain and poor functioning.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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