

# The Relationship Among Sleep Quality, the Stages of Change Readiness and Treatment Eagerness Scale, Abstinence Self-efficacy, and Quality of Life with Alcohol Use Disorder in South Korea

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## Abstract

Many patients with alcohol use disorder experienced insomnia or sleep disturbances. However, their sleep problems rarely addressed in the treatment process. It may prove beneficial if treatment programs should intend to help prevent the recurrence of alcohol use disorder by solving patients' sleep-induced problems and accordingly include appropriate sleep interventions. The present study employed a descriptive design and conducted a cross-sectional survey to assess the relationship among sleep quality, score on the Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES), abstinence self-efficacy, and quality of life in inpatients with alcohol use disorders. Data were collected from June to August 2018, from 117 patients admitted to the psychiatric ward for alcohol-use patients in two mental hospitals in South Korea. Sleep quality was significantly correlated with the SOCRATES score ( $r = .247, p = .007$ ) and quality of life ( $r = -.346, p = .001$ ). However, it showed no relationship with abstinence self-efficacy ( $r = -.066, p = .477$ ). These findings suggest that abstinence programs need to employ a comprehensive approach instead of primarily focusing on maintaining abstinence and cessation of alcohol use. However, both sleep disturbances and alcohol abstinence require patience and prolonged treatment. Thus, it is a challenge to design concrete interventions to address the sleep problems experienced by patients with alcohol use disorder.

**Keywords:** Abstinence, Alcohol use disorder, Self-efficacy, Sleep disturbances

## 1. Introduction

Patients with alcohol use disorder suffer from severe and prolonged sleep disruptions that manifested as severe insomnia (Brower & Perron, 2010). In some cases, patients with insomnia may ask clinicians to prescribe sedative-hypnotic agents (Stein & Freidmann, 2009). However, the tendency to consume alcohol to induce sleep is a severe problem (Brower & Hall, 2001). Drinking to induce sleep leads to increased alcohol tolerance, such that the individuals need to consume much more alcohol over time (Kühlwein, Hauger, & Irwin, 2003). This behavior leads to a vicious cycle of alcohol use and sleep disorders. However, sleep complaints do not receive the attention they deserve, resulting in a severe lack of sleep intervention programs to aid recovery after the treatment or detoxification period (Lee, 2010; Ko et al., 2003).

Most previously cited studies have focused on sleep mechanisms, the physiopathology of patients with alcohol use disorder, or the relationship between sleep and alcohol (Ebrahim et al., 2013; Hartwell et al., 2015; Stein & Friedmann, 2009; Vinson et al., 2010; Voinescu & Orășan, 2014). However, there remains a lack of clarity surrounding the emotional and psychological factors affecting sleep disturbances (Lee, 2010; Ko et al., 2017). Due to the lack of awareness regarding the sleep complaints experienced by patients during the recovery or sobriety period, sleep problems and disturbance of alcohol treatments are being exacerbated simultaneously (Ko et al., 2017). Thus, it may be necessary to focus on implementing sleep intervention during recovery.

Subjective and objective indicators of sleep disturbances is said to predict alcohol-use relapse (Brower & Perron, 2010), while psychological variables of recovery predict abstinence and the level of change motivation (McAweeney et al., 2005). To identify the relationship between predictors of sleep disturbances and recovery, this study aimed to assess two variables; stage of change readiness and treatment eagerness, which are known predictors of treatment prognosis (Brown & Miller, 1993), and abstinence self-efficacy, which is considered as a

significant predictor of behavior change for recovering patients (Miller & Rollnick, 2002).

The motivation for change is regarded as an intermediate treatment outcome (Demmel et al., 2004; Williams et al., 2007), and clinicians use it as a direct means to predict the results of alcohol-dependency interventions (DiClemente, Nidecker, & Bellack, 2008). Abstinence from substance use is strongly associated with low self-efficacy and various unhealthy behaviors (Glozah, Adu, & Komesuor, 2015), including low self-efficacy regarding refusing heavy drinking and demonstrating expectations of social facilitation (Gills, Turk, & Fresco, 2006). An increase in the motivation for change and self-efficacy during the recovery phase is considered helpful after the treatment. Individuals with alcohol use disorders typically go through several stages in achieving and sustaining their long-term behavior changes.

