

Sleep quality in patients with spinal cord injury

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Introduction

Sleep disturbance is a common problem in patients with spinal cord injury (SCI). According to literature, SCI individuals are at high risk of sleep disturbance including snoring, difficulty in initiating and maintaining sleep, often awaking in the early morning and difficulty in falling asleep again, and easy tiredness during daytime. Factors that aggravate the quality of sleep in tetraplegic patients include pain, spasm, paresthesia, tendency to sleep in supine position, sedative usage or sleep apnea. However, only a few studies have focused on the quality of sleep in SCI population in Korea. The purpose of this study is to investigate the current status of sleep quality in patients with SCI.

Methods

The Nordic Sleep Questionnaires (NSQ) is widely used questionnaire for assessing the quality of sleep, consisting of 21 questions that are quantitative, ordinal or open question. The questionnaire asks the individuals to describe their sleep tendency for the last three months. We handed out the NSQ to patients with SCI as inpatients or outpatients. We also gathered demographic data, neurologic level of injury and severity of pain using the Numeric Rating Scale (NRS). Question 13 and 14 about the time going to bed and waking-up were not analyzed. The collected data were analyzed by descriptive statistic Method.

Results

A total of 61 questionnaires from 46 males and 15 females were returned. Twenty six patients were paraplegic while the others were tetraplegic. Mean duration of injury was 11.13 ± 11.63 years. Mean NRS score was 5.03 ± 2.26 . Other demographic data are shown in Table 1. Forty four patients (72.1%) reported difficulties in falling asleep, and they needed 39.84 ± 31.25 minutes to fall asleep. Fifty eight (95.1%) subjects answered they wake up during the overnight sleep, and especially more than half of them said it happens every day. Fifty five participants (90.2%) reported that they have not been slept well in last 3 months at various degree with 6.62 ± 2.40 hours of sleeping time, while they needed 7.74 ± 1.91 hours. Twenty one patients (34.4%) needed sleep medications to fall asleep. Distributions of the answers to each question are listed in Table 2 and 3. Twenty five patients reported various sleeping problems in answer to question 21, such as voiding or gastrointestinal problems (20.0%), shallow sleep (28.0%), pain (24.0%), position change (8.0%) and spasm (12.0%).

Conclusion

This study showed current state of sleep quality of patients with SCI. Pain, spasm, position change and voiding or gastrointestinal problem were reported as factors that

interfere the sleep. Sleep quality of patients with SCI can be improved by managing these factors. Further study with larger participants will be needed to determine the modifiable factors affecting the quality of sleep.

Table 1. Demographic characteristics of the participants

Characteristics	Value
Age (year)	53.93±11.66
Sex	
Male	46 (75.5%)
Female	15 (24.5%)
Duration of injury (year)	11.13±11.63
Functional status	
Paraplegia	26 (42.6%)
Tetraplegia	35 (57.4%)
AIS scale	
A	28 (45.9%)
B	4 (6.6%)
C	7 (11.5%)
D	21 (34.4%)
E	1 (1.6%)
Form of residence	
Home	54 (88.5%)
Rehabilitation center	7 (11.5%)

Table 2. Distribution of the answers to the questions on the Nordic Sleep Questionnaire with a 5-point ordinal scale

Question	Answers in number of participants (%)				
	1	2	3	4	5
Q1. Have you had difficulties in falling asleep?	17 (27.9%)	4 (6.6%)	9 (14.8%)	7 (11.5%)	24 (39.3%)
Q3. How often do you awaken at night?	4 (6.6%)	9 (14.8%)	7 (11.5%)	8 (13.1%)	33 (54.1%)
Q4. How many times do you usually wake up in one night?	3 (4.9%)	10 (16.4%)	21 (34.4%)	20 (32.8%)	7 (11.5%)
Q5. How often have you awakened very early in the morning without being able to fall back to sleep again?	17 (27.9%)	7 (11.5%)	12 (19.7%)	10 (16.4%)	15 (24.6%)
Q6. How well have you been sleeping?	6 (9.8%)	14 (23.0%)	12 (19.7%)	13 (21.3%)	16 (26.2%)
Q7. Have you used sleeping pills (by prescription)?	40 (65.6%)	1 (1.6%)	3 (4.9%)	5 (8.2%)	11 (18.0%)
Q8. Do you feel excessively sleepy in the morning after awakening?	19 (31.1%)	10 (16.4%)	11 (18.0%)	10 (16.4%)	11 (18.0%)
Q9. Do you feel excessively sleepy during the daytime?	12 (19.7%)	8 (13.1%)	17 (27.9%)	14 (23.0%)	10 (16.4%)
Q10. Have you suffered from irresistible tendency to fall asleep while at work?	21 (34.4%)	10 (16.4%)	11 (18.0%)	10 (16.4%)	9 (14.8%)
Q11. Have you suffered from irresistible tendency to fall asleep during free time (leisure time)?	18 (29.5%)	12 (19.7%)	11 (18.0%)	12 (19.7%)	8 (13.1%)
Q15a. How often do you have a nap during the daytime?	19 (31.1%)	11 (18.0%)	12 (19.7%)	11 (18.0%)	8 (13.1%)
Q16. Do you snore while sleeping (ask other people)?	20 (32.8%)	9 (14.8%)	8 (13.1%)	12 (19.7%)	12 (19.7%)
Q17. In what way do you snore (ask other people)?	18 (29.5%)	21 (34.4%)	10 (16.4%)	3 (4.9%)	9 (14.8%)
Q18. Have you had breathing pauses (sleep apnea) during sleep (have other people noticed that you have pauses in respiration when you sleep)?	46 (75.4%)	3 (4.9%)	7 (11.5%)	1 (1.6%)	4 (6.6%)

Answer-alternatives of question 1, 3, 5, 7, 9, 10, 11, 15a, 16 and 18 are as follow: 1, never or less than once per month; 2, less than once per week; 3, on 1-2 days per week; 4, on 3-5 days per week; 5, daily or almost daily.
 Answer-alternatives of question 4 are as follow: 1, usually I don't wake up at night; 2, once per night; 3, two times; 4, 3-4 times; 5, at least five times per night.
 Answer-alternatives of question 6 are as follow: 1, well; 2, rather well; 3, neither well nor badly; 4, rather badly; 5, badly
 Answer-alternatives of question 17 are as follow: 1, I don't snore; 2, my snoring sounds regular and it is of low voice; 3, it sounds regular but rather loud; 4, it sounds regular but it is very loud (other people hear my snoring in the next room); 5, I snore very loudly and intermittently (there are silent breathing pauses when snoring is not heard and at times very loud snorts with gasping)

Table 3. Distribution of the answers to the quantitative questions in the Nordic Sleep Questionnaire

Question	Answers in percent	
	Mean	SD
Q2. For how long a time (how many minutes as an average) do you stay awake in bed before you fall asleep (after lights out) (minutes)	39.84	31.25
Q12. How many hours do you usually sleep per night? (hours)	6.62	2.40
Q15b. If you take a nap, how long does it usually last? (minutes)	67.97	46.66
Q19a. If you snore at least 1-2 times per week, how many years have you been snoring? (ask other people if you don't know)? (years)	4.82	6.44
Q20. How many hours of sleep do you need per night (how many hours would you sleep if you had the possibility to sleep as long as you need to)? (hours)	7.74	1.91