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The Effect of Occupational Therapy Intervention on Occupational Performance in the Patients with Obstructive Sleep Apnea Syndrome

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Abstract

Background: Obstructive Sleep Apnea Syndrome (OSAS) is a common sleep disorder characterised by recurrent breathing interruptions during sleep, leading to significant health issues and impaired occupational performance. This study aimed to assess the effectiveness of occupational therapy intervention program tailored for OSAS patients.

Methods: A total of 23 participants (18 males and 5 females) diagnosed with OSAS were included in this prospective analytical study conducted over six months at a tertiary care hospital. Participants were selected based on specific inclusion criteria, and their baseline and post-intervention assessments were performed using the Occupational Performance History Interview-II (OPHI-II). Statistical analysis was conducted to evaluate the significance of the results.

Results: The mean age of participants was 51.96 years, with an average Apnea-Hypopnea Index (AHI) of 39.87. Significant improvements were observed in occupational identity (pre-test: 25.08 ±6.88; post-test: 30.78 ±7.02), occupational competence (pre-test: 20.91 ±6.37; post-test: 25.00 ±6.65), and occupational setting (pre-test: 20.86 ±6.00; post-test: 25.04 ±6.58), with all p-values < 0.001, indicating high statistical significance.

Conclusion: The occupational therapy intervention program significantly enhanced the occupational performance and overall well-being of patients with OSAS. This study highlights the importance of integrating occupational therapy into the management of OSAS, particularly for patients facing barriers to conventional treatments. Future research should further explore the long-term effects and broader applications of such interventions.

Keywords: Occupational Therapy, Obstructive Sleep Apnea Syndrome, Occupational Performance

1. Introduction

Obstructive Sleep Apnea Syndrome (OSAS) is a clinical disorder characterised by recurrent episodes of breathing cessation during sleep, often accompanied by loud snoring. According to the World Health

Organisation (WHO), these interruptions can disrupt the oxygen supply to the body, leading to transient arousals that allow for the reopening of airways and the resumption of breathing [1]. The prevalence of OSAS varies by geography, with estimates indicating that approximately 2% of women and 4% of men in the United States are affected. In India, prevalence rates are significantly higher, estimated at 7.5%, with 2.4% to 4.96% in men and 1% to 2% in women [2].

In OSAS, reduced upper airway dimensions may arise from both anatomical and functional factors, including obesity, fluid shifts, and structural changes in the maxillofacial region. Increased pharyngeal collapsibility occurs due to diminished neuromuscular compensation and a lack of the protective pharyngeal reflex during sleep [3]. Key risk factors for OSAS include obesity, central obesity, increased neck circumference, hypertrophied tonsils and tongue, retrognathia, micrognathia, nasal congestion, endocrine disorders such as hypothyroidism and acromegaly, as well as craniofacial abnormalities (e.g., Treacher-Collins syndrome, Pierre Robin syndrome), genetic predisposition, menopause, polycystic ovary syndrome, and the use of certain medications, including alcohol, benzodiazepines, muscle relaxants, and testosterone therapy [2].

The severity of OSAS is assessed using the Apnea-Hypopnea Index (AHI), which quantifies the number of apneas and hypopnea per hour of sleep. Patients are categorised based on AHI values as follows: Minimal (AHI < 5), Mild (AHI ≥ 5 and < 15), Moderate (AHI ≥ 15 and < 30), and Severe (AHI ≥ 30) [4]. This condition can result in numerous nighttime events that compromise sleep quality, leading to excessive daytime sleepiness, difficulty concentrating, and headaches, with snoring being a prominent feature.

Research indicates that OSAS significantly impacts occupational health, contributing to absenteeism, work disability, and reduced productivity [5,6]. Occupational performance, defined as the ability to engage in tasks for self-maintenance, productivity, leisure, and rest, is often impaired in individuals with OSAS [7]. The Occupational Performance History Interview (OPHI-II) version 2.1, rooted in the Model of Human Occupation (MOHO), serves as a valuable tool for assessing occupational performance in OSAS patients [8,9]. This semi-structured interview explores thematic areas such as daily routines, occupational settings, activity choices, and critical life events, and includes three rating scales: occupational identity, occupational competence, and occupational settings.

