The associations between insomnia and health-related quality of life in rehabilitation units at 1 month after stroke

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ABSTRACT

Objective: The principal objective of this study was to investigate the relationship between insomnia and health-related quality of life (HRQoL) during the early stage of stroke rehabilitation.
Methods: The subjects were 214 first-time stroke patients admitted to a rehabilitation unit at one of three Korean hospitals. Within 7 days after stroke, functions were evaluated using; the Berg Balance Scale, the Modified Barthel Index, the Mini Mental State Examination, the Frontal Assessment Battery, Screening Tests for Aphasia and Neurologic-Communication Disorders, and the National Institute of Health Stroke Scale. Insomnia, depression, anxiety, and HRQoL were investigated at one month after stroke. Insomnia was defined as presence of at least one of the four following; difficulty initiating sleep, difficulty maintaining sleep, early morning awakening, and non-restorative sleep. HRQoL was assessed using the Short Form Health survey SF-8. Depression and anxiety were measured using the Hospital Anxiety Depression Scale. Multivariate linear regression analysis was conducted to examine the association between insomnia and HRQoL.
Results: The prevalence of insomnia at one month after stroke was 59.5%. Patients with insomnia were more likely to be older and female and to have depression and anxiety. Patients with insomnia had poorer physical and mental HRQoL. By multivariate analyses, physical HRQoL was significantly associated with type of stroke, hypnotic usage, balancing function, and insomnia. Mental HRQoL was significantly associated with balancing function, depression, and insomnia.
Conclusion: Insomnia was found to be negatively associated with physical and mental HRQoL in stroke patients during the early stage of rehabilitation.

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1. Introduction

Insomnia is a common psychiatric complaint among stroke patients [1,2]. Reported prevalences of insomnia vary widely across studies because of the diverse definitions used. DSM 5 criteria for insomnia address the following three symptoms: difficulty in initiating sleep, difficulty in maintaining sleep, and early morning awakening [3]. In addition, non-restorative sleep has also been suggested to be a symptom of insomnia [4]. The prevalence of poststroke insomnia has been reported to range from 30 to 68% [1,5–8]. Furthermore, in stroke patients, insomnia is also considered a risk factor of physical disability, dementia, depression, and anxiety [1,2], and a potential risk factor of future stroke [9,10].

Quality of life is defined as an individual's perception of their position in life, in the context of the culture and value system in which they live, and in relation to their goals, expectations, standards, and concerns [11]. Of the many scales devised to measure health-related quality of life (HRQoL), the Short Form-36 (SF-36) is commonly used in a variety of medical/psychiatric conditions [12–15]. The advantages of SF-36 are that it has good reliability and validity in different populations, is easy to complete, and allows comparisons across disease states [12]. Two abbreviated versions of SF-36 are available, that is, the 12-item SF-12 and the eight-item SF-8 [12].

In the general population, insomnia is known to have a negative effect on HRQoL [13,16], and many previous studies, which used SF-36, have reported a negative relation between insomnia and HRQoL [13, 16–18]. Two previous studies have examined the influence of poor sleep quality on HRQoL using SF-36 in stroke patients [19,20]. However,

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the results obtained could not be generalized because samples were small and the studies were conducted at least 1 year after stroke. Another study examined the association between insomnia and HRQoL during the acute state at 3 months after stroke but did not address physical function or depression [8].

The principal objective of this study was to investigate the relationship between insomnia and HRQoL during the early stage of rehabilitation at 1 month after stroke. In addition, we sought to determine whether insomnia is independently associated with HRQoL by considering physical function, depression, and anxiety.

2. Methods

Initially, 278 hospitalized stroke patients at the rehabilitation centers of three hospitals (Inha University Hospital, Dong-A University Hospital, or Pusan University Hospital) between March 2014 and December 2015 were considered for the study. Stroke was diagnosed based on clinical presentation and brain magnetic resonance imaging findings by neurologists.

The study inclusion criteria were: (1) International Classification of Diseases (ICD)-10 codes (I60, 61, 62, 63, or I64) (World Health Organization 1997); (2) first onset stroke; (3) age ≥ 18 years; (4) and satisfactory cognitive function. The study exclusion criteria were; (1) an Mini Mental State Examination (MMSE) score of ≤10 or for subjects with a MMSE score between 11 and 23, physician confirmation of cognitive incompetence; (2) aphasia; (3) transient ischemic attack; (4) or severe auditory or visual impairment.

