Global Journal of Multidisciplinary Research
Prestigious Peer-Reviewed Journal | E-ISSN: 2476-1540
Original Research Article | DOI: 10.5281/zenodo.22645363

A Quasi Experimental Study To Assess The Effectiveness Of Aroma Therapy (Lavender Oil) On Quality Of Sleep Among Elderly People (≥60 Years) Residing At Selected Old Age Homes Of District Mandi (H.P.)

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Abstract

Sleep disturbances are common among older adults and may adversely affect physical, cognitive, and emotional well-being. Lavender oil aromatherapy is a simple, non-pharmacological approach that may promote better sleep. To assess the effectiveness of lavender oil aromatherapy on quality of sleep among elderly people (≥60 years) residing in selected old age homes of District Mandi, Himachal Pradesh. A quasi-experimental, non-randomized pre-test post-test control group design was used among 40 elderly people selected through non-probability purposive sampling. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). The experimental group received lavender oil aromatherapy for 14 consecutive nights, while the control group received routine care. Data were analyzed using descriptive statistics, paired t-test, unpaired t-test, and chi-square test. The experimental group showed a reduction in mean PSQI score from 9.95 ± 2.724 at pre-test to 6.15 ± 2.889 at post-test ($t = 9.628$, $p < 0.001$), whereas no significant change was observed in the control group ($t = 0.326$, $p = 0.748$). The post-test comparison between groups was highly significant ($t = -4.161$, $p < 0.001$). In the control group, monthly income and primary source of financial support were significantly associated with post-test sleep quality ($p = 0.034$). Lavender oil aromatherapy was effective in improving sleep quality among elderly people residing in selected old age homes.

Keywords: Effectiveness, Sleep Quality, Elderly People, Aromatherapy, Lavender Oil, Quasi-Experimental Design

1. Introduction

Sleep is a fundamental biological process essential for physical health, cognitive functioning, and emotional well-being. Sleep disturbances are common among older adults and adversely affect their quality of life.[1] The prevalence of sleep disturbances varies across Indian states, with Himachal Pradesh reporting the highest prevalence at 45%, followed by Uttarakhand at 38%, and West Bengal and Madhya Pradesh at 32%. [2]

Lavender aromatherapy is a widely recognized complementary therapy with calming properties and potential benefits in improving sleep quality among older adults.[3] Its effects may be associated with linalool, which may influence the GABAergic system through the olfactory-limbic pathway, producing anxiolytic and sedative effects. [4]

Despite the high prevalence of sleep disturbances among older adults, effective management remains a concern, particularly in institutional settings such as old age homes. [5]

The present study was conducted to assess the effectiveness of aroma therapy (lavender oil) on quality of sleep among elderly people (≥60 years) residing at selected old age homes of District Mandi (H.P) .

2. Materials and Methods

Research Approach: The research approach used for this study was the quantitative research approach.

Research Design: A quasi-experimental, non-randomized pre-test post-test control group design was used.

Research Setting: The study was conducted at selected old age homes in District Mandi, Himachal Pradesh. The experimental group was selected from old age home Bhangrotu while the control group was selected from Suket Senior Citizen Home, Sundarnagar, Dist. Mandi (H.P).

Sample Size and Sampling Technique: A total of 40 elderly people aged ≥ years were selected using a non-probability purposive sampling technique, with 20 participants in the experimental group and 20 in the control group.

Inclusion Criteria: Elderly people aged ≥60 years who were residing in the selected old age homes of District Mandi, Himachal Pradesh, were willing to participate, available during data collection, and had a Pittsburgh Sleep Quality Index (PSQI) score >5.

Exclusion Criteria: Elderly people taking sleep-inducing medications, having cognitive or sensory impairments, allergy to lavender essential oil, or severe respiratory conditions such as uncontrolled COPD or asthma were excluded.

Tool for Data Collection

It Included 2 sections:

- **Section A:** Socio-demographic data (Age, gender, marital status, educational status, previous occupational status, monthly income, primary source of financial support, duration of stay in old age home, any king of medical illness, any kind of drug use)
- **Section B:** Pittsburgh sleep quality index (PQSI) which consists of seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. The global PSQI score ranges from 0 to 21, with a score >5 indicating poor sleep quality.