Sleep insufficiency, defined as the lack of restorative sleep, is a pressing public health concern linked to motor vehicle accidents, industrial mishaps, increased healthcare utilisation, and diminished work productivity. It is also associated with chronic conditions such as hypertension, diabetes, depression, obesity, and has been correlated with cancer, premature mortality, and decreased quality of life [10]. Addressing sleep insufficiency through appropriate interventions is thus crucial.

Current treatment options for OSAS encompass a range of medical therapies, including Continuous Positive Airway Pressure (CPAP), Bilevel Positive Airway Pressure (BiPAP), Variable Positive Airway Pressure (VPAP), oral appliance therapy, and upper airway stimulation therapy. While surgical intervention is available in select cases, alternative rehabilitative approaches are also considered [11]. Occupational therapy practitioners integrate the impact of sleep on function and participation into their practice, recognising that adequate sleep is foundational to optimal occupational performance [12]. Occupational therapists utilise their understanding of sleep physiology and evidence-based practices to evaluate and address the consequences of sleep disorders on occupational engagement.

Interventions provided by occupational therapists aim to enhance sleep performance through client and caregiver education about sleep misconceptions, management of secondary conditions affecting sleep quality, establishment of predictable routines, and advocacy for healthier work environments. These

interventions may also involve cognitive-behavioural techniques, environmental modifications, and strategies to improve stress and time management [12].

Despite the established efficacy of CPAP therapy, compliance remains a challenge due to discomfort and associated costs. Therefore, exploring alternative therapeutic approaches is vital for enhancing patient outcomes. This study seeks to evaluate the effectiveness of an occupational therapy intervention program tailored specifically for individuals with OSAS, focusing on its impact on their occupational performance.

2. Methodology

This prospective analytical study was conducted over a six-month period at a tertiary care hospital, involving 23 subjects diagnosed with OSAS. Participants were selected using a convenient sampling method, specifically targeting individuals who were either unwilling or unable to afford CPAP.

2.1 Inclusion Criteria

Participants included both males and females aged 18 to 75 years, who met the following criteria:

- Diagnosed with OSAS via polysomnography and AHI evaluation.
- Possessed co-morbidities such as hypertension, diabetes mellitus, hypothyroidism, hyperthyroidism, or asthma.

2.2 Exclusion Criteria

Individuals were excluded from the study if they met any of the following criteria:

- Diagnosed with neuropsychiatric disorders or severe cardiac diseases unrelated to hypertension.
- Had undergone recent surgical interventions for cardiac conditions.
- Were unable to comprehend written or oral instructions.

2.3 Study Procedure

A total of 80 patients were referred by physicians from the ENT, Medicine, Chest-Thorax, and Pulmonology departments. After screening against the inclusion criteria, 54 patients were selected. Following several drop-outs, the final sample comprised 23 patients with OSAS. Each participant was thoroughly informed about the newly designed occupational therapy Intervention Program and its physiological significance.

During the initial visit, baseline assessments were conducted using a general evaluation form and the OPHI-II, which required approximately 30 to 45 minutes to complete. Participants were then introduced to a tailored occupational therapy intervention program, with instructions to adhere to the program for a minimum of two months.

The occupational therapy intervention program included various lifestyle modification techniques, sleep hygiene training, breathing exercises, tongue and facial exercises, general body exercises, neck stretches, coughing techniques and strategies for shortness of breath, yoga, and relaxation techniques.

Each occupational therapy session lasted approximately 20 to 25 minutes, with patients advised to perform these sessions three times daily. The intervention was personalised for each patient on a weekly basis. Weekly telephonic follow-ups were conducted to address any discomfort experienced during the sessions, and both digital and hardcopy handouts were provided for reference.

Mid-level assessments were performed at the one-month mark, allowing for revisions to the treatment program. The final assessment was conducted at the end of the two-month intervention period using the same assessment tools.

