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ORIGINAL RESEARCH

IMPACT OF CONTINUOUS POSITIVE AIRWAY PRESSURE (CPAP) THERAPY ON POLYSOMNOGRAPHIC PARAMETERS IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

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ABSTRACT

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Obstructive sleep apnea is a respiratory disorder characterized by recurrent episodes of upper airway obstruction during sleep, resulting in oxygen desaturation, sleep fragmentation, and several systemic consequences. Its high prevalence and association with cardiovascular, metabolic, and neurocognitive disorders, as well as impaired quality of life, make obstructive sleep apnea an important public health problem. Diagnosis is primarily performed through polysomnography, considered the gold standard for the assessment of sleep-related breathing disorders, allowing the measurement of parameters such as the apnea-hypopnea index, oxygen saturation, sleep architecture, and arousals. Continuous positive airway pressure is considered the first-line therapy for patients with moderate to severe obstructive sleep apnea, promoting the maintenance of upper airway patency during sleep. Scientific evidence indicates that regular use of continuous positive airway pressure significantly reduces the apnea-hypopnea index, improves nocturnal oxygenation, decreases arousals, and promotes partial recovery of sleep architecture. In addition, treatment may contribute to reducing cardiovascular risks and improving cognitive function, quality of life, and metabolic parameters. The present study aims to analyze, through a qualitative, descriptive, and exploratory literature review, the impact of continuous positive airway pressure use on polysomnographic outcomes in patients with obstructive sleep apnea. The research will be conducted using national and international databases, including PubMed, SciELO, Web of Science, and Google Scholar. The expected results are that the findings will demonstrate the effectiveness of continuous positive airway pressure in improving polysomnographic parameters, highlighting the importance of treatment adherence and therapeutic individualization to achieve better clinical outcomes. Thus, this review seeks to strengthen evidence-based medical practice and contribute to the improvement of follow-up care for patients with obstructive sleep apnea.

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Introduction

Obstructive sleep apnea (OSA) is one of the most prevalent sleep-related breathing disorders in the adult population and is characterized by recurrent episodes of partial or complete upper airway obstruction during sleep, resulting in oxygen desaturation, sleep fragmentation, and activation of the sympathetic nervous system[1]. Recent epidemiological studies estimate that moderate to severe OSA affects approximately 10% to 30% of the adult population, with increasing prevalence associated with aging and obesity[2]. This condition is strongly associated with adverse cardiovascular outcomes, metabolic alterations, and neurocognitive impairment, reinforcing its clinical relevance and public health impact.

The diagnosis of OSA is primarily performed through polysomnography (PSG), considered the gold standard for the assessment of sleep-related breathing disorders[3]. PSG allows the measurement of parameters such as the Apnea-Hypopnea Index (AHI), peripheral oxygen saturation, sleep architecture, arousals, and sleep efficiency. Based on these data, disease severity can be classified and appropriate treatment can be selected. In addition to its diagnostic role, polysomnography also plays an essential role in therapeutic monitoring, particularly in the titration and assessment of the effectiveness of treatment with continuous positive airway pressure.

CPAP (Continuous Positive Airway Pressure) therapy is considered the first-line treatment for patients with moderate to severe OSA[2]. Its mechanism of action is based on maintaining upper airway patency through the application of continuous positive pressure, preventing pharyngeal collapse during sleep. Recent evidence demonstrates that regular CPAP use significantly reduces the AHI, improves minimum oxygen saturation, and partially restores sleep architecture, with an increase in N3 and REM sleep stages[4].

In addition to its immediate respiratory benefits, the impact of CPAP extends to systemic and cardiovascular parameters. Studies have demonstrated an association between adequate CPAP use and reductions in blood pressure, improvement in endothelial function, and decreased risk of cardiovascular events in specific patient subgroups[5]. However, despite robust evidence regarding its clinical efficacy, heterogeneity has been observed in polysomnographic outcomes following therapy, reinforcing the need for a critical analysis of recent literature concerning the objective effects of CPAP on outcomes measured by polysomnography (PSG), particularly with regard to treatment adherence and adaptation.

In the Brazilian context, studies published in the *Jornal Brasileiro de Pneumologia* indicate that regular CPAP use is associated with a significant reduction in the apnea-hypopnea index (AHI) and improvement in nocturnal oxygenation in patients with moderate to severe OSA[6]. However, factors such as treatment adherence, difficulties adapting to the device, phenotypic profile, and anatomical variability of the upper airways, in addition to comorbidities such as obesity, cardiovascular diseases, and otorhinolaryngological disorders, directly influence the results observed in follow-up polysomnography[7].

