

Effects of a Sleep-Promoting Program on Sleep Quality among Older Patients at Special Medical Ward Chaloeprakiat 9th Floor Chaiyaphum Hospital: A Program Development and Pilot Study

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*This study was granted by the Research and Training Center for Enhancing Quality of Life of Working Age People.

Abstract— Objective: The purposes of this study were to develop and conduct a feasibility test on effects of a sleep-promoting program on sleep quality among older patients at special medical ward Chaloeprakiat 9th floor Chaiyaphum Hospital. **Methodology:** This study was divided into two phases. In phase I, a sleep-promoting program for older patients in hospital was developed based on a systematic review of 13 empirical articles and the context of the special medical ward Chaloeprakiat 9th floor Chaiyaphum Hospital was also applied. The feasibility of the program was evaluated by a medical doctor and registered nurses who are experts in sleep managements and interventions. In phase II, this sleep program was piloted among 10 older patients at special medical ward Chaloeprakiat 9th floor Chaiyaphum Hospital for five days. **Results:** The sleep program was evaluated by a medical doctor and four registered nurses. They confirmed that this program was suitable to be used to promote sleep for older patients admitted to hospital. However, minor adjustments to justify volume of drinks and time of activity in the program were needed, volume of drinks was increased and time of activities was shortened. Finally, there was 100% agreement and the pilot study in 10 hospitalized older patients showed that after participating in the program, patients' sleep quality scores were better ($Mdn = 111.50$) than before participating in the program ($Mdn = 61.50$). A Wilcoxon signed-rank test indicated that this difference was statistically significant, $Z = -2.80$ $p = .005$. **Conclusion:** The sleep promoting program was high feasibility to use to promote sleep quality among hospitalized older patients. However, to confirm the effectiveness of the program, well-designed study with larger sample size were needed for further study.

Keywords— In-Patients, Older Adult, Sleep-Promoting Program, Sleep Quality.

I. INTRODUCTION

Sleep is important for maintenance human's functions in cases of balancing between activity and rest. If a person has inadequate sleep and unable to meet balance between sleep and wake (Sleep-wake-cycle), impaired body functions can be occurred. Moreover, growing and repairing processes are distracted (Miller, 2012). In contrast, high quality of sleep promotes both physical and mental health. These include

repairing body organs and restoring energies to be used for vital activities in daily life (Chengpiew, 2012).

Sleep problems is more common in older adults, especially in advanced age group (Richter et al., 2020). Approximately 50% of older adults reported difficulty initiating or maintaining sleep (Crowley, 2011). Another study of 6,800 older adults (age 65 years or older) found that 5% of participants experienced sleep disturbance and up to 7.97% at 1-year follow-up (Dhaval Patel et al., 2018). A study in hospitalized patients indicated that about 50% of the patients with insomnia would have a re-admission during the follow-up (Dhaval Patel et al., 2018).

Sleep disturbance is a specific health problem among older adults and associated with other physical and mental diseases (Limpapawattana & Sawanyawisut, 2018). When older adults were admitted to the hospital, their current illnesses combined with aging processes can cause uncomfortable symptoms, which in turn, leading to sleep disturbance and low quality of sleep (Yaowa, Putwatana & Monkong, 2009). A study reported that the prevalence of poor sleep quality among hospitalized patients after the first day of admission was 80.2%, comparing with 41.7% among people at home (Kulpatcharapong et al., 2019). This common problem contributes to negative effects on the physical, mental, emotional, and cognitive functions. Moreover, sleep disturbance also caused long length of stay, high cost of treatment, low quality of life, and high mortality rate (Adib-Hajbaghery, Izadi-Avanji, & Akbaril, 2012; Norachan, 2018). A good sleep quality in hospitalized older patients will promote recovery and rehabilitation, as well as shorten length of stay in hospital (Zhang et al., 2015; Maneethanue, 2010). Therefore, sleep problems in hospitalized older patients should be paid more attention. The literature review regarding sleep management suggested both pharmacological and non-pharmacological interventions. However, pharmacological management should be used in only a short period of time to

avoid drug interactions and side effects (Norachan, 2018). Then the non-pharmacological intervention was more appropriate and be suggested to promote sleep among hospitalized older patients. Moreover, contextual and individual considerations should be concerned when applying sleep promoting intervention as older adults' experience sleep problems differently and prefer different proper interventions (Yaowa, Putwatana & Monkong, 2009; Norachan, 2018).

