Music therapy on sleep quality in elderly

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Abstract. Sleep is one of the essential needs, which if not fulfilled will have an impact on changes in the biological or psychological condition of a person. Good sleep is often defined as a quality sleep. Along with aging, a person tends to be more difficult to achieve a good quality of sleep for themselves. Treatment of sleep disorder in elderly consist of non-pharmacological and pharmacological therapy, one of the forms of non-pharmacological therapy is a music therapy. The purpose of this study was to determine the effect of music therapy on sleep quality in elderly at a social residential in Bali. The study design that used was a pre-experimental study with one group pretest-posttest design. The number of sample was 31 persons that got a 2 weeks therapy. Sleep quality was measured using The Pittsburgh Sleep Quality Index at the end of each week to determine changes in sleep quality in elderly. Based on analytical test result using a paired t-test, it was found that the mean of sleep quality before therapy, after the first week and after the second week was (11.97), (10.90), and (8.58) respectively, with p-value 0.000. Therefore, it can be concluded that there is a significant improvement in sleep quality after music therapy in elderly. Recommendation for the elderly with poor sleep quality, in order to familiarize them self to listen to sedative music to help improve their sleep quality.

1. Introduction
Sleep is said to have become an essential need, which if not fulfilled will have an impact on changes in the biological or psychological condition of a person. Good sleep is often defined as a quality sleep. Sleep with good quality, in this case, can be defined as the reduced period of time a person needs from the beginning of sleep preparation to get into the early stages of sleep and the minor frequency of awakened while sleeping [1]. Aging has a significant influence on the needs and sleeps pattern of a person. Sleep in elderly people has a different pattern when compared to the other ages. The possibility of changes in circadian rhythm sensitivity in elderly, resulting in the increased time needed to enter sleep and have a shorter sleep time than before [2]. Therefore, along with aging in a person, they tend to be more difficult in achieving a good quality of sleep for themselves.

Based on information from Statistic Center of the Republic of Indonesia, the percentage of elderly in Indonesia estimated to increase until 2050 is predicted to reach 28.68%. This figure is greater when compared with the number of population with age less than 15 years which is predicted to reach only 15.80% in 2050. This is due to two reasons: (1) improvement in the field of health services that gives longer life expectancy, (2) higher socioeconomic growth rate in society, thus raising community life expectancy [3]. The problem in fulfilling a quality sleep in elderly had been observed before in Denpasar, and it was found that the incidence of insomnia as one form of a decreased quality of sleep reached 40%. In elderly people, insomnia that lasting for more than 1 month, will induce a deep anxiety.
In a study of elderly people in the United States, a disorder of sleep pattern in elderly has a correlation with the emergence of ideas for attempting suicide. The study becomes an explanation which is 2008, the incidence of suicide in elderly by 30% higher than the incidence of suicide in young adults [4]. And most importantly, in elderly with degenerative diseases will deteriorate their illness [2].

Sleep disorder therapy that occurs in elderly may consist of non-pharmacological and pharmacological therapy [5]. However, the long-term use of pharmacological therapy is not recommended because of its side effects. Non-pharmacological therapy is then developed considering the side effect of pharmacological therapy, one of the non-pharmacological therapy is music therapy.

2. Material and methods
The study design that used was a pre-experimental study with one group pretest-posttest design given to a single group without a comparison group. Thirty-one persons met the inclusion and exclusion criteria at social residential in Bali. Inclusion criteria were elderly aged 45-65 years old and willing to become respondents, while exclusion criteria were elderly with a hearing problem, in the treatment of sleeping or tranquilizing drugs, elderly with dementia and the one with schizophrenia. Each elderly who had been selected as a research subject was then interviewed using Pittsburg Sleep Quality Index (PSQI) questionnaire to determine the initial condition of their sleep quality before treatment (pre-test). Music therapy in the form of relaxation music given for 2 weeks with the length of music played in each session was 30 minutes in the evening. Interviews then conducted at the end of the first and second weeks to determine the effect of therapy (post-test).

The ethical clearance is given by the Ethical Eligibility Institution of Udayana University/Sanglah Central General Hospital Denpasar. All patients were given informed consent before being included in the study. The data were analyzed using a paired t-test, in SPSS program verse 18.0, the p-value less than 0.05 was considered significant.

3. Results And discussion
3.1. Characteristics of study participants
The characteristic data of respondent can be seen in the table 1.

| Characteristic                  | Total | Percentage |
|--------------------------------|-------|------------|
| Age                            |       |            |
| Early Elderly (45 – 55 years)  | 12    | 39%        |
| Late Elderly (56 – 65 years)   | 19    | 61%        |
| Gender                         |       |            |
| Male                           | 10    | 32%        |
| Female                         | 21    | 68%        |
| History of using music media   |       |            |
| Rare                           | 3     | 10%        |
| None                           | 28    | 90%        |

Table 1 above illustrates the distribution of respondents according to their listening habits. Based on Table 1, can be seen that from 31 elderly people as the study respondents, there were 3 persons (10%) who had a habit of listening to music with a frequency less than 3 times a week so then categorized into a rare group, while the remaining 28 elderly people (90%) claimed not to have a habit of listening to music while they were in the social residential. The age range of respondents in this study is 45-65 years old, which is then categorized into two groups that are an early elderly with the age range from 45-55 years old and late elderly with the age range from 56-65 years old. Based on the results of this study
found that most respondents are in the age range from 56-65 years with the number of 19 people (61%), these findings in line with the finding of the study conducted by Ling in 2005 which states that more than 50% patients with sleep disorder in an elderly community, involving elderly with age range from 50-65 years [6]. Daglar et al., in 2016 found the same results that more than half of the elderly have a poor sleep quality [7].