Therefore, understanding the impact of CPAP on polysomnographic parameters requires consideration not only of objective PSG data but also of the individual patient's clinical context. Such an approach is essential for optimizing therapeutic strategies, guiding multidisciplinary interventions, and individualizing clinical management.

Given the high prevalence of OSA, its systemic repercussions, and the central role of CPAP as standard therapy, an updated literature review analyzing the impact of continuous positive airway pressure on polysomnographic

outcomes is justified. In addition, the study proposes to improve the clinical interpretation of these findings by considering baseline and titration polysomnographic data in order to support more accurate clinical decisions and strengthen contemporary evidence-based medical practice.

The pathophysiology of OSA is multifactorial and involves not only anatomical factors, such as reduced upper airway caliber, but also functional components, including ventilatory control instability, reduced pharyngeal muscle tone during sleep, and alterations in the arousal threshold. These mechanisms contribute to variability in clinical presentation and treatment response, making OSA a heterogeneous condition that requires individualized approaches[8].

In recent years, the importance of phenotypic characterization of OSA has been emphasized, considering not only disease severity based on the AHI but also clinical, anatomical, and physiological aspects. Different phenotypes may exhibit distinct responses to CPAP treatment, reinforcing the need for a broader analysis of therapeutic outcomes beyond the simple reduction of respiratory events[9].

Another relevant aspect concerns anatomical variability of the upper airways, including craniofacial abnormalities, soft tissue hypertrophy, and peripharyngeal fat deposition, particularly in individuals with obesity. These characteristics may directly influence CPAP effectiveness, as well as the need for individualized adjustments during pressure titration[9].

Adherence to CPAP treatment is considered one of the main determinants of its clinical effectiveness. Despite its proven benefits, many patients experience difficulties adapting to the device related to discomfort, adverse effects, noise, or psychosocial issues. Poor adherence significantly compromises therapeutic outcomes and may explain part of the heterogeneity observed in polysomnographic findings[10].

In addition to adherence, the effective duration of CPAP use during the night also plays a crucial role in determining the magnitude of the benefits observed. Studies indicate that use below the recommended duration may result in partial improvement in polysomnographic parameters without significant effects on broader clinical outcomes[10].

Comorbidities associated with OSA, such as obesity, systemic arterial hypertension, diabetes mellitus, and cardiovascular diseases, also interfere with treatment response. These conditions may influence both the pathophysiology of OSA and CPAP effectiveness, requiring an integrated approach to patient management[6].

Follow-up polysomnography performed after CPAP initiation represents an important tool for objectively assessing therapeutic response. However, interpretation of its results should take into account possible limitations, such as night-to-night variability, first-night effects, and differences in data acquisition and analysis protocols[10].

Another point to be considered is technological advancement in CPAP devices, including auto-adjusting positive airway pressure (APAP) equipment and systems for remote adherence monitoring. These innovations have the potential to improve treatment adaptation and optimize clinical outcomes, but they also introduce new variables that should be considered in outcome analysis[11].

Adequate positive airway pressure titration is essential to ensure treatment effectiveness, as insufficient pressures may fail to completely eliminate respiratory events, whereas excessive pressures may compromise patient comfort and adherence[5]. Therefore, individualized titration is an essential step in OSA management.

Given this complexity, it becomes evident that the assessment of CPAP impact should not be restricted to isolated parameters such as the AHI, but should include an integrated analysis of multiple polysomnographic and clinical indicators. This approach allows a more comprehensive understanding of treatment effects and contributes to more accurate clinical decision-making[10].

An updated literature review is justified by the need to synthesize and critically analyze scientific evidence published in recent years regarding the impact of CPAP on polysomnographic parameters.

Objectives

GENERAL OBJECTIVE

To analyze, through a literature review of recent scientific evidence, the impact of CPAP (Continuous Positive Airway Pressure) use on polysomnographic outcomes in patients with obstructive sleep apnea.

To strengthen evidence-based medical practice by providing theoretical support for clinical decision-making and therapeutic follow-up of patients with OSA, as well as to foster academic discussions within the field of Sleep Medicine.