Many researchers have suggested non-pharmacological interventions to promote sleep among hospitalized older persons. However, the sleep-promoting programs for older patients in hospitals were variety of interventions applying in different contexts. The purposes of this study were to develop a program to promote sleep quality of older patients at special medical ward Chaloemphrakiat 9th floor Chaiyaphum Hospital and conduct a feasibility test on effects of this program. The results of this study could guide improvement of quality nursing services through independent nursing role in promoting sleep quality for hospitalized older patients in the future.

II. METHODS

This study was to develop a sleep-promoting program and conduct a feasibility test on effects of the program on sleep quality among older patients at special medical ward

Chaloemphrakiat 9th floor Chaiyaphum Hospital. The systematic review was conducted to develop the sleep-promoting program and the one group pre-posttest study was carried out as a pilot project for initial evaluation of the program.

A. Method of Research

There were two phases of this study: phase I was a program development and feasibility test, and phase II was a program implementation and evaluation.

Phase I: Program development and feasibility test

A systematic search for empirical articles was conducted in CINAHL, SCOPUS, PubMed, ProQuest, ScienceDirect and Thai Digital Collection unlimited until July 2019. Keywords were “older adult,” “older person,” “older people,” “elderly,” and “senior.” These keywords were combined with “in patient,” “in-patient,” “hospitalize*” by using AND. Moreover, “nursing,” “intervention,” “program,” “management,” “protocol,” “sleep disturbance,” and “insomnia” were combined with the prior both concepts by also using AND. The inclusion criteria were research or project regarding sleep managements, focusing on older adults, and studying in in-hospital department. The initial searching found 52,590 articles. After removing duplication and criteria were applied, a total of 13 articles met the criteria for final review (Fig. 1).

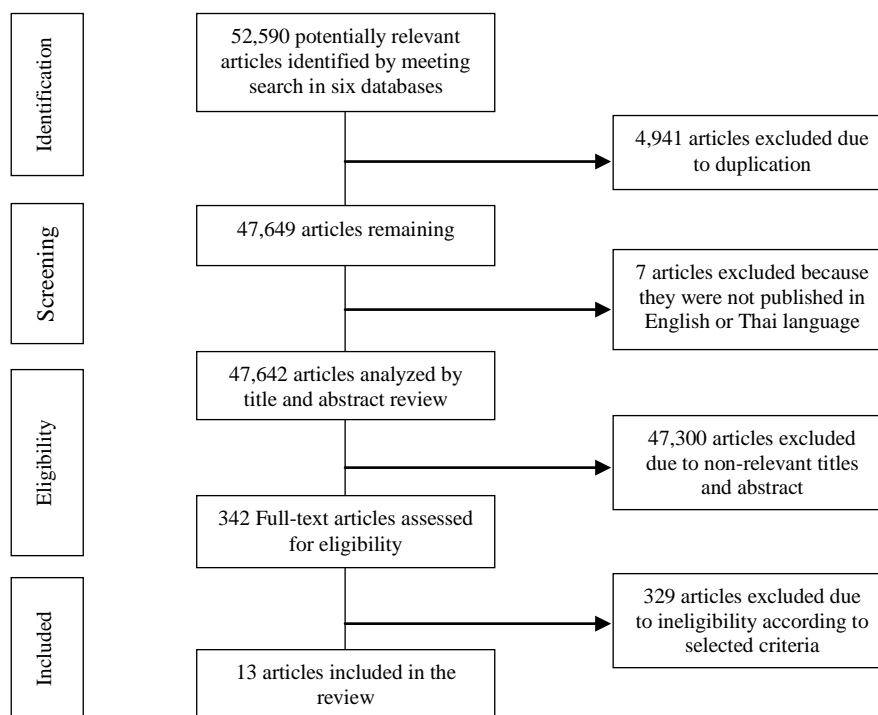


Fig. 1. Flow chart of included articles.

