The effect of sleep hygiene education for improving sleep quality among patients with stroke: A systematic review

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WORD COUNT	4798	TIME SUBMITTED	01-JUN-2024 05:29PM
		PAPER ID	109359749

MINH
MALAHAYATI INTERNATIONAL JOURNAL OF NURSING AND HEALTH SCIENCE
ISSN 2620-9152 (Print)
ISSN 2621-4083 (Online)
DOI: 10.33024
Nomor: 79/E/KPT/2023

ARTICLE INFORMATION
Received: February, 5, 2024
Revised: May, 29, 2024
Available online: May, 31, 2024
at : https://ejurnal.malahayati.ac.id/index.php/minh

The effect of sleep hygiene education for improving sleep quality among patients with stroke: A systematic review

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Abstract

Background: One of the problems experienced by stroke sufferers is sleep problems. Stroke patients report having difficulty sleeping about 50% of the time in the early months after a stroke. Cognitive behavioral therapy (CBT) including sleep hygiene, controlling environmental stimuli, sleep restriction, positioning therapy, and educational management are some of the methods used to treat sleep problems.
Purpose: To determine sleep hygiene education on the outcomes of cognitive behavioral therapy in stroke patients with sleep disorders.
Method: Systematic review research using the Covidence application in the data extraction process. The framework used in this paper uses PICO, so the researchers set the research question in this systematic review as "Is sleep hygiene more effective than no sleep hygiene for sleep disorders in stroke patients?". Literature searches were carried out from Scopus, Wiley, Sciencedirect, Sage, Embase, Pubmed, Proquest and Medline for articles published up to March 19, 2023.
Results: Three articles were included in this systematic review. All three articles provide sleep hygiene education on sleep-related cognitive behavioral therapy to help improve sleep disorders after stroke.
Conclusion: Sleep hygiene education in cognitive behavioral therapy significantly improves sleep quality in stroke patients, but long-term studies are needed to test further significance.

Keywords: Cognitive-Behavioral Therapy (CBT); Sleep Hygiene Education; Sleep Quality; Stroke.

INTRODUCTION

Stroke is a non-communicable disease that causes death worldwide. According to the World Health Organization, stroke is the cause of 6.7 million deaths worldwide each year. Stroke causes 6 deaths per 60 seconds and every 60 seconds 30 new stroke cases can occur throughout the world (World Health Organization, 2014). Stroke is even the third leading cause of death and disability in developed countries (Casolla, Bodenant, Girot, Cordonnier, Pruvo, Wiel, & Goldstein, 2013). Based on Basic Health Research data conducted in 2018, the prevalence of stroke was 10.9% and the prevalence of stroke was 12.2%, in DKI Jakarta (Ministry of Health of the Republic of Indonesia, 2019). Stroke attacks 8 out of 1000 people in Indonesia and of the 7 people who died, 1 of them was caused by a stroke. Stroke is a cause of death and disability throughout the world, as well as in Indonesia (Ministry of Health of the Republic of Indonesia, 2016).

Stroke sufferers experience several changes or damage, namely sleep-wake disorders. This is caused by changes in the shape of abnormal sleep waves in stroke people, namely a decrease in slow waves and rapid eye movements (REM). Other

DOI: https://doi.org/10.33024/minh.v7i3.146

Studies say that around 50% of patients experience insomnia during the first few months after a stroke. One third of patients experience insomnia for the first time, and the remainder are patients who have suffered from it before (Baylan, Griffiths, Grant, Broomfield, Evans, & Gardani, 2020).

Sleep is a basic human need that must be met by every individual, including people with chronic illnesses, in order to survive (Berman, Snyder, & Kozier, 2014). Based on surveys in various countries, it shows that the world's population on average has less sleep duration, so that difficulty sleeping can disrupt sleep quality (Smolensky, Di Milia, Ohayon, & Philip, 2011). As many as 10-48% of the world's population is also believed to experience sleep problems such as insomnia (Arroll, Fernando, Falloon, Goodyear-Smith, Samaranayake, & Warman, 2012).

Each individual has different recommended sleep duration according to their stage of growth and development. The National Sleep Foundation recommends 7-9 hours of sleep for young adults and adults (National Sleep Foundation, 2010). Sleep can improve daily functioning, important for cognitive, psychological, and psychosocial functioning (Berman et al., 2014). According to the National Institute of Health, getting enough sleep helps protect mental, physical health, quality of life, and safety. The recommendation for 7-9 hours of sleep is also a necessity for stroke patients because insufficient sleep duration can disrupt sleep quality, cognitive, psychological and psychosocial functions.