SPECIFIC OBJECTIVES

- To identify the main polysomnographic parameters used to assess obstructive sleep apnea, such as the Apnea-Hypopnea Index (AHI), peripheral oxygen saturation, arousals, and sleep architecture;
- To evaluate recent scientific evidence regarding the reduction of the AHI following CPAP use.

Materials and Methods

The present study is characterized as a bibliographic study with a qualitative approach and descriptive and exploratory nature. The investigation aims to analyze the available scientific evidence regarding the impact of continuous positive airway pressure, known by the acronym CPAP (*Continuous Positive Airway Pressure*), on the results obtained through polysomnography in patients diagnosed with obstructive sleep apnea (OSA).

The qualitative approach was chosen because it allows the interpretation and discussion of information contained in the scientific literature, considering the different findings reported by the selected studies. Therefore, the purpose is not merely to quantify publications related to the topic, but rather to understand the findings, identify the main changes observed after CPAP use, and discuss factors that may interfere with treatment response.

Regarding its objectives, the study has a descriptive nature because it seeks to present and characterize the main findings related to OSA treatment with CPAP, particularly those identified through polysomnography. It also has an exploratory nature because it seeks to develop an understanding of the effects of therapy on different parameters assessed during sleep, allowing the identification of similarities, differences, and aspects that remain insufficiently discussed in the scientific literature.

The study will be conducted through a systematic search of the scientific literature using national and international databases. The databases PubMed/MEDLINE, SciELO (*Scientific Electronic Library Online*), Web of Science, and Google Scholar will be used. These sources were selected because of their availability of publications related to sleep medicine, pulmonology, and health sciences, providing access to national and international studies on obstructive sleep apnea and its different treatment modalities.

PubMed/MEDLINE will be used because it provides access to a broad collection of biomedical and health-related scientific studies. SciELO will be consulted to identify national and Latin American scientific publications available in scientific journals. Web of Science will allow the identification of studies published in different international journals, whereas Google Scholar will be used as a complementary tool to locate scientific studies that may not be retrieved through the other selected databases.

For the searches, Health Sciences Descriptors (DeCS) and equivalent terms from the *Medical Subject Headings* (MeSH) will be used, considering the terminology adopted by the different databases. The main terms will include: *"Continuous Positive Airway Pressure," "CPAP," "Obstructive Sleep Apnea," "Sleep Apnea," "Polysomnography,"* and *"Sleep Study."*

The descriptors will be combined using the Boolean operators AND and OR, according to the characteristics and search capabilities of each database. Combinations of terms related to obstructive sleep apnea, CPAP treatment, and polysomnography will be performed. The planned search strategies include combinations such as: *"Continuous Positive Airway Pressure" AND "Obstructive Sleep Apnea" AND "Polysomnography"*; *"CPAP" AND "Sleep Apnea" AND "Sleep Study"*; and *"Obstructive Sleep Apnea" AND "CPAP."* These combinations will allow the retrieval of studies directly addressing the effects of therapy on sleep- and respiratory-related parameters.

Study selection will be conducted systematically, beginning with the identification of publications retrieved from the databases. Initially, the titles and abstracts of the identified studies will be analyzed to determine their relevance to the research topic. Subsequently, studies considered compatible with the research objectives will undergo full-text assessment.

After this stage, the final selection of publications containing information on the effects of CPAP in patients diagnosed with OSA will be performed, particularly regarding polysomnographic findings. Duplicate publications identified in more than one database will be removed during this process.

The inclusion criteria will comprise full-text scientific articles published in scientific journals and directly related to the research topic. Studies involving patients diagnosed with obstructive sleep apnea and presenting information on CPAP use and its effects on parameters assessed during sleep will be considered. Publications available in Portuguese, English, and Spanish will be included, considering the possibility of accessing and understanding the selected studies.

Studies published in recent years will also be prioritized in order to gather updated information on OSA treatment and outcomes associated with CPAP use. However, earlier publications may be included when they have theoretical or scientific relevance to understanding the topic and are frequently cited as references in the field.

The exclusion criteria will include duplicate studies, studies not available in full text, and publications unrelated to the established research objectives. Studies addressing exclusively other sleep disorders without a specific relationship to obstructive sleep apnea will also be excluded, as will studies focusing on therapeutic modalities other than CPAP that do not provide relevant information for the proposed discussion.

