ORIGINAL ARTICLE

CLINICAL AND SLEEP-RELATED CHARACTERISTICS AS PREDICTORS FOR RISK OF DYSPHAGIA IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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Highlights:

(1) One-third of the sample has a sleep disorder. (2) High incidence of dysphagia risk in individuals with COPD. (3) Daytime sleepiness and the risk of sleep apnea are predictors of dysphagia risk.

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CLINICAL AND SLEEP-RELATED CHARACTERISTICS AS PREDICTORS FOR RISK OF DYSPHAGIA IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

ABSTRACT

Objective: To identify clinical risk predictors for dysphagia in patients with chronic obstructive pulmonary disease (COPD). **Methods:** This is a cross-sectional study carried out in the pulmonary rehabilitation unit of a University Hospital. The sample included 37 COPD patients, of both sexes, in ambulatory follow-up. Patients were evaluated in relation to aspects of body composition, peak expiratory flow, perception of dyspnea (Modified Medical Research Council - mMRC), impact of the disease on health status (COPD Assessment Test - CAT), excessive daytime sleepiness (Epworth Sleepiness Scale - ESS), risk of sleep apnea (Berlin Clinical Questionnaire), modified Mallampati index and symptoms indicative of dysphagia (Questionnaire for Dysphagia Screening - QDS). Data were analyzed using multivariate analysis and the level of significance was set at 5%, with a confidence interval of 95%. **Results:** In a sample of patients with moderate to severe COPD, 83% reported symptoms of swallowing dysfunction assessed by the QDS and 62.2% presented risk for sleep apnea. The CAT, Epworth and Berlin indices predicted 32% of risk for dysphagia. **Conclusion:** The impact of the disease on health status, daytime sleepiness scores and risk of sleep apnea were the best predictors for risk of dysphagia for COPD among those surveyed. In this sense, it is proposed that assessments of health status, sleepiness and QDS be included in the routine assessment of COPD patients.

Keywords: COPD. Pulmonary Disease, Chronic Obstructive. Deglutition Disorders. Sleep Apnea, Obstructive.

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a chronic and most often progressive respiratory condition, which may frequently be prevented and treated, characterized by chronic obstruction to airflow in the lungs, with a prevalence that increases dramatically with age and is associated with high morbidity and mortality[1].

Because of its progression and for being a limiting respiratory disease, COPD may affect the dynamics and coordination of other important functions, such as deglutition. Respiratory difficulties may alter this coordination, resulting in decreased protection of lower airways, due to alterations in ventilatory functions and thoracoabdominal biomechanics. This may lead to dysphagia, a difficulty in the swallowing process[2].

Although COPD primarily affects the lungs, it also produces important systemic manifestations such as loss of body mass, worsening of muscle function and sarcopenia. Sarcopenia is diagnosed when there is low skeletal muscle mass with muscle weakness or poor physical performance[3]. Studies indicate that it is associated with an increased risk of dysphagia in these individuals, probably because of muscle depletion, which also affects the pharyngeal muscles, besides the respiratory ones[4].

Within the extrapulmonary manifestations, sleep alterations have also been evidenced in people with COPD, including insomnia and sleep fragmentation, in addition to impaired pulmonary function, which is exacerbated during rest[5,6]. Studies suggest that poor sleep quality affects aspects of the disease related to respiratory disorders, including obstructive apnea, which is common in these patients[7,8,9]. In addition, they have worse oxygenation during sleep and shorter duration of REM sleep, when compared to total normal sleep time[10].

This way, the clinical relevance of COPD and the overlapping and frequent sequelae of dysphagia cannot be overlooked, given that both disorders are closely intertwined and generate concomitant physiological and psycho-emotional consequences. There is need for researchers and health professionals to consider the impact of this disease more broadly, in order to maximize treatment results[11].

Therefore, the objective of this study was to identify the clinical risk predictors for dysphagia in individuals with COPD.

METHODS

This is an original, observational, cross-sectional, prospective and quantitative study, which was approved by the Ethics Committee for Research with Human Beings from its institution of origin (nº 1.967.549). The target population of this study consisted of people with COPD, who are assisted in the Pulmonary Rehabilitation Program of the University Hospital of Santa Maria.