Sleep disorders are a problem that is often reported following problems in the brain area, reported by more than 50% of traumatic brain injury sufferers and 38% of stroke sufferers (Baylan et al., 2020; Mathias, & Alvaro, 2012). In another study, it was found that the prevalence of sleep disorders was around 44.20% after an attack (Suh, Choi-Kwon, & Kim, 2016). Difficulty sleeping has serious side effects on the recovery stage of neurological function and the patient's quality of life, and even increases the risk of stroke recurrence (Donnellan, Hickey, Hevey, & O'neill, 2010; Tang, Lau, Mok, Ungvari, & Wong, 2013; Yu , Arima, Bertmar, Hirakawa, Priglinger, Evans, & Krause, 2016). Furthermore, neurological disorders worsen neurological deficits and even increase mortality and cognitive impairment (Hermann, & Bassetti, 2009; Robinson, & Spalletta, 2010). Post-stroke sleep disorders, if left untreated, will increase the risk of recurrence, worsen nerve function and even cause de

Currently, treatment for sleep disorders is mostly drug-based, however sleeping pills have side effects and excessive use can be fatal (Auger, Burgess, Emens, Deriy, Thomas, & Sharkey, 2015). Therefore, non-pharmacological treatment that is safe, economical and comfortable is an important issue. Several studies have shown disturbances in neurotransmitter levels such as serotonin and norepinephrine in the pathogenesis of stroke sleep disorders (Hama, Murakami, Yamashita, Onoda, Yamawaki, & Kurisu, 2017; Coppola, Di Lenola, Abagnale, Ferrandes, Sebastianelli, Casillo, & Pierelli, 2020). In overcoming sleep problems in stroke patients, an integrated and multidimensional approach is needed in providing nursing care. Previous research suggests the existence of treatments for sleep disorders that are not related to stroke, such as, involving the prescription of sedative-hypnotic drugs or oxygen treatments involving the application of positive airway pressure (Benbir, & Karadeniz, 2012; Brill, Rösti, Hefti, Bassetti, Gugger, & Ott, 2014). Pharmacological intervention for sleep disorders is only limited to physiological problems, so non-pharmacological treatment is needed that provides sustainable improvement.

One of these interventions is a combination of cognitive-behavioral therapy (CBT) stimulus control from the environment, sleep restriction, position therapy, and sleep hygiene. In addition, educational management that encourages healthy sleep and facilitates various coping skills and relaxation in overcoming sleep disorders (Park, & Choi-Kwon, 2018). Many studies confirm that such interventions can improve sleep quality. However, due to differences in stroke type, gender, frequency, intensity, time and method of providing intervention, there are differences in the influence on the sleep quality of stroke patients.

RESEARCH METHOD

Systematic review research using the Covidence application in the data extraction process. The framework used is PICO, so the researchers set the research question in this systematic review as "Is

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sleep hygiene more effective than no sleep hygiene for sleep disorders in stroke patients?". A literature search was conducted from Scopus, Wiley, Sciencedirect, Sage, Embase, Pubmed, Proquest and Medline for articles published up to 19 March 2023. A manual search was performed on the bibliographies of all articles that appeared relevant. Different keyword combinations include “Sleep Hygiene OR “Sleep Education” OR “Sleep Health Promotion Education”, “Stroke OR CVA OR Ischemic” dan “Sleep Quality” OR “Sleep adequate”.

The selection of literature was determined based on inclusion criteria, including stroke patients, publication year between 2019-2023, random control trial, pilot randomized trial, open access, full text, and in English. Exclusion criteria were articles with participants other than stroke as research samples. The author carried out initial screening by importing the obtained literature into Covidence, which can automatically detect duplication. The next stage is screening by reviewing the titles and abstracts of all 265 works. The next screening stage looked at the entire content of the literature and found 1 duplicate, 8 other populations not studied, 5 other interventions, and 5 articles using designs that did not meet the criteria.