Studies that do not provide data or discussions related to polysomnographic parameters will also be excluded when they do not contribute to answering the research objective. Simple abstracts from scientific conferences,

materials without adequate source identification, and publications lacking scientific foundations compatible with the study proposal will not be considered in the final analysis.

Data analysis will be performed using a qualitative and descriptive approach. Findings from the selected studies will be organized and compared according to the research objectives, seeking to identify convergences and divergences among the publications. The discussion will consider the effects observed following CPAP use, as well as factors that may interfere with therapeutic outcomes.

Because this is a bibliographic study based on previously published scientific studies available through academic sources, there will be no direct participation of human subjects or interventions involving patients. Therefore, the research will use exclusively information available in the scientific literature, respecting ethical principles related to the use, interpretation, and presentation of the consulted publications.

Results and Discussion

The analysis of the selected studies demonstrated that obstructive sleep apnea (OSA) produces effects that extend beyond nocturnal respiratory disturbances, significantly affecting quality of life, functional performance, and systemic health. The studies analyzed demonstrated that sleep fragmentation resulting from recurrent apnea and hypopnea episodes is associated with excessive daytime sleepiness, cognitive impairment, and reduced productivity, factors that increase the occurrence of occupational and traffic accidents, particularly among economically active populations[6].

In addition to the effects related to daily activities, it was observed that OSA may directly affect how individuals perceive their own health and well-being. Repeatedly interrupted sleep prevents the body from adequately completing the physiological processes necessary for physical and mental recovery. Consequently, many patients develop persistent fatigue, irritability, difficulty maintaining concentration, and reduced willingness to perform routine activities. When persistent, these effects may impair family, social, and professional relationships, demonstrating that the consequences of the disease are not restricted to the nighttime period[12].

In this context, excessive daytime sleepiness deserves attention because it represents one of the most frequently reported manifestations among individuals with OSA. Difficulty remaining alert during activities requiring concentration may represent important risks, particularly for drivers, machine operators, and professionals exposed to long working hours. Thus, the findings reinforce that the diagnosis and treatment of OSA have implications that extend beyond sleep improvement, also affecting patient safety and daily functioning[13].

The results also revealed that the intermittent hypoxia characteristic of OSA plays a central role in the activation of inflammatory mechanisms and oxidative stress. This process promotes endothelial dysfunction and contributes to the development and worsening of cardiovascular diseases, demonstrating that OSA should be understood as a systemic condition rather than merely a sleep-related respiratory disorder[11,1].

The recurrence of episodes of reduced or interrupted respiratory airflow causes frequent fluctuations in oxygen levels during sleep. This condition subjects the body to a continuous process of adaptation and may trigger physiological responses that, over time, are associated with impairment of different systems. The mechanisms described in the literature include inflammatory alterations, increased sympathetic nervous system activity, and changes in vascular function, helping to explain the association between OSA and chronic diseases[14].

Understanding OSA as a condition with systemic repercussions also highlights the importance of early patient identification. Many individuals live for years with loud snoring, respiratory pauses observed by family members, and excessive daytime sleepiness without seeking specialized assessment. In some cases, symptoms are interpreted merely as consequences of stress or excessive workload, delaying diagnosis. Therefore, clinical investigation combined with specific diagnostic testing is necessary to recognize disease severity and guide treatment according to the needs of each patient[15].

Regarding polysomnographic parameters, the studies showed consensus regarding the effectiveness of CPAP in reducing the Apnea-Hypopnea Index (AHI), considered the main marker of disease severity.

The therapy produced a marked reduction in obstructive respiratory events, reflecting objective improvement in the indices recorded during follow-up polysomnography. These findings are consistent with current clinical recommendations, which recognize CPAP as the first-line treatment for patients with moderate to severe OSA[2,6].

The reduction in the AHI represents one of the most important outcomes observed after treatment initiation because this indicator quantifies the frequency of respiratory events occurring during sleep. Higher values are associated with greater disease severity and, consequently, greater exposure to the effects caused by sleep fragmentation and repeated reductions in oxygenation. Therefore, a decrease in this index after CPAP use objectively demonstrates the therapy's ability to control obstructive events and promote greater respiratory stability throughout the night[16].

However, interpretation of the findings should not be limited exclusively to the numerical reduction in the AHI. Although it is a widely used indicator for assessing OSA severity and treatment response, other parameters should also be considered. Patient-reported improvement, reduction in daytime sleepiness, sleep quality, and the presence of associated symptoms complement the data obtained through polysomnography. Therefore, therapeutic assessment becomes broader when objective findings are analyzed together with changes reported by the patient[11].