Data Collection Procedure: Participants in the experimental group received lavender oil aromatherapy for 14 consecutive nights. Two drops of lavender essential oil were applied to cotton balls and placed on the integrated headboard shelf directly behind the participant's head, one hour before bedtime. The cotton balls were removed at 7:00 AM the following morning. The control group received routine care without lavender aromatherapy. Post-test assessment of sleep quality was conducted on the 15th day using the Pittsburgh Sleep Quality Index (PSQI).

Ethical Considerations: Ethical approval obtained from the Institutional Ethics Committee. Written informed consent was taken. Confidentiality and anonymity were ensured.

3. Data Analysis

Data were analyzed using descriptive statistics (frequency, percentage, mean, and standard deviation) and inferential statistics (paired *t*-test, unpaired *t*-test, and chi-square test). The level of significance was set at $p < 0.05$

Organisation of Analysed Data:

The analyzed data was organized according to the objectives and presented under the following sections:

SECTION-A : Findings related to frequency and percentage distribution of selected socio-demographic variables.

SECTION-B : Findings related to effectiveness of Aromatherapy (Lavender oil) in Experimental and Control group.

SECTION-C: Findings related to association of Quality of Sleep scores with selected sociodemographic variables.

SECTION-A: Findings Related To Frequency And Percentage Distribution Of Selected Socio-Demographic Variables.

Table 1: Frequency And Percentage Distribution Of Socio-Demographic Variables.

N=40

S. No	Socio-demographic Variables		Experimental Group (n=20) f (%)	Control Group (n=20) f (%)
1	Age (in years)	60–69	7 (35%)	6 (30%)
		70–79	**8 (40%)**	**9 (45%)**
		80–89	5 (25%)	5 (25%)
		≥90	0 (0%)	0 (0%)
2	Gender	Male	8 (40%)	**12 (60%)**
		Female	**12 (60%)**	8 (40%)
3	Marital status	Unmarried	2 (10%)	4 (20%)
		Married	5 (25%)	6 (30%)
		Widowed	**12 (60%)**	**8 (40%)**
		Separated	1 (5%)	2 (10%)
4	Educational status	**No formal education**	**14 (70%)**	**10 (50%)**
		Primary	6 (30%)	6 (30%)
		UptoSenior secondary	0 (0%)	2 (10%)
		Graduate & above	0 (0%)	2 (10%)

5	**Previous occupational Status**	Government job	1 (5%)	1 (5%)
		Private job	4 (20%)	5 (25%)
		Self-employed	**13 (65%)**	**7 (35%)**
		Not employed	2 (10%)	7 (35%)
6	**Monthly income[in rupees]**	No income (0)	1 (5%)	1 (5%)
		<10,000	**19 (95%)**	**19 (95%)**
		10,001–20,000	0 (0%)	0 (0%)
		20,001–30,000	0 (0%)	0 (0%)
		>30,000	0 (0%)	0 (0%)
7	**Primary source of financial support**	**Pension**	**20 (100%)**	**19 (95%)**
		Personal savings	0 (0%)	0 (0%)
		Family support	0 (0%)	0 (0%)
		Others	0 (0%)	1 (5%)
8	**Duration of stay in old age home**	<1 year	2 (10%)	5 (25%)
		1–3 years	**8 (40%)**	**8 (40%)**
		4–6 years	3 (15%)	4 (20%)
		>6 years	7 (35%)	3 (15%)
9	**Any kind of Medical illness**	Yes	5 (25%)	9 (45%)
		No	**15 (75%)**	**11 (55%)**
10	**Any kind of Drug use**	Yes	4 (20%)	9 (45%)
		No	**16 (80%)**	**11 (55%)**

A total of **40 elderly people** were included in the study. The socio-demographic profile is summarized as follows:

1. Age: Most participants were aged **70–79 years** (40% experimental, 45% control).

2. Gender: Females comprised **60%** of the experimental group, while males comprised **60%** of the control group.

3. Marital Status: Widowed participants were predominant in both groups (60% experimental, 40% control).

4. Educational Status: Most had **no formal education** (70% experimental, 50% control).

5. Previous Occupational Status: Self-employed participants were predominant in the experimental group (65%), while the control group had 35% each self-employed and not employed.

6. Monthly Income: 95% in both groups had a monthly income of <₹10,000.

7. Primary Financial Support: Pension was the main source of financial support (100% experimental, 95% control).

8. Duration of Stay: 40% in both groups had stayed in the old age home for 1–3 years.

9. Medical Illness: 75% experimental and 55% control participants had no medical illness.

10. Drug Use: 80% experimental and 55% control participants reported no drug use.

SECTION-B: Findings Related To Effectiveness Of Aromatherapy (Lavender Oil) In Experimental And Control Group.

