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The Difference of Implementation Between Reflexology Massage and Combination of Exercises With Reflexology Massage for Elderly With Insomnia

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ABSTRACT

Introduction: The older people have various health problem and one of them is insomnia. Physiologic changes of aging, environmental conditions, and chronic medical illnesses contribute to insomnia among elderly. Insomnia in this population is associated with decreased memory, impaired concentration, and impaired functional performance. Objective: The objective of this study was to investigate the condition of insomnia among elderly after being given combined exercise with reflexology and reflexology only before and after the intervention. Method: This research used a quasi-experimental design with pre-post design with the control group. Sampling was carried out systematically during the study period with samples was taken according to inclusion criteria. The target number of samples is set using the difference formula average. The instruments that measure Imsonia used is PIRS. Data analysis was carried out on all subjects in both groups A and B with analysis statistics measuring the difference between PIRS before and after intervention. Results: The results of the Mann-Whitney test before the intervention in group A obtained a mean rank of 16.07. Before the intervention in group B obtained a mean rank of 19.45. Statistically, it showed that the difference was not significant, p=0.33 (p>0.05). The results of the Mann-Whitney test after intervention in group A had a mean rank of 22.10 and after intervention in group B had a mean rank of 14. 93. Statistically showed a significant difference, p=0.04 (p<<0.0) Conclusion: We found that there was a change in the condition of insomnia before and after the combination intervention (group A). The average decrease in insomnia scores for the elderly was carried out using the Pittsburg Insomnia Rating Scale (PIRS) questionnaire> However, there was no change in the condition of insomnia. statistically significant. Likewise, in group B, the average insomnia score decreased and was statistically significant

Keywords: Insomnia, elderly, reflexology, combination of exercises with reflexology.

INTRODUCTION

Globally, the number of elderly people is around 13% and it is estimated that in 2040 it was around 20% of the total global population. Rapid demographic changes in developing countries are more widely observed (Destek et al., 2024). The health problems experienced by the elderly vary from feeling useless, and easily sad, stress, depression, anxiety, dementia, delirium, and sleep disorders both in sleep quality and quantity or insomnia. Insomnia is the most common sleep complaint, with approximately 9-15% of the general population worldwide suffering from insomnia symptoms (Ferini-Strambi et al., 2021). Depression and insomnia prevalence are frequently reported in elderly people. However, the aging process itself does not always improve insomnia and depression depends on possible activities to guard emotions (Niu et al., 2023). Three separate texts state diagnostic criteria for insomnia: Diagnostic and Statistical Manual of Mental Disorders (DSM), International Classification of Sleep Disorders, and The Classification of Mental and Behavioral Disorders ICD-10.

Based on the duration of symptoms, there are acute and chronic insomnia On the other hand, chronic insomnia may more often be associated with intrinsic sleep disorders, primary insomnia, or chronic medical or psychiatric conditions and may require further evaluation (including assessment of comorbid conditions) to determine appropriate treatment. Some untreated insomnia can lead to an increased risk of falls, as well as depression, and shorter survival. Insomnia has double the risk of cardiovascular disease, stroke, cancer, and suicide compared to their peers.

Insomnia is also associated with increased utilization and institutionalization of health services. Reduction of negative impacts is needed for insomnia through a systematic approach to diagnosis, evaluation, and management as well as improving quality of life, which is a major problem for the elderly and their families (Reyes et al., 2020). Therefore, insomnia sufferers have the right to receive appropriate therapy. Therapeutic approaches for insomnia sufferers can be pharmacological or non-pharmacological, based on the severity and course of the insomnia symptoms themselves. Before therapy, several Diagnostic efforts with various tools that are useful in evaluating insomnia, one of which is practical is a questionnaire from subjective measures such as sleep diaries, symptom checklists, psychological screening tests, and sleep partner interviews. Pittsburgh Sleep Quality Index, Insomnia Severity Index, Pittsburgh Insomnia Rating Scale (PIRS), Nocturnal polysomnography, and daytime multiple sleep latency test. PSQI is a self-assessment questionnaire with 18 items that assesses sleep quality by measuring seven components: subjective sleep quality (obtained by dividing the length of quality sleep by the total time spent in bed), sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances (measured by a person's awakenings during the night), use of sleeping medication, and daytime dysfunction (determined by the problems a person experiences during the day caused by sleep disorders) during the past month.

