

Evaluating the Efficiency of the Ottawa Risk Scale in Assessing Adverse Outcomes in COPD Patients Presenting to the Emergency Department

Oya Akpınar Oruç  - Şerife Özding  - Hülya Sevil 

Department of Emergency Medicine, School of Medicine, Afyonkarahisar Health Sciences University, Afyonkarahisar, Turkey

Introduction: Chronic Obstructive Pulmonary Disease (COPD) exacerbations present significant challenges in emergency care settings. Predictive tools like the Ottawa Risk Scale (ORS) can potentially enhance early patient management. We aimed to assess the reliability and efficiency of the ORS among COPD in emergency departments.

Materials and Methods: The study reviewed 75 patients presenting with COPD exacerbations were evaluated using the ORS. The ORS categorized patients into four risk groups: Low, Medium, High, and Very High. Clinical characteristics, blood gas analyses, and imaging results were documented.

Results: Clinical symptoms were prevalent across all risk categories, but a significant association was found between smoking history and ORS categorization ($p=0.042$), oxygen saturation levels ($p=0.043$), initial PaO_2 levels ($p=0.013$), initial and post-treatment PaCO_2 ($p=0.008$, $p=0.003$ respectively), and pathological X-ray findings ($p=0.005$). The mMRC scale showed a correlation with ORS categorization ($p=0.0001$). The High and Very High-risk groups had higher hospitalization rates and adverse outcomes compared to Low and Medium risk.

Conclusion: The ORS is a promising tool for predicting short-term adverse outcomes in COPD within emergency settings. This study underscores its potential utility in aiding clinical decision-making, guiding interventions, and improving patient outcomes.

Keywords: COPD exacerbations, Ottawa risk scale, emergency department, mMRC scale

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a global health crisis that demands urgent attention (1). The disease, characterized by a persistent and often progressive airflow limitation, is associated with an enhanced inflammatory response in the lungs and airways due to exposure to harmful gases and particles

(2). As a preventable and treatable condition, it is disconcerting to note its enduring high rates of morbidity and mortality on a global scale (3). Its broad reach and adverse impact underscore the necessity for rigorous and efficient disease management, pushing it to the forefront of global healthcare priorities (4).

Corresponding Author: Oya Akpınar ORUC; Department of Emergency Medicine, School of Medicine, Afyonkarahisar Health Sciences University, Afyonkarahisar, Turkey

E-mail: droyaoruc@gmail.com

ORCID: 0000-0003-2515-0956

Received: June 10, 2023 **Accepted:** July 19, 2023

Published: Sep 13, 2023

This is an Open Access article distributed under the terms of Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, or reproduction in any area, original work is properly cited.

The Ulutas Medical Journal © 2023



The emergency department is one of the crucial arenas where the complex dynamics of COPD management become strikingly evident (5, 6). Patients suffering from acute exacerbations of COPD often seek immediate medical attention. While the initial treatment response for many patients is positive, enabling them discharged from the hospital, a subset requires intensive care and hospital admission (7). Further adding to management complexities, some patients, initially deemed fit for discharge, re-emerge within days at the emergency department (8). Their condition tends to deteriorate with respiratory symptoms worsened (9). These scenarios underscore the high stakes involved in managing acute COPD exacerbations in the emergency setting and, thus, highlight the vital need for a robust, accurate, and reliable risk assessment tool (10).

The Ottawa Risk Scale (ORS) is a tool designed to predict the likelihood of serious adverse outcomes in experiencing COPD exacerbations and accounts for a broad spectrum of variables, incorporating factors such as patient history (11, 12). Its comprehensive approach allows for a nuanced understanding of a patient's condition, increasing potential for effective management (5). Through the enhanced predictive capability, healthcare providers can make more informed, confident decisions regarding disposition (5), whether that involves discharge, hospitalization, or initiating intensive care measure (3, 13).

