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# A COMPARATIVE STUDY TO EVALUATE THE EFFECTIVENESS OF JOGGING AND MEDITATION ON QUALITY OF SLEEP, HOPELESSNESS AND ANXIETY AMONG ADOLESCENTS

Nursing

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## ABSTRACT

**Background:** Adolescence is a critical developmental period marked by rapid physiological, emotional, and psychological changes. These transitions often lead to increased vulnerability to mental health issues, including hopelessness, anxiety, and sleep disturbances. Despite their growing prevalence, these concerns remain under-recognized and undertreated in school-going adolescents in India. **Objectives:** The study aimed to assess and compare the effectiveness of jogging and meditation in improving the quality of sleep and reducing levels of hopelessness and anxiety among adolescents. **Methods:** A true experimental, pre-test, post-test control group design was used. Ninety 9th-grade students aged 13–15 years were randomly allocated into three equal groups: Experimental Group 1 (Jogging), Experimental Group 2 (Meditation), and a Control Group. Interventions were carried out over six structured sessions. Validated tools such as the Beck Hopelessness Inventory, Spence Children's Anxiety Scale, and Pittsburgh Sleep Quality Index were used for data collection. Statistical analysis included paired t-tests, ANOVA, and Pearson's correlation. **Results:** Jogging significantly reduced hopelessness and anxiety but had no significant effect on sleep quality. Meditation significantly improved all three outcomes—quality of sleep, hopelessness, and anxiety. Between-group comparisons revealed that both interventions were more effective than no intervention, with meditation being the most effective. Correlation analysis showed weak and statistically insignificant associations between sleep quality, hopelessness, and anxiety. **Conclusion:** Both jogging and meditation are effective school-based interventions for improving adolescent mental health, with meditation demonstrating a more comprehensive impact. These findings advocate for the integration of non-pharmacological practices like guided meditation in school health programs to support adolescent well-being.

## KEYWORDS

Adolescents, Meditation, Jogging, Sleep Quality, Anxiety, Hopelessness, Mental Health.

## BACKGROUND

Adolescent years are said to be the “best years of a person's life”. The adolescence stage is defined as the time when individuals begin to function independently of their parents. It is generally viewed as a critical period of development. Behavioral scientists have often referred to adolescence as a period of “storm and stress”[1]. The biologically oriented psychologists have attributed this pronounced period of storm and stress to the adjustment required by the tremendous physiological and psychological changes both in body structure and functioning. Children, especially adolescents, represent the future, and ensuring their healthy growth and development ought to be a prime concern of all societies[2].

WHO's "Health for the world's adolescents" reports that out of 1.2 billion, totaling one-sixth of the global population. Globally, it is estimated that 1 in 7 (14%) 10–19-year-olds experience mental health conditions[3], yet these remain largely unrecognized and untreated. According to the present data, there are around 239 million adolescents in India in the age group of 10-19 years. These rapid changes in hormonal milieu, changing ideas and concepts about the world, having to cope with the expectations from society, and the need to establish their own identity keep them under a lot of pressure. Adults should supervise and support the developmental process of adolescents, which leads to their future autonomy[4]. Children in their teens are going through the transitional phase, which is an intermediate stage between childhood and adulthood. The report released on the eve of World Health Day on April 6, 2017, stated that the total population of India was 1.3 billion, of which, adolescent (13-15 years) population was 250.8 million, or 21% per cent of the total population[4]. For adolescents, much of this phenomenon occurs in the school environment. Excessive stress during this stage could result in an increased prevalence of psychological problems like Anxiety, depression, hopelessness and nervousness, which could ultimately harm achievement outcome[5]. It may lead to poor decision-making and also contribute to major health hazards, including both physical illness and psychological problems like depression, anxiety, substance abuse, and suicidal tendencies. It is noteworthy that the same stressors may be perceived differently by different students, depending on their cultural background, personality traits, experience and coping skills[6]. A study stated that high school students often face academic stress in school and compete with each other to get better grades[7]. Research on anxiety and stress among high school students found that this age group has to deal with the demands of the academic world. Therefore, there is a demand and hope for themselves, their parents, teachers and the society to see them succeed. Students feel the effects of stress in harsh and negative ways. Some of these effects include a sudden drop in grades, depression, general fatigue, sleep habits, mood swings, temper tantrums and aggression[8].

