

Pneumologia

The risk of mortality and use of high-flow oxygen device based on respiratory distress clinical classification on emergency department admission: a retrospective study in Persahabatan Hospital, Jakarta

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Abstract

English:

Background: Rapidly assessing respiratory distress in emergency settings is challenging due to the limited availability of tools. We developed a clinical classification to identify and stratify patients with respiratory diseases based on symptom severity and aimed to evaluate its association with mortality and high-flow oxygen use.

Methods: This retrospective study included 126 emergency department patients. A Respiratory Distress Clinical Classification (RDCC) score was assigned based on consciousness, respiratory rate and oxygen saturation, categorising patients into mild, moderate, or severe distress. We analysed the association between RDCC and mortality as well as the use of high-flow oxygen devices.

Results: The study population included 9.5% with mild ($n = 12$), 40.5% with moderate ($n = 51$) and 50% with severe ($n = 63$) respiratory distress. The RDCC score was associated significantly with both the mortality ($P < 0.001$) and the use of high-flow oxygen devices ($P < 0.001$). Patients with severe distress had a higher risk of mortality (RR: 3.00; 95% confidence interval (CI): 1.61–5.60) and use of high-flow oxygen devices (RR: 5.40; 95% CI: 2.22–13.12) compared to those with mild-moderate distress. Comorbidities such as diabetes mellitus, liver and renal insufficiency significantly contributed to the mortality risk. Renal and cardiac insufficiencies may increase the risk of using high-flow oxygen devices.

Conclusion: The RDCC shows its potential as a simple, valuable tool for predicting mortality risk and high-flow oxygen devices needed in patients with respiratory distress, using only three variables. Further studies with larger samples are warranted to validate these findings.

Keywords

emergency admission • pulmonary diseases • respiratory distress • retrospective

Riscul de mortalitate și utilizarea dispozitivelor cu oxigen cu debit crescut pe baza clasificării clinice a detresei respiratorii la internarea în departamentul de urgență: un studiu retrospectiv realizat la Spitalul Persahabatan, Jakarta

Rezumat

Romanian:

Context: Evaluarea rapidă a detresei respiratorii în serviciile de urgență este dificilă din cauza disponibilității limitate a instrumentelor. Am dezvoltat o clasificare clinică pentru identificarea și stratificarea pacienților cu boli respiratorii pe baza severității simptomelor și am urmărit evaluarea asocierii acestora cu mortalitatea și utilizarea dispozitivelor cu oxigen cu debit crescut.

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Metode: Acest studiu retrospectiv a inclus 126 de pacienți din departamentul de urgență. Fiecărui pacient i s-a atribuit un scor Respiratory Distress Clinical Classification (RDCC), bazat pe nivelul de conștiență, frecvența respiratorie și saturația oxigenului, pacienții fiind încadrați în detresă ușoară, moderată sau severă. A fost analizată asocierea dintre scorul RDCC, mortalitate și utilizarea dispozitivelor cu oxigen cu debit crescut.

Rezultate: Din populația studiată, 9,5% au prezentat detresă ușoară ($n = 12$), 40,5% detresă moderată ($n = 51$) și 50% detresă severă ($n = 63$). Scorul RDCC s-a asociat semnificativ atât cu mortalitatea ($P < 0,001$), cât și cu utilizarea dispozitivelor cu oxigen cu debit crescut ($P < 0,001$). Pacienții cu detresă severă au avut un risc mai mare de mortalitate (RR: 3,00; IC 95%: 1,61–5,60) și de utilizare a oxigenului cu debit crescut (RR: 5,40; IC 95%: 2,22–13,12) comparativ cu cei cu detresă ușoară-moderată. Comorbidități precum diabetul zaharat, insuficiența hepatică și renală au contribuit semnificativ la riscul de mortalitate. Insuficiența renală și cardiacă pot crește riscul de utilizare a dispozitivelor cu oxigen cu debit crescut.

Concluzie: Clasificarea RDCC demonstrează potențialul său ca instrument simplu și valoros pentru predicția riscului de mortalitate și a necesarului de oxigen cu debit crescut la pacienții cu detresă respiratorie, utilizând doar trei variabile. Sunt necesare studii suplimentare, cu eșantioane mai mari, pentru validarea acestor rezultate.