The study focused on testing ORS's reliability and efficiency in the emergency department's high-pressure, fast-paced environment. It can provide a comprehensive understanding of the applicability and effectiveness of the ORS in predicting severe adverse events that may occur in the critical early stages of COPD exacerbation management.

Materials and Methods

The research is a prospective observational study conducted on a select group of 75 patients older than fifty years who presented to

the emergency department of Health Sciences University with a chief complaint of COPD exacerbation. It was designed to explore the relationship between COPD exacerbation and its potential outcomes, enhance the understanding of the disease, and improve the quality of patient care in emergency settings.

In this study, we evaluated the demographic and characteristics of patients categorized by the Ottawa Risk Score, which stratifies patients into four categories: Low, Medium, High, and Very High. Our analysis included 75 patients distributed among the four risk categories as follows: Low (n:7), Medium (n:21), High (n:31), and Very High (n:16). In defining our study population, we employed stringent criteria to maintain the data's integrity and ensure the outcomes' relevance to the COPD patient demographic. Patients included in the study were hemodynamically stable and displayed no symptoms of cognitive impairment. We made it necessary that the participating patients were aware of their involvement in the study. Thus, only those patients who provided informed consent were included.

Exclusion Criteria

The research team employed a robust exclusion criterion to ensure the collected data accurately reflected the outcomes for the targeted demographic. This criterion encompassed patients with cognitive impairments such as dementia, those presenting with hemodynamic instability, and individuals requiring immediate treatment for ischemic chest pain. Moreover, patients with an Electrocardiogram indicating acute ST elevation, those with poor general health due to an expected imminent demise from chronic disease, and patients from nursing homes or chronic care centers were also excluded. Patients already undergoing long-term hemodialysis treatments were exempted from this study, considering their unique medical condition that might influence the study outcomes. Lastly, the study did not

include patients who had already participated in the survey within the past two months or declined to provide informed consent.

Data Collection/Analysis

Upon satisfying the inclusion criteria, patient demographic characteristics, vital signs, and routine blood tests and imaging results were meticulously recorded for comprehensive data collection. This rigorous documentation provided a solid foundation for a robust and detailed data analysis stage. The methodology covered the Modified Medical Research Council Dyspnea (mMRC) Scale. This validated tool quantified the severity of dyspnea in COPD, offering crucial insights into patient's condition. To maintain adherence to established literature, mMRC results were categorized into groups 0-1 (*Group 1*) and 2-3-4 (*Group 2*).

The Ottawa Risk Scale (ORS)

The study utilized the ORS to gauge the risk of adverse outcomes in the patient cohort (13). Patients scoring 0-2 points according to the Ottawa COPD Risk Scale are categorized into the low-to-moderate risk group of severe events, while those scoring 3-4 are considered high-risk, and those scoring ≥ 5 are deemed very high-risk. The outcomes were diligently logged and integrated into the final analysis. We monitored for any fatalities from any cause within the subsequent 30 days or any adverse events encountered within 14 days post-emergency department visit. These records were obtained by scrutinizing hospital and provincial death records or through direct patient contact via registered phone numbers.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS-v25 Windows-based software), a widely accepted tool for conducting rigorous statistical analysis, was utilized. This software facilitated a detailed exploration of the relationships within our dataset, allowing us to interpret complex patterns and trends. Descriptive statistics

included measures of central tendency (mean, median) and variability (standard deviation, interquartile range) for continuous variables. Frequencies and percentages were calculated for categorical variables. Chi-square or Fisher's exact tests were used for categorical variables. In contrast, the Student's t-test or Mann-Whitney U test was employed for continuous variables, depending on the normality of distribution. The ORS was treated as both continuous and categorical variables for different analyses. For continuous data, the correlation between the score and the likelihood of adverse outcomes was evaluated using Pearson's or Spearman's correlation coefficients based on the distribution of the scores. All tests were two-tailed, and a p-value of less than 0.05 was considered significant.