Adolescence is a critical stage of development characterized by significant physical, emotional, and psychological changes. Unfortunately, mental health issues such as hopelessness, anxiety, and sleep disturbances are increasingly prevalent among adolescents. Understanding effective interventions to address these issues is crucial. It is estimated that less than 1% of the children and adolescents suffering from mental disorders receive treatment (Shastri, 2009). However, very few researchers have focused on mental health problems among school-going children, and no studies have specifically examined the mental health of 9th, 10th, and 11th grade students. Therefore, the present study aims to compare the effects of jogging and meditation on hopelessness, anxiety, and sleep quality among adolescents. The study will hopefully contribute to the basic steps of prevention and control in addressing mental health problems.

## AIMS & OBJECTIVES

1. To evaluate and compare the effectiveness of jogging on Quality of Sleep, Hopelessness, and Anxiety before and after the exposure of jogging among adolescents in the experimental group and control group.
2. To evaluate and compare the effectiveness of meditation on Quality of Sleep, Hopelessness, and Anxiety before and after meditation exposure among adolescents in the experimental and control groups.
3. To investigate the relationship between Quality of sleep, Hopelessness, and anxiety after jogging and meditation among adolescents.

## MATERIAL AND METHODS

### Research Approach & Design

A quantitative research approach was employed for this study, as it was appropriate for evaluating the effectiveness of structured interventions. The study focused on comparing the impact of jogging and meditation on quality of sleep, hopelessness, and anxiety among adolescents. A pre-test, post-test, and control group design was selected to enable objective measurement and comparison of changes across groups.

The design of the study was experimental, involving three groups: two experimental groups and one control group. Experimental Group I received a jogging intervention, Experimental Group II received a meditation intervention, and the Control Group received no intervention. All groups underwent both pre-test and post-test assessments to measure the effect of the interventions.

### Setting Of The Study

The study was conducted at Nav Jeevan Adarsh Senior Secondary School, located in New Delhi, India. The setting was chosen based on

factors such as accessibility, administrative cooperation, and the availability of a suitable adolescent population.

**Population And Sampling**

The study population consisted of school-going adolescents aged 13–15 years, specifically 9th-grade students. A total of 90 participants were selected using probability-stratified random sampling. The sample was equally divided into three groups of 30 students each.

**Inclusion Criteria:**

- Adolescents aged between 13–15 years
- Students enrolled in 9th grade
- Both genders
- Willingness to participate
- Availability during the data collection period

**Exclusion Criteria:**

- Students with diagnosed medical or psychiatric conditions
- Students currently practicing other relaxation techniques
- Students who missed any session of the intervention
- Students who were sick during the study period

**Pilot Study**

A pilot study was conducted with 30 students from class 11, divided equally among the two intervention groups and the control group. This helped in refining the study tools and procedures before the final implementation.

**Interventions**

- **Experimental Group I:** Participated in structured jogging sessions.
- **Experimental Group II:** Participated in guided meditation sessions.
- **Control Group:** Did not receive any intervention.

Each intervention was administered over a specific period under supervised conditions.

**Tools For Data Collection**

1. Socio-Demographic Data Sheet – To collect background information (10 items)
2. Beck Hopelessness Inventory – To assess levels of hopelessness (20 items)
3. Spence Children's Anxiety Scale – To assess anxiety symptoms (46 items)
4. The Pittsburgh Sleep Quality Index (PSQI) – To evaluate sleep quality (19 items)

Each of these tools was self-reported and administered under the researcher's supervision.

**Reliability Of The Tools**

All instruments used in the study were standardized and demonstrated acceptable reliability:

- Beck Hopelessness Inventory – Cronbach's alpha = 0.80
- Spence Children's Anxiety Scale – Cronbach's alpha = 0.83
- Pittsburgh Sleep Quality Index – Cronbach's alpha = 0.86

These values indicate high internal consistency and reliability.