Table 2: Frequency and Percentage distribution of Quality of Sleep scores in Experimental and Control group.

N=40

CATEGORY	SCORE	EXPERIMENTAL GROUP (n=20)		CONTROL GROUP (n=20)	
		PRE-TEST f (%)	POST-TEST f (%)	PRE TEST f (%)	POST TEST f (%)
GOOD SLEEP QUALITY	(0-5)	0 (0%)	8 (40%)	0 (0%)	1 (5%)
POOR SLEEP QUALITY	(6-21)	20 (100%)	12 (60%)	20 (100%)	19 (95%)

Maximum score =21 **Minimum score = 0**

Out of **40 participants**, the distribution of sleep quality was as follows:

1. Good Sleep Quality (0–5): None of the participants in either group had good sleep quality at pre-test. At post-test, **40% (8 participants)** in the experimental group and **5% (1 participant)** in the control group achieved good sleep quality.

2. Poor Sleep Quality (6–21): At pre-test, **100% (20 participants)** in both groups had poor sleep quality. At post-test, poor sleep quality decreased to **60% (12 participants)** in the experimental group, while **95% (19 participants)** remained in the control group.

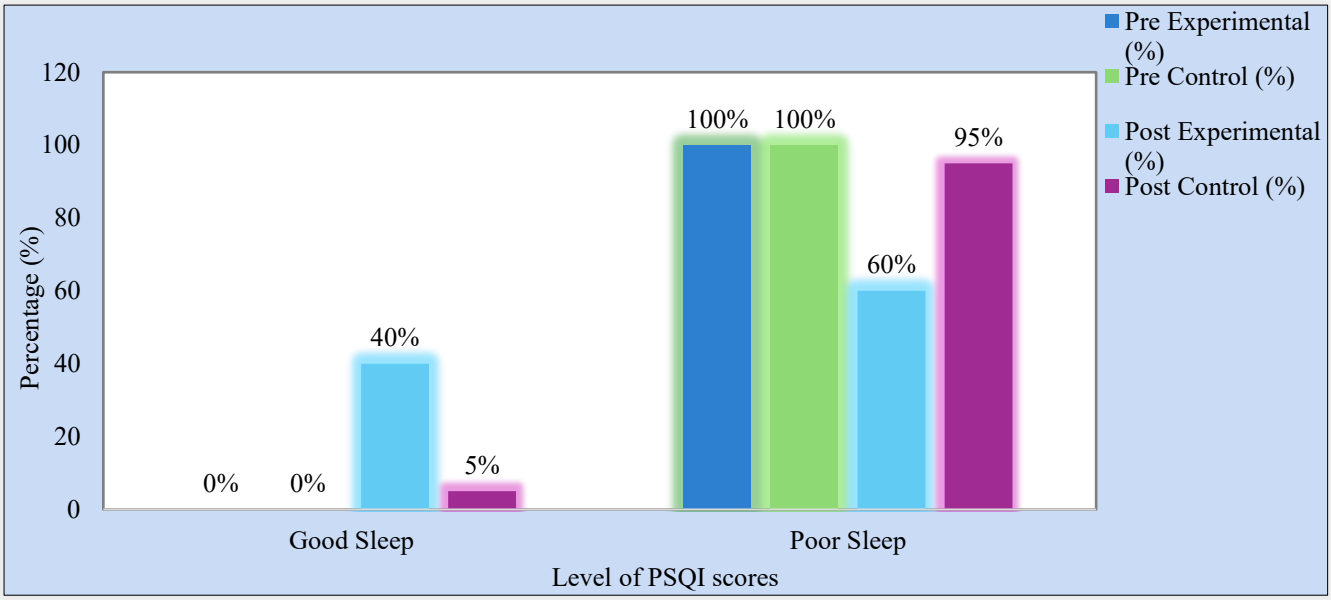


Figure 01: Percentage distribution of pre-test and post- test PSQI scores in experimental and control group.

Figure 1 shows that 100% of participants in both groups had poor sleep quality at pre-test. At post-test, 40% of the experimental group achieved good sleep quality, compared with 5% in the control group, while poor sleep quality remained in 60% and 95%, respectively.

Table 3: Descriptive Statistics of Quality of Sleep Scores.

