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# Effectiveness of cognitive behaviour therapy (CBT) to improve the sleep quality of the elderly in hospital

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**Abstract**---Background Quality of sleep is very important for everyone both healthy and sick, Efforts to provide sleeping pills have also not been effective because of the elderly do not want to report or treat sleep problems experienced so that the quality of sleep becomes poor. One of the therapies that can be done to improve the quality of sleep in the elderly, using Cognitive Behaviour Therapy (CBT) therapy. Method research design is quasi experimental design pre and post test design with Control group and interventions in the form of CBT therapy to elderly clients. The study was conducted using two groups, the intervention group was given CBT therapeutic interventions and the control group was only given general care. The study subjects got CBT therapy for 2 days (dose 2 X 1 day @ 20-30 minutes). Measurement of sleep quality was carried out 2 times for 4 days in the study subjects using the Indonesian version of the ISI instrument. Results of a one-way nonparametric test using Mann-Whitney found a difference in insomnia scores before and after cbt action with p-value (0.000) < 0.05 on the first day until the fourth day meaning there was a significant difference in insomnia score in the control group and

intervention of the first day until the fourth day before and after cbt action.

**Keywords**---Elderly, Sleep, Cognitive Behavioral therapy.

## Introduction

The quality of sleep is very important for everyone both healthy and sick. In the elderly, 58% reported having difficulty sleeping and approximately 40-50% of the elderly population suffered from sleep disorders (1). Efforts to provide sleeping pills have also not been effective because 85% of the elderly do not want to report or treat sleep problem (2).

Based on the results of the analysis that has been done can conclude that CBT therapy is effective to overcome sleep disorders (insomnia) and improve the quality of sleep in the elderly treated at Anna Medika Hospital.ms experienced so that the quality of sleep becomes poor.

Poor sleep quality increases the risk of morbidity and higher mortality, heart disease, anxiety disorders, depression, impaired cognitive function, decreased overall quality of life (3). There are several underlying factors complaints about sleep disorders in the elderly appearing including changes in circadian rhythms, age, medical conditions/illnesses suffered, and psychosocial changes that generally accompany aging (4).

Indonesia is one of the countries with the largest number of elderly people in the world, In 2020, the number of elderly people in Indonesia reached 18.781 million people and West Java Province became one of the provinces with the highest number of elderly (5). Efforts to overcome the problem of sleep disorders experienced by the elderly are often carried out pharmacological therapy by medical personnel either in the hospital or in the Nursing Home Tresna Werdha, while non-pharmacological therapy that is sometimes given has not been effective to overcome the problem of sleep thoroughly because the effects are felt only short-term. One of the therapies that can be done to improve the quality of sleep in the elderly, using Cognitive Behaviour Therapy (CBT) therapy (6).

Researchers are interested in conducting further research on sleep problems with cognitive behavior therapy approach in the elderly, especially in Bekasi City because There is a lot of evidence to show that cognitive behavioral therapy for insomnia (CBT) reduces sleep disorders among older patients with insomnia and this approach covers many psychological aspects so it is hoped that interventions can be more effective in dealing with sleep problems in the elderly (7).

This approach not only focuses on the emotional side of the distress that occurs but also tries to modify the cognition and behavior of the elderly. Cognition interventions can be in the form of modifying the negative thoughts of the elderly related to the sources of stress they face. In addition, this approach also provides behavioral interventions that can help the elderly to adapt to the demands of a new lifestyle as well as other changes in their lives (7).

Other benefits that will be felt by the elderly with cbt therapy approach, can help the elderly to change their behavior and form a new perspective on a more realistic life, solve problems, and see what the sufferer thinks about his condition (8).

### **Purpose**

- a. This is to determine the effectiveness of CBT interventions in improving sleep quality in the elderly
- b. Assess the quality of sleep in the elderly before CBT intervention in control group and Intervention group
- c. Analyzing sleep quality in the elderly after CBT intervention in control group and Intervention group

### **Method**

The research design that will be used in this research is with quasi experimental design pre and post test design with Control group. The research that will be carried out is by providing interventions in the form of CBT therapy to elderly clients. The study was conducted using two groups, the intervention group was given CBT therapeutic interventions and the control group was only given general care. The study subjects got CBT therapy for 2 days (dose 2 X 1 day @ 20-30 minutes). Measurement of sleep quality was carried out 2 times for 4 days in the study subjects using the Indonesian version of the ISI instrument.