For the constitution of the sample, the following inclusion criteria were established: clinical and spirometry diagnosis of COPD, according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD, 2023); ratio of forced expiratory volume in one second (FEV_1)/ forced vital capacity (FVC) < than 0.7 post bronchodilator; being clinically stable at the time of assessments; no exacerbation of the disease or hospitalizations in the three previous

months; ability to communicate and cooperate; and acceptance to the Free and Informed Consent Form.

Conversely, the exclusion criteria were: history of neurological impairment; head and/or neck neoplasms; active smokers; uncontrolled arterial hypertension; recent abdominal or thoracic surgery; and a lower-than-expected Mini Mental State Examination (MMSE) score (≤ 24 points). The MMSE was applied in order to track any cognitive impairment, for the reliability of the answers, recommending a 24-point cutoff[12].

Spirometric data were extracted from the patients' charts, calculated through the ratio FEV_1/FVC post-bronchodilator lower than 70% of expected, indicating airflow obstruction; and the severity of COPD determined by FEV_1, being classified as: Mild, with $FEV_1 \geq 80\%$; Moderate, with $50\% \leq FEV_1 < 80\%$; Severe, with $30\% \leq FEV_1 < 50\%$; and Very Severe, with $FEV_1 < 30\%$[1].

The sample was composed by convenience. After applying the inclusion and exclusion criteria, it was formed a sample group of 37 individuals diagnosed with COPD, 19 (51.4%) females and 18 (48.6%) males, with an average age of 63.7 years old. To collect data for this research, the group underwent assessment of body composition, waist and neck circumference, peak expiratory flow, perception of dyspnea, impact of the disease on health status, handgrip strength (HGS), excessive daytime sleepiness, risk of sleep apnea, modified Mallampati index and symptoms indicative of dysphagia.

To assess body composition, weight and height were measured. Weight measurement was performed with the aid of a portable digital scale (Filizola®). The patient was positioned standing, barefoot, in the center of the scale, wearing light clothes. Height was measured with a portable stadiometer (Sanny®), with the patient standing with his back to the evaluator, barefoot and with the weight equally distributed between the feet, heels together and arms extended along the body with the palms of the hands facing the thighs. Afterwards, the Body Mass Index (BMI) was calculated, and patients were classified in: malnutrition (BMI < 22 kg/m^2), eutrophy (BMI between 22 and 27 kg/m^2) and obesity (BMI > 27 kg/m^2), according to the stratification established for people with COPD[13].

A tape measure was used to measure waist and neck circumference. At the abdominal level, the tape was positioned in the middle region, between the lower edge of the last rib and the upper edge of the iliac crest, at the height of the umbilical scar. Neck circumference was

measured with the patient seating, feet flat on the ground and erected spine, the measuring tape was positioned at the level of the cricothyroid cartilage, just above the laryngeal prominence[14].

The assessment of peak expiratory flow was performed using the Peak Flow Meter instrument (Philips). The patient, in a sitting position and using a nose clip, was instructed to, after a maximal inspiration, generate a rapid and forced expiration through the disposable mouthpiece. Three measurements were taken, with 1 minute of rest and the measurements could not have more than 20 L/min difference between them. The highest value among the performed measurements was recorded for the analyses. The obtained value was compared to the predicted value for each person, according to age, sex and body size[15].

The patients' perception of dyspnea was verified using the modified Medical Research Council (mMRC) scale, validated for the Portuguese language and used for self-assessment of dyspnea in daily activities. It consists of five items, with a score varying from 0 to 4, considering: 0 - dyspnea only with great efforts; 1 - dyspnea if walking fast or going up hill; 2 – the person walks more slowly than people of the same age due to shortness of breath or, when walking on leveled ground, at his/her own pace, has to stop to breathe; 3 - after walking less than 100 meters or a few minutes on a leveled ground, has to stop to breathe; and 4 - does not leave the house due to dyspnea. The higher the score, the greater the sensation of dyspnea[16].

