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Effect of Aroma Therapy on Insomnia Among Young Adults

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Aroma therapy involves massage and satisfying odor with using essential oils, which may indirectly improve sleep. High-quality essential oils are ingested into the body through the skin or airways. Insomnia is characterized by continuous trouble getting asleep or staying happy when sleeping. This study focused on practical approaches to improving sleep quality, which is essential for both psychological and physiological well-being. The primary objective of the study was to examine the effects of aromatherapy on insomnia. The research was conducted on young adults, with ages ranging from 18 - 25 years. Experimental research design was used in this study by giving Lavender Essential Oil to participants. This study involves total 30 participants of both genders (15 males; 15 females). To gauge sleep quality and insomnia, the Pittsburgh Sleep Quality Index (PSQI; Buysse et al. (1989) and Insomnia Severity Index (ISI; Bastien et al. (2001) were used. Data was analyzed through SPSS (Statistical Package for Social Sciences). Results revealed a statistically significant improvement in sleep quality following aromatherapy, as indicated by a reduction in Pittsburgh Sleep Quality Index (PSQI) scores from pre- to post-assessment. Although a slight reduction in insomnia severity was observed using the Insomnia Severity Index (ISI), this change was not statistically significant. Gender-wise analysis demonstrated higher baseline insomnia and poorer sleep quality among females; however, post-intervention findings showed a greater improvement in sleep quality among female participants compared to males. Overall, the study identified significant pre- to post-intervention improvements in sleep quality following aromatherapy, supporting its potential role in promoting healthier sleep patterns among young adults.

Keywords. Essential Lavender Oil, sleep quality, insomnia, aroma therapy, sleep improvements

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To preserve excellent physical and mental health, sleep is a fundamental human necessity. Insomnia is a type of sleep disorder marked by purposeful problems with falling asleep, remaining asleep, or waking up feeling unhappy with sleep (American Academy of Sleep Medicine, 2014; Qaseem et al., 2016). More than half of those who suffer from severe insomnia may experience symptoms for more than ten years (Morin et al., 2009; Morin et al., 2012).

In today's fast-paced world, sleep-related issues, such as insomnia, have become increasingly frequent among young adults. Insomnia, distinguished by trouble falling asleep, staying asleep, or facing non-restorative sleep, can notably affect an individual's overall well-being, cognitive function, and quality of life. The notion of using fragrances for therapeutic purposes dates back centuries, with aromatherapy drawing upon ancient practices from cultures around the world. Essential oils are believed to exert physiological and psychological effects through their interactions with the olfactory system, which is intricately linked to the brain's limbic system. A region associated with emotions, memories and sleep regulation (Goel et al., 2005).

People of all ages and races have insomnia, which is well known in all civilizations and nations. Depending on how strict a definition is adopted, different populations actually experience insomnia. About 33% to 50% of adults have insomnia signs. 10% to 15% have insomnia signs coupled with discomfort or impairment (general insomnia disorder), and 5% to 10% have particular insomnia disorders. Ageing, female sex, comorbid (medical, mental, sleep, and drug use) sickness, shift work, as well as potential joblessness and lower socioeconomic level, are all compatible chance element for insomnia. With sleeplessness rates as high as 50% to 75% among patients with psychiatric and chronic pain disorders, patients who have coexisting medical and mental health illnesses are particularly at risk (Taylor, 2007).

The majority of sleeplessness, which is over 30%, may include having trouble falling asleep, having trouble remaining asleep, or getting restless sleep. In addition to other negative consequences on one's wellbeing and standard of living, insomnia can lead to a number of issues, including cardiovascular and cerebrovascular problems, depression, irritability and other serious health issues (Qu et al., 2021).

Aberrant sleep patterns and parasomnias that occur on a regular basis. Insomnia exacerbates the big life events like a loved one's death, a job loss or shift, a divorce, or a move can all cause stress. The environment, which includes temperature, light, and sound, as well as your genes, can all have an impact on how well you sleep. If you have

problems falling asleep because of jet lag, a new shift at work, or bad habits you grow when you first started having trouble, your sleep schedule may change. There could be a family history of insomnia (Gauld et al., 2021).