The change is continuous, relative, innovative, increasingly diverse, and unpredictable (Rogers, 1992). That is, it means that there is no repetition of stages and no regression to late stages (Fawcett, 2005). However, patients with alcohol use disorder experience repeated successes and failures in the course, especially during the abstinence period, leading to a cycle of relapse. Eventually, these patients experience insomnia, which is one of the most common complaints during recovery. It persists even after weeks or months of abstinence (Kühlwein, Hauger, & Irwin, 2003). Additionally, as the aim of alcohol use disorder treatment is the cessation of drinking, they need to focus on abstinence or early treatments that aid recovery (Donovan et al., 2005). The ultimate aim of alcohol use disorder treatments is not merely achieving cosmetic outcomes such as cessation of alcohol drinking; instead, they intend to aid the resolution of real-life problems such as sleep disturbances.

Scales assessing the quality of life of patients with alcohol use disorder are essential indicators in this multifactorial pathology of therapeutic stages (Malet et al., 2006). Therefore, indices for measuring drinking behaviors and quality of life are considered to be meaningful (Cisler & Zweben, 1999). Although recovery is defined as the “gradual healing (through rest) after sickness or injury” or “returning to an original state,” the concept of “recovering” rather than “recovered” is considered more appropriate for alcohol use disorder (Shin, Kwak, & Kang, 2014). That is, the process of recovering from alcohol use disorder should be considered similar to live life. Alcohol problems are closely interrelated with other life problems, and several negative consequences have an adverse effect on some areas of drinkers' lives (Donovan et al., 2005). The complexities of psychological dynamics can affect sleep to the extent that the changed behavior by abstinence means recovery, but this does not mean the improvement for the quality of life (Cisler & Zweben, 1999). Besides, the quality of life of patients with alcohol use disorder is lower as compared to the general population or those with other diseases (Cisler & Zweben, 1999; Donovan et al., 2005). Many patients with alcohol use disorder have tasks, which means that they can continue to maintain their abstinence and recovery even through the challenges they encounter in their daily life. However, they continuously face a risk of failure at any given time, which may result in the substantial psychological burden that affects their sleep patterns during the abstinence period. Nevertheless, few studies have examined the quality of life of patients in the recovery period (Yoon & Kim, 2015; Saatcioglu, Yapici, & Cakmak, 2008). Furthermore, there is no significant research on the relationship between motivation for change, abstinence self-efficacy, and sleep disturbances.

Therefore, the present study aimed to investigate the relationship among sleep quality, score on the stages of change readiness and treatment eagerness scale (SOCRATES), abstinence self-efficacy, and quality of life in patients with alcohol use disorder. It intended to provide evidence on the variables affecting the quality of sleep of patients with alcohol use disorder and to provide the basis for the development of appropriate sleep intervention programs for such patients.

## **2. Methods**

### *2.1 Design*

This study employed a descriptive design and conducted a cross-sectional survey to assess the relationship among sleep quality, the SOCRATES, abstinence self-efficacy, and quality of life in inpatients with alcohol use disorder, who were admitted to psychiatric hospitals.

### *2.2 Participants*

Participants were patients admitted in the alcohol use disorder-specialized wards of two mental hospitals in J Province, South Korea. Individuals who fulfilled the selection criteria for participating in this study were chosen randomly. The researchers received permission and cooperation from the directors of the facilities, the patients' doctors, nurse directors, and ward nurses. The following inclusion and exclusion criteria were used to determine participant eligibility:

- 1) Patients who understood and agreed with the purpose of the study.

- 2) Patients with alcohol use disorder, diagnosed using the DSM-5 (Diagnostic and Statistical Manual of Mental Disorders-5) criteria, and hospitalized for over one month.
- 3) Patients aged 18 to 65 years.
- 4) Patients with any comorbid conditions and physical or cognitive complications were excluded.

The minimum sample size was determined using G\*Power v. 3.1 (Heinrich Heine University, Dusseldorf, Germany). The minimum sample size required for a correlation test was 109, with the following parameters: a power of 0.90, an alpha of 0.05, and an effect size of 0.3. A total of 120 questionnaires were distributed, taking dropouts into account. An appropriate final sample of 117 participants was included in the analysis.