Currently. PIRS as psychometric properties and normative data have been established using physicians and researchers working in the field of sleep. PIRS is an instrument widely used in clinical practice and research. This is a scale with 65 items. It is designed to assess the severity of insomnia in clinical trials, clinical practice, etc. Subjects scored items that had three major parts. The first is the subjective distress score (46 items), then the subjective sleep parameters (10 items), and finally the quality of life (9 items). (Abbasi Fakhravari et al., 2018), (Veqar et al., 2014) The PIRS65 sleep time item, considered a metric of psychological disability, performed poorly, despite good external validation of prospective sleep records. The PIRS65 item with attribution of symptoms to a time pattern of "sleep deprivation" had

the highest discrimination parameters, indicating how respondents perceive their disability due to insomnia (Schweizer-Schubert et al., 2021).

Based on research, non-therapy pharmacology is an option because it is cheaper and more effective than administering drugs. The side effects of the drug and the possibility of recurrence after treatment is stopped must be considered carefully so as not to worsen the patient's condition. Several non-pharmacological methods used to help insomnia sufferers include sleep restriction therapy, stimulus control therapy, sleep hygiene, as well as relaxation therapy, and biofeedback. Many practical ways of relaxation therapy are useful for improving the function of body parts, the most common of which are various types of massage, not infrequently also hydrotherapy and gymnastics for the elderly. Apart from being able to improve the quality of sleep in the elderly, elderly exercise can also increase flexibility by stretching, as we get older, we become less flexible due to the lack of physical activity we do (Kaur Sharma., 211)

Alternative medicine techniques such as foot reflexology are traditionally considered non-scientific traditional medicine used only by less educated and lower-class elderly people. However, now more and more people and health workers are paying more attention and have evaluated its effectiveness scientifically. Foot reflexology massage is an effective intervention that can relieve fatigue and sleep disorders. accompanied That can increase the quality of Sleep subjective with the use of recording polysomnography For done study continued (Ha et al., 2024); (Leila et al., 2015); (Huang et al., 2021)). Exercise is considered a safe, efficacious, and cost-effective intervention to improve health and quality of life (Passos et al., 2012) and has been used in many studies as an intervention to improve insomnia or sleep complaints in elderly people living in the community (Wood et al., 2024) and to improve sleep quality in elderly people living in the community (Kay et al., 2024) exercise can be a better alternative because of its multifactorial effects Doing the right dose with the FITT principle (frequency, intensity, time, type of exercise) and training exercise elderly can increase the quality of sleep, insomnia, and drowsiness during daylight hours as decreasing so that can brings us a paradigm shift in the treatment of sleep disorders, and can also become an alternative method for treating the elderly. (Reyes, 2020), (Fauziah et al., 2022), (Nasa et al., 2018).

Reflexology massage has been reported to have a higher level of effectiveness for treating insomnia than a combination of psychological treatments, including counseling, relaxation training, and education about sleep hygiene, lifestyle modification, and hypothetical use, the effect of reflexology on sleep quality, reflexology is an intervention that safe and effective for insomnia. This will learn about Insomnia conditions in the elderly after reflexology intervention alone and a combination of exercise with reflexology.

