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Letter to the Editor

Impact of disease severity on sleep quality in Japanese patients with atopic dermatitis

To the Editor,

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Severity scoring of atopic dermatitis (SCORAD)
Pittsburgh Sleep Quality Index (PSQI)

Atopic dermatitis (AD) is a common allergic skin disease that is characterized by chronic, pruritic and eczematous lesions. The relationship between AD and sleep disturbances has been studied and the current theory is that sleep problems are related to nocturnal itching and scratching behavior [1]. The Pittsburgh Sleep Quality Index (PSQI) is a self-related questionnaire assessing sleep quality and disturbances over a 1-month time period [2]. Doi et al. developed the Japanese version of PSQI (PSQI-J) and disclosed the utility of the PSQI-J as a reliable and valid measure for sleep quality in clinical practice and research. They showed that the PSQI-J mean scores were significantly higher in psychiatrically disordered subjects than control subjects [3]. There has, however, been no study evaluating sleep quality in Japanese adult AD patients using PSQI-J in relation to disease severity. The aim of this study is to examine the impact of disease severity on sleep quality in this group of patients using PSQI-J.

The PSQI has 19 questions that generate 7 component scores: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. The sum of the 7 component scores generates a global score, ranging from 0 to 21. Higher scores indicate worse sleep quality, and a global PSQI score greater than 5 is consistent with poor sleep quality [2]. To assess the relationship between PSQI outcomes and severity of AD, two different clinical severity indexes were used: severity scoring of AD (SCORAD) for disease severity, and dermatology life quality index (DLQI) for quality of life (QOL) impairment. SCORAD is a severity index combining extent, intensity and subjective symptoms and is scored from 0 to 103, with a larger number indicating greater severity [4]. DLQI is an instrument that assesses the effect of a skin disease on six different aspects of a patient's QOL. It is scored from 0 to 30, with higher scores indicating a greater impairment of the patient's QOL [5]. In this study, both continuous SCORAD/DLQI scores and categorical SCORAD ($<$20, 20–40, and $\geq$40) as well as DLQI ($<$5, 5–10, and $\geq$10) were used to assess severity.

We conducted a self-administered questionnaire survey of 112 adult AD patients (56 males and 56 females) who visited the Jikei University Hospital. All patients gave written informed consent of their participation in the study which was approved by the ethical committees at the Jikei University. PSQI-J was adapted from "http://www.sleepmed.jp/q/meq/psqi_form.php" with permission of the copyright holder. Correlation analysis was used to assess the association between the continuous PSQI outcomes and the severity of AD (SCORAD and DLQI). The associations between PSQI and categorical SCORAD ($<$20, 20–40, and $\geq$40) or DLQI ($<$5, 5–10, and $\geq$10) were also assessed using the ANOVA with SNK test. A P-value of <0.05 was considered statistically significant.

Patients' mean age was 35.6 ± 10.8 years, SCORAD was 35.5 ± 21.9, DLQI was 7.8 ± 5.1, and PSQI was 7.3 ± 2.8. Associations between PSQI and SCORAD/DLQI scores are shown in Fig. 1(a) and (b). The PSQI score was significantly correlated with both SCORAD and DLQI scores. Association between the PSQI score and categorical SCORAD/DLQI scores are depicted in Fig. 1(c) and (d). PSQI in the SCORAD $\geq$ 40 group was significantly higher than those in SCORAD $<$ 20 and 20 $\leq$ SCORAD $<$ 40. PSQI in 5 $\leq$ DLQI $<$ 10 was significantly higher than that in DLQI $<$ 5 and PSQI in DLQI $\geq$ 10 was significantly higher than that in 5 $\leq$ DLQI $<$ 10. Associations between PSQI component scores and SCORAD/DLQI are shown in Table 1. The SCORAD score was significantly associated with subjective sleep quality and sleep latency. The DLQI score was significantly associated with subjective sleep quality, sleep latency, habitual sleep efficiency, sleep disturbance and daytime dysfunction. Additional analyses disclosed that there is no significant association between PSQI and gender ($P = 0.47$, unpaired t-test), and a weaker association between PSQI and age ($r = 0.214$, $P = 0.02$, correlation analysis) than that between PSQI and SCORAD ($r = 0.332$, $P = 0.0003$) or between PSQI and DLQI ($r = 0.430$, $P = 2.2 \times 10^{-6}$).

Table 1
Associations between PSQI component scores and SCORAD/DLQI.

PSQI and SCORAD	r	P
Subjective sleep quality	0.360	$P<0.001$
Sleep latency	0.307	$P<0.001$
Sleep duration	0.061	0.52
Habitual sleep efficiency	0.090	0.34
Sleep disturbance	0.077	0.41
Use of sleeping medication	0.159	0.09
Daytime dysfunction	0.123	0.19
PSQI and DLQI	r	P
Subjective sleep quality	0.403	$P<0.001$
Sleep latency	0.321	$P<0.001$
Sleep duration	0.162	0.08
Habitual sleep efficiency	0.198	$P<0.05$
Sleep disturbance	0.250	$P<0.01$
Use of sleeping medication	0.018	0.84
Daytime dysfunction	0.323	$P<0.001$

PSQI, Pittsburg Sleep Quality Index; SCORAD, severity scoring of AD; DLQI, dermatology life quality index.