To assess the impact of the disease (COPD symptoms) on health status, the Portuguese version of the COPD Assessment Test (CAT) questionnaire was applied, which is self-evaluative, consisting of eight questions related to the symptoms of COPD that most affect the individual, which are: coughing, secretion, chest tightness, shortness of breath when walking up hill and/or stairs, limitation in domestic activities, confidence to leave the house, sleeping and energy. For each question, the patient chooses only one answer option, whose score varies from 0 to 5 points. In the end, the sum of the scores of all responses is stratified into four categories that reflect the impact of COPD symptoms on patients' lives, namely: 6-10 points, light; 11-20, moderate; 21-30, severe; and 31-40, very severe. It is noteworthy that higher scores correspond to a greater impact of the disease on health status[17].

The HGS assessment was performed using a manual hydraulic dynamometer (Saehan SH-5001), keeping the patient seated, with the arm performing the maneuver adducted and parallel to the trunk, with shoulder, forearm and wrist in neutral rotation and elbow flexed at 90º. Three measurements of maximal isometric strength were performed in both arms, with a

1-minute rest interval between them, being considered the result of the average between the measurements. The dominant hand was defined as the preferred hand for performing daily activities. Reference equations were used to predict the normality of HGS-D and HGS-ND, which vary according to sex, age and body weight[18].

For the assessment of Excessive Daytime Sleepiness (EDS), the Epworth Sleepiness Scale (ESS) was used, which is a questionnaire composed of 8 questions, graded from zero to three points, according to the intensity of sleepiness in certain daily activities, with the objective of analyzing the chance of dozing in each presented situation. It reaches a maximum score of 24 points and normal sleepiness is considered to be from 1 to 6 points, average sleepiness from 7 to 8 points, and abnormal sleepiness (possibly pathological) from 9 to 24 points, or values greater than 10 points are abnormal sleepiness[19].

The risk for Obstructive Sleep Apnea Syndrome (OSAS) was assessed using the Berlin Clinical Questionnaire, which classifies individuals at low or high risk of OSAS through 10 questions, grouped into 3 categories. The first category comprises 5 questions regarding snoring and sleep apnea. The second comprises four questions and assesses excessive daytime sleepiness, fatigue and tiredness. The third category refers to hypertension and obesity. It is considered a high risk of obstructive sleep apnea if 2 out of the 3 categories are considered as positive[20].

The modified Mallampati Index classification was performed in order to characterize the individual dimension of oropharyngeal exposure. For the assessment, the patient remained seated, with his head held high, mouth open and tongue exteriorized to the maximum. Through observational assessment, the subjects were classified into one of the four stages from I to IV. In class I, the oropharynx was very exposed with visible soft palate, fauces, uvula and tonsil pillars; in class II, only soft palate, fauces and uvula are visible; in class III, only the soft palate and base of the uvula are visible; and in class IV, there was no exposure of the oropharynx, with soft palate totally not visible[21].

To identify symptoms of dysphagia, it was adopted the Questionnaire for Dysphagia Screening (QDS), consisting of 15 questions, each with three response options. Symptoms are categorized as moderate (often), with 3 points; mild (sometimes), with 2 points and no symptoms, with 0 points. The total score was based on the sum of the responses and the risk of dysphagia was considered as the patient presented at least one moderate symptom[22].

The collected data were tabulated and statistically analyzed using the IBM SPSS Statistics statistical package, version 26.0 (IBM Corporation, Armonk, NY, USA). The normality of data distribution was analyzed using the Shapiro-Wilk test and, in case of non-normal data, these were transformed to natural logarithm. The comparison between the variables regarding the distribution in each classification of BMI, GOLD, Epwhort Sleepiness Scale, mMRC, CAT and the modified Mallampati Index, was performed using One-way ANOVA followed by Tukey's post-hoc. The association between the QDS with the CAT questionnaire and the Epwhort sleepiness scale was performed using Pearson's Correlation Coefficient. Multiple linear regression was used to identify risk predictors for dysphagia, using QDS as the dependent variable. The variables studied were included in the model. The level of significance was set at 5%, with a confidence interval of 95%.

RESULTS

The sample was composed by convenience. After applying the study eligibility criteria, the sample consisted of 37 patients with a COPD spirometry diagnosis. Among the individuals, 19 (51.4%) were females and 18 (48.6%) were males; 23 (62.2%) were at risk for sleep apnea and 31 (83.8%) of the subjects were at risk for dysphagia. Most of the COPD severity classification was presented as moderate 11 (29.7%) and severe 12 (32.4%) (Table 1).