In addition to the reduction in the AHI, consistent improvement in nocturnal oxygenation parameters was observed. The studies analyzed identified an increase in minimum oxygen saturation and a reduction in periods of desaturation during sleep, indicating greater respiratory stability after treatment initiation.

This finding has significant clinical relevance, considering that recurrent hypoxia is directly associated with cardiovascular and metabolic complications observed in these patients[1].

Improved oxygenation during sleep represents an important aspect of the response to CPAP because maintaining more stable oxygen levels reduces the body's exposure to recurrent episodes of hypoxia. Before treatment, each obstructive event may cause a decrease in oxygen saturation followed by a physiological response to restore breathing. This cycle may occur numerous times throughout the night, depending on disease severity. With adequate positive airway pressure, the airways remain open, reducing the occurrence of these fluctuations and providing greater respiratory regularity[6].

Findings related to oxygenation also reinforce the need for patient monitoring after therapy initiation. Although CPAP produces satisfactory results in many individuals, treatment response may vary according to clinical characteristics, pressure settings, and treatment regularity. Therefore, periodic assessments allow

clinicians to determine whether respiratory parameters remain controlled and whether difficulties exist that may interfere with continued device use[9].

Another aspect widely addressed in the literature was partial recovery of sleep architecture. As demonstrated, regular CPAP use promoted an increase in deep sleep (N3) and REM sleep stages, which are frequently reduced in individuals with untreated OSA. Restoration of these stages is associated with improved physical recovery, memory consolidation, and neuroendocrine regulation. However, these results did not occur uniformly in all patients, demonstrating the influence of individual factors on therapeutic response[4].

Sleep architecture refers to the organization of the different stages that constitute nighttime sleep. When frequent arousals occur because of respiratory events, this organization may be disrupted, making it difficult for individuals to remain in deeper sleep stages. Consequently, even after spending several hours in bed, patients may awaken feeling that they have not rested adequately. In this regard, partial recovery of sleep architecture after CPAP initiation helps explain the improvement reported by many patients in daytime physical and mental functioning[16].

Recovery of REM and deep sleep also deserves attention because these stages are associated with different physiological and cognitive processes. Persistent alterations in sleep organization may affect memory, learning capacity, and emotional regulation. Thus, improvements observed in polysomnographic examinations may have effects beyond the reduction of respiratory events, extending to cognitive functioning and overall well-being among treated individuals[14].

The reduction in transient arousal episodes contributed to greater sleep continuity and improved sleep efficiency. Although often considered less important than the AHI, this parameter proved relevant for understanding the functional benefits associated with treatment, particularly regarding reductions in fatigue and daytime sleepiness[4].

Arousals, although not always consciously perceived by patients, directly interfere with normal sleep continuity. The recurrence of these episodes prevents prolonged maintenance of the different sleep stages and may result in a night that appears sufficiently long but is not restorative. Reduction of these events following CPAP use demonstrates that treatment contributes not only to improved breathing but also to greater continuity of the sleep process[17].

This aspect helps explain why some patients report improved energy even when other changes are not immediately perceived. The ability to remain asleep for longer periods without interruptions promotes a greater sense of rest upon awakening. Consequently, gradual improvements may occur in concentration, mood, and performance of daily activities, although the magnitude of these benefits may vary among individuals[11].

The discussion of the findings identified that CPAP effectiveness does not depend exclusively on treatment prescription but is strongly associated with patient adherence.

A multicenter study demonstrated that treatment regularity and duration of device use are determining factors for achieving better polysomnographic outcomes. In this regard, individuals with poor adherence experienced limited benefits even when appropriately titrated to positive airway pressure[7].

Adherence is therefore one of the main issues associated with treatment success. CPAP must be used regularly for its effects to be maintained during sleep. Sporadic or short-duration use may limit the observed benefits

because respiratory events may recur on nights when the device is not used. Thus, the findings reinforce the importance of educating patients from the beginning of treatment about the need to incorporate the device into their daily routine[6].

Adaptation should also be understood as a gradual process. Some patients become accustomed to the equipment quickly, whereas others require more time to deal with changes related to mask use and the sensation of airflow pressure. Professional follow-up during this phase may help identify difficulties and seek alternatives that make treatment more tolerable. Small adjustments to the mask, pressure settings, or guidance provided may make a difference in the patient's experience and continuation of therapy[15].

