Assessment of Sleep Quality in Patients with Osteoarthritis

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ABSTRACT

BACKGROUND

Sleep disturbances usually accompany osteoarthritis (OA) because of chronic pain. Poor sleep quality is related to many factors like pain, fatiguability, restless leg syndrome, immobility of joints, anxiety and depression. But the quality of the sleep in patients with osteoarthritis has been rarely studied. We wanted to assess the prevalence of sleep disturbances in OA patients, determine the sleep quality in osteoarthritis patients and evaluate the relationship between pains and sleep quality.

METHODS

150 patients with osteoarthritis were selected through convenience sampling as per the inclusion and exclusion criteria. Pittsburgh Sleep Quality Index (PSQI) and Numerical Pain Rating Scale (NPRS) were applied. Data was analysed using SPSS. One sample T test and Pearson Correlation were applied to find the correlation between the pains and sleep quality.

RESULTS

A total of 86 (57 %) patients with osteoarthritis were found to have sleep disturbances and were assessed for sleep quality and pain level. This group contains 18 (20 %) males and 68 (80 %) females. A total of 62 (72 %) osteoarthritis patients including 14 males and 48 females were having poor sleep quality; 67 (78 %) patients had intolerable pain (NPRS > 7). Strong positive correlation (p-value < 0.001) was found between GPSQI and NPRS.

CONCLUSIONS

Patients with osteoarthritis with high NPRS values have poor sleep quality. There is significant association between pain and poor sleep quality. It will be highly useful for the patients with osteoarthritis if osteoarthritis treatment protocol includes assessment and management of poor sleep quality. As poor quality is an early indicator of majority of mental illnesses, psychiatric liaison services will be highly beneficial for patients with osteoarthritis.

KEYWORDS

Osteoarthritis, Pain, Sleep Quality, Numerical Pain Rating Scale (NPRS), Pittsburgh Sleep Quality Index (PSQI)

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BACKGROUND

Sleep is a physiological process that is necessary to maintain equilibrium in the human body.[1] Decreased quality of sleep often leads to reduced work output, reduced social and community interaction and reduced activity.[2] Sleep disturbances are common among adults, with 54 % of US adults reporting at least one symptom of insomnia including difficulty falling asleep, waking a lot during the night, waking up too early and not being able to get back to sleep, or waking up feeling unrefreshed for a few nights a week or more. It has been found that 33 % reporting at least one of these symptoms almost every night during the past year. Difficulties with sleep can have a major influence on pain, quality of life, vocational performance, personal relationships, morbidity, and healthcare use.[3,4,5,6]

Osteoarthritis is considered as one of the important health problems for the aging population in world.[7] Osteoarthritis is caused due to an advancing age, is a degenerative disease mainly involving articular cartilage of the joints. The mechanism is not understood clearly whether sleep disturbances paves the way for development of osteoarthritis or if the sleep quality is decreased by osteoarthritis.[8] The osteoarthritis problem usually affects the quality from life in a bad way and it also leads to many problems in the life such as physical disability and chronic fatigability. Osteoarthritis affects the sleep quality of people and Pain is the major factor for contributing sleep disturbances in the osteoarthritis patients.[9] Sleeplessness is the risk factor for the fatigue.[10,11] Sleep disturbances occurring in most of the patients with joint pathology is because of pain.[12] Pain occurring and increasing with action and decreasing at the time of taking rest is the very important sign of early stages of the osteoarthritis and it becomes more progressive as the age increases. Around 30 % of the individuals experience pain during the night time.[13] Many studies show that osteoarthritis leads to sleep disturbances in the form of early morning awakening, disruption of sleep on and off in the night and unable to fall asleep early.[12,14,15] Many studies show that patient with osteoarthritis have pain, joint stiffness, functional limitation, fatigue and sleep disturbances which negatively affects ones mental well-being. Hence pain and sleep are bidirectional[16,17,18] and pain lead to sleep onset difficulty and sleep maintenance.

Although there is evidence for an association between arthritis and sleep difficulties, most studies have either focused specifically on rheumatoid arthritis (RA)[19,20,21] or more broadly on self-reported arthritis or rheumatic disorders, without respect to a specific or verified diagnosis.[22,23] Very few studies have specifically examined the association of osteoarthritis (OA) with sleep difficulties[24, 25,26] One such study reported a high prevalence of problems with sleep onset (31 %), sleep maintenance (81 %), and early morning awakenings (51 %), occurring at least weekly, among older adults with knee pain or knee pain with radiographic OA.[26]

We wanted to assess the prevalence of sleep disturbances in OA patients, determine the sleep quality in osteoarthritis patients and evaluate the relationship between pains and sleep quality.