Results

The distribution of patient characteristics within each category is presented in Table 1. Age was observed to be an essential factor in determining the risk category of patients. Patients aged 70-79 years constituted the majority in Very High category, representing 56.3% of the total patients in this category ($p=0.172$). Gender did not appear to influence risk categorization. Most patients in the Low-risk category were female (71.4%), while the other risk categories showed a more balanced distribution of gender ($p=0.196$).

All of the examined clinical characteristics were prevalent in all risk categories. For instance, 100% of patients in the Low and Very High categories experienced difficulty breathing, while 96.8% of patients in the High-risk category reported same symptom. However, none of the examined clinical characteristics demonstrated a significant association with Ottawa risk. The prevalence of a history of smoking was highest in the Very High category (81.3%), followed by the High (58.1%), Medium (52%), and Low (14.3%) categories.

Table-1. Demographic and Clinical Characteristics of Patients Categorized by Ottawa Risk

Variables	Low [n:7]	Medium [n:21]	High [n:31]	Very high [n:16]	P-value
Age (50-59)	2 (28.6%)	3 (14.3%)	3 (9.7%)	1 (6.3%)	0.172
(60-69)	3 (42.9%)	2 (9.5%)	12 (38.7%)	5 (31.3%)	
(70-79)	1 (14.3%)	9 (42.9%)	11 (35.5%)	9 (56.3%)	
(>80)	1 (14.3%)	7 (33.3%)	5 (16.1%)	1 (6.3%)	
Gender - Female	5 (71.4%)	7 (33.3%)	12 (38.7%)	4 (25%)	0.196
Hardly Breathing	7 (100%)	21 (100%)	30 (96.8%)	16 (100%)	0.697
Cough	7 (100%)	20 (95.2%)	30 (96.8%)	16 (100%)	0.667
Phlegm	7 (100%)	20 (95.2%)	26 (83.9%)	15 (93.8%)	0.375
Chest Pain	1 (14.3%)	2 (9.5%)	3 (9.7%)	1 (6.3%)	0.943
History of Smoking	1 (14.3%)	11 (52%)	18 (58.1%)	13 (81.3%)	0.042
History of SVO	1 (14.3%)	2 (9.5%)	1 (3.2%)	1 (6.3%)	0.677
History of CAD	0 (0%)	5 (23.8%)	5 (16.1%)	2 (12.5%)	0.324
History of CHF	0 (0%)	7 (33.3%)	8 (25.8%)	4 (25%)	0.191
History of DM	2 (28.6%)	9 (42.9%)	13 (41.9%)	4 (25%)	0.591
History of HT	4 (57.1%)	8 (38.1%)	18 (58.1%)	8 (50%)	0.547
History of CKD	0 (0%)	3 (14.3%)	3 (9.7%)	3 (18.8%)	0.447
Comorbidity (>2)	4 (57.1%)	10 (47.6%)	14 (45.2%)	8 (50%)	0.871

Abbreviations. SVO: Stroke or Vascular Occlusion, CAD: Coronary Artery Disease, CHF: Congestive Heart Failure, COPD: Chronic Obstructive Pulmonary Disease, DM: Diabetes Mellitus, HT: Hypertension, CKD: Chronic Kidney Disease. **Data Analysis.** The association between categorical variables and Ottawa risk was assessed using the Chi-square or Fisher's exact test, as appropriate. The p-value was used to evaluate the significance of the observed associations, with a p-value of less than 0.05 considered significant.

The association between a history of smoking and Ottawa risk was significant ($p=0.042$). The presence of comorbidities did not demonstrate a significant association with Ottawa risk, with similar distributions observed across all risk categories (Table-1).