Table 1 - Demographic and anthropometric characteristics and degree of disease established by GOLD for the sample.

Sex and age	
Female, n (%)	19 (51.4)
Male, n (%)	18 (48.6)
Age (years) (mean ± SD)	63.7 ± 13.1
Anthropometric Variables	
BMI (average ± SD)	25.6 ± 7
1 - < 22 Kg/m^2 for malnutrition, n (%)	10 (27.0)
2 - 22 e 27 Kg/m^2 for eutrophy, n (%)	12 (32.4)
3 - > 27 kg/m^2 for obesity, n (%)	15 (40.5)
Circumferences	
Neck, cm	35.5 ± 4.2
Abdominal, cm	92.8 ± 14.8
Hand Grip Strength	
DH, kgf	28.7 ± 9.1
DH, % of predicted	85.0 ± 17.7
NDH, kgf	27.3 ± 8.8
NDH, % of predicted	91.2 ± 21.5
Espirometry	
FEV_1,% of predicted (mean ± SD)	56.6 ± 24.9
FEV_1/FVC, % of predicted (mean ± SD)	55.2 ± 18.5
COPD Severity Rating	
Mild, n (%)	8 (21.6)
Moderate, n (%)	11 (29.7)
Severe, n (%)	12 (32.4)
Very Severe, n (%)	6 (16.2)

Legend: GOLD - Global Initiative for Chronic Obstructive Lung Disease; HGS - Hand Grip Strength; kgf - kilogram force; %pred - percentage of predicted; FEV_1 - Forced Expiratory Volume in one second; FVC - Forced Vital Capacity; DH - Dominant Hand; NDH - Non-Dominant Hand; n = number of subjects; SD - standard deviation.

Table 2 shows the results of the assessed variables on sleep, pulmonary function and risk of dysphagia. It was observed abnormal sleepiness in 14 (37.8%) individuals and the risk for sleep apnea was present in 23 (62.2%) individuals in the sample. In mMRC, individuals were mainly in grades 3 and 4 with (10 subjects; 27%) and (11 subjects; 29.7%), respectively. In the CAT, the majority of subjects were classified as moderate (17 subjects; 45.9%) and severe (13 subjects; 35.1%). In the QDS, 31 out of the 37 subjects (83.8%) were at risk of dysphagia.

Table 2 – Assessment variables on sleep, pulmonary function, risk of dysphagia and modified Malampatti index.

Epworth Sleepiness Scale	
Epwhort (mean ± SD)	7.2 ± 5.8
Normal sleep, n (%)	19 (51.4)
Average sleepiness, n (%)	4 (10.8)
Abnormal sleepiness, n (%)	14 (37.8)
Berlin Clinical Questionnaire	
Positive, n (%)	23 (62.2)
Negative, n (%)	14 (37.8)
Peak Expiratory Flow	
mean ± SD	251.4 ± 109.6
predicted	199.9 ± 87.7
mMRC	
0, n (%)	4 (10.8)
1, n (%)	10 (27.0)
2, n (%)	8 (21.6)
3, n (%)	11 (29.7)
4, n (%)	4 (10.8)
CAT	
CAT (mean ± SD)	19.4 ± 8.9
Mild, n (%)	4 (10.8)
Moderate, n (%)	17 (45.9)
Severe, n (%)	13 (35.1)
Very severe, n (%)	3 (8.1)
Questionnaire for Dysphagia Screening	
Score (mean ± SD)	8.1 ± 5.2
Risk of dysphagia, n (%)	31 (83.8)
Modified Mallampati Index	
1, n (%)	4 (10.8)
2, n (%)	9 (24.3)
3, n (%)	11 (29.7)
4, n (%)	13 (35.1)

Legend: mMRC - modified Medical Research Council; CAT - COPD Assessment Test; n - number of subjects; SD - standard deviation.

For the multiple linear regression analysis, the total QDS score was considered as the dependent variable. The coefficient of determination (R^2) explained the relationship between QDS and the independent variables: mMRC, HGS-MD, Epwhort Sleepiness Scale, waist circumference, FEV_1/FVC, FVC, Berlin Clinical Questionnaire, FPP-MND % of predicted, CAT, FPP-MND and FEV_1 (Table 3). The results indicated that 59.2% of the QDS variation may be explained by this model. This shows that more than half of the risk of dysphagia was identified due to the results of perception of dyspnea, sleep, waist circumference, spirometry and handgrip strength.

