

Influence of Sleep Apnea on Heart Disease and ENT Role

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Abstract

Aims: To identify relation of heart disease and sleep apnea patients. Also estimate role of ENT in diagnosis of sleep apnea cases. In addition highlight the risk factors, symptoms and treatment in these cases.

Methodology: A observational hospital-based research was performed in 2 years period including all patients who visited the ENT Department in Al-Salam Teaching Hospital, who suffered from sleep disturbance (50). Demographic data, clinical features, and treatment modalities were reported. The study exclusion criteria comprise any participants with deficient investigations. Unwill to share.. Systemically unfit patients other than heart disease. All patients had gone through a comprehensive history and a full physical examination by ENT professionals.

Results: The highest age group are between (11-20 years old) . More than fifty of cases are male (66%) while the rest are females. Craniofacial anomalies and neuromuscular disorders show zero cases on the contrary obesity shows the uppermost percent (46%). Treatment modalities as positive airway pressure (pap) therapy and changing life style are the best line of treatment options (42% and 28% subsequently). Heart diseases are documented in near quarter of the cases (26%).

Conclusion: Obstructive sleep apnea (OSA) and cardiovascular illness exhibit a bidirectional association, wherein OSA elevates the risk of cardiovascular conditions, and pre-existing heart disease exacerbates OSA. Timely identification and treatment of OSA are essential for mitigating cardiovascular consequences. ENT doctors play a vital role in the diagnosis of disorders from early childhood.

Key Words: Sleep Disturbances, Cardiovascular Diseases, ENT Role in OSA, Sleep-Disordered Breathing, Epidemiology.

Introduction

The complicated sleep disease known as sleep apnea is characterized by the disruption of restful sleep and has important implications for the health of the cardiovascular system. It can have a major impact on

the heart, despite its sometimes overlooked status [1].

Sleep apnea is a condition that is characterized by shallow breathing or recurrent pauses in breathing while the individual is sleeping. These abnormalities can lower blood oxygen and disrupt sleep cycles. It is possible for obstructive and central sleep apnea, which are the two most common kinds of sleep apnea, to have a negative impact on cardiovascular health [2].

1. **Obstructive Sleep Apnea (OSA):** Occurring more frequently than other types of sleep apnea, it is characterized by the narrowing or obstruction of the airway while the individual is sleeping. This results in snoring and breathing pauses, both of which put strain on the heart because they need more effort to breathe against the obstruction rather than simply breathing normally.
2. **Central Sleep Apnea (CSA):** It is not possible for the brain to provide the appropriate signals to the muscles that control breathing. In addition to affecting the functioning of the heart, this can cause unpredictable breathing patterns to occur when the individual is sleeping [3].

Sleep Apnea's Impact on Heart Health

There is a correlation between patients who suffer from sleep apnea and an increased likelihood of acquiring cardiovascular disorders such as coronary artery disease, heart attacks, and strokes. Chronic stress on the cardiovascular system, in conjunction with disturbed sleep patterns, generates an environment that is permissive to the advancement of heart-related illnesses [4]. This environment fosters the development of heart-related conditions. The strain on the heart and the intermittent decreases in oxygen levels can trigger irregular heartbeats. Untreated irregular heartbeats can increase the risk of more serious cardiac events. Untreated sleep apnea that is chronic can play a role in the development of heart failure or in the worsening of existing heart failure.

ENT Role in Sleep Apnea Patients

In order to identify sleep apnea, ENT doctors perform complete evaluations. Medical professionals can help treat sleep apnea [1]. As part of this process, it may be necessary to conduct physical tests, evaluate the patient's medical history, and suggest sleep studies. In addition to assisting in the development of a treatment plan that is specifically customized to the patient's needs, this assures an accurate diagnosis and identification of the type and degree of sleep apnea.

There are a number of physical impediments that can contribute to sleep apnea, such as swollen tonsils, a deviated septum, or nasal polyps. ENT specialists will check the upper airway in order to discover any of these abnormalities[5].

The exact reason for the obstruction of the airway can be determined with the use of these, oral appliances, continuous positive airway pressure (CPAP) therapy, and lifestyle changes (such as losing weight and quitting smoking) are examples of non-surgical treatments that an ENT expert might offer. It is possible for ENT experts to undergo surgical procedures in order to eliminate any obstructions in circumstances when non-surgical treatments have been unsuccessful [3]. The structural problems that cause sleep apnea can be permanently resolved with this method, which also has the potential to dramatically enhance breathing while sleeping and general quality of life.

The continued monitoring and follow-up care that ENT specialists provide after surgery is intended to ensure that the therapy is effective and to allow for any necessary adjustments to be discussed. In order to effectively diagnose, treat, and manage sleep apnea, ENT professionals provide a significant contribution [6].