### *2.3 Ethical considerations*

The institutional review board approved this study of the mental health psychiatric hospital (approval No.: JPMH-IRB-2018-004). The purpose of this study was to explain to patients who met the inclusion criteria. They informed that participation was voluntary and that they could withdraw at any time. Informed consent was obtained from all participants. Subsequently, they responded to each questionnaire individually.

### *2.4 Measurements*

#### *2.4.1 Pittsburgh Sleep Quality Index (PSQI)*

The Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989) was used to assess sleep quality and quantity over the past month. This 3-factor scale utilizes a 19-item scoring model to evaluate insomnia. The three factors are sleep efficiency, perceived sleep quality, and daily disturbances. Additionally, this scale evaluates the following seven components of sleep difficulties: sleep quality, latency, duration, efficiency, disturbances, use of medication, and daytime dysfunction (Buysse et al., 1989; Hartwell et al., 2015). Scores range from 0 to 3 points for each component, with a maximum total score of 21 points. Ratings above 5 points indicate poor sleep quality. In a previous study, the Cronbach's  $\alpha$  for this scale was .79 (Hartwell et al., 2015). In the present study, it was .74.

#### *2.4.2 Stages of Change Readiness and Treatment Eagerness Scale-K (SOCRATES-K)*

The Stages of Change Readiness and Treatment Eagerness Scale (SOCRATES) was designed to assess the stage of change readiness in problem drinkers undergoing treatment for alcohol use disorder (Miller & Tonigan, 1996). It contains 19 items that are rated on a 5-point Likert scale ranging from strongly disagree to agree strongly. Higher scores indicate higher motivation to change. This study used the SOCRATES-K (Korean version) developed by Chun (2005). In previous studies, the Cronbach's  $\alpha$  ranged from .80 to .91 (Chun, Shin, & Cho, 2010) and .87 to .96 (Miller & Tonigan, 1996). In the present study, the Cronbach's  $\alpha$  ranged from .69 to .92, and that for the total scale was .84.

#### *2.4.3 Alcohol Abstinence Self-Efficacy Scale (AASES)*

The alcohol abstinence self-efficacy scale measures an individual's confidence in his/her ability to resist alcohol use in tempting situations, feelings, or states. This study used the AASES developed by DiClemente et al. (1994), which assesses the development of self-efficacy and evaluates an individual's efficacy to abstain from drinking in 20 typical drinking situations. It utilizes a 5-point Likert scale, with scores ranging from 0 to 80 points. Higher ratings indicate higher self-efficacy to abstain from alcohol use. Previous studies reported a Cronbach's  $\alpha$  of .92 (DiClemente et al., 1994) and .97 (Glozah, Adu, & Komesuor, 2015). It was .96 in the present study.

#### *2.4.4 Alcohol use disorder Quality of Life Scale (AIQoL-9)*

The AIQoL-9 comprises nine items derived from the Short-Form Health Survey (SF-36). This scale was exclusively developed to address the issue of quality of life in individuals with alcohol dependence (Malet et al., 2006). It is a highly acceptable tool because it is brief, comprehensive, and easy to complete (Pappa et al., 2016). The AIQoL-9 includes dichotomous alternatives as well as Likert-type items containing three to six response options. The mean overall quality of life score is expressed quantitatively, without the use of cut-off thresholds. The score ranges from 9 to 41 points, with higher scores indicative of the higher quality of life. In previous studies, Cronbach's  $\alpha$  for this scale was 0.81 (Malet et al., 2006) and 0.83 (Pappa et al., 2016). It was 0.79 in the present study.

### *2.5 Data Collection and Analysis*

Data were collected from June to August 2018. Subsequently, they were analyzed using IBM SPSS Statistics for Windows v. 23.0 (IBM Corporation, Armonk, NY, USA). All scales were administered as self-report questionnaires.

The procedure of analysis was as follows:

- 1) The general characteristics of the participants were examined using frequencies and percentages.
- 2) Differences in scores on the SOCRATES, AASE, AIQoL, and PSQI based on the participants' general characteristics were examined using the independent *t*-test and a one-way ANOVA. The Duncan test was applied for posthoc analysis.
- 3) Pearson's correlation coefficients were calculated to examine the relationship between SOCRATES, AASE, AIQoL, and PSQI scores.