Blood pressure was primarily within normal range across all risk categories, with 85.7% of the Low-risk group, 52.4% of the Medium-risk group, 74.2% of the High-risk group, and 56.3% of the Very High-risk group exhibiting normal blood pressure ($p=0.303$). Most patients in the Low-risk category had oxygen saturation levels between 90-100% (71.4%), while those in the Very High-risk category exhibited lower saturation levels, with only 12.5% of patients having oxygen saturation between 90-100%. In the Very High-risk, 25% had oxygen saturation

between 50-69% and 25% between 70-79%. The association between oxygen saturation and Ottawa risk was significant ($p=0.043$). As seen in Table-2, exacerbation of difficulty breathing and sputum increase were highly prevalent across all risk categories, and their associations with Ottawa risk were insignificant. Initial blood gas analysis revealed differences in PaO_2 across risks. In Very High-risk, 25% had PaO_2 below 40 mmHg, compared to none in the Low and Medium-risk categories. In the Low-risk, 42.9% of patients had PaO_2 between 80-100 mmHg, compared to none in the Very High-risk. The association between initial PaO_2 and Ottawa was significant ($p=0.013$). Post-treatment blood gas analysis revealed varying PaO_2 across risk categories, but the association with Ottawa risk was insignificant ($p=0.056$).

Table-2. Comparison of Clinical Parameters and Characteristics Across Different Ottawa Risk Levels

Variables		Low [n:7]	Medium [n:21]	High [n:31]	Very high [n:16]	P-value
Blood Pressure	<i>Normal</i>	6 (85.7%)	11 (52.4%)	23 (74.2%)	9 (56.3%)	0.303
Saturation	< 50	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0.043
	50-69	0 (0%)	1 (4.8%)	6 (19.4%)	4 (25%)	
	70-79	0 (0%)	1 (4.8%)	5 (16.1%)	4 (25%)	
	80-89	2 (28.6%)	8 (38.1%)	11 (35.5%)	6 (37.5%)	
	90-100	5 (71.4%)	11 (52.4%)	9 (29%)	2 (12.5%)	
Exacerbation breathing difficulty		7 (100%)	21 (100%)	31 (100%)	16 (100%)	0.855
Exacerbation sputum increase		7 (100%)	20 (95.2%)	26 (83.9%)	16 (100%)	0.412
Initial Blood Gas - PaO ₂	<40	0 (0%)	0 (0%)	5 (16.1%)	4 (25%)	0.013
	40-59	2 (28.6%)	9 (42.9%)	15 (48.4%)	9 (56.3%)	
	60-79	2 (28.6%)	9 (42.9%)	5 (16.1%)	3 (18.8%)	
	80-100	3 (42.9%)	3 (14.3%)	6 (19.4%)	0 (0%)	
Post-treatment Blood Gas - PaO ₂	<40	0 (0%)	0 (0%)	2 (6.5%)	1 (6.3%)	0.056
	40-59	0 (0%)	3 (14.3%)	14 (45.2%)	6 (37.5%)	
	60-79	3 (42.9%)	10 (47.6%)	6 (19.4%)	5 (31.3%)	
	80-100	4 (57.1%)	8 (38.1%)	9 (29%)	4 (25%)	
Initial Blood Gas - PaCO ₂	<35	4 (57.1%)	10 (47.6%)	4 (12.9%)	3 (18.8%)	0.008
	36-44	2 (28.6%)	9 (42.9%)	16 (51.6%)	4 (25%)	
	45-55	1 (14.3%)	1 (4.8%)	9 (29%)	4 (25%)	
	>55	0 (0%)	1 (4.8%)	2 (6.5%)	5 (31.3%)	
Post-treatment Blood Gas - PaCO ₂	<35	6 (85.7%)	13 (61.9%)	7 (22.6%)	3 (18.8%)	0.003
	36-44	1 (14.3%)	7 (33.3%)	17 (54.8%)	5 (31.3%)	
	45-55	0 (0.0%)	0 (0.0%)	5 (16.1%)	5 (31.3%)	
	>55	0 (0.0%)	1 (4.8%)	2 (6.5%)	3 (18.8%)	

Abbreviations. PaO₂ - Partial Pressure of Oxygen, PaCO₂ - Partial Pressure of Carbon Dioxide. **Data analysis.** The variables were analyzed across the different Ottawa risk levels (low, medium, high, very high). For each variable, the count and percentage of observations in the respective subgroups were calculated within each risk level. A chi-square test or Fisher's exact test, as appropriate, was performed to determine if there were any significant differences in the distribution of subgroups across the different risk levels. A p-value of less than 0.05 was considered significant.