Aim of the Study: To identify relation of heart disease and sleep apnea patients. Also estimate role of ENT in diagnosis of sleep apnea cases. In addition highlight the risk factors, symptoms and treatment in these cases.

Materials and Methods

Ethical considerations

This research was approved by the Scientific and Ethical Research Committee, Nineveh Health Directorate, Ministry of Health Iraq in License No. (20250220) . Moreover, verbal notified consent was obtained from all participants families .

Study design

A observational hospital-based research was performed in the time of January 2022 to December 2023 (2 years period) including all patients who visited the ENT Department in Al-Salam Teaching Hospital, who suffered from sleep disturbance (50). Patients were seen by two ENT consultants. Demographic data, clinical features, and treatment modalities were reported in this study.

Study Population:

All patients have sleep disturbances.

Inclusion Criteria: The research inclusion criteria comprise both sex and age groups above 5 years to 50 years complaining from sleep disturbances.

Exclusion Criteria: The study exclusion criteria comprise any participants with deficient investigations. Unwill to share.. Systemically unfit patients other than heart disease.

Sample size: 50 participants

Data collection procedure

Data were collected using a structured questionnaire. The participants were approached with questions concerning their socio-demographic details, and ENT-related complaints such as snoring, whilst the ENT professionals applied and reported clinical examinations, ENT-related diagnosis and management. All patients had gone through a comprehensive history and a full physical examination by ENT professionals.

Data analysis

The patients' data were processed statistically using the SPSS version 21. A descriptive statistical summarization was performed. The result was considered significant at a p-value less than 0.05.

Results

In this current study, table 1 show a descriptive frequencies for different variables collected including demographical informations added to that the risk factors availability, treatment modalities as well as presence or absence of heart disease.

The highest age group are between (11-20 years old) . More than fifty of cases are male (66%) while the rest are females. In regard to residency place more than fifty are lives in the city (58%) while (26%) are lives outside the city in the rural area.

Risk factors also recorded; craniofacial anomalies and neuromuscular disorders show zero cases on

the contrary obesity shows the uppermost percent (46%).

Different treatment modalities are also emphasized positive airway pressure (pap) therapy and changing life style are the best line of treatment options (42% and 28% subsequently), on the other hand surgical manuveour seen in 2 patients only (4%). Heart diseases are documented in near quarter of the cases (26%)

Table 1: Descriptive Frequencies for the Study Sample

Study Variables		No. of Patients	%
Age (Years)	5-10	10	20.0
	11-20	15	30.0
	21-30	9	18.0
	31-40	11	22.0
	41-50	5	10.0
Gender	Male	33	66.0
	Female	17	34.0
Residency Place	Urban	29	58.0
	Rural	13	26.0
	Mixed	8	16.0
Risk Factors	Tonsillar hypertrophy	18	36.0
	Adenoid hypertrophy	9	18.0
	Obesity	23	46.0
	Craniofacial anomalies	0	
	Neuromuscular disorders	0	
Treatment	Life Style Change	14	28.0
	Positive Airway Pressure (PAP) Therapy	21	42.0
	Oral Appliances	6	12.0
	Medical	7	14.0
	Surgical	2	4.0
Heart D.	Yes	13	26.0
	No	37	74.0

Different Variable Relations and Correlations:

Variables correlations are also studied as follow

- Correlation between the age groups and risk factors
- Correlation between the risk factors and treatment modalities
- Correlations between risk factors and heart disease.

As shown in (Table 2) T test statistical differences are performed, risk factors in relation to age shows highly significant relations (0.000) while for the correlations with treatment show no significant relation (0.523). In regard to risk factors and heart disease show significant p value relations (0.013).

Table 2: Different Variable Relations and Correlations

	t-Test	d.f.	Sig. (2-tailed)
Age & Risk F.	11.513	49	0.000**
Risk F. & TT	0.643	49	0.523
Heart D. & Risk F.	2.585	49	0.013*

*Significant at p-value ≤ 0.01

** Highly Significant at p-value ≤ 0.01

Discussion:

Obstructive sleep apnea (OSA) is a condition characterized by repeated interruptions in breathing during sleep due to airway obstruction. Its prevalence varies across different age groups and between genders [1].

Prevalence by Age Group: Young Adults (20–44 years): Approximately 1.2% of men in this age range are diagnosed with OSA. Middle-Aged Adults (45–64 years): The prevalence increases to about 4.7% in men. Older Adults (65 years and above): Studies indicate a higher prevalence, with 70% of men and 56% of women aged 65 to 99 years experiencing OSA [7]. In this current study the highest age group are convenient with these facts (30% of cases).

Prevalence by Gender Differences: Men generally have a higher prevalence of OSA compared to women. For instance, among individuals aged 50–70 years, 12% of men and 3% of women are affected, indicating that men have four times higher rates of sleep apnea in this age group [8]. In this study male form more than sixty percent of cases.