### 3. Results

#### 3.1 Demographic Characteristics

Data collected from 112 males (95.7%) and five females (4.3%) were analyzed. Their age ranged from 27 to 60 years, with a mean age of 53.1 years. A total of 34 participants were single (29.0%), 36 were married (30.8%), 35 were divorced (29.9%), and 12 were bereaved (10.3%).

Eighty-seven (74.4%) patients experienced sleep disturbances while 30 (25.6%) did not. Among those who experienced sleep disturbances, 80 (68.4%) consumed hypnotic medications, whereas 37 patients (31.6%) consumed hypnotics despite the absence of sleep disturbances. Further, 86 patients (73.5%) received advice from doctors or nurses about the relationship between sleep disturbances and drinking, while 31 (26.5%) had not received any such advice before the present study. Ninety patients (76.9%) responded that they needed education or intervention for sleep disturbances.

Further details about the general characteristics of the present participants have been presented in Table 1.

Table 1. General Characteristics of Participants (N = 117)

Characteristics	Category	N (%)	Mean ± SD
Gender	Female	5(4.3)	
	Male	112(95.7)	
Age	27-49	34(29.1)	
	50~59	55(47.0)	53.1±2.34
	≥60	28(23.9)	
Education	Middle school	28(23.9)	
	High school	59(74.4)	
	Over college	30(25.6)	
Marital status	Single	34(29.0)	
	Married	36(30.8)	
	Divorced	35(29.9)	
	Separated or Bereaved	12(10.3)	
Employment	Employed	27(23.1)	
	Unemployed	90(76.9)	
Duration of Alcohol use disorder (yrs.)	≤ 1	21(18.9)	
	2 ~ 10	55(47.0)	9.4±0.65
	11 ~ 20	26(22.2)	
	≥ 21	15(12.8)	
Admission frequency	≤ 5	59(50.4)	
	6~10	25(21.4)	
	11-20	17(14.5)	
	≥ 21	16(13.7)	

Experienced sleep disturbance	Yes	87(74.4)
	No	30(25.6)
Experienced taking hypnotics during sleep disturbance	Yes	80(68.4)
	No	37(31.6)
Experienced drinking during sleep disturbance	Yes	91(77.8)
	No	26(22.2)
Experienced advice from a doctor or nurse about the relationship between sleep disturbance and drinking	Yes	86(73.5)
	No	31(26.5)
Need for education or intervention for sleep disturbance	Necessary	90(76.9)
	Unnecessary	27(23.1)

### 3.2 Severity of the variables

The mean scores on the PSQI, SOCRATES, AASE, and AIQoL were  $8.15 \pm 4.55$ ,  $65.69 \pm 11.47$ ,  $40.28 \pm 15.62$ , and  $27.06 \pm 3.71$  points, respectively (Table 2).

Table 2. The severity of PSQI, SOCRATES, Abstinence Self-Efficacy, and AIQoL (N = 117)

Variables	Mean $\pm$ SD
PSQI	$8.15 \pm 4.55$
SOCRATES	$65.69 \pm 11.47$
Abstinence Self-Efficacy	$40.28 \pm 15.62$
AIQoL	$27.06 \pm 3.71$

\* PSQI: Pittsburgh Sleep Quality Index;

\* SOCRATES: Stage of Change Readiness and Treatment Eagerness Scale;

\* AIQoL: Alcoholism Quality of life.

### 3.3 Differences in PSQI, SOCRATES, AASE, and AIQoL Scores by General Characteristics

An examination of PSQI scores concerning participants' general characteristics revealed significant differences between patients who experienced and did not experience sleep disturbances ( $t = 5.42$ ,  $p = .000$ ), and between patients with sleep disturbances who took and did not take hypnotics ( $t = 4.29$ ,  $p = .000$ ).

Regarding SOCRATES scores, the married and divorced groups had significantly higher scores as compared to the single, separated, and bereaved groups ( $F = 3.38$ ,  $p = .021$ ). Additionally, patients who experienced sleep disturbances had significantly higher scores as compared to those who did not ( $t = 2.71$ ,  $p = .008$ ), and those with sleep disturbances who took hypnotics had substantially higher scores as compared to the no sleep disturbance group ( $t = 2.36$ ,  $p = .020$ ). Patients who consumed alcohol while experiencing sleep disturbances had significantly higher scores as compared to those in the no-alcohol group ( $t = 3.70$ ,  $p = .000$ ). Finally, patients who had received advice from doctors or nurses about sleep disturbances experienced due to alcohol use disorder had significantly higher scores than those who did not receive such information ( $t = 2.87$ ,  $p = .005$ ).