Patients who struggle with insomnia may express difficulties getting asleep, frequent awakenings, trouble falling back to sleep, waking up too early, or sleep that doesn't seem restorative, reviving, or rejuvenating. Despite the fact that some patients may only report one type of sign, it is quite usual for various different signs to coexist, and the precise awarding might change over time. Characterizing the sort of complaint, its time period (months, years, lifetime), severity of evening distress, frequency (nights per week or number of times per night), and related daytime symptomatology, course (progressive, intermittent, relentless), factors that exacerbate or ameliorate signs, and recognition of past and present precipitants, perpetuating factors, treatments, and feedback are all important factors (Lichstein, 2003).

A fundamental human need, sleep is essential to preserving both physical and mental health. Some of the current therapies for insomnia include medication, psychotherapy, physical therapy and cognitive-behavioral therapy for insomnia (CBTI) (Lee & Lee, 2006). However, because the number of people suffering from insomnia is quickly increasing, further effective insomnia treatments are needed. Aromatherapy is one of the drug-free strategies for better sleep quality (Nasiri et al., 2016).

Patients with insomnia frequently experience impatience, boredom, moderate depression, and worry. Patients with chronic insomnia frequently lament their mental sluggishness, memory loss, inability to concentrate, and difficulties with tough mental tasks. Individual and societal burdens are associated with insomnia. Patients with chronic insomnia, by definition, have daily cognitive, mood, or performance impairment that affects the patient as well as maybe their family, friends, coworkers, and carers. Patients with chronic insomnia are more likely to seek medical attention, consult a doctor, miss work or arrive late, make mistakes or have accidents at work, and experience more severe auto accidents (Léger, 2006).

Aromatherapy has drawn interest as a potential complementary strategy for enhancing sleep quality. Aromatherapy has been advocated as a non-pharmacological way to promote relaxation, relieve tension, and maybe improve sleep. It entails inhaling or applying essential oils made from plants topically. Lavender is a valuable essential oil because of its soothing and anxiolytic effects. The autonomic nervous system may be affected by the calming scent of lavender, which may enhance the quality of your sleep (Smith et al., 2023).

It takes them at least thirty minutes to fall asleep and at least as long to stay awake at night for people who have problems falling asleep. 10% to 15% of adult populations suffer from chronic insomnia. As a result, insomnia affects more than just sleep. Additionally, it affects one's general lifestyle quality as well as their physical and emotional health. In modern communities, sleep disruption is a worldwide issue (Chueh, 2009).

Sample

The present research recruited 30 participants for this intervention; there were 15 women and 15 men. Their ages ranged from ages of 18 and 25 years. The respondents were chosen from Faisalabad Agriculture University, Faisalabad.

Measures

Pittsburgh Sleep Quality Index (PSQI)

The PSQI, developed by Buysse et al. (1989) is a tool that provides data on the different kinds, levels and qualities of sleep disturbances over the course of a month. There are a total of 24 questions, of which 5 are for evaluating a roommate or bed partner and 19 are for self-evaluation. The scoring includes self-rated questions, but not the other five questions. 19 self-rated questions are used to evaluate daytime trouble, sleep pattern, sleep latency, sleep length, and habitual sleep efficiency. The questions are divided into seven categories. Each item had a difficulty level vary from 0 (*No Issue*) to 3 (*Severe Issue)*, and the score for each component may be between 0 and 3. The sums of the seven component values are then added to yield the PSQI score, which ranges from 0 to 21 (Buysse et al., 1989).

Insomnia Severity Index (ISI)

The ISI developed by Bastien et al. (2001) is a 7-item self-report questionnaire that assesses the types, degrees and outcomes of insomnia. The characteristics evaluated include sleep discontent, the severity of sleep issues in terms of onset, maintenance and early morning awakenings, how much daytime functioning is impacted by sleep issues, how noticeable the issues are to others, and how distressing the issues are themselves. The "last month" is the usual recall window. The total score goes from 0 to 28 and is based on a 5-point Likert scale, with 0 denoting *No Difficulty* and 4 denoting *An*

Exceedingly Serious Condition. According to the overall score, there is no insomnia (0 - 7), sub-threshold insomnia (8 - 14), moderate insomnia (15 - 21), and severe insomnia (2 - 28) (Morin et al., 2006).