Factors such as mask leakage, facial discomfort, claustrophobia, and difficulties during initial adaptation may compromise treatment continuity. This finding demonstrates that CPAP effectiveness is not solely related to its technical properties but also to the patient's ability to incorporate therapy into their daily routine[10].

The relationship between the patient and the treatment should therefore be considered throughout follow-up. CPAP prescription based solely on clinical criteria does not guarantee that the equipment will be used correctly and continuously. Individual experiences, treatment expectations, and difficulties encountered at home may directly affect adherence. Therefore, listening to patient needs is important for understanding the reasons that may lead to reduced or discontinued device use[4].

Family involvement may also assist the adaptation process, particularly during the first months of treatment. Support received in the home environment may promote continued use and facilitate the identification of changes related to the patient's sleep and behavior. Although responsibility for treatment is individual, the social and family context may influence how therapy is incorporated into daily life[9].

The studies analyzed demonstrated that anatomical, phenotypic, and physiological characteristics influence treatment response. Patients with obesity, craniofacial abnormalities, ventilatory instability, or multiple comorbidities frequently present different clinical courses, reinforcing the need for individualized approaches and continuous follow-up by multidisciplinary teams[7,1].

The heterogeneity observed among patients demonstrates that OSA does not manifest in the same way in all individuals. Although upper airway obstruction represents a common characteristic of the disease, the factors involved in its development may differ. Aspects related to body weight, upper airway anatomy, age, associated medical conditions, and lifestyle may interfere with both disease severity and treatment response[10].

This diversity reinforces the need for an assessment that considers each patient's individual characteristics. Polysomnography provides essential information regarding events occurring during sleep, but its interpretation should be combined with clinical assessment and reported symptoms. Two patients may present similar results in certain parameters and still experience different effects on their daily activities and quality of life. Therefore, follow-up helps clinicians better understand the needs of each case[6].

The findings also indicated benefits extending beyond respiratory parameters. Associations were observed between effective OSA treatment and improvements in depressive symptoms, anxiety, and mood disturbances, suggesting that normalization of sleep patterns may positively affect patients' mental health[9]. Similarly, some studies reported improvements in cognitive functions related to attention, memory, and executive performance, although methodological differences limit definitive conclusions[4].

The relationship between sleep and mental health is an important aspect of the discussion. Continuous sleep deprivation or fragmentation may cause mood changes and increase the perception of emotional exhaustion. When treatment provides greater respiratory regularity and fewer nighttime interruptions, some patients report improved energy and greater emotional stability. However, it is important to consider that psychological changes have multiple causes and cannot be explained exclusively by the presence of OSA[15].

Regarding cognitive functions, improved sleep quality may provide more favorable conditions for attention and performance in activities requiring concentration. Excessive sleepiness and fatigue frequently reported before treatment may interfere with professional and academic performance, as well as with simple daily tasks. Despite favorable findings identified in part of the literature, differences among study methods indicate the need for further research to more accurately understand the extent of these changes[11].

From a cardiovascular perspective, the findings reinforced the potential of CPAP to reduce risk factors associated with arterial hypertension and vascular dysfunction. The therapy was found to contribute to blood pressure control, particularly when used consistently, suggesting additional clinical benefits beyond the control of respiratory events[5].

Nevertheless, the magnitude of these effects varies among studies, highlighting the need for further investigations with long-term follow-up.

Cardiovascular outcomes should be interpreted considering treatment regularity and patients' clinical characteristics. The presence of other diseases, medication use, and lifestyle factors may interfere with observed outcomes. Therefore, although CPAP has the potential to improve certain factors associated with cardiovascular risk, its effects should not be analyzed in isolation. Care for patients diagnosed with OSA may also involve lifestyle counseling and monitoring of other existing health conditions[10].

The need for studies with longer follow-up is also justified by the chronic nature of OSA. Benefits observed during the first months of treatment are important, but maintaining these outcomes over the years depends on several factors, particularly continued adherence. Understanding how patients use CPAP over prolonged periods may help identify strategies capable of reducing treatment discontinuation and improving clinical follow-up[15].