### **Population and sample**

The population in this study were all elderly clients who were treated at Anna Medika Hospital in Bekasi City. The samples in this study were elderly patients who stayed hospitalized. After the initial screening, 80 patients experienced insomnia and there were 72 respondents who met the inclusion and exclusion criteria. The number of samples in the study used a large formula of samples for numeric comparison tests of two groups not paired more than one measurement, of 36 samples for the intervention group and 36 samples for the control group. Sampling technique is concecutive sampling.

### **Sample Criteria**

The samples in the study were all seniors who met the criteria of inclusion and exclusion, namely:

- 1) Inclusion criteria:
  - a. Elderly clients who live hospitalized
  - b. Clients have sleep disturbances
  - c. Clients who can communicate clearly and can speak Indonesian
- 2) Exclusion criteria:
  - a. Uncooperative in research,
  - b. Patients who use sleeping pills or who have side effects cause sleep.
  - c. Hearing loss

### **Research Ethics**

Ethics in this study was submitted to the National Research Ethics Commission (KEPKN)

### **Data Process**

The implementation of the research is divided into several stages, namely

- a. The reviewer conducted screening to determine the initial condition of the client's sleep quality in both the control group and the intervention group prior to the CBT intervention and looked at patient data to find out demographic data (name, age, gender), general health conditions, and ongoing therapies.
- b. Obtaining a certificate passed the ethics review to carry out research at Anna Medika Hospital Bekasi City
- c. Researchers take care of research licensing at research locations
- d. Ask permission to the person in charge of the Hospital Room and socialize the purpose and purpose of the research.

### **The next step is the implementation of research**

#### **Pre-intervention**

- a. Conducted to find out the initial condition of sleep quality of the client both the control group and the intervention group before cbt therapy is carried out in the elderly. This stage is carried out on the first day to one week of research, to find out the psychological condition of the client holistically. Therefore the researcher will perform a time contract with the relevant client to be given therapy.
- b. Intervention stage and post intervention  
The intervention stage of CBT therapy is performed on the first day after pre-intervention measurement. The timing of CBT administration is given morning and afternoon assuming that when conducting the researchers can perform cognitive therapy and client behavior. CBT therapy begins with an interview in order to know the client's negative thoughts so that researchers can member knowledge or suggestion poistif to the client. Interventions will be given 2 times a day for 4 weeks with a duration of 20-30 minutes per session in the intervention group. The control group did not get CBT therapy intervention.

#### **Post-intervention**

Post interventions were carried out to determine the difference in the client's sleep quality level after being given CBT therapy interventions for two times a day and then carried out sleep quality measurements with the ISI instrument.

### **Instrument Insomnia Severity Index (ISI)**

Instruments for detecting cases of sleep disturbances in the population using ISI. The dimensions evaluated were the severity of sleep onset, sleep maintenance and problems after waking up, sleep dissatisfaction, sleep difficulties disorders with impaired daytime function, opinions of others from sleep problems experienced and suffering from difficulty sleeping. There are 7 questions with the scoring

system (0 means no problem and 4 means there is severe interference). The total score is 0-28.

## Results

### Univariate Analysis

Respondent characteristics in this study include age, gender, education, occupation, income. Characteristics of respondents are presented in the following table:

#### Age

Table 1  
Distribution of Respondent Characteristics Based on Age of sleep disorders n = 72  
Respondents in hospitals Anna Medika Bekasi

| Variable  | Intervention Group<br>(n=36) | Control Group<br>(n=36) |
|-----------|------------------------------|-------------------------|
| Age       |                              |                         |
| Mean      | 57.25                        | 57.00                   |
| SD        | 8.124                        | 7.973                   |
| Min – Mak | 80–96                        | 80–93                   |

The table above describes the age characteristics in the intervention group and the control group obtained on average aged 61 years.

