The impact of daily arthritis pain on spouse sleep

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ABSTRACT

Although chronic pain has been linked to poorer psychosocial well-being in the spouse, the extent to which patient pain affects spouse sleep is unknown. The aim of the present study was to test the hypothesis that greater daily knee pain would be associated with poorer sleep for the spouse that evening. We also tested the hypothesis that this pain contagion is exacerbated in couples who have a close relationship. A total of 138 knee osteoarthritis (OA) patients and their spouses completed baseline interviews and a 22-day diary assessment. Multilevel lagged models indicated that greater knee OA pain at the end of the day was associated with spouses' poorer overall sleep quality that night and feeling less refreshed after sleep. In contrast, there was no evidence that spouse sleep was related to greater patient pain the next day. The effects of patient pain on spouse sleep were not due to disturbances in patient sleep and were also independent of spouse sex, depressive symptoms, and physical comorbidities; both partners' negative affect; and the quality of marital interactions throughout the day. As predicted, we also found that patient pain was more strongly related to less refreshing sleep for spouses who were in a close relationship. Findings illustrate that chronic pain may place the spouse's health at risk and suggest an important target for couple-oriented interventions.

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1. Introduction

Research suggests that chronic pain negatively affects the emotional well-being and marital satisfaction of the spouse [14,15,38]. An important yet unanswered question is the degree to which patient pain also affects behavioral health outcomes such as the spouse's sleep. In the present study, we used dyadic data to examine the effects of daily knee osteoarthritis (OA) pain on spouses' nightly sleep. We also examined whether the patient pain-spouse sleep association was stronger in couples with a high level of closeness.

Sleep is a critical health behavior, and individuals whose sleep is affected by their partner's pain are at risk of physical and psychiatric problems. Self-reported sleep problems are related to increased risk of hypertension, heart disease, depression, and mortality [12,22,30,45]. Spouses whose sleep is compromised may also be less able to respond empathically to patients' symptoms and need for support.

Arthritis pain is likely to affect the sleep of the spouse for reasons related and unrelated to sharing a bed. Knee pain makes it difficult to get comfortable and to maintain sleep [17,19,47], and the resulting restlessness may disturb the bed partner. In addition, exposure to patients' physical and emotional suffering may affect mood or marital interactions in ways that make it difficult for spouses to get a good night's sleep [8,16,36,37].

Although a satisfying intimate relationship confers advantages for health [24], adults who are in a very close or interconnected relationship may be the most negatively affected by partner illness symptoms. The self-expansion model of Aron et al. [5,7] defines closeness as including the partner in one's concept of the self. This sense of self-other overlap has been shown to lead to more empathic responding [13] and greater neurological response when a partner makes errors on cognitive tests [21]. In a related line of research, married older adults were more negatively affected by each other's depressive mood if they were close, as indicated by both partners' report that they were a confidant to the other [44]. Taken together, these findings suggest that spouses are at greatest risk of being affected by their partner's chronic pain if they are in a relationship that partners characterize as close.

The current study tested the hypothesis that greater knee OA pain during the day would be associated with poorer sleep for

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the spouse that night. Two indicators of sleep were examined: overall quality of sleep and the extent to which sleep was refreshing. We used data collected over 22 days with handheld computers to examine lagged, within-couple associations between patient pain and spouse sleep. To provide the strongest test of our hypotheses, we examined these effects independent of patient sleep and spouse sex, depressive symptoms, and physical comorbidities.

We also examined the moderating role of couple closeness in the within-couple association between pain and sleep. Closeness was measured using both partners' report of self-other overlap. Based on previous research, we predicted that patient pain would have stronger effects on spouse sleep for couples who reported high closeness than for those who reported low closeness.

2. Methods

2.1. Study design

Data presented in this report are from an observational (ie, non-intervention) study of couples and knee OA that combined in-person interviews conducted over an 18-month period (ie, time 1, time 2 at a 6-month follow-up, and time 3 at an 18-month follow-up) with a 22-day assessment of daily experiences immediately after the time 1 interview. During the daily assessment protocol, patients and spouses used a handheld computer to answer questions 3 times per day (ie, beginning of the day [BOD], afternoon, and end of the day [EOD]). The current report uses data from the time 1 and time 2 interviews, EOD assessments, and BOD assessments on the following day.