After achieving an article that meets the author's requirements. These articles were criticized using the JBI critical appraisal checklist tool for randomized controlled trials to assess the quality of the three articles' methods to reduce the possibility of bias in the design, intervention and analysis that will be discussed in the systematic review. The following three articles were randomized into intervention and control groups, both groups did not know whether they would enter the intervention or control group. The characteristics of both groups have the same characteristics, respondents also do not know what intervention they will receive after providing informed consent. The intervention group only received the intervention provided without additional intervention so that there was no bias. The results of statistical tests in the intervention and control groups were carried out the same, so that the three articles could meet the extraction requirements at the next stage. Of the 13 questions on the JBI tool, the three articles were credible enough with 100% results to be used in a systematic review.

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DOI: https://doi.org/10.33024/minh.v7i3.146

RESEARCH RESULTS

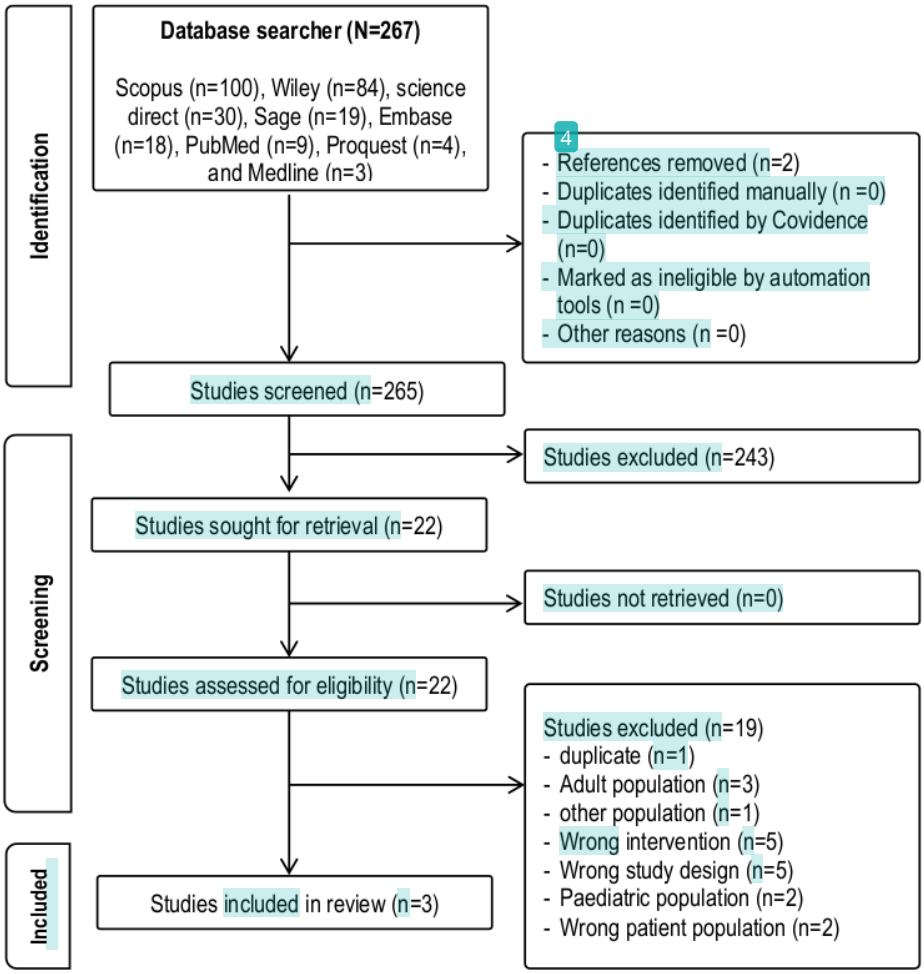

Figure of PRISMA Flow Diagram

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Results Analysis of the Selected Articles