Procedure

The participants were given a bottle of lavender essential oil via breathing for 30 days. After pre-testing, the participants were instructed to start using the inhalation technique started on the first day and continue every day for 30 days. Daily phone conversations were used to keep participants motivated throughout the period intervention was applied. Every night before bed, participants applied three drops of essential oil to the cover of their pillows. It is assumed that the components of lavender essential oil of oil would be sufficient to transmit messages to the olfactory system via the lungs and nasotracheal mucosa, which would prompt the brain to release neurotransmitters such aminobutyric acid as a result. The premise behind this exercise is that sleep difficulties can be managed with the use of aminobutyric acid's sedative, anti-anxiety and mental calming qualities. Prior to the application of the lavender oil, the intervention group's pretest data were gathered using a questionnaire, and then the same scales were given to them once more to assess the quality of their sleep.

Results

The data for the research was analyzed using SPSS. Independent sample *t*-test and paired sample *t*-tests, and Person Correlation was used to analyze the data.

Table 1*: Pre-Assessment of Gender Difference on Study Variables (N = 30)*

	Males (n = 15)		Females (n = 15)					95% *CI*	
	M	*SD*	*M*	*SD*	*t*	*df*	*α*	*LL*	*UL*
Insomnia Severity	11.80	2.54	14.06	2.34	-2.54	28	.02	-4.10	0.44
Sleep Quality	12.13	2.03	15.93	2.96	-4.10	28	.00	-5.70	-1.90

Note. *M* = Mean; *SD* = Standard Deviation; CI = Confidence Interval; *LL* = Lower Limits; *UL* = Upper Limit.

The mean insomnia severity score for males was 11.8, while for females, it was 14.06 and mean sleep quality score for males was 12.13, while for females, it is 15.33, as shown in Table 1. This suggests that,

on average, females have a higher severity of insomnia compared to males in this sample and females have a higher sleep quality index, which means poorer sleep quality, compared to males in this sample. For both the insomnia severity and sleep quality, the *t*-values for testing the equality of variance are less than the conventional significance level of .05. This suggests that there is statistically significant difference in variance between the gender groups for both insomnia variables. Therefore, with these statistics' hypothesis, there will be higher level of insomnia in females than males. Table 1 and Figure 1 show the results. So, hypothesis one is accepted that "There was a higher level of insomnia in females than males." Figure 1 shows the pre-assessment of participants of both the sleep quality and Insomnia scale. Blue color indicates the male and orange color indicates female. This figure shows that higher insomnia in females than males.

Figure 1: *Pre-Assessment Mean Comparison Among Respondents*

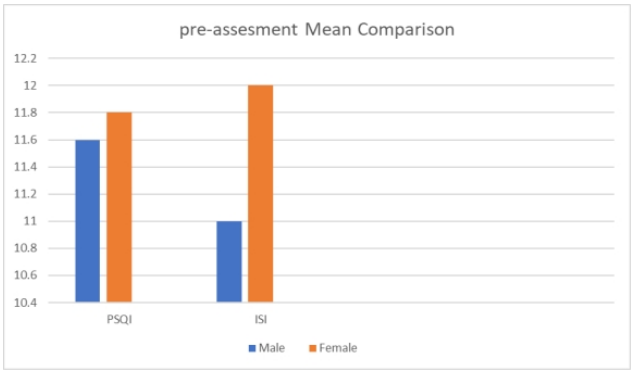


Table 2: *Pre/Post Assessment Statistical Difference in Participants for Sleep Quality (N = 30).*

	Pre-assessment (*n* = 15)		Post-assessment (*n* = 15)					95% *CI*	
Variables	*M*	*SD*	*M*	*SD*	Mean Difference	*t*	*df*	*LL*	*UL*
Sleep Quality	11.70	8.86	2.02	2.81	2.83	4.79	29	1.62	4.04

Table 2 shown as the pre-assessment group had an average PSQI score of 11.7, which decreased to 8.86 in the post-assessment group, suggesting an improvement in sleep quality after the intervention. The standard deviation of the pre-assessment PSQI scores is 2.02. The standard error of the mean for the pre-assessment PSQI scores is 0.37.