Initial blood gas analysis showed differences in PaCO₂ across risk categories. In the Low-risk, 57.1% had PaCO₂ below 35 mmHg, compared to only 12.9% in the High-risk. The association between initial PaCO₂ and Ottawa risk was significant (p=0.008). Post-treatment analysis revealed differences in PaCO₂ across risk categories. In Low-risk, 85.7% had PaCO₂ below 35mmHg, compared to 18.8% in the Very High-risk. The association between post-treatment PaCO₂ and Ottawa was significant (p=0.003).

Thoracic CT showed pathological findings in most patients across all risk groups, with a slight increase in the proportion of the pathological

conclusions as risk level increased, reaching 100% in the Very High-risk group. PAAC X-ray revealed pathological findings in an increasing proportion of patients with increasing risk. The Low-risk had 57.1% pathological findings, while the Very High-risk had 100%. The association between pathological PA-AC X-ray findings and Ottawa risk levels was significant (p=0.005).

Regarding the mMRC scale, most patients in the Low-risk had an mMRC score of 0-1 (85.7%), compared to only 6.3% in the Very High-risk. Conversely, the Very High-risk had a higher proportion of patients with an mMRC of 2 (93.8%) compared to the Low-risk (14.3%). The

Table 3. Distribution of Clinical and Radiological Parameters across Different Risk Levels in Ottawa

Variables		Low [n:7]	Medium [n:21]	High [n:31]	Very high [n:16]	P-value
Thoracic CT	<i>Pathological</i>	4 (80%)	14 (87.5%)	25 (96.2%)	15 (100%)	0.242
PA-AC X-ray	<i>Pathological</i>	4 (57.1%)	15 (88.2%)	29 (96.7%)	15 (100%)	0.005
mMRC	1	6 (85.7%)	8 (38.1%)	4 (12.9%)	1 (6.3%)	0.0001
	2-3-4	1 (14.3%)	13 (61.9%)	27 (87.1%)	15 (93.8%)	
Outcome	<i>Discharge</i>	5 (71.4%)	17 (81%)	14 (45.2%)	3 (18.8%)	0.0041
	<i>Ward Admission</i>	1 (14.3%)	1 (4.8%)	8 (25.8%)	5 (31.3%)	
	<i>ICU Admission</i>	0 (0%)	1 (4.8%)	3 (9.7%)	1 (6.3%)	
	<i>ICU Referral</i>	0 (0%)	1 (4.8%)	4 (12.9%)	2 (12.5%)	
	<i>Ward Referral</i>	0 (0%)	0 (0%)	0 (0%)	1 (6.3%)	
	<i>Treatment Refusal</i>	1 (14.3%)	1 (4.8%)	2 (6.5%)	4 (25%)	
Follow-up	<i>No problem</i>	7 (100%)	18 (85.7%)	22 (71%)	5 (31.3%)	0.004
	<i>Death</i>	0 (0%)	2 (9.5%)	3 (9.7%)	7 (43.8%)	
	<i>Readmission</i>	0 (0%)	1 (4.8%)	6 (19.4%)	4 (25%)	
	<i>BiPAP</i>	0 (0%)	0 (0%)	0 (0%)	0 (0%)	

Abbreviations. CT: Computed Tomography, PA-AC X-ray: Posteroanterior-Anterocaudal X-ray, mMRC: Modified Medical Research Council, ICU: Intensive Care Unit, BiPAP: Bilevel Positive Airway Pressure. **Data analysis.** The P-values in the table were calculated using the Chi-squared test or Fisher's exact test, as appropriate. A P-value less than 0.05 was considered significant.