AASE scores showed significant differences in terms of duration of alcohol use disorder ( $F = 3.64$ ,  $p = .015$ ), frequency of hospitalization ( $F = 3.48$ ,  $p = .018$ ), and consumption of alcohol while experiencing sleep disturbances ( $t = -2.11$ ,  $p = .037$ ).

AIQoL scores were significantly higher among employed patients as compared to their unemployed counterparts ( $t = 3.29$ ,  $p = .001$ ). Further, patients who experienced sleep disturbances had significantly higher scores as compared to the no sleep disturbance group ( $t = -2.53$ ,  $p = .013$ ).

Further details about the means and differences according to general characteristics are presented in Table 3.

Table 3. Analysis of Differences in PSQI, SOCRATES, Abstinence Self-Efficacy, and AIQoL by General Characteristics (N = 117)

Variables	Categories	PSQI		SOCRATES		Abstinence Self-Efficacy		AIQoL	
		M(SD)	F/t (p) Duncan	M(SD)	F/t (p) Duncan	M(SD)	F/t (p) Duncan	M(SD)	F/t (p) Duncan
Gender	Female	10.80(4.09)	.747(.389)	69.60(11.67)	-1.33(.186)	36.60(11.37)	-.35(.727)	26.00(6.12)	-0.65(.516)
	Male	8.04(4.56)		65.52(11.48)		39.38(17.60)		27.11(3.60)	
Age (yrs.)	27-49	8.68(4.77)	2.30(.105)	65.94(9.14)		39.38(13.00)		26.62(3.48)	
	50~59	6.69(4.49)		66.31(13.23)	0.33(.721)	41.43(18.71)	1.06(.350)	27.32(3.79)	0.38(.684)
	≥60	6.86(3.86)		64.18(10.48)		34.86(18.89)		27.07(3.88)	
Education	Middle school	7.85(5.03)	1.06(.351)	64.97(13.15)		41.50(18.01)		26.46(4.18)	
	High school	8.73(4.44)		66.42(11.15)	0.24(.788)	38.00(17.96)	0.39(.676)	27.05(3.33)	0.72(.490)
	Over college	7.30(4.31)		64.93(10.70)		39.67(15.80)		27.63(3.98)	
Marital status	Single <sup>a</sup>	8.94±4.64		62.59(12.19)		34.56(16.10)		26.50(3.49)	
	Married <sup>b</sup>	7.31±4.35	2.21(.090)	67.81(11.90)	-3.38(.021)*	43.14(17.89)		28.03(4.21)	
	Divorced <sup>c</sup>	9.03±4.53	d < b, < a, c	68.66(8.24)	d < a < b, c	40.29(17.27)	1.51(.215)	26.49(3.38)	1.41(.244)
	Separated or Bereaved <sup>d</sup>	5.92±4.36		59.50(12.94)		38.00(18.33)		27.42(3.34)	
Employment	Employed	7.04(4.54)	-1.46(.147)	66.15(11.61)	-0.23(.815)	43.00(18.32)	-1.28(.204)	29.04(3.60)	-3.29(.001)*
	Unemployed	8.49(4.54)		65.56(11.49)		38.14(17.00)		26.47(3.54)	
Duration of alcohol use disorder (yrs.)	≤ 1 <sup>a</sup>	7.62(4.36)	.674(.570)	65.38(11.23)		45.65(17.18)		28.19(3.23)	
	2 ~ 10 <sup>b</sup>	8.48(4.57)		65.96(12.14)	-0.178(.911)	39.36(15.75)	3.64(.015)*	26.68(3.71)	1.64(.183)
	11 ~ 20 <sup>c</sup>	7.50(5.01)		64.69(11.23)		30.96(18.59)	c < b < a, d	27.31(4.01)	d < b, c < a
	> 21 <sup>d</sup>	9.56(3.88)		67.78(9.83)		44.22(16.62)		25.44(3.64)	
Admission frequency	≤ 5 <sup>a</sup>	8.03(4.74)	2.18(.095)	66.69(11.73)	2.10(.104)	44.10(17.75)	3.481(.018)*	27.44(3.60)	1.92(.131)
	6~10 <sup>b</sup>	8.44(4.05)	c < a, b < d	65.20(10.98)	c < b, a < d	36.28(16.70)	c, d < b < a	26.16(3.40)	
	11-20 <sup>c</sup>	6.24(3.58)		59.88(12.66)		32.41(16.82)		28.24(3.98)	
	≥ 21 <sup>d</sup>	10.19(5.02)		68.94(8.22)		33.38(12.90)		25.81(3.94)	
Experienced sleep disturbance	Yes	9.36(4.28)	5.42(.000)*	67.33(9.59)	2.71(.008)*	37.53(15.38)	-1.86(.065)	26.56(3.34)	-2.53(.013)*
	No	4.67(3.45)		60.93(14.90)		44.30(21.64)		28.50(4.34)	
Experienced taking hypnotics during sleep disturbance	Yes	9.30(4.57)	4.29(<.000)**	67.36(9.38)	2.361(.020)*	38.19(16.54)	-.99(.326)	26.65(3.43)	-1.78(.078)
	No	5.68(3.45)		62.08(14.53)		41.59(19.03)		27.95(4.15)	
Experienced drinking during sleep disturbance	Yes	8.57(4.56)	1.87(.064)	67.68(9.80)	3.70(.000)**	37.48(16.48)	-2.11(.037)*	26.98(3.50)	-0.445(.657)
	No	6.69(4.34)		58.73(14.15)		45.50(19.18)		27.35(4.43)	
Experienced advice from a doctor or nurse about the relationship between sleep disturbance and drinking	Yes	8.59(4.66)	1.75(.083)	67.47(9.76)		38.63(17.42)		26.92(3.61)	
	No	6.94(4.09)		60.77(14.32)	2.87(.005)*	41.03(17.35)	-0.66(.511)	27.45(3.98)	-0.69(.495)
The need for education or intervention for sleep disturbance	Necessary	10.99(4.08)	1.99(.050)*	68.14(10.39)	1.66(.100)	37.94(17.78)	-1.51(.134)	26.81(3.56)	-1.33(.186)
	Unnecessary	9.22(3.97)		57.85(11.60)		43.67(15.35)		27.89(4.12)	