**RESULTS**

The results of this study are presented in alignment with the study objectives, focusing on the effects of jogging and meditation on quality of sleep, hopelessness, and anxiety among adolescents. Descriptive and inferential statistics were employed to analyze the pre- and post-intervention data of the three groups: Experimental Group 1 (Jogging), Experimental Group 2 (Meditation), and the Control Group.

**Demographic Characteristics**

A total of 90 adolescents participated, equally distributed into three groups (n=30 per group). The age distribution showed that most participants were aged 14 (43.3%) and 15 years (50%). The majority were male (74.4% overall). Most participants were first-born children (51.1%), from joint families (53.3%), and had a monthly family income ranging between ₹12,445 and ₹93,380. Demographic variables were evenly distributed across groups, supporting baseline comparability.

**Baseline Homogeneity**

To ensure homogeneity between the groups before the intervention, a one-way ANOVA was conducted on the pre-test scores of quality of sleep, hopelessness, and anxiety.

| Variable | F-value | p-value | Significance |
|---|---|---|---|
| Quality of Sleep | 4.043 | 0.021 | Significant |
| Hopelessness | 0.835 | 0.437 | Non-Significant |
| Anxiety | 0.410 | 0.665 | Non-Significant |

Despite a marginal significance in quality of sleep, the overall lack of significant differences suggested that the groups were sufficiently homogenous for comparison.

**Effect of Jogging on Study Variables (Experimental Group 1)**

| Variable | Pre Mean (SD) | Post Mean (SD) | t-test | p-value |
|---|---|---|---|---|
| Quality of Sleep | 9.17(3.31) | 8.46(2.40) | 0.697 | >0.05 |
| Hopelessness | 12.16(2.21) | 8.86(2.50) | 5.276 | <0.05 |
| Anxiety | 49.33(12.72) | 28.03(11.04) | 7.354 | <0.05 |

Jogging had a significant effect in reducing hopelessness and anxiety but did not significantly improve sleep quality.

**Effect of Meditation on Study Variables (Experimental Group 2)**

| Variable | Pre Mean (SD) | Post Mean (SD) | t-test | p-value |
|---|---|---|---|---|
| Quality of Sleep | 8.77(2.17) | 5.40(2.02) | 4.840 | <0.05 |
| Hopelessness | 12.66(1.76) | 6.56(1.75) | 16.243 | <0.05 |
| Anxiety | 46.43(17.22) | 22.93(9.80) | 6.726 | <0.05 |

Meditation significantly improved quality of sleep and reduced hopelessness and anxiety.

**Control Group Analysis**

| Variable | Pre Mean (SD) | Post Mean (SD) | t-test | p-value |
|---|---|---|---|---|
| Quality of Sleep | 7.13(3.18) | 6.73(3.18) | 0.808 | >0.05 |
| Hopelessness | 11.93(2.66) | 11.16(2.06) | 1.803 | >0.05 |
| Anxiety | 45.76(18.17) | 45.50(18.74) | 0.183 | >0.05 |

The control group showed minimal changes across all variables with no statistically significant differences.

**Between-Group Comparisons (Post-Test Scores)**

One-way ANOVA was used to compare post-test scores among the three groups.

| Variable | F-value | p-value | Significance |
|---|---|---|---|
| Quality of Sleep | 6.168 | 0.003 | Significant |
| Hopelessness | 30.264 | 0.0001 | Significant |
| Anxiety | 22.141 | 0.0001 | Significant |

Post-intervention differences between the groups were statistically significant across all three outcome variables, indicating the effectiveness of both interventions compared to the control.

**Correlation Analysis**

Post-test correlation among variables within experimental groups was assessed using Pearson's correlation coefficient.

**Experimental Group 1 (Jogging):**

| Variable | r-value | p-value | Significance |
|---|---|---|---|
| Sleep Vs Hopelessness | 0.287 | 0.124 | Not Significant |
| Hopelessness Vs Anxiety | 0.089 | 0.641 | Not Significant |
| Sleep Vs Anxiety | 0.132 | 0.485 | Not Significant |

**Experimental Group 2 (Meditation):**

| Variable | r-value | p-value | Significance |
|---|---|---|---|
| Sleep Vs Hopelessness | 0.211 | 0.264 | Not Significant |
| Hopelessness Vs Anxiety | -0.071 | 0.709 | Not Significant |
| Sleep Vs Anxiety | 0.113 | 0.554 | Not Significant |

No significant correlations were found among post-test scores of sleep quality, hopelessness, and anxiety, indicating that changes in one variable did not predict changes in others.