2.4 Ethical Declarations

Prior to the study's commencement, approval was obtained from the Institutional Ethics Committee (IEC). Informed consent was secured from all participants, facilitated through a patient information sheet and consent form available in English, Hindi, and Marathi.

3. Results

This study involved 23 patients diagnosed with OSAS, encompassing both males and females. Data collected from the baseline and final assessments of the participants were systematically organised and tabulated in a master chart utilising Microsoft Excel. To analyse the data effectively and derive meaningful conclusions, appropriate statistical tests of significance were employed. This rigorous analytical approach facilitated a comprehensive understanding of the impact of the Occupational therapy Intervention Program on the participants 'occupational performance.

Table 1. outlines the demographic and clinical characteristics of the participants in the study. It shows the gender distribution, with 18 males (78.26%) and 5 females (21.74%), indicating a higher representation of males. The table also details the participants' age, reporting a mean age of 51.96 years, with the age range of 26 to 73 years. Additionally, it presents the AHI scores, which have a mean of 39.87, and ranged from 5.5 to 90. Finally, the Body Mass Index (BMI) data shows a mean BMI of 31.84, and a range from 25.98 to 57.8.

Table 1. Demographic and Clinical Characteristics of Patients with OSAS in This Study

COMPONENT	VALUES
Gender, n (%)	
Male	18 (78.26%)
Female	5 (21.74%)
Age (Years)	
Mean	51.96
Standard Deviation	12.81
Range	26 - 73
AHI* Score	
Mean	39.87
Standard Deviation	22.44
Range	5.5 - 90
BMI*	

Table 1. Demographic and Clinical Characteristics of Patients with OSAS in This Study

Mean	31.84
Standard Deviation	7.1
Range	25.98 - 57.8

*AHI - Apnea-Hypopnea Index; BMI - Body Mass Index

Graph 1 summarises the comorbidities present among the study participants. The data indicates that hypertension was the most common condition, affecting 14 patients. Diabetes mellitus was reported in 6 participants, while various classifications of obesity were noted: Type I obesity in 5 patients, Type II in 3, and Type III in 4. Additionally, asthma was present in 5 participants, and hypothyroidism was reported in 2. This overview highlights the prevalence of associated health conditions within the study population.