N= 40

Groups		Mean Score	SD	Median Score	Maxim um Score	Minim um Score	Range	Mean %
Experimental Group (n=20)	**Pre-Test**	9.95	2.724	10	14	6	8	47.38
	Post-Test	6.15	2.889	6	12	1	11	29.29
Control Group (n=20)	**Pre-Test**	10.10	3.210	9.5	16	6	10	48.10
	Post-Test	10.15	3.183	9	16	5	11	48.33

Maximum score = 21 Minimum score = 0

Experimental group had a mean PSQI score of **9.95 ± 2.724** at pre-test, which decreased to **6.15 ± 2.889** at post-test. The median score also decreased from **10 to 6**, indicating improvement in sleep quality following the intervention.

In the control group, the mean PSQI score was **10.10 ± 3.210** at pre-test and **10.15 ± 3.183** at post-test, with the median score changing from **9.5 to 9**. These findings indicate no noticeable improvement in sleep quality in the control group.

Table 4: Comparison of Quality of Sleep Scores in Experimental and Control Group.

N=40

Groups		Pre-Test	Post-Test	Paired T Test		
		Mean ± SD	**Mean ± SD**	**df**	**T**	
Experimental Group (n=20)		9.95 ± 2.724	6.15 ± 2.889	19	9.628	**P value = <0.001 *****
Control Group (n=20)		10.10 ± 3.210	10.15 ± 3.183	19	0.326	P value = 0.748
Unpaired T Test	**df**	38	38			
	T	-0.159	-4.161			
	Result	P value = 0.874	**P value = <0.001 *****			

KEY: Very Highly Significant * Maximum score =21 Minimum score = 0**

The experimental group had a significant reduction in mean sleep quality scores from **9.95 ± 2.724** at pre-test to **6.15 ± 2.889** at post-test (**p < 0.001**), indicating improved sleep quality following the intervention. In the control group, no significant change was observed (**10.10 ± 3.210 vs. 10.15 ± 3.183, p = 0.748**).

The unpaired *t*-test showed no significant difference between the groups at pre-test (**p = 0.874**), while a highly significant difference was observed at post-test (**p < 0.001**), demonstrating the effectiveness of lavender aromatherapy in improving sleep quality.

SECTION-C : Findings Related To Association Of Quality Sleep Scores With Sociodemographic Variables.

Table 5 : Association of Post-intervention Quality of Sleep Scores with Socio-Demographic Variables in Experimental Group.

n=20

Demographic Variables	Options	Good Sleep Quality	Poor Sleep Quality	Chi Test	p-value	df	Table value
Age (in years)	60–69	2	5	2.902	0.234	2	5.991
	70–79	5	3				
	80–89	1	4				
	≥90	0	0				
Gender	Male	4	4	0.078	0.780	1	3.841
	Female	4	8				
	Others	0	0				
Marital Status	Unmarried	0	2	2.847	0.416	3	7.815
	Married	3	2				
	Widowed	5	7				
	Separated	0	1				
Educational Status	No formal education	5	9	0.010	0.921	1	3.841
	Primary education	3	3				
	Senior Secondary	0	0				
	Graduate and above	0	0				
Previous Occupational Status	Govt job	1	0	1.971	0.578	3	7.815
	Private job	1	3				
	Self-employed	5	8				
	Not employed	1	1				
Monthly Income (Rs.)	No income (0)	0	1	0.000	1.000	1	3.841
	≤10,000	8	11				
	10,001-20,000	0	0				
	20.001-30,000	0	0				
	>30,000	0	0				
Primary Source of Financial Support	Pension	8	12	-	-	-	-
	Personal savings	0	0				
	Family support	0	0				
	Others	0	0				
Duration of Stay in Old Age Home	<1 year	0	2	3.457	0.326	3	7.815
	1–3 years	5	3				

	4–6 years	1	2				
	>6 years	2	5				
Any Kind of Medical Illness	Yes	1	4	0.278	0.598	1	3.841
	No	7	8				
Any Kind of Drug Use	Yes	1	3	0.013	0.909	1	3.841
	No	7	9				

None of the selected socio-demographic and clinical variables were significantly associated with post-test sleep quality scores in the experimental group, including age (χ^2 = **2.902, p = 0.234**), gender (χ^2 = **0.078, p = 0.780**), marital status (χ^2 = **2.847, p = 0.416**), educational status (χ^2 = **0.010, p = 0.921**), previous occupational status (χ^2 = **1.971, p = 0.578**), monthly income (χ^2 = **0.000, p = 1.000**), duration of stay (χ^2 = **3.457, p = 0.326**), medical illness (χ^2 = **0.278, p = 0.598**), and drug use (χ^2 = **0.013, p = 0.909**). Chi-square was not performed for primary source of financial support as all participants reported the same source. Overall, no significant associations were observed (**p > 0.05**).