2.2. Participants

To be eligible for the study, patients had to be diagnosed with knee OA by a physician, experience usual knee pain of moderate or greater intensity, be at least 50 years of age, and be married or in a long-term relationship (self-defined) in which they shared a residence with their partner. Exclusion criteria were a comorbid diagnosis of fibromyalgia or rheumatoid arthritis, use of a wheelchair to get around, and a plan to have hip or knee surgery within the next 6 months. Couples were excluded from the study if the spouse had arthritis pain of moderate or greater intensity, used a wheelchair to get around, or required assistance with personal care activities. Both partners had to be cognitively functional, as indicated by the accuracy of their answers to questions regarding the current date, day of the week, their age, and birth date. Both partners also had to be free of any major hearing, speech, or language problems that would interfere with the comprehension and completion of data collection conducted in English.

Primary sources of recruitment were research registries for rheumatology clinic patients and older adults interested in research, flyers distributed to University of Pittsburgh staff and faculty, and word of mouth. A total of 606 couples were screened for eligibility. Of these, 221 couples declined to participate, and the most frequent reasons were lack of interest (N = 87) or illness in the family (N = 55). Of the 606 couples, 233 were not eligible, and the most frequent reasons were no OA in the knee (N = 55) or knee OA pain that was mild (N = 47). The total enrolled sample comprised 152 couples (ie, 304 individuals), which included 3 same-sex couples.

A total of 145 couples completed the diary assessment component of the study, and 138 of these couples provided sufficient data for our primary analyses (see Section 2.3). Table 1 provides background information for patients and their spouses. Consistent with previous research on sleep quality in hip or knee OA patients [17], patients' average global score on the Pittsburgh Sleep Quality Index

Table 1
Demographic characteristics of patients and spouses (N = 138).

Variable	Patients	Spouses
Age	65.4 (9.5)	65.2 (11.4)
Male	42	59
Years of education	16.1 (2.0)	15.9 (2.0)
Caucasian race	88	87
Employed	43	46
Years married/in relationship	34.3 (16.5)	
Household income	US$40,000–59,000	
Duration of knee OA, y	12.3 (10.9)	

Values shown are M (SD) or %.
OA, osteoarthritis.

[10] was 7.1 (SD = 4.2; range, 0–18) and 70% met criteria for poor sleep (ie, global score of >5).

2.3. Data collection procedures

Trained staff interviewed patients and spouses independently in their home. After these interviews, couples were trained in the use of the handheld computer (ie, the Palm, Inc. Sunnyvale, CA) as well as the format and content of the diary questions. The handheld computer and questionnaire were designed for easy use by older adults and people with minimal computer experience; accessible features included large font size and an oversized stylus for registering responses. Each patient and spouse were provided with a handheld computer that was clearly labeled with his or her name. Participants were trained to complete their diary assessments independently of the spouse, but we did not ask whether they adhered to this request.

Our goal was to capture participants' experiences within the general time frames of morning, afternoon, and evening. Therefore, participants were instructed to answer questions: (1) within 60 minutes of rising in the morning (ie, BOD), (2) between 2:00 and 4:00 pm (ie, afternoon), and (3) upon retiring at night (ie, EOD). Participants used a written log to record their daily rise time and bed time.

Completion and compliance rates were examined for the diary data. Of a potential 6380 EOD observations (290 individuals × 22 days), a total of 5863 were completed (92%). Compliance with the requested timing of the EOD assessment was evaluated by comparing the time of the handheld computer entries with participants' written log of daily bedtimes. EOD assessments that were completed >120 minutes before bedtime and BOD assessments completed >120 minutes after waking were excluded from analysis. Using these criteria, 5327 of the 5863 completed observations were included in analysis (ie, 92% of the completed observations or 83% of the total possible observations). Completion and compliance rates were virtually identical for patient and spouse.

2.4. Key variables

Within-person and within-couple correlations between key study variables are presented in Table 2.

2.4.1. Patient pain
Patients provided EOD reports of knee pain over the past 30 minutes, using a scale from 0 to 3 (no pain to severe pain). This measure is taken from the Rapid Assessment of Disease Activity in Rheumatology [28]. The average level of pain was mild to moderate (mean = 1.46; SD = 0.67; range, 0–3).

2.4.2. Nightly sleep
Consistent with previous daily diary research [1], nightly sleep was measured in a way that minimized participant burden. Specifically, 2 indicators of nightly sleep were assessed for both patients