Graph 1: Associated Comorbidities in Patients with OSAS in This Study

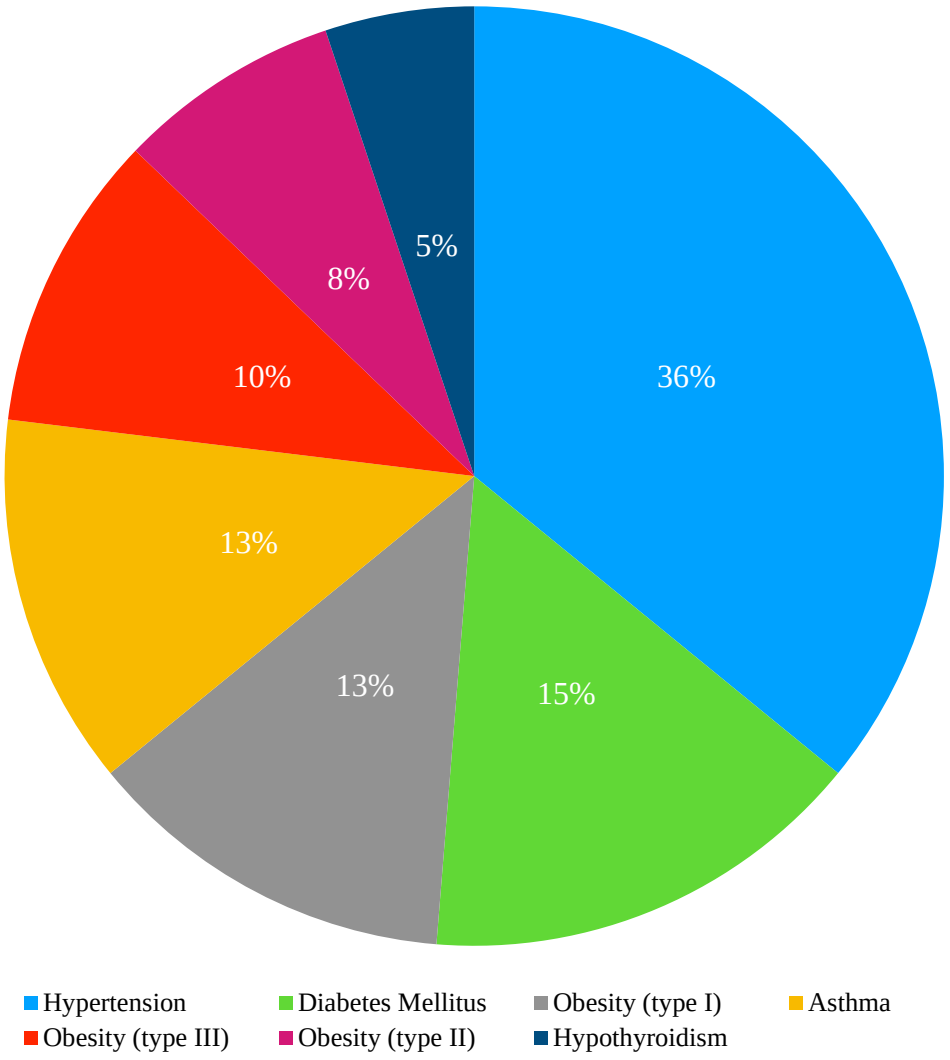


Table 2 and Graph 2 presents the results of the pre- and post-test assessments of each scales of OPHI-II i.e., occupational identity, occupational competence, and the occupational setting among study participants. The pre-test scores for occupational identity averaged 25.08 ±6.88, while post-test scores significantly increased to 30.78 ±7.02. Similarly, occupational competence improved from a pre-test average of 20.91 ±6.37 to 25.00 ±6.65 post-test. The occupational setting scores also saw a notable increase from 20.86 ±6.00 pre-test to 25.04 ±6.58 post-test. The corresponding t-values indicate significant improvements across all measures: 5.5602 for occupational identity, 4.3250 for occupational competence, and 4.2522 for the occupational setting. All p-values are less than 0.001, indicating highly significant results (HS). This data underscores the effectiveness of the intervention in enhancing various aspects of occupational functioning.

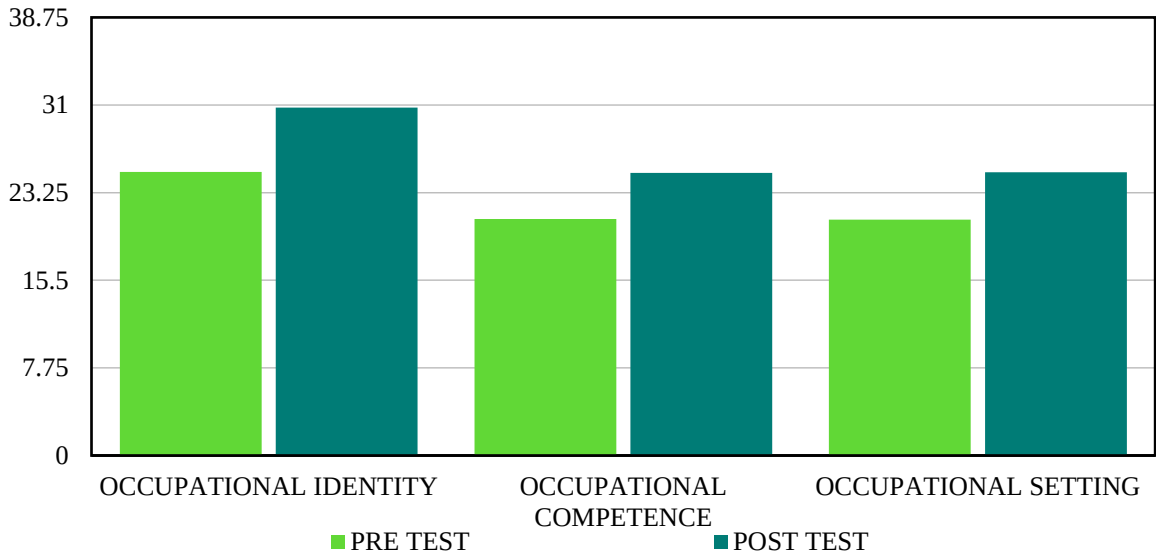
Table 2: Effect of Occupational Therapy Intervention on Occupational Identity, Occupational Competence, and Occupational Setting in Patients with OSAS in This Study