Cuvinte-cheie

internare de urgență • boli pulmonare • detresă respiratorie • retrospectiv

Introduction

Respiratory distress is a condition that may arise from many pulmonary or cardiovascular diseases and results from the experience of dyspnoea. Dyspnoea is defined as shortness of breath, which comprises sensations of uncomfortable breathing. Dyspnoea should be recognised as a sign of respiratory distress. If this condition is not promptly identified and addressed, it may lead to respiratory failure, significantly increasing the risk of mortality (1). Respiratory failure results from inadequate gas exchange by the respiratory system, which may cause low oxygen levels (hypoxaemia) and can be accompanied by a rise in carbon dioxide levels in blood (hypercapnia) (2). A study by Cabrini et al. (3), 20% patients with acute respiratory failure were dead within 30 days after the onset of the disease. Moreover, approximately two-thirds of patients experiencing respiratory distress or failure suffer from persistent lung function impairment 1 year following the acute episode (4). Therefore, early recognition and accurate assessment of respiratory distress upon a patient's arrival in the emergency care setting is paramount. Assessment tools, including questionnaires and scales, become essential for evaluating dyspnoea intensity, its impact on a patient's perceived health-related quality of life and the urgency of using high-flow oxygen therapy in emergency settings.

High-flow oxygen therapy is the main treatment for respiratory distress. High-flow oxygen therapy is defined as a technique in which a device delivers a flow of air containing oxygen higher than the actual inspiratory flow (30 L/min). Those devices consist of non-invasive devices (such as high-flow nasal cannula) and invasive devices, such as mechanical ventilation. Non-invasive devices are indicated in patients with respiratory failure, especially in conscious patients. Using non-invasive devices may reduce the mortality and morbidity and avoiding patients from falling into mechanical

ventilation (5). Furthermore, non-invasive is more practical and comfortable for patients compared to invasive devices, as they have been proven to be effective in coronavirus disease 2019 (COVID-19) patients with respiratory distress (6).

However, the availability of practical scoring systems for classifying the severity of respiratory distress remains limited. One of the scoring systems is from Campbell et al. (7) to assess the severity of respiratory distress, called the Respiratory Distress Observation Scale (RDOS). However, this scoring system uses eight parameters, such as heart rate, respiratory rate, accessory muscle use, paradoxical breathing pattern, restlessness, grunting at end-expiration, nasal flaring and a fearful facial display that may not be practical in emergency settings. Based on epidemiological data, a higher risk of mortality and cardiac arrest in respiratory distress patients exhibiting a respiratory rate exceeding 29 breaths per min and an oxygen saturation $<90\%$ (8). This threshold aligns with the experience from the COVID-19 pandemic and World Health Organization (WHO) (9) applies the variables such as consciousness, respiratory rate and peripheral saturation to stratify the severity of COVID-19 diseases and has demonstrated effectiveness in predicting mortality and guiding treatment strategies, particularly in the application of high-flow oxygen therapy. Therefore, we suggested a scoring system classification using these three variables to classify the degree of respiratory distress especially in pulmonary diseases.

Objectives

Therefore, we introduce the Respiratory Distress Clinical Classification (RDCC) as a practical tool utilising three

fundamental parameters – consciousness, respiratory rate and peripheral oxygen saturation – to accurately stratify respiratory distress severity in terms of mortality and the need for high-flow oxygen support in patients with pulmonary diseases.

Materials and methods

An observational retrospective study was conducted on patients admitted to emergency department of Persahabatan Hospital, Jakarta. All adult patients (>18 years old) who experienced dyspnea and were admitted to the pulmonary emergency department from August to October 2021 were included in the study. We only selected patients with confirmed pulmonary diseases, which were proven by the clinical, laboratory and radiological examination. All patients included must have had a thorough medical record from the beginning of admission. Our exclusion criteria were patients with pregnancy, trauma cases and patients who had mechanical ventilation device upon their arrival to the emergency department. We also excluded patients with the main causes of dyspnea due to non-pulmonary diseases, such as patients with cardiogenic acute lung oedema. This study was approved by the ethics committee of Persahabatan Hospital, Jakarta (ethical clearance no. 93/KEPK-RSUPP/06/2023).

The RDCC is a three-item ordinal scale classification designed to measure the presence and intensity of respiratory distress in adult patients. This scale was developed by Rasmin (10) from the same hospital and institution. This classification is based on the findings by Prekker et al. (8) regarding the respiratory rate and mortality, where respiratory rate frequency of >29 times per min and oxygen saturation of 90% contribute to mortality and cardiac arrest, which require advanced life-saving techniques in prehospital care. Therefore, by incorporating the peripheral saturation that may reflect the haemoglobin saturation, the model for respiratory distress classification was made (Table 1).