Supporting the results obtained, Potter and Perry (2005) explained the cause of the tendency of the elderly who are in the age of late elderly are more often to experience disruption to their sleep quality, due to alteration in sleep pattern that occurs as the aging developed resulting from a decrease in sensory sensitivity in maintaining circadian rhythm. As a result of this process, people with a further age has a difficulty in starting sleep and maintaining sleep at a higher level than younger age [8].

3.2. Effect of music therapy
The classification of sleep quality of respondents was based on the results of score calculation from the Pittsburgh Sleep Quality Index (PSQI) questionnaire which then grouped into six assessment components such as subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbance, and daytime dysfunction. Each of the six components has a score ranged from 0-3, therefore the total score range is 0-18. A score of >5 is interpreted as poor sleep quality, and a score ≤5 is interpreted as a good sleep quality.

Table 2. The differences in sleep quality in elderly before and after music therapy intervention.

| Variable                        | N  | Mean   | Differences of Mean±SD | p-value |
|---------------------------------|----|--------|------------------------|---------|
| before intervention             | 31 | 11.97  | 1.07±1.41              | 0.000   |
| after intervention (first weeks)| 31 | 10.90  | 3.40±1.82              | 0.000   |
| after intervention (second weeks)|31 | 8.58   | 2.32±2.54              | 0.000   |

Table 2 showed a significant difference or a significant mean of sleep quality after intervention at week 1 (10.90) and the mean of sleep quality after the second week's intervention (8.58), with the result of paired T-test on both data was p-value 0.000. The mean difference between the score on the first-week intervention (10.90) and the second-week's intervention (8.58) indicated that there was a significant difference between the first and second-week intervention which meant that the sleep quality of elderly in the second-week intervention was better.

There were 3 people (10%) who had a habit of listening to music with a frequency less than 3 times a week therefore categorized into a rare group, while the remaining 28 elderly people (90%) claimed not to have a habit of listening to music while they were in the social residential. Table 3 showed that there was no significant difference in sleep quality in elderly based on the frequency of listening to music prior the music therapy.

Table 3. Analysis of the effect on music listening habit.

|        | N  | Mean   | Mean difference (CI 95%) | P value |
|--------|----|--------|-------------------------|---------|
| First week | Rare | 3 | 10.86 | 0.47 | 0.793 |
|         | Never | 28 | 11.33 | (-3.20-4.15) | |
| Second week | Rare | 3 | 8.54 | 0.46 | 0.130 |
|         | Never | 28 | 9.00 | (-1.42-2.35) | |

Another opinion about the cause of worsening sleep quality in elderly is also explained based on three factors including physical, mental and psychological disorders. Physical disorders, in this case, are medical disorders that often arise with age, including aches, joint pain, dizziness, and itching. Mental disorder in this case associated with easier to get angry, feeling emotional, suspicious and become more
selfish that can be the beginning of psychosocial disorders. Psychosocial disorders associated with the feeling of loneliness because they are away from their family or losing friends [9,10].

Improvements in the sleep quality in elderly by music therapy that was found in this study is similar to some previous studies. Three weeks music intervention during sleep can improve the sleep quality in elderly [11]. These results are in line with Monttaghi et al, 2015 who found that the addition of music therapy in cognitive behavioral therapy was able to reduce the symptoms of insomnia in elderly [12]. Music has an effect on the level of depression shown by the results of the study by Chan et al, in 2011 conducted over 8 weeks [13,14]. Music also has an effect on anxiety levels as in the study results of Bush et al, in 2012 [15]. However, different results were found by Tai et al, in the elderly population in Taiwan was found no significant differences in the intervention and control group [16]. A recent study by Sarikaya and Oguz who studied the elderly for 3 weeks found that music therapy improved sleep quality in elderly people in Turkey [17]. The study was supported by research from Wang et al in 2016 in urban communities in China conducted over 3 months by comparing the intervention and control group [18].

Improvements of the sleep quality in elderly by music therapy by Novita (2012) was described as a form of effects of the music therapy that works by altering the activity and sensitivity of the brain wave to a form that allows an elderly person to feel more relaxed, thus supporting the elderly to be more easily fall asleep [19]. Relaxation achieved by the elderly by listening to music is not only due to changes in brain waves, it was caused by the influence of endorphins hormone secretion stimulation by the music therapy, where the endorphins hormone, in this case, is known to have a relaxing effect on the body [20]. In addition, music has advantages in social, physical and emotional life in the form of contact with young people, among generation, music is fun, inducing life passion and improving mobility and improving mood from the lyrics and tone in music [21].

4. Conclusion
Building on the elaborated results of this study, it can be concluded that music therapy is able to improve sleep quality for elderly people. It can be recommended that music should be played to elderly in a social residential in Bali and other nursing and rehabilitation centers at the evening hours.

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