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EFFECT OF LIFESTYLE MODIFICATION ON ELDERLY WOMEN AFFECTED WITH INSOMNIA

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Abstract
Insomnia is a sleep disorder characterized by difficulties in both falling and staying asleep. Current research indicates 10% to 30% of adults, especially over the age of 60, are at a higher risk of insomnia. This study explores the impact of exercise and a vegetarian diet on specific physiological, biochemical, and psychological factors in elderly women suffering insomnia. A randomized controlled trial, involving 120 participants divided into three groups of 40. Group A received both a vegetarian diet and exercise interventions; Group B engaged in exercise alone, while Group C acted as a control group with no interventions, allowing for the assessment of various outcomes. Statistically significant differences were observed in all chosen physiological (BMI, systolic and diastolic blood pressure), biochemical (low-density lipoprotein, ppbs), and psychological factors (Insomnia Severity Index) following training with a Sattvic diet when comparing pre-test and post-test results from Group A and Group B. Group A showed a remarkable improvement, especially for low-density lipoprotein, postprandial blood sugar, and insomnia severity index, with mean values of 134.13±13.82, 133.83±21.54, and 13.23±1.99, respectively, thus enhancing a good quality of sleep compared to Group B. In conclusion, changes in lifestyle with regular physical activity and a vegetarian diet can greatly enhance the sleep quality in older women.
Keywords: Insomnia, elderly women, Exercise, Low-density lipoprotein, Insomnia Severity Index

INTRODUCTION

Sleep disorders affect an extensive population globally. One significant component of sleep disorders is insomnia [1, 2], making it difficult to sleep and stay awake. Chronic insomnia is defined by the International Classification of Sleep Disorders as the inability to fall asleep or stay asleep at least three times per week for at least three months, even when there are sleep-friendly surroundings [5]. The total number of elderly individuals is growing considerably; by 2050, there will be nearly 2 billion people over the age of 60, up from the currently estimated 205 million [6]. Insomnia is the most commonly observed sleep disorder among the elderly population. [7]. Compared to younger people, older folks are more likely to experience insomnia. Despite the prevalence of insomnia conditions being estimated to be between 12% and 20% in the older population, the incidence of insomnia symptoms ranges between 30% and 48%. [8-9]

India's old population is growing quickly as a result of improvements in general medical care standards. Recognizing insomnia in this population may help with better management of common chronic illnesses linked to aging, which may ultimately enhance older persons' quality of life as knowledge on the relationship between sleep and health continues to grow [10]. Both forms of therapy are currently used to treat insomnia. Despite its extensive use, medication is advised to be used only temporarily due to the possibility of negative side effects. When taken over an extended period of time, they can include weariness, mental impairment, tolerance, and reliance. [11]. Thus, the focus of this study was to evaluate how exercise and a sattvic diet can alter particular physiological, biochemical, and psychological aspects in older women who suffered from insomnia and the level of improvement pre- and post-treatment in all three groups (Group A, Group B and Group C) and their statistical significance.

METHODOLOGY

Study design sample size:
The test measure of 120, which was split into three batches of 40 each, was used in this randomized controlled study. Group B was exposed to, in a sense, working out; Group C was a control group that received no therapy; and Group A was mediated by sattvic eating less and exercising. The same criteria were used to analyze the findings of the pre- and post-test.

Participant:
In this study, 120 participants were chosen at random. They were diagnosed with insomnia if their overall Pittsburgh Sleep Quality Index score was five or higher and their insomnia severity index score was greater than

eight [12, 13]. Women between the ages of 60 and 70 who were willing to engage in the study met the inclusion criteria, while women under 60 who were on medication and unwilling to participate met the exclusion criteria.

Statistical analysis:

Analysis of the data was carried out with the aid of SPSS statistical software (version 16.0; SPSS Inc., Chicago, IL, USA). The relationship between insomnia and different parameters, such as physiological, biochemical, and psychological variables, was evaluated using the chi-square test. A critical p-value of less than 0.05 was used to indicate significant differences, based on a sample of 120 patients.