Author	Purpose	Method	Results
(Ford, Geurtsen, Groet, Rambaran Mishre, Van Bennekom, & Van Someren, 2023).	To evaluate the effectiveness of Cognitive Behavioral Therapy (eCBT-I) for insomnia developed specifically for people with brain injury.	This RCT used a multicentre, prospective, randomized, blinded, open-blind, prospective endpoint study design (PROBE). Patients came from 4 outpatient rehabilitation centers in the Netherlands, diagnosed with stroke or brain injury, with an insomnia severity index score ≥10 (252 respondents) followed by randomization using a research randomizer program (www.randomizer.org), resulting in 52 respondents. The intervention group was given cognitive behavioral therapy (eCBT-I) available on the e-Health Mind District platform, while the control group was given treatment as usual (TAU). The pre-post-test was measured before and after the action and the results were compared in the two groups.	Insomnia severity showed significant improvement with eCBT-I compared with treatment as usual, both at post-treatment (mean [SEM] 4.0 [1.3]). The insomnia severity index showed a stronger decline, d=0.96, p<0.003) and at follow-up (mean [SEM] 3.2 [1.5] insomnia severity index points, d=0.78, p< 0.03).
(Urcan, & Kolcu, 2022).	To determine the effect of an educational program led by nurses for stroke patients on sleep quality and quality of life.	The pretest-posttest control research design was random. The patients came from the physical rehabilitation department of Turkish University Hospital. 120 stroke patients who met the criteria were randomized using Microsoft Excel to obtain 92 people. The intervention group was given education led by a nurse, while the control group was given treatment as usual (TAU), namely routine stroke care in the form of monthly clinical evaluations, rehabilitation, and information booklets provided at physical therapy and outpatient clinics. Pre-post-test physical therapy was measured before and after the procedure and the results were compared in both groups.	The intervention group had a higher mean post-test Richard-Campbell Sleep Questionnaire (RSQC) score (t=2.437, p<0.05). The intervention group had higher sleep quality than the control group.

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(Ymer, McKay, Wong, Frencham, Grima, Tran, & Ponsford, 2021).	To compare CBT for sleep disorders and fatigue (CBT-SF) with a health education (HE) intervention to control for nonspecific treatment effects.	Randomized parallel group design. The patients came from communities whose doctors reported dealing with advertising via email or word of mouth, totaling 148 people. Then, multilevel randomization was carried out using an algorithm to obtain 51 people. The intervention group was given CBT for sleep disorders and fatigue (CBT-SF), while the control group was given health education (HE) to control for non-specific therapy effects. The pre-post-test was measured before and after the action and the results in the two groups were compared.	CBT-SF resulted in significantly greater improvements in sleep quality compared with HE, both during treatment and after 2 months [95% confidence interval (CI) -24.83; -7.71], as well as a significant reduction in fatigue maintained at all time points that was not seen in HE (95% CI -1.86; 0.23). HE caused delayed improvements in sleep quality at 4 months post-treatment and depression (95% CI -1.37; -0.09) at 2 months post-treatment. CBT-SF resulted in significant improvements in self-efficacy (95% CI 0.15; 0.53) and mental health (95% CI 1.82; 65.06).

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DISCUSSION

Researchers identified 3 articles that assessed sleep hygiene interventions as one of the discussions in CBT to improve sleep or sleep disorders in adults with a history of stroke or brain injury. The majority of publications focus on CBT, namely sleep-related education conducted in the community or outpatient settings, and most sleep quality measurements use the Pittsburgh sleep quality index (PSQI) and the Richards–Campbell Sleep Questionnaire (RCSQ).

The characteristics of stroke patients in the intervention group from the article above were an average age of 52.32 years, not much different from the control group. This is in line with the incidence of stroke by age group, which occurs more frequently in Indonesia at the age of 55-64 years. This happens because one of the causes is the lack of optimal early detection of risk factors and health checks at productive age. The majority of stroke patients were male with a total of 123 people. Meanwhile, men and women have almost the same proportion of incidents (Ministry of Health of the Republic of Indonesia, 2019). This happens because the three articles do not come from the same country, so there are differences in the majority of men who experience strokes. The majority of patients in these three articles experienced ischemic stroke. This is in line with the last 10 studies which reported a high prevalence of large blood vessel occlusion, namely patients experiencing acute ischemia (Lakomkin, Dhamoon, Carroll, Singh, Tuhrim, Lee, & Mocco, 2019). None of the characteristics of the respondents in the articles discussed are directly related to sleep problems in stroke patients.

Stroke patients need to treat their sleep disorders by measuring sleep disorders using the Insomnia Severity Index (ISI) and the Pittsburgh Sleep Quality Index (PSQI). Meanwhile, one article only asks whether there are sleep disorders in stroke patients, namely in the second article. Therefore, nurses need to identify sleep problems in stroke patients in providing post-stroke care. Apart from the care provided in the form of education about post-stroke sleep while in hospital, stroke patients require treatment with further care assistance. In line with the second article which states that the provision of follow-up care in the form of practical education to improve sleep quality (the importance of sleep and quality of sleep) is led by a nurse via telephone every week for the next 12 weeks (weeks 9-20 of the program) shows that the educational program is led by nurses can influence changes in lifestyle behavior in stroke patients (Urcan, & Kolcu, 2021).