This data shows the changes in sleep quality, as measured by the PSQI, before and after some intervention or treatment. The pre-assessment group had an average PSQI score of 11.70, which decreased to 8.86 in the post-assessment group, suggesting an improvement in sleep quality after the intervention.

Of the 30 respondents the post-assessment means (8.86) is lower than the Pre-assessment means (11.70). This indicates that, on average, the respondents' sleep quality improved after aroma therapy. The mean difference of 2.83 suggests that participants' sleep quality improved by this amount after the aroma therapy. The p-value is reported as .00. So, Aroma therapy appears to have a statistically significant positive effect on sleep quality, as indicated by the paired sample *t*-test.

Table 3*: Relationship Between Aroma Therapy and Sleep Quality (N = 30)*

Aroma Therapy	With oil	*α*
Without using oil	.13	.49

The correlation between aromatherapy (presumably without using oil) and the specific outcome is .13. Correlation measures the strength and direction of the linear relationship between two variables. The significance level associated with the correlation is .49 this suggests that the correlation between aromatherapy without oil and the outcome is not statistically significant.

Table 4*: Pre/post Assessment Statistical Difference in Participants (N = 30)*

	Pre Assessment (*n* = 15)		Post Assessment (*n* = 15)					95% *CI*	
Variables	*M*	*SD*	*M*	*SD*	Mean Difference	*t*	*df*	*LL*	*UL*
Sleep Quality	11.60	2.85	10.86	3.42	.73	1.18	29	-.54	2.01

Note. M = Mean; *SD* = Standard Deviation; CI = Confidence Interval; *LL* = Lower Limits; *UL* = Upper Limit.

This data provides insights into the changes in insomnia severity, as measured by the ISI, before and after some intervention or treatment. The pre-assessment group had an average ISI score of 11.6, which decreased to 10.86 in the post-assessment group, suggesting a slight

improvement in insomnia severity after the intervention. In order to determine the positive effect of aroma therapy on respondents paired t - test was applied on both the variables. The mean difference of 0.73 indicates that, on average, there is a slight decrease in the Insomnia Severity Index scores after the intervention. This means that, on average, participants' insomnia severity worsened slightly after the intervention. The p-value associated with the paired sample test is 0.249, which is greater than the conventional significance level (0.05). This indicates that the observed change in ISI scores is not statistically significant. The p-value suggests that any observed difference between Pre-assessment and Post-assessment ISI scores may be due to chance or random variability. In Table 4 the result revealed that significant reduction was found solely in insomnia level in post-assessment data as per PSQI scale. ISI scale do not find significant results in post-assessment among insomnia respondents.

Table 5*: Relationship Between Aroma Therapy and Insomnia Severity (N = 30).*

Aroma therapy	With oil	*α*
Without using oil	.42	.02

The correlation between aromatherapy without using oil and the specific outcome is .42. Correlation measures the strength and direction of the linear relationship between two variables. The significance level associated with the correlation is .02; this suggests that the correlation between aromatherapy without using oil and the outcome is statistically significant.

Table 6: *Post-Assessment of Gender Difference on study Variables (N = 30)*

	Males (n = 15)		Females (n = 15)		Mean				95% *CI*	
	M	*SD*	*M*	*SD*	Difference	*t*	*df*	*α*	*LL*	*UL*
Insomnia Severity	14.80	2.57	12.73	2.02	-2.07	-2.45	28	.02	-3.79	-0.34
Sleep Quality	14.40	2.26	10.80	3.34	-3.60	-3.46	28	.00	-5.75	-1.45

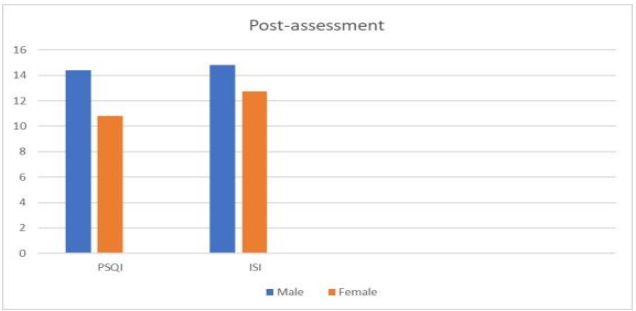
Note. *M* = Mean; *SD* = Standard Deviation; CI = Confidence Interval; *LL* = Lower Limits; *UL* = Upper Limit.

