



Testing bidirectional relationships between marital quality and sleep disturbances: A 4-year follow-up study in a Korean cohort

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ARTICLE INFO

Article history:

Received 24 September 2012

Received in revised form 9 January 2013

Accepted 14 January 2013

Keywords:

Marital quality
Sleep disturbance
Moderator
Epidemiology
Longitudinal

ABSTRACT

Objective: Both poor marital quality and sleep disturbances are risk factors for a broad range of mental and physical health morbidities. The purpose of the study was to investigate bidirectional relationships between marital quality and sleep disturbance and the moderating effects of age and gender.

Methods: Data from 1081 married individuals who participated in the Korean Genome and Epidemiology Study were analyzed. A marital quality questionnaire and the Pittsburgh Sleep Quality Index were used to assess marital quality and sleep disturbances at baseline and 4-year follow-up. Relevant covariates including sociodemographics, health status, health behaviors, and depressive symptoms were also measured.

Results: Hierarchical multiple regression models revealed that there was a significant interaction between marital quality and age predicting sleep disturbance ($P = .017$). While there was no association between marital quality and sleep disturbances for the younger group (ages 45–54; $n = 680$), persons with lower marital quality were more likely to have greater sleep disturbances 4 years later for the older group (ages 55–74; $n = 401$). By contrast, sleep disturbance was a significant predictor of marital quality 4 years later, regardless of age or gender ($P = .025$).

Conclusion: Poor marital quality is a risk factor for sleep disturbance for older adults but not for middle-aged individuals. In turn, sleep disturbance may lead to lower marital quality for all age groups. Clinicians should be aware of the bidirectional relationships between marital and sleep problems for more effective treatments for both.

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Introduction

It has been well documented that marital quality contributes not only to one's mental health outcomes, including depression and anxiety, but also to various physical health outcomes [1–3]. Sleep, a major health behavior, also has critical implications for health, from various psychiatric conditions, such as depression and substance abuse [4] to physical health conditions, such as cardiovascular and metabolic diseases [5,6]. Thus, both marital and sleep problems are risk factors for a broad range of mental and physical health morbidities. Furthermore, an emerging body of literature has indicated that marital quality and sleep disturbances are closely linked to one another, affecting health and well-being [7]. Most married individuals sleep with their partners and people with low marital quality can be vulnerable to sleep disturbances [8–10]. Sense of security and emotional down-regulation are essential for a good night's sleep. However, marital relationships

evaluated as low quality often induce negative mood and high alertness, which may contribute to poor sleep [11]. Conversely, individuals with sleep difficulties may be at greater risk for low marital quality [12,13]. That is, people with disturbed sleep often exhibit high irritability and low tolerance for negative stimuli, which in turn can promote conflictual interactions between partners [14].

Recently, a conceptual framework linking marital quality and sleep via biopsychosocial pathways has been proposed [7]. According to this model, marital functioning and sleep may have a reciprocal relationship through chronobiological (e.g., sleep–wake cycle) [15], behavioral (e.g., physical activity and substance use) [16], psychological (e.g., psychological distress, depression, and anxiety) [4,11,14], and physiological (e.g., hypothalamic–adrenal–pituitary axis, autonomic nervous system, and inflammation processes) [17,18] mechanisms. This model also posits moderating effects of various vulnerability factors such as personality, psychiatric disorders, socioeconomic status, and gender on the relationship between marital quality and sleep [2,4,11,19,20]. More recently, this conceptual framework has been expanded to include the impact of the covariation between marital functioning and sleep on mental and physical health through various physiological pathways [21].

Although reciprocal relationships between marital quality and sleep have been implicated by this model, clear inferences on bidirectional associations have not been possible due to lack of longitudinal data and

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direct tests of bidirectionality within a sample. Recently, a couple of studies attempted to provide some direct evidence for the bidirectional nature of the relationship between sleep and marital quality. In a study of 29 couples, Hasler and Troxel [22] tested whether sleep efficiency predicted the marital interactions the following day and vice versa for 7 days, and the results showed gender-specific effects. While poor sleep predicted more negative marital interactions for males only, increased negative marital interactions predicted lower sleep efficiency for females only. Rauer and Elsheim [23] provided a different perspective focusing on physical and psychological abuse between marital partners. In 215 couples with school-aged children, they found that both husbands and wives with sleep disturbance were more likely to engage in psychological abuse toward their partners 11 months later. However, the level of partner violence did not predict later sleep disturbance, for which they did not provide any plausible explanations. These studies have provided some novel preliminary data and invaluable insights on directionality of the relationships between sleep and marital functioning. However, the inconsistent findings within and between studies, small sample sizes, and short follow-up durations call for further studies with a larger sample and with a longer follow-up duration.