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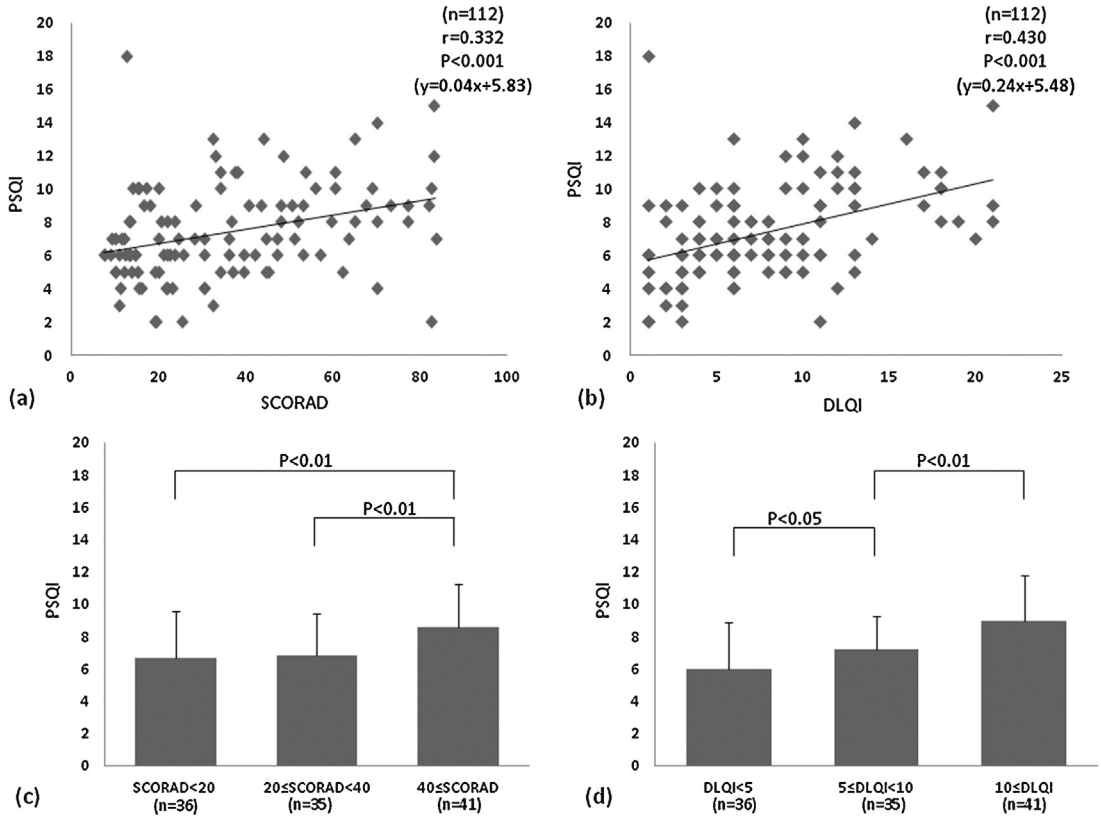


Fig. 1. Associations between PSQI and SCORAD/DLQI. (a) PSQI and SCORAD. (b) PSQI and DLQI. (c) PSQI and categorical SCORAD. (d) PSQI and categorical DLQI. (PSQI, Pittsburg Sleep Quality Index; SCORAD, severity scoring of AD; DLQI, dermatology life quality index).

There are several assessment tools for evaluating the degree of sleep disturbance other than PSQI: the Stanford Sleepiness Scale (SSS), Karolinska Sleepiness Scale (KSS), Epworth Sleepiness Scale (ESS), Oguri–Shirakawa–Azumi sleep inventory MA version (OSA-MA) and SleepMed Insomnia Index (SMI) [6–10]. The first three scales (SSS, KSS and ESS) are questions about subjective sleepiness in given situations, OSA-MA is a questionnaire assessing sleep state of the previous night and SMI is a diagnostic insomnia questionnaire. PSQI has been used widely for over 20 years in various clinical populations and seems to be the most suitable measure among those above-mentioned for evaluating sleep quality in chronic skin diseases including AD.

Mostaghimi showed the prevalence of sleep problems by PSQI in chronic skin diseases (n = 16) as a pilot study [1]. The mean PSQI score of his patients was 10.5 ± 4.0 and 15 out of the 16 (93.8%) had a PSQI score of more than 5, indicating poor sleep quality. In addition, 9 out of the 16 participants (56.3%) in his study reported mood problems such as depression or anxiety and participants with chronic skin diseases that did not cause itching, such as alopecia areata, also reported poor sleep quality. Ours is the first study to evaluate the sleep quality of Japanese adult AD patients using PSQI-J. The mean PSQI score of AD patients (n = 112) was 7.3 ± 2.8 and 70 out of the 112 (62.5%) had a PSQI score of more than 5, suggesting poor quality. We demonstrated that global and component PSQI scores such as subjective sleep quality and sleep latency were positively and significantly associated with SCORAD/DLQI scores, indicating that nocturnal itching and scratching behavior impair the sleep quality of AD patients. Furthermore, PSQI score was more strongly associated with DLQI than with SCORAD, and component PSQI scores such as habitual sleep efficiency, sleep disturbance and daytime dysfunction were associated with DLQI but not with SCORAD, suggesting the possibility that mood problems also impair sleep quality. Further studies are necessary to elucidate the relationship between mood problems and impaired sleep quality in Japanese AD patients.

Acknowledgments

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