This new classification proposed by the author uses measurement of three variables based on the previous classification, which were vital signs in the time of emergency admission: consciousness, respiratory rate and peripheral oxygen saturation (pulse oximetry). In this study, scoring

system was calculated for each variable according to the corresponding patient vital signs. The severity of respiratory distress is based on the total score: *mild* ≤2, *moderate* 3–4, *severe* ≥5. The maximum overall score is 9 (Table 2).

For the sample size, we also used the same data from Prekker et al. (8) that showed the prevalence of respiratory distress in patients in emergency medical services was 11.9% (95% CI: 11.7–12.1%). By using the confidence level of 95% and a margin of error between 4% and 8%, this study needed at least 112 samples for this research.

In-hospital mortality was defined as death occurring during the 30-day hospital stay. Patients were observed for 30 days or were discarded or died. The use of high-flow oxygen was defined by the use of a high-flow nasal cannula device and intubation, which led to utilisation of mechanical ventilation. Related organ insufficiency was evaluated within 48 hr admission. Cardiac insufficiency was defined as a non-ischaemic acute cardiac dysfunction. Renal insufficiency was defined as an increase in serum creatinine to two times baseline or urine output <0.5 mL/kg/hr for 12 hr. Liver insufficiency was defined by at least two of the following items: an increase in bilirubin of >2.5 mg/dL (>43 µmol/L), serum alanine transaminase concentration of more than twice the upper limit and prothrombin time of >1.5 times the control value. The neurology deficiency was defined by evidence of neurology deficit in physical examination and an intracerebral lesion proven by head computed tomography (CT) scan.

Chi-square tests were used to compare the proportions in categorical variables. If the condition of the chi-square was not met, we used the Fisher exact test to Categorical values were presented as numbers or percentages. A *P*-value of 0.05 was considered to be statistically significant. We calculated the relative risk (RR) for each clinical outcome in the corresponding respiratory distress status.

Table 1. Respiratory distress classification.

Degree of respiratory distress	Consciousness	Respiratory rate (times/min)	Peripheral oxygen saturation (%)
Mild	Alert, good contact	15–20	93–98
Moderate	Alert, good contact	20–25	88–93
Severe	Apathetic, delirium	25–30	<88

Table 2. Proposed RDCC.

Variable	0 points	1 point	2 points	3 points	Total
Consciousness	GCS 15	-	-	GCS <15	
Respiratory rate (times/per)	<15	16–20	21–25	>26	
Pulse oximetry (%)	99–100	93–98	88–92	<88	

GCS, Glasgow Comma Scale; RDCC, respiratory distress clinical classification.

Results

Clinical characteristics

Clinical characteristics are listed in Table 3. There are 126 total patients with complete medical records, from the time of admission to discharge/death, listed in this study. The majority of patients were middle-aged adults, with mean age was 51.14 years old (SD: 15) years old. Majority of the gender is male with 78 patients (61.9%). The most frequent underlying disease is lung tuberculosis in 38 patients (30.2%). We included both drug-sensitive and drug-resistant tuberculosis. Lung malignancies were found in 38 patients (30.2%). There were 37 patients (22.9%) with renal insufficiency. The other most frequent comorbidities were cardiac and liver insufficiency, both with 35 patients (27.8%). With the application of RDCC, most patients admitted with severe respiratory distress, a total of 63 patients (50%). There were 12 patients (9.5%) with mild respiratory distress and 51 patients (40.5%) with moderate respiratory distress (Table 3).

Clinical outcome associated with RDCC

Mortality was found to be higher in patients with severe respiratory distress in comparison with moderate and mild respiratory distress. Note that 30 patients (47.6%) died with severe respiratory distress compared to 10 patients (19.6%) who died with moderate respiratory distress (P -value <0.001). Usage of high-flow oxygen was also found higher in patients with severe respiratory distress, with 27 patients (42.9%) compared to 5 patients (9.8%) with moderate respiratory distress (P -value <0.001) (Table 4).

RDCC as predictive value

Since we found no mortality and use of high-flow nasal canule in patients with mild respiratory distress, we combined the patients with mild respiratory distress status with moderate respiratory distress status. In this study, we found that patients with severe respiratory distress had three times the mortality risk (RR: 3.00; P -value 0.0006) and 5.4 times the risk of usage of high-flow oxygen (RR: 5.40; P -value 0.0002) compared to mild-moderate respiratory distress, and all the results were statistically significant (Table 5).