\* p < .05, \*\* p < .000.

### 3.4 Correlation among the SOCRATES, AASE, AIQoL, and PSQI

The PSQI was significantly correlated with the SOCRATES ( $r = .247, p = .007$ ) and AIQoL ( $r = -.346, p = .001$ ). However, it was not correlated with the AASE ( $r = -.066, p = .477$ ). The results of the correlation tests are presented in Table 4.

Table 4. Correlations among PSQI, SOCRATES, Abstinence Self-Efficacy, and AIQoL

Variables	PSQI	SOCRATES	Abstinence Self-Efficacy	AIQoL
	$r(p)$	$r(p)$	$r(p)$	$r(p)$
PSQI	1			
SOCRATES	.247(.007)*	1		
Abstinence Self-Efficacy	-.066(.477)	.284(.002)*	1	
AIQoL	-.346(<.001)*	-.135(.147)	.044(.636)	1

\* PSQI: Pittsburgh Sleep Quality Index.

\* SOCRATES: Stage of Change Readiness and Treatment Eagerness Scale.

\* AIQoL: Alcoholism Quality of life.

## 4. Discussion

This study examined the relationship among sleep quality, score on the SOCRATES, abstinence self-efficacy, and quality of life in inpatients with alcohol use disorder admitted in mental hospitals. In this study, 74% of patients experienced sleep disorders. Non-treatment-seeking problem drinkers demonstrated a 76% prevalence rate of sleep disturbances in a similar study in which the same measurement instrument was used (Hartwell et al., 2015). Further, this study incidence of sleep disturbances was higher as compared to that reported in previous studies (44~71%) (Brower & Hall, 2001; Brooks et al., 2019). Besides, 77% of the patients who consumed alcohol as self-care for sleep disturbances responded that sleep problems interfered with abstinence. Approximately 70% of the patients who took hypnotics and expressed the need for sleep management programs reported that they had not yet received any sleep interventions in this study.