METHODS

Study Design

This study used a quasi-experimental design with a pre and post-design with a control group to see the condition of insomnia in the elderly after it was given combined elderly and reflexology and reflexology only before and after the intervention. Sampling method was carried out systematically during the project period with samples taken according to the inclusion criteria, where the target number of samples was obtained using the difference formula average with the formula.

$$n = \frac{2\sigma^2 \left[z_1 - \frac{\alpha}{2} + z_1 - \beta\right]^2}{(\mu 1 - \mu 2)^2}$$

Notes:
Z1-α/2 = 5% degree of significance
Z1-ß = Degree of test strength 80%
μ1= average score after intervention (Sun., et al, 2010).
μ2 = average score after intervention

Inclusion and exclusion criteria

For inclusion criteria, elderly aged over 60 – 72 years. Exclusion criteria were uncommunicative elderly and elderly people who are unable to mobilize independently.

Drop Out Criteria

Subjects were excluded if they did not participate in training 3 times during the intervention.

OUTCOME MEASURES

The outcome is chronic or acute sleep disorders characterized by complaints of difficulty initiating, and/or maintaining sleep, and/or subjective complaints of poor sleep quality resulting in daytime disturbances and subjective reports of sleep disturbances. which were measured using the PIRS instrument. The PIRS questions on the instrument are in the form of direct interviews and consist of 65 question items. PIRS has 3 assessment items:

a) Distress assessment items (W1-W46). Each question gets a score of 0-3.
0= not annoying at all
1= a little annoying
2 = quite annoying
3 = very annoying
Of the 46 questions, 2 questions were missed. So the scoring formula is as follows: (sum /missing 1)* 46.
These can be categorized as follows:
0= not annoying
>138= very disturbing

b) Sleep parameter assessment items (W47-W56). Each question gets a score of 0-3.
The scores for numbers 47-50 are follows:
0= less than 1/2 hour
1= between 1/2 to 1 hour
2= between 1 and 3 hours
3= more than 3 hours or I didn't sleep
The scores for numbers 51-52 are:
0= more than 7 hours
1= between 4 to 7 hours
2= between 2 to 4 hours
3= less than 2 hours or I didn't sleep
The scores for numbers 53-54 are:
0= none or 1 night
1= at 2 or 3 in the afternoon
2= at 4 or 5 pm
3= on the 6th or all night
The scores for numbers 55-56 are:
0= none or 1 am

1= at 2 or 3 am
2= at 4 or 5 am
3= 6 o'clock or all morning
Of the 10 questions, 1 was left missing. So, the scoring formula is as follows: (sum 2/missing 2)* 10.
These can be categorized as follows:
0 = good sleep
>30= sleep disturbance.

c) . Quality of life assessment items (W57-W65). Each question gets a score of 0-3.
0 = excellent
1= good
2= fair
3= poor
Of the 9 questions, 1 was left missing. So, the scoring formula is as follows: (total 3/minus 3)* 9.
These can be categorized as follows:
0 = excellent
>27= poor
Then these three items can be added together as a whole. The total score is as follows: (sum1+sum2+sum3)/(missing1+missing2+missing 3)* 65
These can be categorized as follows:
0= good
>195= bad

Procedure

After collecting written consent forms, patients are selected based on inclusion and exclusion criteria, they were divided into two groups, namely group A and group B.

Group A was treated with additional exercise (elderly exercise) reflexology massage, while group B was given treatment only with reflexology massage. Before and after the intervention, each group was interviewed using the PIRS instrument and saved for further analysis of the results.

The intervention was carried out:

A. Reflexology massage intervention

1) Duration of Reflexology Massage: between 100 – 140 minutes in one therapy session.
2) Therapy Frequency: 3 times a week for 4 weeks.
3) Intensity: 30-60 rounds of pressure applied
4) Frequency every week 3 times for 4 weeks

B. Elderly Exercise Intervention

1) Exercise dosage for the elderly:
a) Frequency: 3 times a week for 4 weeks
b) Intensity: 60-70% of DNM (maximum pulse rate)
c) Time: 45 minutes
d) Type: Moderate aerobic
e) Repetitions: 1 movement 8 repetitions

Starting with a warm-up, continuing with core exercises, and ending with a cool-down process Group A. For the combined intervention, what was carried out first was reflexology intervention and then elderly exercise Group B.