Table 3 – Results of the multiple linear regression analysis using the total QDS score as a dependent variable.

QDS	Independent variable	Coefficient (CI 95%)	p
$r^2 = 0.59$	FEV_1/FVC, % of pred	0.30 (0.13 - 0.46)	0.001
	FVC, %	0.21 (0.10 - 0.32)	0.001
	FEV_1,%	-0.31 (-0.47 - - 0.14)	0.001
	CAT	0.40 (0.17 - 0.62)	0.001
	HGS-NDH, kgf	-0.65 (-1.13 - - 0.17)	0.01
	EPWHORT	0.18 (-0.04 - 0.40)	0.10
	BERLIN	-4.54 (-7.66 - - 1.41)	0.006
	HGS-NDH, % of predicted	0.13 (0.04 - 0.22)	0.009
	Abdominal circumference, cm	-0.10 (-0.21 - 0.01)	0.075
	HGS-DH, kgf	0.27 (-0.13 - 0.68)	0.18
	mMRC	-0.73 (-2.11 - 0.65)	0.29

Legend: FEV_1 - Forced Expiratory Volume in one second; FVC - Forced Vital Capacity; CAT - COPD Assessment Test; HGS - Hand Grip Strength; kgf - kilogram force; %pred - percentage of predicted; NDH - Non-Dominant Hand; DH - Dominant Hand; mMRC - modified Medical Research Council.

The analysis resulted in a statistically significant model:

[F(11.25) = 5.75; p<0.001; R2 = 59.2%]

In order to verify, among the variables impact of the disease on health status (CAT), Epworth Sleepiness Scale and Berlin Clinical Questionnaire, which ones best explain the variation in QDS, a new analysis was performed and the results are presented in Table 4. With this model, it can be confirmed that the CAT and the Epworth Sleepiness Scale are independent predictors for the risk of dysphagia at 31.9%. This shows that 31.9% of the risk of dysphagia can be explained by the impact of the disease on health status and the degree of daytime sleepiness.

Table 4 - Results of multiple linear regression analysis using the total QDS score as a dependent variable and the independent variables COPD Assessment Test (CAT) and Epwhort Sleepiness Scale (ESS) and Berlin Clinical Questionnaire.

Model	β	t	IC95%	p
CAT	0.42	2.76	0.06 - 0.42	0.009
Epworth	0.27	1.81	-0.03 - 0.52	0.080
Berlim	-0.12	-0.81	-4.55 - 1.97	0.425

Legend: CAT - *COPD Assessment Test*.

[F(3,33) = 6,63; p<0,001; R2 = 31,9%]

The correlation between QDS scores and the COPD Assessment Test (CAT) and the correlation between QDS scores and the Epwhort Sleepiness Scale (ESS) is shown in Figure 1. There was a positive and moderate correlation between the risk of dysphagia (QDS) and the impact on health status (CAT). The greater the impact of the disease on health status, the greater the risk of dysphagia (Figure 1A).

There was a positive and weak correlation between the risk of dysphagia (QDS) and daytime sleepiness (ESS). The greater the daytime sleepiness, the greater the risk of dysphagia (Figure 1B).