association between mMRC and Ottawa risk was significant ($p=0.0001$). Regarding patient outcomes, the majority of patients in the Low (71.4%) and Medium (81%) risk groups were discharged, whereas only 45.2% of patients in the High-risk group and 18.8% in the Very High-risk group were discharged ($p=0.0041$). Follow-up data showed that all patients in the Low-risk reported no problems. In the Very High-risk, 43.8% had died, compared to 9.7% in the High-risk and 9.5% in the Medium-risk. Readmission rates were higher in the High (19.4%) and Very High (25%) risk groups compared to the Low and Medium risk groups ($p=0.004$).

Discussion

In the battle against COPD exacerbations, developing and utilizing predictive tool have become increasingly vital. ORS, in particular, stands out for its focus on estimating likelihood of short-term adverse events in patients with COPD exacerbation. The study presented ORS in managing COPD, its strength, limitation, and possibilities for its further integration into clinical practice for a comprehensive and nuanced approach to COPD management.

A different scoring system was analyzed and tried to use in routine assessment of COPD (14). The ORS presents as a viable predictive tool for COPD exacerbation outcomes, and its application in the emergency has garnered support from physicians. It's important to mention that non-medical elements impact whether a patient is admitted or discharged from the emergency beyond disease severity alone. Factors such as emergency department congestion, availability of necessary resources in the emergency department, home care options, and patient preference can all sway this decision. Still, the ORS can guide clinicians in their decision-making process in line with local practices. Support for the ORS's effectiveness in the emergency department setting was echoed by 70.2% of surveyed physicians (15).

In the present analysis, the distribution of patient characteristics across various Ottawa risk categories has provided valuable insights into the presentation and outcomes of the studied cohort. Age emerged as an influential factor in determining the risk category. Interestingly, gender did not seem to play a role

in risk determination. Although the Low-risk class predominantly consisted of females, other risk categories demonstrated a more even gender distribution. Clinical manifestations, particularly difficulty breathing, were universally prevalent across all types. The Low and Very High-risk had all their patients experience this symptom. When considering lifestyle factors like smoking, there was a discernible pattern. The Very High-risk category reported the highest prevalence of smoking history, with a gradual decrease in the percentages moving to the lower-risk types. This association between smoking history and risk was statistically significant, underscoring the potential long-term implications of smoking on health.

Comorbidities appeared uniformly across all categories, suggesting that other health conditions might not directly correlate with the Ottawa risk categorization. An examination of vital signs like blood pressure showed it was within the normal range across all categories. Oxygen saturation was strikingly variable, especially between the Low and Very high risk. The Very High-risk displayed notably lower oxygen saturation, further underscoring the severity of condition. Exacerbation symptoms like increased difficulty in breathing and sputum production were omnipresent across categories, making them less distinctive as singular markers for risk differentiation. Initial blood gas analysis provided essential differentiation, with apparent variations in PaO₂. Notably, the Very High-risk category had a notable portion of its patients with critically low PaO₂. In contrast, the Low and Medium-risk groups exhibited higher.

Post-treatment blood gas analysis brought forward variations in PaO₂, but the initial and post-treatment PaCO₂ showed associations with Ottawa. The observed variations in these gas levels across risk groups emphasize the complexity and potential severity of these patients' respiratory issues. The utilization of radiological tools like Thoracic CT and PAAC X-

ray illuminated further differentiation. While pathological findings in Thoracic CT were prevalent across all groups, the PAAC X-ray demonstrated a distinct increase in pathological findings as the risk level escalated. Lastly, using the mMRC scale for assessment, the Low-risk predominantly had scores indicating minor impairment, contrasting sharply with the Very High-risk. The mMRC score and the reported patient outcomes reinforced evident disparities between the risk groups. Particularly telling was stark difference in mortality and readmission between the Very High and other risk groups.