RESULTS

One of the most major concerns in recent years has been insomnia, and the occurrence of sleep disorders has increased remarkably. This study focuses on sleep disorders, particularly insomnia, among elderly women aged over sixty. In this research, 120 women were randomly selected over the age of 60 among the 120 participants; 22 are aged over 70 years, and 98 are women over the age of 60. Random sampling method was performed; the participants were subdivided into three groups: Group A, Group B, and Group C. Forty participants were randomly selected for each group. The general characteristics of the participants in all three groups were detailed in Table 1.

Table1: Baseline characteristics of elderly women above 60.

Characteristics	Group A (n=40)	Group B (n=40)	Group C (n=40)
Age			
Above 60	32	24	26
Above 70	8	16	14
Married Status			
Married	34	37	36
Divorcee	6	3	4

Group A consisted of participants adhering to a sattvic diet in conjunction with exercise; Group B comprised those engaging just in exercise; and Group C, designated as the control group, included candidates who exclusively follow standard medication. This study assessed the physiological, biochemical, and psychological aspects of the individuals across the three groups. The results were weighted based on the pretreatment and post-treatment results obtained for the parameters involved in each factor. The parameters analyzed are BMI, systolic and diastolic blood pressure, low-density lipoprotein, PPBS and insomnia severity index in each group.

In particular, the SBP value of 139.07±8.07, the DBP value of 87.00±7.76 and the LDL value of 150.23±21.41, which are nearly constant across all three groups, are shown in Table 2, which displays the pre-treatment examination of all the parameters. Similarly, the post-treatment values of the specific parameters studied for all three groups are detailed in Table 3. The statistical data was evaluated for pre- and post-treatment. The standard deviation and mean value were calculated using the statistical interface. The significance of results was studied by comparing the values between pre- and post-treatment for all the parameters. Similarly, the post-treatment values of the specific parameters studied for all three groups are detailed in Table 3.

Table 2: Physiological, Biochemical and psychological characteristics of Group A, B & C (Pre-treatment).

Parameters Analysed	Group A (Exercise with Diet) Mean/SD	Group B (Exercise) Mean/SD	Group C(control) Mean/SD
BMI	26.11±0.97	26.86±0.86	26.03±0.72
SBP	139.07±8.07	139.33±8.00	138.93±7.46
DBP	87.00±7.76	86.93±7.67	87.13±6.26
LDL	150.23±21.41	150.17±15.64	150.37±14.13
PPBS	150.83±21.41	150.63±21.06	150.57±19.66
Insomnia Severity Index	22.13±1.44	22.03±1.47	21.93±1.58

Note: BMI-Body Mass Index, SBP- Systolic Blood Pressure, DBP- Diastolic Blood Pressure, LDL- Low-Density Lipoprotein, PPBS- Postprandial Blood Sugar, SD- Standard Deviation.

Table 3: Physiological, Biochemical and psychological characteristics of Group A, B & C (Post-treatment).

Parameters Analysed	Group A (Exercise with Diet) Mean/SD	Group B (Exercise) Mean/SD	Group C(control) Mean/SD
BMI	25.14±1.60	25.62±1.72	26.09±1.53
SBP	128.47±5.66	129.67±6.52	141.60±6.76
DBP	80.80±6.32	81.27±6.12	88.23±6.76
LDL	134.13±13.82	145.38±15.64	151.37±15.13
PPBS	133.83±21.54	146.63±23.36	151.30±17.41
Insomnia Severity Index	13.23±1.99	16.47±1.61	22.49±1.24

Note: BMI-Body Mass Index, SBP- Systolic Blood Pressure, DBP- Diastolic Blood Pressure, LDL- Low-Density Lipoprotein, PPBS- Postprandial Blood Sugar, SD- Standard Deviation.

Table 4 showed a comparison of pre- and post-treatment results for Group A and Group B, as well as their statistical significance in the form of a P value. The findings were recorded both before and after treatment, and it was fascinating to see that there was a significant difference between the pre- and post-treatment data, demonstrating that exercise and a sattvic diet produced fantastic outcomes with statistical significance.