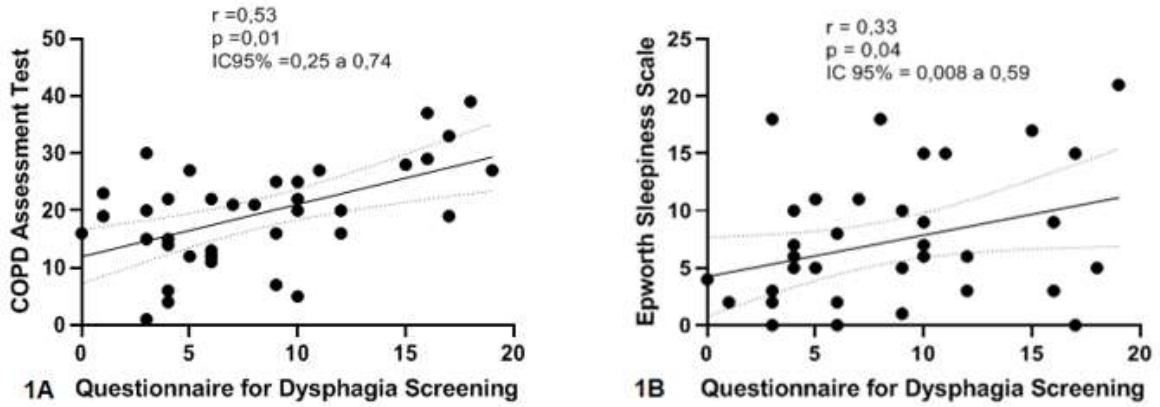

Figure 1A) Correlation between the COPD Assessment Test (CAT) and Questionnaire for Dysphagia Screening (QDS). 1B) Correlation between the Epwhort Sleepiness Scale (ESS) and Questionnaire for Dysphagia Screening (QDS).

DISCUSSION

The current study sought to identify risk predictors for dysphagia in patients with COPD. To this date, this is one of the few studies that evaluates possible risk predictors for dysphagia in COPD patients in a pulmonary rehabilitation program. The recognition of dysphagia risk indicators in patients assisted in a rehabilitation program is essential to establish early intervention and reduce possible health problems, such as acute exacerbations.

In general, it may be observed a high frequency of risk for dysphagia in 31 out of the 37 assessed patients. Similarly, the risk for Obstructive Sleep Apnea Syndrome (OSAS) was present in 23 out of the 37 patients in the sample. In addition, abnormal sleepiness was observed in 14 out of the 37 patients.

Although the exact prevalence of dysphagia among individuals with COPD is unknown, its symptomatology is present even in individuals with mild COPD[23]. The impairment of the respiratory-swallowing pattern observed in individuals with COPD alters the protection of airways, leading to an increased risk of aspiration[24,25].

The presence of COPD interrelated with dysphagia has been investigated and conditions of physiological basis, breathing, shortness of breath and airway protection when swallowing may have a cascading effect, with potential health risk, however, its pathophysiology is still not fully explained[26].

Studies have suggested that factors such as dyspnea associated with swallowing and lung hyperinflation may cause dysphagia[27], as well as spinal deformities, which are often observed in such patients to compensate for respiratory disorders. These alterations in posture can contribute to the deterioration of the respiratory function, as they require adjustments in the breathing pattern, which can interfere with respiratory coordination during swallowing[2,26,27,28].

In this sense, the coordinated movements of the muscle groups related to respiratory apnea, such as the diaphragm and the rectus abdominis, are important to control normal apnea during swallowing. The coordination between swallowing and respiratory movements can be impaired due to the dysfunction of the muscles that hold breath and changes in lung capacity in patients with COPD[29].

Additionally, the overlapping of other comorbidities is evidenced in individuals with COPD, and among these comorbidities is sleep apnea. A person's breathing pattern changes during periods of REM sleep, in which the pharyngeal muscles relax, which may increase the

risk of salivary aspiration in comparison to the awake state. According to Ayuse et al.[29], there are factors that affect the coordination of swallowing and breathing during sleep in patients with COPD, such as increased respiratory rate, decreased tidal volume, spinal deformation, alterations in the function caused by dorsal posture and decreased muscle activity during sleep.

A systematic review on OSAS and the swallowing function observed difficulties in pharyngeal swallowing in patients with OSAS, including late onset of pharyngeal swallowing and aspiration incidence[30]. The pharynx is a multifunctional organ, common to the airways and gastrointestinal tract, integrating complex activities such as breathing and swallowing. During wakefulness, the airway remains pervious due to the intense activity of the pharyngeal dilator muscles; however, after the onset of sleep, muscle activity is reduced, favoring the collapse of the airways. In patients with OSAS, the balance between the negative pressure in the pharyngeal lumen and the pressure exerted by the pharyngeal dilator muscles, due to multifactorial causes, is not effectively preserved during sleep, favoring pharyngeal collapse[31].

Relationships between OSAS symptoms and reduction in FEV_1/FVC in patients with COPD[32] have been documented. Similar to findings by Czerwaty et al.[8], who demonstrated a higher prevalence of OSAS associated with COPD. The scarcity of studies prevents the evaluation of the influence of sleep stages on the occurrence of swallowing. However, previous studies suggest that patients suffering from OSAS may have abnormal swallowing[27], and that the swallowing process requires the activation of several muscles of the upper airways[33].