Phase II, after developing sleep-promoting program for older patients in the hospital, the feasibility test by experts was conducted. A medical doctor and four registered nurses, who were experts in sleep managements and interventions, assess the program. Two points were suggested: providing appropriate volume of drink and time for each activity. The researchers revised the program according to the recommendations by increasing volume of drink from 50 to 100 ml and shortening time of activity from 90 to 60 minutes (Table I). Finally, the five experts had 100% agreement, indicating that this program was fit for promoting sleep among hospitalized older adults. The researchers implemented this program in 10 hospitalized older patients at the special medical ward for 5 days after screening with the Thai Mental State Examination (TMSE)[®] and Thai Geriatric Depression Scale (TGDS)[®].

B. Research Tools

The research tools for this study included 1) Thai Mental State Examination (TMSE) (Train the Brain From Committee, 1993) and Thai Geriatric Depression Scale (TGDS) (Puangwarin, 1994) as the screening tools before including participants for this study 2) The agreement form for sleep-promoting program feasibility test and 3) demographic data questionnaire, sleep history and Verran and Snyder-Halpern Sleep Scale (VSH sleep scale) to assess the quality of sleep.

C. Ethical Considerations

This study was approved by the Ethics in Human Research, Khon Kaen University review board on February 05, 2020. The reference number was HE622278. The consent form was explained in detail to the participants. Inform consent was completed before starting data collection. The participants could withdraw from the study at any time without any effect on their treatment or nursing care. The data obtained from the participants would be kept confidentially and overall findings of this study would be reported in an academic conference and journal without specific personal information.

D. Data Analysis

Data analysis consisted of 1) a systematic review was analyzed using content analysis and descriptive statistics 2) the feasibility was analyzed using content analysis of opinions and suggestions, and descriptive statistics of percent agreement from the five experts and 3) demographic data were analyzed using descriptive statistics, such as frequency, percentage, average, and standard deviation. 4) Wilcoxon Sign Ranks Test was performed to compare sleep quality before and after the intervention

III. RESULTS

For the feasibility test, the five experts were provided two significant points of recommendation: first was volume of drink and second was length of time for each activity. The researchers revised the program by increasing volume of drink from 50 ml to 100 ml. This was changed to have enough concentration of L-Tryptophan and Melatonin to promote

sleep. The length of time was decreased from 90 minutes to 60 minutes to fit the effective time of intervention and prevent too late sleep time. After revising program based on the expert suggestions, this could raise agreement as 100 percent from the five experts. The program was suitable for implementing with hospitalized older adults.

This sleep-promoting program was implemented with 10 participants at special medical ward Chaloeprakit 9th floor Chaiyaphum Hospital. The results showed that most of the older patients (60%) were female, age 60-69 years (average of 67.60, SD = 6.31), and married (90%). All older patients were Buddhist. About 50% had the educational level as primary school, not working, and had income less than 50,000 baht (average 25,800; SD = 15120.25). More than half (60%) was head of a family. Half (50%) were admitted with respiratory disease and had at least two chronic diseases. No participant had medication used to promote sleep or to reduce sleep disturbance. The pretest showed that ten (100%) older patients had moderate quality level of sleep (47-93.99 points). In the posttest, the eight (80%) older patients had good quality level (94-140 points) and two people (20%) had moderate quality level (47-93.99 points) of sleep. Sleep quality scores of older patients in the hospital were compared before and after participating in the sleep-promoting program. Overall, sleep quality scores after attending sleep-promoting program was better (Mdn = 111.50) than before attending this program (Mdn = 61.50). A Wilcoxon signed-rank test indicated that this difference was statistically significant ($Z = -2.80$ $p = .005$). (Table II.)

TABLE II: Comparison of sleep quality scores between before and after attending the sleep-promoting program among older patients in the hospital

Groups	Mdn.	Mean Ranks (positive ranks)	Sum of ranks	Z	Asymp. Sig. (two-tailed)
Before	61.50	5.50	55	-	
After	111.50			2.80	.005*

Note: *Significant for 95% confidence

IV. DISCUSSION

The results showed the feasibility of the sleep-promoting program was 100% agreement of the five experts. This program provided excellent feasibility because it was developed based on a systematic review of empirical evidences. Moreover, concerning of contextual differences was applied in program development processes. The interventions applied in this program were selected complying with the building structures, private room structures, electric systems, and health service systems of the special ward. Moreover, older adults' life style and cultural concerning were also applied to design this program. Common interventions specific schedule of activities, and clear and enough detail of activities were promoted easy used and effective outcome. Other factors promoting high feasibility of use were multi-component sleep interventions and provision of various options. Norachan (2018) pointed out that mixed or multi-components of interventions were more likely to achieve effective in promoting sleep quality among hospitalized older

patients. Multi-component sleep interventions and various options could fulfil individual needs and were suitable in applying to promote sleep quality among hospitalized older patients, resulting in high feasibility of this program.