PSQI scores of over 5 points indicate the presence of sleep disturbances, and those of over 8 points represent poor sleep quality (Carpenter & Andrykowski, 1998). The present participants had a mean score of 8.15 points, indicating that their sleep disturbances were severe. This result is almost similar to the rating of 8.4 points reported by a previous study on patients with alcohol use disorder and insomnia (Hartwell et al., 2015). Another study conducted in Korea reported a score of 9.41 points (Ko et al., 2017), which indicates a much more inferior sleep quality as compared to that observed in other countries. This result reveals the need for further research to identify the cause and the solution for poor sleep quality in Korea. As compared to these findings, a study on individuals with alcohol use disorder in Romania reported a score of 7.5 points (Voinescu & Oran, 2014). Another study conducted in the United States reported a score of 8.12 points a week after discharge, which was similar to the score observed in the present study. However, 4–6 weeks after discharge, the quality of sleep improved to 7.1 points (Brooks et al., 2019). One study conducted in Egypt expanded the application of the PSQI to community-dwelling adults with a substance-related disorder, which was 6.4 points different from the only research of alcohol patients (Manzar et al., 2017). Brooks et al. (2019) found that the quality of sleep improved positively with the implementation of physicochemical evaluations, psychosocial management, and an alcohol treatment program for patients with alcohol use disorder after discharge. Therefore, the present findings, it is recommended that experimental studies be conducted to measure the effects of such interventions on the sleep quality of patients with alcohol use disorder.

This study also revealed that sleep quality was affected by the frequency of hospitalization. Specifically, participants who experienced sleep disturbances experienced taking hypnotics and expressed the need for sleep management programs exhibited a higher incidence of hospitalization. Though these participants experienced severe sleep problems, they did not receive any particular practical program to address these sleep disturbances. Because of the existing research on the sleep disturbances experienced by patients with alcohol use disorder, despite variations in sleep quality according to the treatment environment or cultural differences, the need to

implement sleep education programs for the patients is evident. Physiologically, the comorbid sleep disorders in patients with alcohol use disorder have already been proven (Thakkar, Sharma, & Sahota, 2015); however, the results of this study showed that sleep interventions are rarely implemented. A previous study developed and applied a sleep intervention program for psychiatric patients called Cognitive-Behavioral Therapy for Insomnia (CBT-I) (Taylor & Pruiksma, 2014); however, there are no studies on patients with alcohol dependence. The CBT-I can help obviate the need for hypnotic medications and assist recovering patients with alcohol use disorder by improving their sleep quality (Taylor & Pruiksma, 2014). Therefore, it recommended that future study examines the effectiveness of CBT-I in assisting patients with alcohol use disorder to support their sleep problems.

In the present study, the mean score on the SOCRATES was 65.69 points, which was lower as compared to that reported by other studies that reported scores of 73.35 in inpatients and outpatients (Chun et al., 2010), and 71.98 in inpatients (Won et al., 2016). Additionally, studies on patients undergoing rehabilitation reported much higher scores reported in the present study. For instance, participants in the AA (Alcohol Anonymous) group who successfully abstained from alcohol scored 79.57 points (Won et al., 2016), those selected from a rehabilitation center scored 78.52 points (Aviola et al., 2015), and outpatients scored 75.72 points (Miller & Tonigan, 1996). However, it may be meaningful to consider changes in participants in a rehabilitation program by comparing their SOCRATES scores before and after treatment. It may be appropriate to implement programs to improve the change readiness and treatment eagerness of inpatients (Miller & Tonigan, 1996). That is, it can help explain the effectiveness of the rehabilitation program to inpatients preparing for discharge.

Further, divorced participants had significantly higher SOCRATES scores as compared to their counterparts. Additionally, the post-hoc analysis revealed that they had inferior sleep quality. Studies have found that family support increases the quality of life and affects change readiness and treatment eagerness (Miller & Tonigan, 1996; Fioretine & Hillhouse, 2000). The relationship between an individual with alcohol use disorder and his/her partner appears to have had a reciprocal influence on the drinking behaviors of both individuals (McAweeney et al., 2005). For patients with alcohol use disorders, the recovery process focuses on creating a productive life by making changes in life patterns (Yoon et al., 2012). As divorce can be a life crisis, mental health professionals need to help and support their life patterns turn positive.