In this sense, Wallace et al.[34] demonstrated that there are changes in the responses of pharyngeal swallowing and respiratory-swallowing interaction in patients with OSAS. According to a study by Sato et al.[35], the coordination between breathing and swallowing as a defense mechanism against aspiration was impaired during sleep. The presence of inspiration after swallowing, repetitive swallowing and coughing after swallowing were more frequent during sleep than during wakefulness.

In a study that investigated the patterns of swallowing and the respiratory phase during sleep in elderly people with OSAS, swallowing was related to the stage of sleep, the deeper the stage of sleep, the lower the average frequency of swallowing[36]. Suggesting that sleep-related swallowing and respiratory phase patterns may negatively influence elderly people with sleep-related respiratory disorders[37].

The swallowing reflex is well coordinated with breathing patterns in normal human beings. However, patients with OSAS may have a swallowing disorder that reflects the abnormal function of suprapharyngeal nerves and muscles. In a study[38], it was observed that patients with OSAS tend to exhibit an impaired swallowing reflex, probably due to disturbed neuronal and muscular function of the upper airways.

The simultaneity of OSAS and COPD is generally identified as an overlapping syndrome, indicating an increased prevalence of OSAS in comparison to the general population and stable COPD patients[39].

Although confirmation is required, the triad of comorbidities, gastroesophageal reflux, OSAS, and swallowing dysfunction may increase the risk of pulmonary aspiration and subsequent acute exacerbation in COPD[40]. The presence of dysphagia in patients with moderate to severe OSAS is frequent and subclinical, reinforcing the need to investigate this symptom in this group of patients[31].

The present study had some limitations. Polysomnography (PSG), which simultaneously monitors the patient's breathing and sleep, and swallowing videofluoroscopy, which allows detecting dysphagia through objective examination, in order to characterize the biomechanics of swallowing in this population, were not performed. However, it is important to emphasize that the screening instruments for dysphagia, as part of a clinical evaluation, have an easy and quick applicability, in addition to having low cost. Through it, it is possible to identify patients who need complementary investigation.

CONCLUSION

The present study provided an overview into clinical risk predictors for dysphagia in individuals with COPD. COPD showed impacts on the analized patients' swallowing, sleeping and health status, and this can be attributed to changes resulting from the disease itself.

Among the individuals, it was observed a high frequency of risk for dysphagia, present in 31 (83.8%) of the subjects. Similarly, the risk for sleep apnea was present in 23 (62.2%) patients in the sample. Furthermore, abnormal sleepiness was observed in 14 (37.8%) of the patients.

Our findings demonstrated that the CAT score, which assesses the health status by quantifying the impact of common COPD symptoms; the Epworth score, which assesses daytime sleepiness; and the Berlin questionnaire, which assesses the risk of sleep apnea, are good predictors for predicting the risk of dysphagia, and have a strong association with other severity and prognosis variables in COPD, such as perception of dyspnea, handgrip strength and lung function.

Despite its limitations, this study reinforces the importance and need to screen for dysphagia. Considering the clinical relevance of COPD and the overlapping and frequent comorbidities, the assessment of swallowing cannot be neglected, given its physiological and psycho-emotional consequences.

Also, it is important to highlight the application of screening instruments for dysphagia to complement the clinical assessment. Furthermore, these tools are easy to use, quick and low-cost to apply. Through this screening, it is possible to identify patients who require additional investigation.

In this sense, screening elucidates important information about the systemic impact of the disease and helps to expand the professional's clinical vision and provides a greater understanding of the problem. Still, it contributes to the establishment of multidisciplinary therapeutic management and aids in the development of new interventions for these patients.

This study may be considered a starting point for further research regarding the predictors for the risk of dysphagia in this population, especially in the different stages of COPD. In this sense, it is suggested that new studies should be carried out taking into account the limitations of this work and using objective assessments on the physiological and pathological characteristics of swallowing and sleep in this group of patients.

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CLINICAL AND SLEEP-RELATED CHARACTERISTICS AS PREDICTORS FOR RISK OF DYSPHAGIA IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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