Hypothesis 3 stated that there will be a positive effect of aroma therapy is higher in females than males. For the Insomnia Severity Index (ISI), females have a slightly less mean score than males. For the Pittsburgh

Sleep Quality Index (PSQI), females have a significantly lower mean score than males. The difference in mean PSQI scores is substantial and may suggest that females have lower sleep quality compared to males.

In order to determine the positive effect of aroma therapy on respondents *t*-test was applied on both the variables. There is a statistically significant difference in the means of both ISI and PSQI scores between males and females. This indicates that there are significant differences in the severity of insomnia and sleep quality between the gender groups. The associated p-value is .00. The p-value is less than the conventional significance level of 0.05. Although the scoring of females is less than males in both tools. However, hypothesis no 3 there will be positive effect of aroma therapy in respondents is higher in females than males is accepted. Figure 2 shows the post-assessment of participants. Blue colour shows the male participants and orange colour shows the female participants. This figure shows that insomnia in females is less than males which indicates the positive effect of aroma therapy.

Figure 2: *Post-Assessment Mean Comparison Among Respondents*



Discussion

Hypothesis 1 of the research was that *there will be higher level of insomnia in females than males.* From the means, we can see that females (M = 14.06) have a higher average ISI score compared to males (M = 11.8) and for the PSQI, females (M = 15.93) have a higher average sleep quality index compared to males (M = 12.13). Evidence that there is a considerable difference between men and women's degrees of insomnia. Specifically, females have higher average scores on both the ISI and PSQI scales, suggesting that they experience more severe insomnia and poorer sleep quality compared to males. The gender-specific pre/post-aromatherapy examination revealed that women experience significantly higher levels of sleeplessness than

men. Compared to men, women typically suffer higher levels of stress, worry, and sadness, which can affect how well they sleep. Males and females experience insomnia differently, and this difference has been linked to gender. Psychological factors such as rumination and worry have been associated with insomnia symptoms (Lovato & Gradisar, 2014).

Hypothesis 2 of the research was *there will be positive effect of aroma therapy on respondents;* the data indicates that the average PSQI score decreased from 11.7 in the pre-assessment to 8.86 in the post-assessment. The results purposes that the respondents, on average, experienced an enhancement in their sleep quality after undergoing aromatherapy. The decrease in the PSQI score from pre-assessment to post-assessment indicates that the use of aromatherapy was beneficial on the respondents' sleep. If the respondents were aware of the aromatherapy intervention, they might have experienced improvements in their sleep quality due to expectations or beliefs about the treatment. There is an indication that aromatherapy had a positive effect on the respondents' sleep quality as evidenced by the decrease in the PSQI scores from pre- to post-assessment. The data indicates that the average ISI score decreased from 11.6 in the pre-assessment to 10.86 in the post-assessment. The ISI is a measure of insomnia severity, where lower scores indicate less severe insomnia. The decrease in the mean ISI score from pre-assessment to post-assessment suggests that the respondents experienced a reduction in insomnia severity over time. The paired sample test results indicate that there is a slight improvement in the respondents' insomnia severity scores from pre-assessment to post-assessment. The data does not provide strong evidence to support a significant positive effect of the intervention on reducing insomnia severity. Lavender is one of the most commonly used essential oils for promoting relaxation and improving sleep quality (Hajibagheri et al., 2014).

One of the most well-liked and adaptable essential oils used in aromatherapy is lavender. Versatile oil utilized in essential oil practices is lavender. It is said to have sedative, antispasmodic, analgesic, detoxifying, hypotensive, anti-inflammatory, antifungal, antidepressant, antiseptic, antibacterial, and antimicrobial properties. Lavender essential oil may cause skin rashes or allergic reactions in some people. Use of lavender should be stopped if you experience headache, nausea, or vomiting after taking it. The limbic system, a part of the brain known to affect the neurological system and aid in mood regulation, receives messages when lavender essential oil is inhaled or used topically, according to the principles of aromatherapy (Benbir et al., 2015).