The literature analysis also highlighted the importance of polysomnography not only in diagnosing OSA but also in assessing therapeutic response. The different parameters recorded during the examination provide a more detailed view of changes occurring throughout sleep. Joint analysis of the AHI, oxygen saturation, arousals, and sleep architecture makes it possible to more comprehensively understand the effects produced by treatment. Therefore, relying on a single indicator may not adequately represent all changes occurring after therapy initiation[17].

The findings discussed also demonstrate that patient perception should be considered alongside objective examination data. In some situations, important improvements in polysomnographic parameters may occur without the individual immediately perceiving significant changes in daily life. In other cases, patients may report increased energy and reduced sleepiness even when certain indicators remain abnormal. This relationship demonstrates that OSA follow-up should consider both objectively measured outcomes and the patient's experience during treatment[7].

The involvement of different healthcare professionals may also be important in this process. Physicians, sleep specialists, and other members of the healthcare team may contribute to monitoring treatment-related difficulties. Information exchange between healthcare professionals and patients promotes a broader understanding of barriers encountered and allows management strategies to be adjusted according to the patient's progress over time[4].

The analysis also showed that favorable outcomes associated with CPAP do not mean that treatment is free from challenges. Continuation of therapy requires ongoing monitoring and adaptation, particularly because patient needs may change over time. Changes in body weight, health status, or conditions of device use may require reassessment. Thus, treatment should be understood as a continuous process rather than an intervention limited to the initial prescription[1].

Overall, the findings demonstrated that CPAP has a significant positive impact on the main parameters assessed by polysomnography, particularly the AHI, nocturnal oxygenation, arousals, and sleep architecture. However, the literature also demonstrated that therapeutic response is influenced by multiple clinical, behavioral, and anatomical factors.

Therefore, interpretation of polysomnographic results should be performed in an integrated manner, considering not only objective examination indicators but also the individual clinical context of each patient. This perspective contributes to more accurate, patient-centered clinical practice aligned with the principles of evidence-based medicine.

Therefore, the findings demonstrate that assessment of CPAP effectiveness should incorporate different dimensions. Reduction of the AHI and improvement in oxygenation are essential for demonstrating control of respiratory events, whereas reduction of arousals and recovery of sleep architecture help explain the effects on sleep quality. At the same time, patient perception, ability to adapt to the equipment, and regularity of use should be incorporated into follow-up. Joint analysis of these aspects provides a more realistic understanding of the experience of individuals with OSA and the outcomes achieved during treatment[7,1].

Thus, the literature analyzed reinforces that CPAP remains an important therapeutic option for controlling obstructive sleep apnea, producing favorable outcomes in the main parameters assessed by polysomnography. However, achieving these benefits is directly related to treatment continuity and monitoring of difficulties experienced by patients. Therefore, understanding OSA in its different manifestations and individually monitoring treatment response is necessary to ensure that improvements observed in examinations translate into meaningful improvements in the quality of life and well-being of individuals affected by the disease.

Conclusion

Obstructive sleep apnea is a condition of considerable clinical relevance due to its high prevalence and the impact it has on the physical, mental, and functional health of affected individuals. The findings of this review demonstrated that the disease extends beyond nocturnal respiratory disturbances and is associated with cardiovascular, metabolic, cognitive, and psychosocial alterations that significantly impair patients' quality of life.

The literature analysis demonstrated that continuous positive airway pressure (CPAP) therapy remains the main therapeutic strategy for patients with moderate to severe obstructive sleep apnea. Consistently, the studies

analyzed demonstrated improvements in the main parameters assessed by polysomnography, including reductions in the Apnea-Hypopnea Index, improved nocturnal oxygenation, decreased arousals, and partial recovery of sleep architecture. These findings reinforce the effectiveness of CPAP in controlling respiratory events and promoting more stable and restorative sleep.

However, the review also demonstrated that treatment response does not occur uniformly among all patients. Factors such as treatment adherence, anatomical characteristics of the upper airways, comorbidities, disease phenotype, and behavioral factors directly influence clinical and polysomnographic outcomes. It can be concluded that CPAP plays a fundamental role in the management of obstructive sleep apnea, providing objective and clinically relevant benefits. Nevertheless, maximizing these outcomes requires strategies aimed at treatment adherence, health education, and multidisciplinary follow-up. In this context, interpretation of polysomnographic data and consideration of each patient's clinical characteristics represent essential elements for providing more effective, patient-centered care aligned with the principles of evidence-based medicine.

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