Studies show that the probability of a severe event occurring in patients who score 0-2 points and are subsequently discharged is 7.2% (16). Conversely, when applying this rule, the hospitalization rate of patients only increases modestly from 37.5% to 43.2%. In summary, the research suggests that patients who score 0-2 points on the Ottawa COPD Risk Scale can be safely discharged, and applying this rule does not significantly increase hospitalization rates. This implies that the scale is not only reliable but also practicable.

The interpretations drawn from this study ought to be considered concerning several constraints. Firstly, sample size of this research is limited, suggesting that the generalizability of our findings might be circumscribed. The status of admission can potentially distort its predictive power, as admitted patients might receive more intensive therapies, thereby altering the course of potential adverse outcomes. While we identified no explicit selection bias to the validity, there remains a slight possibility of missed return visits to the emergency department in cases where patients sought care at a different hospital. Finally, while physicians showed satisfactory accuracy in interpreting ORS, we believe targeted training in scoring and interpretation could improve this accuracy during future efforts.

Conclusion

Based on the Ottawa Risk Score, smoking history was associated with higher risk categorization. Other examined demographic and characteristics did not show associations with Ottawa. The analysis revealed significant associations between oxygen saturation, initial and post-treatment PaO₂, and initial and post-treatment PaCO₂ with Ottawa risk categories. These parameters could serve as valuable indicators in assessing patients' risk profile and clinical status. The mMRC scale, patient outcomes, and follow-up outcomes were particularly notable. These findings suggest that mMRC scores, PA-AC X-ray findings, and patient outcomes are valuable parameters for risk stratification and patient management. The research indicates that patients who score 0-2 points on the Ottawa COPD Risk Scale can be safely discharged, and applying this rule does not significantly increase hospitalization rates. This implies that the scale is not only reliable but also practicable. Our results provide insights that may be useful for clinicians in evaluating patients, making informed treatment decisions, and predicting patient outcomes. Further research is needed to corroborate findings and assess their implications for clinical practice.

Conflict of Interest/Financial Disclosure

The authors declare no conflicts of interest. The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

Acknowledgment

We want to thank Gizem Eraslan, Ecem Zülal Elgin, Ayşe Yüksek, Eren Bora, and Mustafa Diker, the 3rd-grade students of Afyon Health Sciences University Faculty of Medicine, who contributed to the formation of our study.