Hypothesis 3 was that *There will be positive effect of aroma therapy is higher in females than males;* some research has suggested that compared to men, women typically have a keener sense of smell. This heightened olfactory sensitivity might influence how aromatherapy scents are perceived and experienced by women. Hormonal differences between genders could potentially impact the effects of aromatherapy. For example, hormonal fluctuations in women due to the menstrual cycle might interact with aromatherapy's effects on mood and emotions (Lillehei et al., 2015). The mean scores for both the Insomnia Severity Index (ISI) and the Pittsburgh Sleep Quality Index (PSQI) are lower in females compared to males. This suggests that females in the sample have less severe insomnia symptoms and better sleep quality compared to males. The mean difference between genders is -2.07 suggesting that females have, on average, lower ISI scores (less severe insomnia symptoms) than males and for the PSQI variable, the mean difference between genders is -3.60, indicating that females have, lower PSQI scores (better sleep quality) than males. The results of the independent samples *t*-test show that females, on average, have lower ISI scores (indicating less severe insomnia symptoms) and lower PSQI scores (indicating better sleep quality) compared to males in the sample.

Implications

Here are some implications and considerations related to the effects of lavender aromatherapy on insomnia among young adults:

1. Relaxation and Sleep Induction: Lavender is frequently linked to stress relief and relaxation. Its perfume is thought to have a calming impact on the neurological system, which may aid young adults in relaxing and getting ready for bed. Before bed, inhaling lavender aroma may encourage relaxation and make it simpler to fall asleep.
2. Improved Sleep Quality: According to certain research, lavender aromatherapy may enhance the quality of sleep by speeding up the process of falling asleep and increasing the quantity of slow-wave or deep slumber. This might result in more restorative sleep and assist with the symptoms of insomnia.
3. Psychological Benefits: The aroma of lavender may offer psychological advantages in addition to any possible physiological effects. In general, aromatherapy can produce a pleasant sensory experience, which may help to lessen tension and anxiety, both of which can have a bad impact on sleep.

Limitations

1. Not suitable for certain conditions. Although lavender oil is typically harmless, several medical disorders, such as allergies, asthma, or problems with hormones, may prevent some people from using it. It's essential to consult a healthcare professional before using essential oils if you have any medical concerns.
2. Adverse reaction. Some individuals may experience adverse reactions like headaches. Use aroma therapy in moderation and discontinue use if you experience any adverse effects.
3. Effectiveness varies. While lavender essential oil has calming properties for many people, its effectiveness may vary from person to person. Not everyone will experience the same level of relaxation or therapeutic benefits from aroma therapy.

Conclusion

Adult users of aromatherapy report reduced stress, anxiety, and tension in addition to improved sleep. One common sleeping problem is insomnia. Insomnia might cause people to feel sleepy during the day, which can make their everyday tasks more challenging. Currently, medications are the main clinical therapies for sleep disorders; nevertheless, we recommend aromatherapy. The application of essential oils for therapeutic purposes is known as aromatherapy. People have been using aromatherapy for a very long time. Lavender essential oil is a plant we use a lot in our daily lives. Lavender also provides certain health advantages.

Inhaling lavender oil might promote calmness and prolong and improve the quality of sleep. The scent of lavender essential oils may enhance the quality of sleep for young, healthy adults, according to the study's findings. These results suggest that aroma directly contributes to higher-quality sleep.

Recommendations

1. Use a high-quality aromatherapy diffuser in your bedroom to disperse the scent of lavender. Add a few drops (usually 3-5 drops) of lavender essential oil to the diffuser and let it run for about 30 minutes before bedtime. The calming aroma can create a relaxing atmosphere and help prepare your mind for sleep.

2. Use a personal inhaler or a cotton ball soaked in essential oil of lavender. Inhale the aroma deeply before bedtime to promote relaxation.
3. When massaged, using lavender and chamomile essential oils enhances the quality of sleep.
4. One of the most well-liked alternative therapies is aromatherapy massage. It involves a range of body manipulation techniques, including massage, squash, touch, deep massage, surface massage, and vibrating motions.
5. Aromatherapy may require consistent use over time to see noticeable effects. Make it a part of your nightly routine to signal your body that it's time to wind down.

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