	Occupational Identity	Occupational Competence	Occupational setting
Pre test	25.08± 6.88	20.91± 6.37	20.86 ± 6.00
Post test	30.78 ±7.02	25.0± 6.65	25.04 ± 6.58
t-value	5.5602	4.3250	4.2522
p-value	<0.0001,HS*	0.0003,HS*	0.0003,HS*

* HS - Highly Significant

The above data is pictured in the next graph.

Graph 2. Effect of Occupational Therapy Intervention on Occupational Identity, Occupational Competence, and Occupational Setting in Patients wit OSAS in This Study



4. Discussion

This study examined the effectiveness of occupational therapy intervention program on occupational performance in the patients diagnosed with OSAS. A total of 23 participants, primarily male (78.26%), were included, with a mean age of 51.96 years. The demographic and clinical characteristics of the participants, as presented in Table 1, reveal a high prevalence of comorbid conditions, particularly hypertension, which affected 14 patients, and varying degrees of obesity. These findings align with existing literature indicating that OSAS frequently coexists with cardiovascular and metabolic disorders, underscoring the multifactorial nature of the syndrome [13,14].

The AHI scores in our cohort, with a mean of 39.87, reflect a population with severe OSAS, corroborating previous studies that link higher AHI values with increased risk for comorbidities and complications [15]. The mean BMI of 31.84 suggests that obesity is a significant factor in the patient population, consistent with findings that highlight obesity as a major risk factor for the development and severity of OSAS [16].

The results of the pre- and post-test assessments using the OPHI-II indicate substantial improvements across all evaluated domains: occupational identity, occupational competence, and occupational setting. Specifically, the increase in scores from pre-test to post-test reflects a statistically significant enhancement in participants' perceived occupational performance. The improvements in occupational identity and competence are particularly noteworthy, suggesting that the intervention not only facilitated better physical function but also enhanced participants' self-perception and engagement in meaningful activities. Such findings align with the literature on Occupational therapy, which emphasises the importance of addressing both the physical and psychological aspects of health to improve overall well-being [17, 18].

The statistical analysis, with all p-values below 0.001, confirms the effectiveness of the Occupational therapy Intervention Program in promoting significant improvements in occupational functioning. This reinforces the notion that targeted Occupational therapy can play a crucial role in the management of OSAS, especially for patients unable or unwilling to pursue CPAP therapy [19]. The tailored approach utilised in this study, which included lifestyle modifications, sleep hygiene training, and various therapeutic exercises, is supported by current evidence advocating for holistic treatment strategies in managing sleep disorders [20].

5. Conclusion

This study demonstrates the positive impact of occupational therapy intervention program on the occupational performance of patients with OSAS. The significant improvements observed in participants' scores across the OPHI-II highlight the effectiveness of the tailored occupational therapy intervention program. By addressing various components of occupational identity, competence, and setting, the intervention not only improved participants' ability to engage in daily activities but also fostered a greater sense of empowerment and satisfaction in their lives.

Moreover, the findings emphasise the necessity of adopting a holistic approach to managing OSAS, on patients' occupational performance. This study reinforces the potential role of occupational therapy as a valuable adjunct to traditional treatments, especially for those who may face barriers to more conventional therapies like CPAP. Future research should continue to explore and refine such integrative strategies, aiming to enhance the overall well-being of the individuals affected by OSAS and to further establish the role of occupational therapy in this context.

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