**DISCUSSION**

The present study aimed to assess and compare the effectiveness of jogging and meditation on the quality of sleep, hopelessness, and anxiety among adolescents using a true experimental pre-test, post-test control group design.

Demographic data showed that most participants were male, and a

significant portion belonged to joint families and were of first birth order. These patterns are consistent with previous research by Eckstein (2000)[9] and Kate Parker (2022)[10], indicating that birth order and family structure can influence adolescent mental health. Moreover, income and academic performance appeared to relate subtly to mental health parameters, supporting findings by Rachel M. Thomson (2022)[11] and Tang et al. (2020)[12].

The findings revealed that jogging significantly reduced hopelessness and anxiety among adolescents. The mean post-test scores for both variables showed a substantial decrease compared to pre-test scores, with corresponding t-values exceeding the critical value, indicating statistically significant improvements. These findings align with prior research by Beth Ellwood (2022)[13], who found that physical activity positively affects feelings of hopelessness. Similarly, Panel Kathleen Mikkelsen (2017)[14] emphasized that exercise alleviates anxiety and enhances mental well-being. However, no significant improvement was observed in the quality of sleep post-jogging, contradicting the findings of Brett A. Dolezal (2017)[15], who emphasized exercise as beneficial for sleep quality. This discrepancy could be attributed to the short duration of intervention (6 sessions) or individual variability in sleep patterns and stress response.

In contrast, meditation significantly improved all three variables: sleep quality, hopelessness, and anxiety. The mean differences were notably large, and the t-values confirmed statistical significance. This supports a growing body of evidence, including studies by Bruce Barrett (2020)[16] and Elizabeth A. Hoge (2013)[17], indicating that meditation enhances sleep quality and reduces anxiety. Additionally, Xianglong Zeng (2015)[18] found meditation to foster positive emotional states, potentially explaining the reduction in hopelessness observed here. These findings suggest that meditation may have a more holistic impact on adolescent mental health than jogging, possibly due to its influence on mind-body relaxation and cognitive restructuring.

A comparison using ANOVA and post hoc Bonferroni tests showed statistically significant differences among the three groups in post-test scores for all variables. Meditation emerged as more effective than jogging, especially in improving sleep quality and reducing anxiety, as evidenced by greater mean differences and pairwise comparisons. This finding highlights the distinct benefits of mindfulness-based practices, as also discussed by Peng Zou et al. (2020)[19], who noted the bidirectional relationship between sleep quality and mental health symptoms.

Interestingly, poor correlations were found between quality of sleep, hopelessness, and anxiety scores in both jogging and meditation groups. While trends suggested a positive correlation in the jogging group and a weak negative trend in the meditation group, neither was statistically significant. This indicates that while interventions had an effect, the variables may not be directly related in all individuals or may require a longer duration to manifest a stronger relationship. Similar findings were reported by Monira Alwhaibi (2023)[20] and Peng Zou (2020)[19], who discussed the complexity and potential bidirectionality of relationships between sleep and mental health. This study concludes that both jogging and meditation are effective in reducing hopelessness and anxiety, but meditation shows additional benefits in improving sleep quality among adolescents. These findings underscore the value of non-pharmacological, school-based interventions in promoting adolescent mental health. Future research could explore long-term effects, combination interventions, and gender-specific outcomes.

## CONCLUSION

The present study concludes that structured physical and mindfulness-based activities can significantly alleviate psychological distress among adolescents. While jogging proved effective in reducing hopelessness and anxiety, it showed limited influence on sleep quality. Conversely, meditation significantly improved all three outcomes, indicating its broader therapeutic value. The results emphasize the importance of integrating mental health-promoting interventions such as guided meditation and physical activity into the school curriculum. These strategies not only offer cost-effective and accessible solutions but also empower adolescents to manage stress and promote emotional regulation. Future research should explore the long-term benefits, examine gender-specific responses, and assess the effects of combined interventions for a more holistic approach to adolescent mental health care.

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