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Research Article

Role of Bhramari Pranayama on Cognitive Functions: A Comprehensive Review

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Abstract

Bhramari Pranayama (Humming Bee Breath) is a commonly practiced slow pranayama technique that involves inhaling through both nostrils and exhaling while producing a humming sound similar to a bee. Regular practice of pranayama is known to enhance vagal tone, thereby reducing stress and strain on various physiological systems. In the present scenario, heightened levels of stress, anxiety, and depression have become prevalent, making pranayama an effective tool for improving mental and emotional well-being. This study aims to assess the effects of Bhramari Pranayama on cognitive functions and to compare its immediate and long-term training effects in the study group. An observational study was conducted among 25 male students aged 18–22 years over a period of one month. Participants performed five rounds of Bhramari Pranayama, and its effects were observed after training and assessed. The findings revealed a statistically significant improvement in cognitive functions. The study suggests that Bhramari Pranayama positively influences cognitive functions by enhancing attention, concentration, and mental clarity immediately after practice. These benefits are likely due to increased alertness and a sense of calm induced by the practice.

INTRODUCTION:

Yoga is an ancient Indian science and a way of life that incorporates specific postures (Asanas) and regulated breathing techniques (Pranayama). With a history spanning over 3,000 years, yoga is a spiritual and ascetic discipline designed to promote harmony between physical, mental, emotional, and spiritual health. Among various yogic practices, Pranayama plays a crucial role in producing different physiological responses in healthy individuals. It involves controlled breathing techniques that serve as a dynamic bridge between the body and mind. Pranayama can be practiced at varying speeds—either slow or fast—and is an art of breath regulation that enhances conscious awareness, reshapes breathing patterns, and improves overall well-being. Regular practice of pranayama has been shown to reduce stress and strain on various physiological systems.

In today's world, heightened levels of stress, anxiety, and depression are widespread, making pranayama an effective tool for enhancing mental and emotional well-being. One of the most commonly practiced slow pranayama

techniques is **Bhramari Pranayam(Humming Bee Breath)**

which involves inhaling through both nostrils and exhaling while producing a humming sound similar to that of a bee. This practice is simple and accessible to individuals of all ages and genders. By altering the normal breathing rhythm—short inhalation followed by prolonged exhalation—Bhramari Pranayama creates a significant impact on the physiological system, promoting feelings of mental refreshment and blissfulness. Anxiety, stress, and mental tension are prevalent in modern life, particularly among students in healthcare courses. Research has shown that practicing pranayama can enhance cognitive functions, which are higher-order brain functions that allow individuals to interpret and respond to sensory information. These functions include evaluation, categorization, and discrimination of stimuli, as well as executive functions, such as working memory, attention span, information retrieval, and mental flexibility. Executive functions help regulate, control, and manage other cognitive processes, enabling individuals to shift between different tasks efficiently.

Despite the known benefits of pranayama, there are limited studies on the effects of Bhramari Pranayama is conducted. Therefore, this study was undertaken to assess the impact of Bhramari Pranayama on cognitive function, focusing on its training effects within the study group.

SAMPLING

The study was conducted on 25 male students from Pratishthan Mahavidyalaya, Paithan, who were selected using a convenient sampling technique. The participants were aged between 18 and 22 years. They underwent a structured training program for a period of one month (five weeks).

BRIEF PROCEDURE

The study was conducted in the Department of Physical Education and Sports at our institution. Participants were selected from undergraduate courses at our college. Bhramari Pranayama training was provided by a qualified yoga instructor. The participants were instructed to sit in a comfortable posture with an erect spine and closed eyes. They performed slow and deep inhalation through both nostrils for **6 seconds**, followed by slow exhalation for **10 seconds** while keeping their index fingers on both external auditory canals. During exhalation, they were instructed to produce a humming sound, resembling that of a bee. Each session consisted of **five rounds** of Bhramari Pranayama, practiced **daily in the morning for 15 minutes** over a period of **five weeks**. After the training period, the effects of Bhramari Pranayama were assessed.

Cognitive Function Assessment

The following standardised tests were conducted to evaluate cognitive functions:

- **Mini-Mental Status Examination (MMSE)**
- **Digit Letter Substitution Test (DLST)**
- **Digit Symbol Substitution Test (DSST)**

Scoring was done using established scales for each test.

Cognitive Function Assessment

1. Mini Mental Status Examination (MMSE)

The MMSE was conducted using a set of **11 questions** covering various cognitive domains, including:

- **Orientation** (e.g., identifying the year, season, date, and month)
- **Registration**
- **Attention and Calculation**
- **Recall**
- **Language**

The total score was assessed, and participants were categorized based on their cognitive state as **alert, comatose, stuporous, or drowsy**.

2. Digit Letter Substitution Test (DLST)

This test was used to evaluate cognitive function. It consisted of **letter-digit pairs** (e.g., W/1, B/2, T/3, P/4, V/5…J/9), followed by a list of alphabets. Participants were instructed to write down the corresponding digit for each letter within **60 seconds**. The number of correct responses was recorded as the final score.

3. Digit Symbol Substitution Test (DSST)

This test was used to assess **neuropsychological activity** of the brain. It consisted of **digit-symbol pairs** (e.g., 1/-, 7/^, 9/=…), followed by a list of digits. Participants were required to match each digit with its corresponding symbol as quickly as possible within **60 seconds**. The total number of correctly matched symbols was recorded as the final score.

STATISTICAL ANALYSIS

Data were entered in Microsoft - Excel and interpretation and analysis was done using SPSS version 23. Categorical variable was expressed in frequency and percentage, continuous variables was expressed in mean and standard deviation and paired 't' test was used to test the significant difference. p value less than 0.05 was considered to be statistically significant.

Table 1: The cognitive functions on immediate and after the practice of Bhramari Pranayama expressed in mean ± SD

Parameters Measured	Immediate Effect of Bhramari	Post Test (After Bhramari	P Value
	Pranayama	**Pranayama Practice)**	
Mini Mental Status Examination (MMSE)	28.3 ±0.51	27.6 ± 0.53	0.000
Digit Letter Substitution Test (DLST)	46.2 ±4.81	43.4 ±5.76	0.000
Digit Symbol Substitution Test (DSST)	47.9 ±4.76	44.1 ±6.86	0.000

Comparison of immediate and training values of Bhramari Pranayama on cognitive test parameters. Expressed in mean ± SD. Statistical analysis was done by students' paired 't' test. p value < 0.01.

Table 1 shows the cognitive functions on immediate and after the practice of Bhramari Pranayama expressed in mean ± SD in which there is a statistically significant change in values of MMSE, DLST, DSST. $p < 0.05$ was significant.**CONCLUSION:**

The present study throws light on how Pranayama is extremely beneficial to mankind in maintaining sound physical and mental health. The findings of the study conclude that, Bhramari pranayama is beneficial for stress reduction. The study also showed better attention, concentration and improved cognitive functions immediately after performing Bhramari pranayama which might be due to increased alertness and calmness.

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