The current study utilized data from a community-based epidemiological study with a 4-year follow-up duration to determine directionality of the relationship between sleep disturbances and marital quality. Substantially longer follow-up duration of 4 years, compared to days or months from previous studies, allowed us to examine long-term effects of more persistent sleep and marital problems. Based on the theoretical framework proposed by Troxel et al. [7,21], we hypothesized that lower levels of marital quality would predict higher levels of sleep disturbances 4 years later. We also hypothesized that the reverse relationship would be true; higher levels of sleep disturbances would predict lower levels of marital quality 4 years later.

In addition, we tested moderating effects of gender on the relationships between marital quality and sleep. Although it has been suspected that the links between relationship functioning and sleep quality may be stronger for women than men due to women's greater sensitivity to both marital and sleep problems [2,24], there have been no studies directly testing this hypothesis. Age was also explored as a moderator. Marital quality in older couples may influence sleep differently in comparison with younger couples, as many aspects of the aging process lead to changes in sleep [25]. With a wider range of age (45 to 74 years) compared with previous studies, the current study tested differences between middle-aged (age range 45–54) versus older adults (age range 55–74) in the relationship between marital quality and sleep disturbances. We chose 55 as the age cut-off to reflect the average retirement age for Korean men [26], and other life course events (i.e., children leaving the household) that may affect one's marital dynamics as well as the pattern and quality of sleep [25,27]. Retirement and experiencing empty nest syndrome often lead to feelings of loss and distress, and require individuals to adjust to new daily routines and couples to renegotiate their marital roles [28].

Examining bidirectional relationships between marital quality and sleep disturbances may contribute to a better understanding of mechanisms linking close relationship functioning with mental and physical health outcomes. Furthermore, identifying vulnerable populations for marital and sleep problems may have implications for clinical practices.

Methods

Study design and sample

Participants of the present study were part of a larger study, namely the Korean Genome and Epidemiology Study (KoGES), which is an ongoing, population-based cohort study that started in 2001 under the original title, Korean Health and Genome Study. Detailed information on the study design and aims of the KoGES have been previously reported [29]. The current study used a subset of individuals from the

original cohort members recruited from Ansan, South Korea who participated in the follow-up assessments in the years 2007 (Baseline) and 2011 (Follow-up). These time points were selected since these were the only times when marital quality, the main focus of the current study, was assessed.

The current study focuses on 1604 participants who were present at the baseline assessment in 2007. Because the main topic of the present study is the relationship between marital quality and sleep disturbances, individuals who did not complete the marital quality questionnaire at baseline were excluded, which resulted in 1100 individuals. All 1100 participants were married. Additional exclusion criteria were pre-existing dementia, cerebrovascular disease, and/or traumatic brain injury. Nineteen participants met this criteria (13 cerebrovascular disease and 6 traumatic brain injury), resulting in a final sample of 1081 participants. An informed consent form was signed by each participant, and the study procedure was approved by the institutional review board of the Korea University Ansan Hospital.

At 4-year follow-up, 86% ($n=932$) of the sample continued to participate in the study. Individuals who did not participate in the follow-up assessment ($n=149$) were significantly older ($P=.020$) and with lower family income ($P<.001$) compared with the follow-up participants. There were no significant differences in gender, education, or employment status (P -values $\geq .121$).

Measures

Marital quality

A 7-item measure from the English Longitudinal Study of Aging [30] was used to assess one's overall subjective perceptions on the marital relationship. This measure includes items evaluating one's perception on the level of understanding, dependency, openness, criticism, disappointment, dislike of spouse's behavior, and intimacy in the relationship with spouse. Items were rated on a 4-point Likert scale and averaged to obtain a total score ranging from 0 to 3 with higher scores indicating higher levels of marital quality. For example, to the question of "how much do they really understand the way you feel about things?" a '0' indicates "not at all" and a '3' indicates "a lot." The Cronbach's alpha reliability was .79. At follow-up, an abbreviated version of the original questionnaire was used to assess the level of intimacy and overall marital satisfaction. The two items were also averaged for a total score ranging 0–3 with higher scores indicating higher marital quality. Correlation coefficient between baseline and 4-year follow-up marital quality was .53 ($P<.001$).

Sleep disturbances

The Pittsburgh Sleep Quality Index (PSQI) [31] was used to measure the quality and disturbances of sleep during the past month. Eighteen self-rated items generate 7 component scores each ranging 0–3: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The component scores are summed to produce a global score ranging 0–21 with higher scores indicating higher sleep disturbances. A global score greater than 5 indicates a poor sleeper [31]. Sound psychometric properties of the Korean version of PSQI have been documented [32]. The Cronbach's alpha was .70.

Covariates

Sociodemographics. All participants provided information on age, gender, level of education, marital status, family income, and employment status including working night shifts, menopausal status, and presence of children in the household.

Health status. Data on history and current use of psychotropic or sleep medications were collected. General health status was measured using one item derived from the Medical Outcomes Study SF-12 [33]

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