DATA ANALYSIS

Data analysis was carried out on all subjects in groups A and B. Univariate Analysis aimed to see the distribution of insomnia variables and was presented in table form containing the average value ± deviation, standard, minimum, maximum, and 95% CI. Bivariate analysis which aims to determine the condition of changes in insomnia before and after intervention in each group A and B or between groups A and B. Before done A data normality test was carried out on an interval scale for each group . If the insomnia variable for each group A and B was known to have normal and normal data (before and after) then the test used is the paired t-test. If the insomnia variable in each group A and B was known to have normal and abnormal data (before and after) then the test used was the Wilcoxon test. If the insomnia variable between groups A and B was known to have normal and normal data (before intervention), then the test used was the independent t-test. If the insomnia variable between groups A and B was known to have normal data (after intervention), then the test used is the independent t-test. If abnormal data was found both (before and before) and (after and after) then the test used was the Mann-Whitney test.

RESULTS AND DISCUSSION

The description of the research subjects was carried out using univariate analysis to see the distribution of the characteristics of the research subjects, namely age, gender, and insomnia scores.

Table 1. Mean, Standard Deviation, Minimum, Maximum, Confidence Interval Age, Age by Gender, Imsonia Score Before and After in Group A

Subject Characteristics	Means DS	Minimal	Max	CI 95%
Age	63.13±2.20	60	66	61.92 – 64.35
Man	62.50±3.54	60	65	30.73-94.27
Woman	63.23±2.13	60	66	61.95-64.52
Insomnia				
Before intervention	1311.68 ± 1240.31	0	5460	624.82-1998.54
After intervention	1230.39 ± 634.13	0	2535	879.22-1581.56

The average insomnia score before t in group A was 1311.68 with a standard deviation of 1240.31. With a 95% confidence level (CI 95%) of 624.82-1998.54. The average insomnia score after the combination intervention was 1230.39 with a standard deviation of 634.13 with a 95% confidence level (CI 95%) of 879.22-1581.56.

Table 2. Mean, Standard Deviation, Minimum, Maximum, and Confidence Interval of Imsonia Scores based on before and after components in group A

Subject Characteristics	Means DS	Minimal	Max	CI 95%
Difficulty				

Before intervention	535.90 ± 654.93	0	1725	173.21-898.59
After intervention	444.67-615.87	0	1932	103.61-785.73
Sleep Parameters				
Before intervention	34.00±44.37	0	130	9.43-58.57
After intervention	47.56±48.64	0	170	20.62-74.49
Quality of life				
Before intervention	75.30±25.59	0	117	61.12-89.47
After intervention	76.50±33.29	0	126	58.07-94.93

The average difficulty of Sleep before intervention was 535.90 ± 654.93, after intervention, it decreased. The average sleep parameter before the intervention was 34.00, after the intervention it increased. The average quality of life before the intervention was 47.56, after the intervention it decreased.

Table 3. Distribution of characteristics by gender Male 2 (13.3%) and female 3 (86.7%)

Gender	N	%
Man	2	13.3%
Woman	13	86.7%

Table 4. Mean, Standard Deviation, Minimum, Maximum, Age Confidence Interval, Age according to gender, Imsonia Score before and after in group B

Subject Characteristics	Means DS	Minimal	Max	CI 95%
Age	65, 40 ± 5.34	60	72	62.90 – 67.90
Man	64.88±5.64	65	72	60.16-69.59
Woman	65.75±5.36	60	72	62.34-69.16
Insomnia				
Before intervention	1407.78 ± 1021.04	0	3460	929.92-1885.64
After intervention	812.28 ± 490.70	0	1917.50	582.63-1041.94

The average insomnia score before intervention was 1407.78 ± 1021.04. And the average after the intervention was 812.28 ± 490.70, there was a visible decrease.