METHODS

This study was carried out at a tertiary health care centre, Tagore Medical College and Hospital. The sample was selected from outpatient department of orthopaedics. It is a cross sectional study and Sampling was done through convenience sampling method. A total of 150 osteoarthritis patients attending the outpatient department in the Tagore Medical College and Hospital were selected. A written informed consent was obtained from all the study participants and confidentiality was maintained. There have been numerous factors which can affect sleep disturbances in osteoarthritis patients like hypertension, diabetes mellitus, depression and other psychiatric disorders, hence the following inclusion and exclusion criteria was applied to all patients.

Inclusion Criteria

- Patients of age above 18 years and below 70 years are included.
- Patients with osteoarthritic complaints of pain, crepitus, swelling and sleep disturbances are included.

Exclusion Criteria

- Patients with osteoarthritis associated with other illness like hypertension, asthma and diabetes mellitus are excluded.
- Patients with mental illness are excluded.

Following tools were applied to these 86 patients.

1. Pittsburgh Sleep Quality Index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. The PSQI is a self-reported questionnaire that evaluates sleep quality and disturbance in patients during the previous month. Patients respond to 19 self-reported questions that are collectively used in evaluation of their sleep. Their responses to the questions are used to formulate 7 individual component scores as well as a final composite score that helps differentiate their sleep quality as "poor" or "good". It differentiates "poor" from "good" sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month. Each of the 7 components is scaled on a 0 to 3 interval. The sum of the components produces a global score ranging from 0 to 21, where a higher score indicates poorer sleep

quality. A global score greater than or equal to 5 characterize patients as poor sleepers with a diagnostic sensitivity of 89.6 % and specificity of 86.5 % (kappa = 0.75, P < .001).[27]

2. The Numeric Pain Rating Scale Instructions (NPRS). The patient is asked to make three pain ratings, corresponding to current, best and worst pain experienced over the past 24 hours on a scale of 0 (no pain) to 10 (worst pain imaginable)". The average of the 3 ratings was used to represent the patient's level of pain over the past 24 hours.[28] The NPRS score of 0 - 7 is considered as tolerable (mild to moderate) pain and > 7 is considered as intolerable (severe) pain.

RESULTS

The baseline sample included 150 patients out of which 86 (57 %) OA patients were having sleep disturbances. All these 86 patients were assessed for sleep quality and pain level through PSQI and NPRS scale respectively.

Total (n = 86)	Males (18)	Females (68)
Age Group		
Young Adults (< 40 yrs.)	4	1
Middle aged adults (40 – 60 yrs.)	14	24
Old adults (> 60 yrs.)	0	43

Table 1. Age and Gender Distribution

As shown in Table 1, the group contains 18 (20 %) males and 68 (80 %) females. Table 1 also shows age distribution among different OA patients, 5 (6 %) belong to young adult age group (< 40 yrs.), 38 (44 %) belong to middle aged adults and 43 (50 %) belong to elderly age group.

Sleep Quality	Males (18)	Females (68)
PSQI Score < 5	4	20
PSQI Score > 5	14	48

Table 2. Sleep Quality among OA Patients

Table 2 shows the sleep quality among OA patients after PSQI questionnaire was applied, 24 (27 %) OA patients were having normal sleep quality (PSQI score < 5) and 62 (73 %) OA patients were having poor sleep quality (PSQI score > 5). Among the study population 14 (77 %) of the males have poor sleep quality and 48 (70 %) of the females have poor sleep quality.

NPRS Score	Males	Females	Total
Tolerable Pain (0 - 7)	9	10	**19 (22 %)**
Intolerable Pain (>7)	14	53	**67 (78 %)**

Table 3. Pain Distribution in the Study Population

NPRS, a subjective scale and the NPRS score has been divided into tolerable pain (07) and intolerable pain (> 7). Table 3 shows that 19 (22 %) out of 86 patients found to have tolerable pain and 67 (78 %) out of 86 patients have intolerable pain.

NPRS	PSQI Score < 5	PSQI Score > 5
NPRS Score [0 - 7]	16 (85 %)	3 (15 %)
NPRS Score [> 7]	8 (12 %)	59 (88 %)

Table 4. Pain Level and Sleep Quality in the Study Population

Table 4 shows that 3 (15 %) out 19 patients with tolerable pain also has poor sleep quality and 59 (88 %) with intolerable pain out of 67 patients have poor quality of sleep.