Risk factors and Age Correlation

Understanding these age-specific and general risk factors is essential for healthcare providers to identify individuals at risk and to develop targeted interventions for preventing and managing OSA. The study show's highly significant correlation between age and risk factors (0.000) [9].

Obstructive Sleep Apnea influenced by various factors. Age can be one of these important factor which can cross different with the OSA. Increased age (≤40 years) is an associated with higher OSA severity but its appear to level off after 60 and 70 years. Regarding gender male are more likely to develop OSA than female, though the risk for women increases after menopause [10].

Obesity (excess weight) as risk factor consider as prominent factor across all age group approximately (70%) . Chronic nasal congestion can double the risk as well as narrow airway such as tonsil and enlarged adenoids also increase risk for OSA [11].

Treatment Modalities

In general OSA managed through different modalities depending on the causes and severity starting with lifestyle changes can end with surgical interventions. These modalities includes:

Adjustment of Life Style Therapy such as reducing weight ad excess body mass can result in OSA. Achieving and maintaining a healthy weight through diet and exercise can significantly reduce the severity of OSA. Another life style factor is positional therapy; sleeping on back can worsened the breathing during sleep also Sleeping on one's side can alleviate airway obstruction in such cases [12].

Positive Airway Pressure (PAP) Therapy consid-

ered the gold standard treatment of OSA cases; sleep. As treatment; oral appliances or surgical interventions may be effective in addressing anatomical issues. In this study No craniofacial abnormalities are recorded in cases [18].

In certain cases oral mandibular advancement devices can be used to maintain the tongue and the mandible advanced [14]

Concerning surgical interventions such as upper airway (uvulopalato pharyngo plasty (UPPP) remove or reposition tissues in the throat to widen the airway) only indicated in failure of other modalities [15].

Medical Treatment include use of Zepbound (Tirzepatide): Recently, approved by the Food and Drug Administration (FDA) In clinical trials, participants experienced significant reductions in apnea events and body weight [16].

Risk Factors and Corresponding Treatment Approaches:

Obesity: Weight loss through lifestyle interventions, such as diet and exercise, is recommended. In cases of severe obesity, bariatric surgery may be considered [12].

Age and Gender : standard treatments like Continuous Positive Airway Pressure (CPAP) therapy are effective across age groups [9].

Lifestyle Factors: smoking and alcohol consumption can exacerbate OSA symptoms. Considering treatment modalities; lifestyle modifications, including smoking cessation and reducing alcohol intake, are recommended [15, 17].

Craniofacial Abnormalities: structural abnormalities can contribute to airway obstruction during

Heart disease and Risk Factors of obstructive sleep apnea Correlation:

Obstructive sleep apnea (OSA) and heart disease are strongly correlated, with OSA being both a risk factor for and a consequence of various cardiovascular conditions. OSA is a sleep disorder characterized by repeated episodes of partial or complete upper airway obstruction during sleep, leading to intermittent hypoxia (low oxygen levels), hypercapnia (high carbon dioxide levels), and sleep fragmentation [19].

These factors contribute to cardiovascular disease through several mechanisms. These mechanisms include Hypoxia and Oxidative Stress were recurrent oxygen deprivation leads to oxidative stress and inflammation, damaging blood vessels and increasing the risk of atherosclerosis. As well as Sympathetic Nervous System Activation as repeated arousals from sleep cause increased sympathetic nervous activity, leading to high blood pressure (hypertension) and arrhythmias [20].

In addition Endothelial Dysfunction; OSA impairs the function of the endothelium (inner lining of blood vessels), leading to reduced nitric oxide production and contributing to hypertension. The last mechanism include Metabolic Dysregulation as OSA is linked with insulin resistance, obesity, and dyslipidemia, all of which increase cardiovascular risk [18].

According to these effects OSA is a major contributor to various cardiovascular conditions, end with

multiple consequences as hypertension, coronary artery disease heart failure and arrhythmias finally can result in stroke [21]

Treating OSA, particularly with continuous positive airway pressure (CPAP) therapy, can help reduce cardiovascular risk by lowering blood pressure; reducing inflammation and oxidative stress; improving heart function in heart failure patients; and reducing the risk of arrhythmias and stroke [22].

Study limitations: small study design, small period of data collection are limitation of this study as well as more focus on the risk factor with good long follow up period for cases are advisable.

Conclusion: Obstructive sleep apnea (OSA) and cardiovascular illness exhibit a bidirectional association, wherein OSA elevates the risk of cardiovascular conditions, and pre-existing heart disease exacerbates OSA. Timely identification and treatment of OSA are essential for mitigating cardiovascular consequences. ENT doctors play a vital role in the diagnosis of disorders from early childhood.

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