Baseline data, including age, gender, and type of stroke were assessed. All patient functions were assessed within 7 days after acute stroke and just before discharge (<2 months after stroke). Depression, anxiety, HRQoL, and insomnia were investigated at one month after stroke. Uses of hypnotic medications (benzodiazepine, benzodiazepine agonist, antidepressant (mirtazapine or trazodone), and antipsychotics) were recorded.

The study was approved by the institutional review boards and medical center ethics committees of Inha, Dong-A, and Pusan hospitals before study commencement. After providing participants with the details of the purpose and methods involved, all provided written informed consent.

2.1. Insomnia assessment

A questionnaire from the Korean Epidemiologic Catchment Area Study Replication (KECA-R) was used to assess insomnia according to DSM-IV [4,21]. The questionnaire is used to assess the prevalence of insomnia in adults [21] and elderly [22] in South Korea.

The questions asked were as follows:

1. "During the past month, how often have you had trouble sleeping due to difficulties of falling asleep?" (difficulty in initiating sleep)

2. During the past month, how often have you had trouble sleeping because you wake up too often after you have gone to sleep?" (difficulty in maintaining sleep)

3. "During the past month, how often have you had trouble sleeping because you wake up too early and cannot get back to sleep?" (early morning awakening)

4. "During the past month, have you ever woken up feeling tired and not refreshed?" (non-restorative sleep)

Responses were coded as "no", "once or twice a week", "three or four times a week", or "almost every night". The presence of the four sleep complaints (difficulty in initiating sleep, difficulty in maintaining sleep, early morning awakening, or non-restorative sleep) was defined as three or more episodes per week in the month following stroke, and insomnia was defined as presence of at least one of these four complaints [21]. Cronbach's alpha coefficient was 0.861.

2.2. Functional assessments

Initial (within 7 days after acute stroke) functions were evaluated using the Korean version of the Berg Balance Scale [23] for balance assessment, the Korean version of Modified Barthel Index [24] for activities of daily living, the Korean version of the Mini Mental State Examination (K-MMSE) [25] for cognitive function assessment, the Korean version of the Frontal Assessment Battery [26] for frontal lobe function assessment, Screening Tests for Aphasia and Neurologic-Communication Disorders [27] for aphasia assessment, and the Korean version of the National Institute's Health Stroke Scale of stroke severity [28].

2.3. Depression and anxiety assessments

The Korean version of the Hospital Anxiety Depression Scale [29] was used to assess depression and anxiety. This scale is composed of 14 items, 7 address anxiety and the other 7 depression. Questions about anxiety include tenseness, frightened feelings, worrying thoughts, relaxation, and restlessness. On the other hand, questions about depression addressed enjoyment, cheerfulness, lethargy, and loss of interest in appearance. The presence of anxiety and depression were defined as a score of ≥11 on their respective subscales [29]. Depression items focused mainly on anhedonia and exclude somatic symptoms, such as, insomnia to prevent overlap with physical disease.

2.4. Health-related quality of life

HRQoL was assessed using the Short Form Health survey SF-8 (SF-8) [15], which contains only eight items. These items provide measures of the eight domains of HRQoL, as follows; physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. These 8 domains were categorized into two scales that provided a physical component summary and a mental component summary; both were scored on a 0 to 100 scale where higher scores indicated better HRQoL. Mean scores of community norms are 50 on these two scales [12]. The reliabilities of the physical component summary and mental component summary are 0.88 and 0.82, respectively [12].

2.5. Statistical analysis

To examine differences between demographic variables, initial physical functioning, depression, and anxiety in patients with or without insomnia, continuous variables were analyzed using independent t-tests and categorical variables were analyzed using chi square tests. Multivariate linear regression analysis was conducted to examine the association between insomnia and HRQoL score. Multivariable linear regression analysis, applying backward elimination, was performed using variables with p-values of <0.1 (as determined by univariate analysis) as covariates (age, gender, type of stroke, hypnotic usage, and various initial physical function).

Missing data were excluded from the analyses, which were conducted using SPSS ver. 19.0 (SPSS Inc., Chicago, IL). Statistical significance was accepted for p values < 0.05.

3. Results

Of the 278 patients initially considered, 64 patients were excluded; 41 because of reduced cognitive function and 23 because they found communication difficult. Accordingly, 214 patients constituted the study cohort. Of these 214 study subjects, 128 (59.8%) reported the presence of at least one of the four sleep complaints during the previous month; one-month prevalences of difficulty in initiating sleep, difficulty in maintaining sleep, early morning awakening, and non-restorative sleep were 42.5%, 46.7%, 34.1%, and 41.5%, respectively (Table 1).