	Test Value = 0					
	t	df	Sig. (2-tailed)	Mean Difference	95 % Confidence Interval of the Difference	
					Lower	Upper
PSQI Score	35.373	85	.000	1.72093	1.6242	1.8177
NPRS Score	39.535	85	.000	1.77907	1.6896	1.8685

Table 5. One-Sample Test

Table 5 shows one sample t test with test value of 0. It has been found the two-tailed P value corresponding to the test statistic is 0.000, which is statistically significant (P < 0.005). It shows that pain is the significant factor affecting sleep.

		PSQI Score	NPRS Score
PSQI Score	Pearson Correlation	1	.668**
	Sig. (2-tailed)		.000
	N	86	86
NPRS Score	Pearson Correlation	.668**	1
	Sig. (2-tailed)	.000	
	N	86	86

Table 6. Pearson Correlation

Table 6 shows Pearson correlation and it shows there is a strong positive correlation found between sleep quality (PSQI) and the pain level (NPRS).

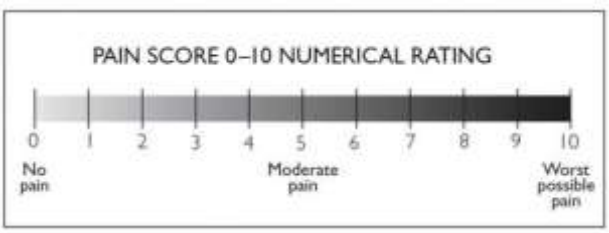

Figure 1. Numerical Pain Rating Scale (NPRS)

DISCUSSION

All the selected patients were applied Pittsburgh Sleep Quality Index (PSQI) for assessing the sleep quality and Numerical Pain Rating Scale (NPRS) for the pain level. Of the 86 patients included majority of the patients in our study were females (80 %). Among 86 patients selected 62 (73 %) OA patients were having poor sleep quality (PSQI score > 5), hence majority of the patients have poor quality of sleep. In our study 67 (78 %) of the OA patients have Intolerable pain (NPRS > 7) level. These numbers show that there are significant disturbances in the sleep quality when there is intolerable pain in the OA patients.

A multicentre osteoarthritis study examined the association between sleep and odds of developing knee pain, and whether this relationship varied by status of widespread pain (WSP), with 2329 participants (4658 knees) [67.9 y, BMI: 30.9]. This study found the strongest association of sleep quality in persons with > 8 painful joint sites (p-trend < 0.01) and significant association between sleep and prevalence of consistent frequent knee pain.[29] The findings of this study are very similar to our study which also showed significant association between pain and sleep quality. This invariably suggest that intolerable pain worsen the sleep quality. Similar to our study findings an internet-based case-crossover study evaluated the association of sleep quality, sleep duration, and fatigue with hip pain exacerbations in persons with symptomatic of the 252 hip-osteoarthritis (OA) patients. The findings showed that both poor sleep quality and greater fatigue were associated with increased odds of pain exacerbations. Short sleep duration was not associated with pain exacerbations.[30]

Another such study evaluated subjective sleep quality and its relationship to fatigue in 613 older adults with osteoarthritis (OA). Among the sample population 78 % were female, similar to our study. Among older people with OA, poor sleep is highly prevalent, and it is linked to the painful arthritis and fatigue in these patients.[31]

A systemic review and meta-analysis of 1445 unique records, including 24 studies show that there is significant association between the sleep quality and pain. In this study it has been found the pain also improving when the sleep quality is improved by Established Sleep interventions like CBT and pharmacological intervention.[32] It is very clear that sleep quality is significantly associated pain similar to our study and intervention for pain management will help to improve sleep quality.

Similarly, another study showed that the sleep quality of patients with knee OA was worse compared to healthy controls. The poor sleep onset and sleep quality in knee OA is significantly associated with pain which had adversely affected quality of life in those patients.[33]

CONCLUSIONS

Patients with osteoarthritis with high pain were highly prone to poor sleep quality, most of them being elderly females. In our study 73 % of the patients have poor sleep quality and there is a significant association between the pain level (NPRS) and sleep quality (PSQI). Osteoarthritis treatment protocol should include assessment and management of poor sleep quality. As poor sleep quality is an early indicator of most mental illnesses, psychiatric liaison services will prove to be highly beneficial for patients with osteoarthritis.

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