The SOCRATES score was also significantly higher among those who took hypnotics, those who experienced sleep disturbances, those who consumed alcohol while experiencing sleep disturbances, and those who had been advised by healthcare providers regarding the association between alcohol use and sleep problems. These results showed they commonly experienced sleep disturbances. However, they seemed to implement non-therapy methods to overcome for sleep disturbances. Although SOCRATES scores and sleep quality were correlated, the previous study reported that SOCRATES had a high correlation with resilience (Abiola et al., 2015). That is, SOCRATES tends to correlated positive variables, but this study showed the opposite. Therefore, it is necessary to reconfirm the correlation through the repeated study of expanding the number of subjects.

The participants of this study had an abstinence self-efficacy score of 40.28 points, which was almost similar to the score of 40.79 points observed in alcohol drinkers among general college students (Glozah et al., 2015). Previous experimental studies that examined abstinence self-efficacy reported that inpatients with alcohol use disorder scored 43 points before intervention (Jung & Hwang, 2015; An & Kim, 2017). In these studies, music, and group art therapy led to an improvement in AASES scores, with scores increasing to 50 points or higher in all participants, and 79 points or higher in participants who were mainly trained for abstinence (Jung & Hwang, 2015; An & Kim, 2017; Won et al., 2016). These results suggest that art programs can help abstinence self-efficacy. Even though there was no correlation between abstinence self-efficacy and sleep quality in the present study, participants who consumed alcohol when they experienced sleep disturbances had a significantly lower score on the AASES. This result suggests that sleep disturbances may lead to short-term failure in recovery by lowering abstinence self-efficacy.

Further, it has been suggested as an essential aspect of early diagnosis management because AASES scores were higher when the duration of diagnosis was shorter, or the number of hospitalizations was less than five. Accordingly, the implementation of treatments for sleep disturbances during early recovery was recommended (Kaplan et al., 2014). Thus, despite the absence of a significant correlation between abstinence self-efficacy and sleep quality, sleep interventions may apply in the early stages of the diagnosis.

The present findings also showed that participants who had a job had a higher quality of life when the alcohol-diagnosed period was short. However, this result was not statistically significant. A post-hoc analysis showed that the scores of participants with a duration of over 21 years were much lower than those of participants with comparatively shorter disease duration. The quality of life of patients experiencing recurrent problems is

significantly lower (Foster, Petersburg, & Marshall, 2000), indicating that the period can be affected. Previous studies have reported that the duration of abstinence and a high level of alcohol dependence are strong predictors of quality of life (Morgan et al., 2004; Daepfen et al., 2014). In the present study, quality of life had a significant correlation with sleep quality. In addition to, the quality of life of patients who did not experience sleep disorders was significantly higher as compared to other groups. The quality of life of such patients is crucial because it is related to depression, anxiety, serious addiction problems, and other such adverse outcomes (Saatcioglu, Yapici, & Cakmak, 2008). In general, their quality of life is low, and it is difficult to improve their abstinence because they have a higher probability of failure, abstinence programs should employ a comprehensive approach to improve patients' quality of life (Yoon & Kim, 2015). Thus, participation in self-help programs such as Alcoholics Anonymous (AA) actively promotes recovery and improves access to social support, thereby enhancing the quality of life (Gomes & Hart, 2009). Patients with alcohol use disorder need to participate in such programs continuously because the treatment of alcohol use disorder is a life-long process that cannot be completed in a short period. Therefore, mental health professionals should encourage patients with alcohol use disorder to participate in various therapeutic communities even after discharge.

## 5. Conclusions

This study examined that alcohol use disorder had associated sleep patterns. The sooner sleep interventions are implemented during the recovery process, the better the results will be. In early intervention, doctors and nurses should correct misconceptions about alcohol (e.g., thinking alcohol as a hypnotics or antidepressant) to help patients have the right sleeping habits. Perhaps, the treatment process can be painful because it takes patience and a long time to prove the interventions of abstinence and sleep disturbances. Nevertheless, if caregivers and patients work together with the same goal, the time for a complete recovery could be advanced.

The present sample was relatively small, and the study was conducted only in two hospitals in one province in South Korea. Therefore, it is difficult to generalize the results to other contexts. Additionally, this study was limited to inpatients admitted to psychiatric hospitals. Further research should be conducted with a more diverse range of participants, such as outpatients, those in alcohol rehabilitation centers, or anonymous alcoholic groups.

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## Competing Interests Statement

The author declares that there are no competing or potential conflicts of interest.

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