Table 5. Mean, Standard Deviation, Minimum, Maximum, Confidence Interval of Imsonia Scores according to before and after components in group B.

Subject Characteristics	Means DS	Minimal	Max	CI 95%
Difficulty				
Before intervention	1028.87 ± 1144.28	0	3404	493.33-1564.41
After intervention	157.93-351.91	0	1288	-6.77-322.63
Sleep Parameters				
Before intervention	12.00±33.04	0	130	-3.46-27.46
After intervention	25.50-41.10	0	110	6.26-44.73
Quality of life				
Before intervention	73.80-50.90	0	180	49.98-97.62
After intervention	70.87-32.48	27	135	55.67-86.07

The average distress score after the intervention decreased, the sleep parameter score after the intervention increased and the quality-of-life score decreased.

Table 6. Distribution of characteristics by gender in Group B Female subjects outnumber male subjects by 60%

Gender	N	%
Man	8	40%
Woman	12	60%

A. Analysis of the Results of Combination Intervention (Group A) and Reflexology Massage Intervention (Group B)

Before analyzing the benefits of the combined intervention with bivariate analysis, a normality test for insomnia scores was carried out before and after the intervention.

Table 7. Normality test for insomnia scores in group A (n= 15)

Insomnia Score	Normality test	Notes
Before intervention	0.00	Not a normal distribution
After Intervention	0.99	Normal distribution

Before the intervention, the insomnia scores before and after were not normally distributed and were normally distributed using Wilcoxon. The test resulted in a decrease in insomnia scores for 7 subjects and an increase in insomnia scores for 8 subjects

Change in insomnia score	Rankings Mean	P
Decrease (7)	7.86	0.78
Upgrade (8)	8.13	
Bound (0)		

* *Wilcoxon* is not significant

Table 8. Test for normality of insomnia scores in group B (n= 20)

Insomnia Score	Normality test	Notes
Before intervention	0.64	Normal distribution
After Intervention	0.43	Normal distribution

Test the normality of insomnia scores before and after normality using the paired t-test.

Table 9. Changes in Insomnia Score before and after intervention in Group B

Insomnia Score	Means DS	Average change	CI (95%)	P
Before intervention	1407.78 ± 1021.04	595.49±962.86	144.86-1046.13	0.01
After Intervention	812.28 ± 490.70			

** Paired T-test is significant*

Because the p-value < 0.05 means that Ho was rejected and Ha is accepted statically and the results of the intervention have changed

B. Comparative Analysis of the Results of Combination Intervention (Group A) and Reflexology Massage (Group B)

Table 10. Normality Test Score Insomnia before and after in group A (n=15) and group B (n=20)

Insomnia Score	A Group	group B	Normality
Before intervention	0.00	0.64	Abnormal – Normal
After Intervention	0.99	0.03	Normal – Not Normal

The normality test for insomnia scores before the combination intervention (Group A) and before the reflexology intervention (group B) showed abnormal and normal results and the normality test for insomnia scores in group A after the intervention and in group B after the intervention showed normal and abnormal results. Mann-Whitney test.

Table 11. Differences in insomnia before and after combination intervention (group A) (N=15) and reflexology intervention (Group B) (N=20).

Insomnia Score	Rankings Mean		Statistical Indicators
	A	B	
Before intervention	16.07	19.45	*Mann-Whitney* U=121.00 Z=-0.97 *P=0.33
After Intervention	22.10	14.93	*Mann-Whitney* U=88.50 Z=-2.05 *P=0.04

Before: Mann-Whitney * Important
After: Mann-Whitney * Important

The results of the Mann-Whitney test before the intervention in group A obtained a mean rank of 16.07 and before the intervention in group B obtained a mean rank of 19.45. Statistically, the difference is not significant, p=0.33 (p>0.05). The results of the Mann-Whitney test after intervention in group A had a mean rank of 22.10 and after intervention in group B had a mean rank of 14.93. Statistically shows a significant difference, p=0.04 (p<<0.0)