Table 4: The comparison of pre- and post-treatment physiological, biochemical, and psychological characteristics between Group A and Group B

Parameters	Group A (Exercise with Diet) Mean/SD	Group B (Exercise)	P-value
Body Mass Index			
Pre-treatment	26.11±0.97	26.86±0.86	0.559
Post-treatment	25.14±1.60	25.62±1.72	0.342
P-value	0.758	0.799	
Systolic Blood Pressure			
Pre-treatment	139.07±8.07	139.33±8.00	0.642
Post-treatment	128.47±5.66	129.67±6.52	0.254
P-value	**< 0.001***	**< 0.001***	
Diastolic Blood Pressure			
Pre-treatment	87.00±7.76	86.93±7.67	0.365
Post-treatment	80.80±6.32	81.27±6.12	0.231
P-value	**< 0.001***	**< 0.001***	
Low-Density Lipoprotein			
Pre-treatment	150.23±21.41	150.17±15.64	0.763
Post-treatment	134.13±13.82	145.38±15.64	**< 0.001***
P-value	**< 0.001***	**< 0.001***	
Postprandial Blood Sugar			
Pre-treatment	150.83±21.41	150.63±21.06	0.674
Post-treatment	133.83±21.54	146.63±23.36	**< 0.001***
P - value	**< 0.001***	**< 0.001***	
Insomnia Severity Index			
Pre-treatment	22.13±1.44	22.03±1.47	0.562
Post-treatment	13.23±1.99	16.47±1.61	**< 0.001***
P-value	**< 0.001***	**< 0.001***	

DISCUSSION

The capacity to do tasks, reducing life quality and mental discomfort, and medical outcomes are related to insomnia [14]. The risk of a high mortality rate is associated with insomnia conditions [15], cardiovascular diseases [16] and injuries [17]. There are various studies in connection to insomnia conditions, one of the major sleep disorders suffered by elderly people, women population above 60. A multicenter study conducted in North India in more than 9000 community-dwelling populations above 65 found that nearly 57% of the people suffered sleeping difficulty [18]. The cases of insomnia are increasing among elderly women, and this issue was addressed in this study, and it was interesting to note that out of the three groups categorized, the participants who followed sattvic diet and exercise had great improvement in their sleep patterns and improved their quality of life as well.

Many studies have reported on the positive effect of exercise in promoting quality of sleep. Exercise stimulates the heat inside the body, and it in turn improves sleep, as increasing temperature is associated with the sleep mechanism connected to the anterior hypothalamus [19]. Also, it is believed that increasing anti-inflammatory cytokines reduces the pro-inflammatory cytokines, thus improving the quality of sleep. Cytokines are seen at an increased level in cases of infections, inflammatory diseases, or other conditions like stress or depressive disorders [20]. Exercise arouses the release of growth hormone, which in turn helps in improving the quality of sleep [21]. Additionally, exercise can distract from disturbing thoughts and result in positive feelings, thus improving sleep quality [22]. This study supports the previous finding in which daily exercise can improve the SBP, DBP, LDL and PPBS values with statistically significant values and also has a great impact on the Insomnia Severity Index in turn improving sleep quality. Similar to exercise, a good quality diet can also help in improving good quality sleep. they are dietic supplements higher in protein, fiber, fruits, vegetables, and anti-inflammatory nutrients and lower in saturated fat (eg, Mediterranean diet) were associated with better sleep quality [23]. Tryptophan is an essential amino acid crucial for protein synthesis and serves as a precursor in the synthesis of melatonin and serotonin that act as sleep-regulatory signals [24].

Whole diets rich in fruits, vegetables, legumes, and other dietary sources of melatonin and tryptophan have been shown to predict higher sleep quality, and specific meals high in these nutrients have been shown to improve the quality of sleep [25]. This study supports the findings that a healthy diet in the right context can undoubtedly lead to high-quality sleep. When individuals in groups A and B maintained healthy eating and exercise habits, their sleep patterns improved significantly, while those in group B followed only exercise. But group A, who are following a strict diet and exercise, showed great improvement in all the parameters of all nature and showed statistically significant outcomes like SBP value of 128.47±5.66, DBP value 80.80±6.32, LDL value 134.13±13.82, PPBS 133.83±21.54 and the most important criteria, the Insomnia Severity Index of 13.23±1.99.

CONCLUSION

Including strict exercise and a sattvic diet into daily life can serve as a strategic method to improve insomnia among older women. It also greatly helps enhance other crucial elements like SBP, DBP, and low-density lipoprotein. Considering these results, regular physical activity and a healthy diet are advised as you grow older.

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