Table 6 : Association of Post-intervention Quality of Sleep Scores with Socio Demographic Variables in Control Group.

n=**20**

Demographic Variables	Options	Good Sleep Quality	Poor Sleep Quality	Chi Test	p-value	df	Table value
Age (in years)	60–69	0	6	1.287	0.526	2	5.991
	70–79	1	8				
	80–89	0	5				
	≥90	0	0				
Gender	Male	1	11	0.000	1.000	1	3.841
	Female	0	8				
	Others	0	0				
Marital Status	Unmarried	1	3	4.211	0.240	3	7.815
	Married	0	6				
	Widowed	0	8				
	Separated	0	2				
Educational Status	No formal education	1	9	1.053	0.789	3	7.815
	Primary education	0	6				
	Senior Secondary	0	2				
	Graduateand above	0	2				
Previous Occupational Status	Govt job	0	1	1.955	0.582	3	7.815
	Private job	0	5				
	Self-employed	1	6				
	Not employed	0	7				
	No income (0)	1	0				

Monthly Income (Rs.)	≤10,000	0	19	4.488	**0.034***	1	3.841
	10,001-20,000	0	0				
	20.001-30,000	0	0				
	>30,000	0	0				
Primary Source of Financial Support	Pension	0	19	4.488	**0.034***	1	3.841
	Personal savings	1	0				
	Family support	0	0				
	Others	0	0				
Duration of Stay in Old Age Home	<1 year	0	5	1.579	0.664	3	7.815
	1–3 years	1	7				
	4–6 years	0	4				
	>6 years	0	3				
Any Kind of Medical Illness	Yes	0	9	0.000	1.000	1	3.841
	No	1	10				
Any Kind of Drug Use	Yes	0	9	0.000	1.000	1	3.841
	No	1	10				

KEY: Significant *

Table shows the association of socio-demographic variables with post-test sleep quality. Monthly income showed a statistically significant association with post-test sleep quality ($\chi^2 = 4.488$, $p = 0.034$). No significant association was observed with age ($\chi^2 = 1.287$, $p = 0.526$), gender ($\chi^2 = 0.000$, $p = 1.000$), marital status ($\chi^2 = 4.211$, $p = 0.240$), educational status ($\chi^2 = 1.053$, $p = 0.789$), previous occupational status ($\chi^2 = 1.955$, $p = 0.582$), duration of stay ($\chi^2 = 1.579$, $p = 0.664$), medical illness ($\chi^2 = 0.000$, $p = 1.000$), or drug use ($\chi^2 = 0.000$, $p = 1.000$). Primary source of financial support showed the same pattern as monthly income ($\chi^2 = 4.488$, $p = 0.034$).

4. Discussion

The study revealed poor sleep quality among all participants at pre-test, with mean PSQI scores of 9.95 in the experimental group and 10.10 in the control group. Following lavender oil aromatherapy, the experimental group showed a significant improvement in sleep quality, whereas no significant change was observed in the control group. The significant post-test difference between the groups ($p < 0.001$) indicates the effectiveness of the intervention. No significant association was found between post-test sleep quality and selected variables in the experimental group, while monthly income and primary source of financial support were significantly associated with sleep quality in the control group.

Similar findings were reported by Zhu et al. (2020)[6], Wang et al. (2019)[7], Joseph and Joseph (2016)[8], Devi et al. (2023)[9]

5. Conclusion

The study concluded that lavender oil aromatherapy was effective in improving sleep quality among elderly people residing in selected old age homes of District Mandi, Himachal Pradesh. Its significant effect on PSQI scores supports its use as a simple non-pharmacological approach for promoting better sleep among older adults.

6. Acknowledgement

I extend my heartfelt thanks to Dr. Bandana, Professor-cum-Principal, Dean, GNC SLBSGMC&H, Nerchowk, Mandi (H.P.), for her valuable support and encouragement. I am deeply grateful to my research guide, Mrs. Anju Bhardwaj, GNC SLBSGMC&H, Nerchowk, Mandi (H.P.), for her expert guidance, valuable suggestions, and continuous support throughout the research process.

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