In this article, the majority of interventions used are CBT, each session focuses on sleep hygiene education, even though the follow-up is carried out online, it is effective in treating sleep disorders in stroke patients. This is in line with CBT-based sleep disorder treatment for 6-8 weeks which is reported to improve subjective sleep quality after stroke (Nguyen, Wong, McKay, Rajaratnam, Spitz, Williams, & Ponsford, 2019). Nurses can improve sleep quality in overcoming sleep disorders experienced by stroke patients with educational interventions provided by nurses according to the results of this review. This research shows that educational programs can influence changes in lifestyle behavior in stroke patients. The education provided by nurses is in the form of general information about stroke, rehabilitation, adaptation to daily life (description of stroke rehabilitation, goals and objectives, practices, importance of quality of life) and practices to improve sleep quality (importance of sleep and quality of sleep (Urcan, & Kolcu, 2021).

One recommended intervention is cognitive behavioral therapy (CBT). CBT can be applied to patients who need management of chronic insomnia which can effectively reduce post-stroke insomnia (Nguyen et al., 2019; Duss, Brill, Bargiotas, Facchin, Alexiev, Manconi, & Bassetti, 2018). Insomnia improved immediately after CBT therapy (ISI 3.89, 95% CI: 0.65-7.14), but at follow-up insomnia scores increased again (ISI 5.25, 95% CI: -0.80-11.30), resulting in long-term physical and mental damage. The benefits appear unclear and need to be studied with larger samples in the future. This occurs because higher severity of sleep disturbance and fatigue at the start of therapy is associated with a positive treatment response (Ymer et al., 2022).

The results of this systematic review showed that the eCBT-I group experienced a significantly greater decrease in ISI scores than the TAU group on ISI (mean 4.0 points, $z = 3.017$, $p < 0.003$, $d = 0.96$) (Ford at al., 2022). In line with the second article, the intervention group had a significantly higher post-test

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RCSQ mean score than the control group (t=2.437, p<0.05). There was a significant pretest-posttest change in the average RCSQ score in the intervention group (t= -5.020, p<.001) (Urcan, & Kolcu, 2021). This shows an improvement in sleep problems. Meanwhile, both ISI score groups experienced increased changes related to sleep problems immediately after treatment (Ymer et al., 2021).

Wrist actigraphy devices (Actiwatch 2 and Actiwatch Spectrum Plus, Phillips Respironics, Bend, OR, USA) were used to measure sleep efficiency and sleep onset latency over 2 weeks at each time point. Actigraphy was corroborated with a self-completed sleep diary and adjusted rest intervals based on reported bedtime and wake times. Data was excluded when data was available for less than 5-14 nights (Ymer et al., 2021). One article used a sleep diary to record sleep and wake schedule reports to measure total hours slept. Even two participants from the eCBT-I group withdrew before completing the study because sleep diary measurements were too burdensome and referral to psychiatry was necessary for further management of comorbidities. When using sleep diaries, no differences were found in changes in sleep problems in stroke patients (Ford at al., 2022).

The articles identified through this systematic review were all community-based but showed promising results that cognitive and education-based therapies may be beneficial, at least in the short term, for those with a history of brain injury and the potential for recurrent stroke. Given the potential for cognitive impairment following brain injury, it is important to determine the longevity of these intervention approaches following brain injury and help determine who may benefit from additional support and the most appropriate and appropriate forms of intervention.

CONCLUSION

CBT containing sleep hygiene education and health education related to sleep problems led by nurses can significantly improve the sleep quality of stroke patients. CBT is recommended given the greater improvement in ischemic stroke patients than in TBI patients. It is better if CBT focuses on one sleep problem, if it is combined with other problems it is feared that it will burden the patient in carrying out therapy with longer sessions.

ACKNOWLEDGMENT

The authors acknowledge *Beasiswa Pendidikan Indonesia* (Indonesia Education Scholarship) and *LPDP* (Indonesia Endowment Fund for Education Agency).

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