This study showed that after receiving the sleep-promoting program, hospitalized older patients had higher score of sleep quality than before receiving the intervention. This result could be explained by the components of this program. The sleep-promoting program among older patients at hospital included specific and effective interventions to promote sleep quality. The interventions comprised sleep hygiene care and environment management, warm drink therapy, aromatherapy, massaging therapy, and music therapy. Each intervention promoted sleep in different mechanisms. The sleep hygiene care and environmental management were used to promote comfortable and prevent disturbing events on sleep processes. These included stop or decreased fluid intake, urinate or go to toilet before going to bed, as well as light, sound, and temperature management. These were provided for hospitalized older patients to promote them for longer sleep and continuous sleep to the next cycle (Miller, 2015; Elmoneem & Fouad, 2017; Panpanit, 2019).

Warm drinks were also used to promote sleep to gain effects of chemical mechanism. The kinds of drink we gave to hospitalized older adults had L-Tryptophan, Serotonin, and Melatonin. These three chemicals were the early, intermediate, and end products for promoting sleep. Receiving tryptophan during the night increases levels of serotonin and melatonin. Tryptophan is an amino acid that is a precursor of serotonin. This chemical will be changed to 5-hydroxytryptophan (5-HTP) then turn into serotonin and melatonin, which carries nerve impulses to act and reduce the nervous system. The results of this mechanism were feeling of relaxation and drowsiness (Yurcheshen et al., 2015; Panpanit, 2019).

Aromatherapy, massaging therapy, and music therapy also promote both body and mind relaxation. Person who received these interventions had high sleep quality: easy to fall asleep, had longer, and deeper sleep (Mayacheal, 2009; Widder & Pittler, 2010; Harris, 2014; Norman, 2015; Ayik, C. & Ozden, D., 2018). Moreover, when these three interventions were performed, sensory nerves were stimulated and signals were sent to the Limbic system. This mechanism stimulated endorphin releasing and reduced levels of catecholamine. Reduction in the level of excitation in the reticular formation stimulate less alert of the body. These mechanisms caused the muscles relaxation and helped person fall asleep easily (Benson, 1976; Lin, Chan, Na-Leung & Lam, 2007; Deukhantod, Somanusorn & Kangchai, 2016).

The results from this study were consistent with numbers of previous studies regarding interventions promoting sleep among older patients. Mcdowell et al. (1998) implemented a nonpharmacologic sleep protocol for hospitalized older patients. The results showed that the nonpharmacologic sleep protocol had a feasible, effective, and non-toxic alternative to promote sleep in older hospitalized patients. Another study used relaxation techniques before sleep, and also showed that this relaxation technique could be decreased sleep disturbance symptoms. Moreover, Ayik & Ozden (2018) found that

aromatherapy and massaging therapy could be used to decrease anxiety and increase sleep quality in patients undergoing colorectal surgery in the preoperative period.

Finally, Chusapalo (2010) studied effects of sleep-promoting program using aromatherapy and relaxation breathing technique on sleep quality in hospitalized older patients with chronic illness. The results showed that after receiving interventions, mean scores of sleep quality in the experimental group were better than those in the control group. In conclusion, the sleep-promoting program among older patients at special medical ward Chaloeprakiat 9th floor, Chaiyaphum Hospital had high feasibility to implement to promote sleep quality among hospitalized older patients. Moreover, the pilot study showed that older patients who attending this program had better sleep quality than before attending this program.

V. OTHER RECOMMENDATIONS

This program should be applied to promote quality of sleep among older adults and other hospitalized patients. However, well-designed of study and larger sample size were needed for future study. Longer time of follow-up should be conducted to confirm the effectiveness of this program.

ACKNOWLEDGMENT

The researchers would like to thank all experts for providing feasibility test and suggestions for a program development. Moreover, we would also like to thank all participants of special medical ward Chaloeprakiat 9th floor who participated in this study, and the Director of Chaiyaphum Hospital for permission of data collection. Finally, the researchers would like to thank the Research and Training Center for Enhancing Quality of Life of Working Age People for funding support.

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