Reference

1. Alqahtani JS, Aldhahir AM, Alghamdi SM, Al Ghamdi SS, AlDraiweish IA, Alsulayyim AS, et al. A systematic review and meta-analysis of heart rate variability in COPD. *Front Cardiovasc Med*. 2023;10:1070327.
2. Wang J, Li X, Lei S, Zhang D, Zhang S, Zhang H, et al. Risk of dementia or cognitive impairment in COPD patients: A meta-analysis of cohort studies. *Front Aging Neurosci*. 2022;14:962562.
3. Zhang J, Perret JL, Chang AB, Idroze NS, Bui DS, Lowe AJ, et al. Risk factors for chronic cough in adults: A systematic review and meta-analysis. *Respirology*. 2022;27(1):36-47.
4. Lv H, Huang J, Miao M, Huang C, Hang W, Xu Y. Could patients with chronic obstructive pulmonary disease benefit from renin angiotensin system inhibitors? A meta-analysis. *BMJ Open Respir Res*. 2023;10(1).
5. Ruan H, Zhang H, Wang J, Zhao H, Han W, Li J. Readmission rate for acute exacerbation of chronic obstructive pulmonary disease: A systematic review and meta-analysis. *Respir Med*. 2023;206:107090.
6. Sami R, Savari MA, Mansourian M, Ghazavi R, Meamar R. Effect of Long-Term Oxygen Therapy on Reducing Rehospitalization of Patients with Chronic Obstructive Pulmonary Disease: A Systematic Review and Meta-Analysis. *Pulm Ther*. 2023;9(2):255-70.
7. Liao Y, Liao Y, Wen F. Association of human Hedgehog interacting protein gene polymorphisms with the risk of chronic obstructive pulmonary disease: a meta-analysis. *Expert Rev Respir Med*. 2022;16(4):447-59.
8. Gupta S, Panchal P, Sadatsafavi M, Ghanouni P, Sin D, Pakhale S, et al. A personalized biomedical risk assessment infographic for people who smoke with COPD: a qualitative study. *Addict Sci Clin Pract*. 2022;17(1):1.
9. Gao YC, Zhang YW, Shi L, Gao W, Li YJ, Chen H, et al. What are Risk Factors of Postoperative Pneumonia in Geriatric Individuals after Hip Fracture Surgery: A Systematic Review and Meta-Analysis. *Orthop Surg*. 2023;15(1):38-52.
10. Fortis S, Shannon ZK, Garcia CJ, Guillemet RV, Aloe AM, Schweizer ML, et al. Association of Nonobstructive Chronic Bronchitis With All-Cause Mortality: A Systematic Literature Review and Meta-analysis. *Chest*. 2022;162(1):92-100.
11. Alavi-Moghaddam M, Partovinezhad H, Dasdar S, Farjad M. Ottawa Risk Scale in Predicting the Outcome of Chronic Obstructive Pulmonary Disease Exacerbation in Emergency Department; a Diagnostic Accuracy Study. *Arch Acad Emerg Med*. 2023;11(1):e32.
12. Kim V, Aaron SD. What is a COPD exacerbation? Current definitions, pitfalls, challenges and opportunities for improvement. *Eur Respir J*. 2018;52(5).
13. Unal A, Bayram B, Ergun B, Can K, Ergun YK, Kilinc O. Comparison of two scores for short-term outcomes in patients with COPD exacerbation in the emergency department: the Ottawa COPD Risk Scale and the DECAF score. *ERJ Open Res*. 2023;9(2).
14. Ali U, Basak B, Begum E, Kazim C, Yagiz Kagan E, Oguz K. Comparison of Two Scores for Short Term Outcomes in Patients with COPD Exacerbation in ED: The Ottawa COPD Risk Scale and the DECAF Score. *ERJ Open Research*. 2022:00436-2022.

15. Hale MKP, Stiell IG, Clement CM. Emergency Department Management of Heart Failure and COPD: A National Survey of Attitudes and Practice. CJEM. 2016;18(6):429-36.
16. Stiell IG, Clement CM, Aaron SD, Rowe BH, Perry JJ, Brison RJ, et al. Clinical characteristics associated with adverse events in patients with exacerbation of chronic obstructive pulmonary disease: a prospective cohort study. Cmaj. 2014;186(6):E193-204.

Contact Details

Oya AKPINAR ORUC, MD (*Corresponding**)

Department of Emergency Medicine, School of Medicine, Afyonkarahisar Health Sciences University, Afyonkarahisar, Turkey

E-mail: droyaoruc@gmail.com

ORCID: 0000-0003-2515-0956

Şerife OZDINC, MD

Department of Emergency Medicine, School of Medicine, Afyonkarahisar Health Sciences University, Afyonkarahisar, Turkey

E-mail: drseri03@hotmail.com

ORCID: 0000-0003-3948-8501

Hülya SEVİL, MD

Department of Emergency Medicine, School of Medicine, Afyonkarahisar Health Sciences University, Afyonkarahisar, Turkey

E-mail: drhulyasevil@gmail.com

ORCID: 0000-0002-3536-3253

How to cite?

Oruc OA, Ozdinc S, Sevil H. Evaluating the Efficiency of the Ottawa Risk Scale in Assessing Adverse Outcomes in COPD Patients Presenting to the Emergency Department. Ulutas Med J. 2023;9(3):128-136

DOI: 10.5455/umj.20230822072102