#### Gender, Education, Employment and Income

Table 2  
Distribution of Respondents based on Gender, Education, Employment and Income of Elderly Patients suffering from Insomnia with 72 Respondents

| Variable           | Intervention Group |      | Control group |      |
|--------------------|--------------------|------|---------------|------|
|                    | F                  | %    | F             | %    |
| Gender             |                    |      |               |      |
| Man                | 5                  | 13.9 | 6             | 16.6 |
| Women              | 31                 | 86.1 | 30            | 83.3 |
| Education          |                    |      |               |      |
| Primary school     | 5                  | 13.9 | 6             | 16.7 |
| Junior high school | 9                  | 25   | 8             | 22.2 |
| Senior High School | 12                 | 33.3 | 15            | 41.7 |
| Diploma, bachelor  | 10                 | 27.8 | 7             | 19.4 |
| Work               |                    |      |               |      |
| Private            | 7                  | 19.4 | 8             | 22.2 |
| Entrepreneur       | 16                 | 44.4 | 10            | 27.8 |
| Retired            | 4                  | 11.1 | 3             | 8.3  |
| Does not work      | 9                  | 25   | 15            | 41.7 |
| Income             |                    |      |               |      |
| < Rp 1.200.000     | 15                 | 41.7 | 16            | 44.4 |
| ≥ Rp 1.200.000     | 21                 | 58.3 | 20            | 55.6 |

The table above shows the gender in the intervention group is dominated by 31 women (86.1%), as well as in the control group is dominated by 30 women (83.3%). Senior high school education in the intervention group is dominated by 12 respondents (33.3%), as well as in the control group Senior high school is dominated by 15 respondents (41.7%). Respondents as entrepreneur in the intervention group is dominated by 16 respondents (44.4%), while in the control group who do not have a job is dominated by 15 respondents (41.7%). The intervention group is dominated who have an income of  $\geq$  Rp 1.200.000 by 21 respondents (58.3%), as well as in the control group is dominated who have an income of  $\geq$  Rp 1.200.000 by 20 respondents (55.6%).

### Bivariate Analysis

- a. The effect of CBT on insomnia in the control group The results of statistical tests of the influence of CBT on insomnia scores in the control group on the first to fourth day were presented in the table below:

Table 3

Distribution of Different Insomnia Score Test Results on The First To Fourth Day of the Control Group Before and After CBT-I with 72 Respondents

| Inspection time | Delta | Result<br><i>wilcoxon test</i> | Sig   |
|-----------------|-------|--------------------------------|-------|
| Day 1           | 1     | -2.823                         | 0.005 |
| Day 2           | 1     | -2.823                         | 0.005 |
| Day 3           | 1     | -2.823                         | 0.005 |
| Day 4           | 1     | -2.823                         | 0.005 |

*\*p < 0,05 based on Wilcoxon*

Nonparametric test results using wilcoxon found differences in insomnia scores before and after CBT action with p-value (0.005) < 0.05, meaning there was a significant difference in insomnia score in the control group before and after CBT action.

- b. The influence of CBT-I on insomnia in the intervention group. The results of the statistical test of the influence of CBT on insomnia scores in the intervention group on the first day or day four are shown in the table below:

Table 4

Results of Insomnia Score Different Test on The First Day Until The Fourth Day in the Intervention Group Before and After CBT with 72 Respondents at Anna Medika Hospital Bekasi

| Inspection time | Delta | Wilcoxon test | Sig   |
|-----------------|-------|---------------|-------|
| Day 1           | -16.1 | -4.109        | 0.000 |
| Day 2           | -16.1 | -4.109        | 0.000 |
| Day 3           | -16.1 | -4.109        | 0.000 |
| Day 4           | -16.1 | -4.109        | 0.000 |

*\*p < 0,05 based on wilcoxon*

Nonparametric test results using wilcoxon showed a difference in insomnia score before and after CBT action with p-value (0.000) < 0.05, meaning there

was a significant difference in insomnia score in the intervention group before and after CBT action.

c. The Effect of CBT On Insomnia

Statistical test results of cbt effect on insomnia score in control and intervention group on the first to fourth day were presented in table 5:

Table 5  
Results of Different Insomnia Score Test on The First To Fourth Day in The Control and Intervention Group Before and After CBT with 72 Respondents

| Inspection time | Delta            | Delta                 | Man Whitney<br>test | Sig   |
|-----------------|------------------|-----------------------|---------------------|-------|
|                 | Control<br>Group | Intervention<br>Group |                     |       |
| Day 1           | 1                | -16.1                 | -4.474              | 0.000 |
| Day 2           | 1                | -16.1                 | -4.474              | 0.000 |
| Day 3           | 1                | -16.1                 | -4.474              | 0.000 |
| Day 4           | 1                | -16.1                 | -4.474              | 0.000 |

*\*p< 0,05 based on Mann-Whitney*

The results of a one-way nonparametric test using Mann-Whitney found a difference in insomnia scores before and after cbt action with p-value (0.000) < 0.05 on the first day until the fourth day meaning there was a significant difference in insomnia score in the control group and intervention of the first day until the fourth day before and after cbt action.

## Discussion

The results of this study showed that the elderly very often experience insomnia or sleep disorders. The findings of this study showed that after the implementation of CBT interventions, there were significant improvements in all sleep quality and daytime problems caused by sleep deprivation as reported by the elderly who were studied. In line with this, a study in Germany showed that pre-post comparisons revealed a significant reduction in daytime sleepiness and depressive symptoms in older adults studied (9).

Similarly, another German study by (10) revealed post-interventional improvements in the daytime atmosphere of the intervention group as well as their overall psychological condition. They also showed symptoms of depression that decreased after intervention. In a more recent study, similar results were found by (11) who conducted their research in South Australia to evaluate the efficacy of cbt short treatment programs for older adults. The findings of this study suggest that CBT produces improvements in daytime function, daytime sleepiness, fatigue and anxiety.

Several studies have shown that sleep problems can lead to substantial health disorders, cognitive decline, and decreased quality of life (12). Therefore, healthy sleep is an essential need to maintain physical and mental performance as well as elderly health. In accordance with the findings of the current study, a study in Egypt conducted by (13) revealed that the quality of sleep of the elderly increased

significantly after the implementation of educational training programs on sleep disorders in the elderly.

In line with that, in another study conducted (14) to find out the prevalence and risk factors of insomnia, and the impact of cognitive behavioral therapy for institutionalized elderly people who complain of sleep disorders in Alexandria. The findings of this study showed that after performing behavioral therapy (CBT) in the elderly, there was a very significant improvement in the quality of elderly sleep as measured by PSQI. The findings of the current study reveal significant post-intervention statistical improvements in sleep parameters such as sleep latency, sleep efficiency, total sleep time, and naps as reported by the elderly studied. According to the findings of the current study, a study in Germany by Richter et al. (2014) showed that pre-post comparisons revealed significant improvements in sleep latency, sleep efficiency, and daytime naps in the elderly studied. In line with that, Gałuszko-Węgielnik et al. (2012) in their research in Poland found a significant increase in the size of sleep onset latency, the number of wakings at night, sleep efficiency, and sleep quality after CBT for primary insomnia.

The efficacy of CBT for insomnia and improving sleep quality and sleep parameters in older adults has been demonstrated in many studies including systematic reviews and meta-analyses of different countries (15). One randomized controlled trial using PSQI infrastructure to measure sleep quality showed improvements in global Pittsburgh Sleep Quality Index (PSQI) scores and PSQI sleep efficiency sub-scores in older adults randomly for self-help and CBT for insomnia treatment groups compared to controls (16).

In a research (17), which presented information relating to the effectiveness and safety of different interventions for primary insomnia in the elderly that included cognitive behavioral therapy (18). They report that CBT improves sleep quality in older people with primary insomnia. They found 5 systematic reviews that identified 11 randomized control trials in total.

### **Limitations of Research**

This study has limitations that result in the results have not been as expected. Limitations in this study are:

1. Researchers have difficulty in recruiting elderly respondents due to the reduction of elderly patients at Anna Medika Hospital.
2. Researchers did not involve the family as the closest person to the respondent thoroughly in the continuity of CBT intervention.

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## Conclusion

Based on the results of the analysis that has been done can conclude that CBT therapy is effective to overcome sleep disorders (insomnia) and improve the quality of sleep in the elderly treated at Anna Medika Hospital.

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