From the results of the analysis of the reflexology intervention before and after the elderly insomnia scores, it was seen that there were changes and also changes in the PIRS components. The results of this study are in line with research conducted by Yeung et al (2012), in their systematic review stating that regarding the effect of reflexology on sleep quality, reflexology is a safe and effective intervention for insomnia. systematically reviewed five clinical trials regarding the effectiveness of reflexology and other effective methods in treating insomnia. Based on the findings of this study, both interventions improved sleep quality in two separate aspects., Therefore, these two methods can be recommended as a consolidation in the non-drug treatment of insomnia in the elderly. Insomnia can be a symptom of depression, but it can also cause depression. Anxiety can cause the person to wake up at night and ruminate. It can be concluded that a decrease in anxiety scores correlates with a decrease in the incidence of insomnia in the elderly. If seen from qualitative and quantitative values, reducing anxiety scores can reduce insomnia scores in the elderly (Bjelkarøy et al., 2024)v. (Wang et al., 2008). From the results of the intervention analysis in group A, there were changes in the PIRS components. The results of this research are in line with research conducted by Paso, et. The research results show that exercise training is effective in reducing sleep complaints and insomnia. Aerobic exercise is more widely researched, and its effects are similar to those observed after the use of hypnotic drugs. There is additional documented evidence regarding the anti-depressant and anti-anxiety effects of exercise. Exercise is effective for reducing sleep complaints and treating chronic insomnia. The training given has the same results when compared to hypnosis. Research conducted by NASA, et al., found a significant relationship between exercise and insomnia in the elderly (p=0.000). Referring to the frequency of exercise training, it was also found that there was a significant relationship between exercise training and insomnia in the elderly (p = 0.040) (Tseng et al., 2020).

The results of group A and group B regarding insomnia showed differences in reducing insomnia. These results are also in line with research conducted by Yeung et al. Regarding the effect of reflexology on sleep quality, reflexology massage is a safe and effective intervention

for insomnia (Yeung., 2012) Massage reflection is one method and is a technique very noninvasive used (Dakić et al., 2024). Reflexology is defined as the systematic application of pressure to certain reflex points on the feet with the objective give affecting homeostasis. Wang al., 20008) Massage reflection is a complementary and alternative medical method and is an application of body-based manipulation that is often used. Reflexology massage is a therapeutic method that aims to stimulate target organs with electrochemical messages delivered to the organs through stimulated neurons. through point reflexes in the hands and feet, (Ernst et al). Massage reflection is a special compression technique by applying pressure to reflex points on the feet, and each point is responsible for a certain part. Body Gunnnardottir et al., 2010) Massage reflection was reported to have a higher level of effectiveness for treating insomnia than a combination of psychological treatments, including counseling, relaxation training, hygiene education sleep, modification style life, and use hypnotics (Hsu W et al., 2006). In this research, some limitations affect the research results. Among them, not analyzing physical activity in the elderly, the sample range based on gender is uneven because the number is limited, and the number of female samples is greater than male. It also does not follow up on depression, stress, anxiety, gender, age, and cognition.

CONCLUSION

In this study, there was a change in the condition of insomnia before and after the combination intervention (group A), the average decrease in insomnia scores for the elderly was carried out using the Pittsburg Insomnia Rating Scale (PIRS) questionnaire, but there was no change in the condition of insomnia. statistically significant. Likewise, in group B, the average insomnia score decreased and was statistically significant. It is recommended to avoid things that make you think a lot which will cause depression, stress, and anxiety which results in changes in insomnia scores in the elderly. As well as continuing research with variables that have not been studied in an integrated manner such as gender, age, depression, anxiety, stress, and cognitive. It is hoped that the results of this research can increase public knowledge, especially among families with elderly people, to pay more attention to the elderly to prevent an increase in insomnia scores in the elderly.

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