Variables contributed to mortality risk and use of high-flow oxygen

We also added additional analysis to find any variables that also contribute to mortality. Our findings revealed that diabetes mellitus, renal insufficiency and liver disease may contribute to mortality risk, as these variables had significant differences between non-survivor and survivor groups (Table 6). Furthermore, cardiac dysfunction and renal insufficiency were two variables that contributed to a higher risk for use of high-flow oxygen (Table 7).

Table 3. Baseline characteristics of study participants.

Variable	N = 126
Age (years), mean (SD)	51.14 (15)
Gender, n (%)	
• Male	78 (61.9)
• Female	48 (38.1)
Primary diagnosis, n (%)	
• Pneumonia	20 (15.9)
• Bronchiectasis	11 (8.7)
• Tuberculosis	38 (30.2)
• Lung malignancies	38 (30.2)
• COVID-19	10 (7.9)
• COPD/asthma	6 (4.8)
• Lung mycosis	2 (1.6)
• Lung abscess	1 (0.8)
Comorbid, n (%)	
• Hypertension	24 (19.0)
• Diabetes mellitus	31 (24.6)
• Cardiac dysfunction	35 (27.8)
• Renal insufficiency	35 (27.8)
• Liver insufficiency	33 (26.2)
• Neurology insufficiency	2 (1.6)
Respiratory distress status, n (%)	
• Mild	12 (9.5)
• Moderate	51 (40.5)
• Severe	63 (50)

SD, standard deviation.

Table 4. Clinical outcome related to RDCC.

Outcome	Mild, n (%)	Moderate, n (%)	Severe, n (%)	P-value
Mortality				<0.001
Alive	12 (100)	41 (80.4)	33 (52.4)	
Death	0 (0)	10 (19.6)	30 (47.6)	
Usage of high-flow oxygen				<0.001
Not used	12 (100)	46 (90.2)	36 (57.1)	
Used	0 (0)	5 (9.8)	27 (42.9)	

RDCC, respiratory distress clinical classification.

Table 5. RDCC as risk for mortality and use of high-flow oxygen.

Respiratory distress status	Mortality		Use of high-flow oxygen	
	RR (95% CI)	P-value	RR (95% CI)	P-value
Severe (compared to mild-moderate)	3.00 (1.61–5.60)	0.0006	5.40 (2.22–13.12)	0.0002

RR, relative risk; RDCC, respiratory distress clinical classification.

Table 6. Variables contributed to mortality in RDCC.

Variable	Non-survivor (death in 30 days) (%)	Survivor (%)	P-value
Age (years)			0.181
• ≤65	30 (29.1)	73 (30.9)	
• >65	10 (43.5)	13 (56.5)	
Gender			0.326
• Male	22 (28.2)	56 (71.8)	
• Female	18 (37.5)	30 (62.5)	
Comorbid			
• Hypertension	7 (29.2)	17 (70.8)	0.763
• Diabetes mellitus	15 (48.4)	16 (51.6)	0.027
• Cardiac dysfunction	13 (37.1)	22 (62.9)	0.420
• Renal insufficiency	21 (60.0)	14 (40.0)	<0.001
• Liver insufficiency	18 (54.5)	15 (45.5)	0.002
• Neurology deficit	1 (50.0)	1 (50.0)	0.536
Respiratory distress status			<0.001
• Mild-moderate	10 (15.9)	53 (84.1)	
• Severe	30 (47.6)	33 (52.4)	

RDCC, respiratory distress clinical classification.

Table 7. Variables contributed to the use of high-flow oxygen in RDCC.

Variable	Use of high-flow oxygen (%)	Not using high-flow oxygen (%)	P-value
Age (years)			0.539
≤65	25 (24.3)	78 (75.7)	
>65	7 (30.4)	16 (69.6)	
Gender			0.936
Male	20 (25.6)	58 (74.4)	
Female	12 (25.0)	36 (75.0)	
Comorbid			
Hypertension	7 (29.2)	17 (70.8)	0.637
Diabetes mellitus	10 (32.3)	21 (67.7)	0.312
Cardiac dysfunction	19 (54.3)	16 (45.7)	0.001
Renal insufficiency	14 (40.0)	21 (60.0)	0.020
Liver insufficiency	11 (33.3)	22 (66.7)	0.223
Neurology deficit	1 (50.0)	1 (50.0)	0.420
Respiratory distress status			<0.001
Mild-moderate	5 (7.9)	58 (92.1)	
Severe	27 (42.9)	36 (57.1)	

RDCC, respiratory distress clinical classification.

Proportion of respiratory distress, mortality and use of high-flow oxygen based on lung diseases

We conducted further analysis to determine the lung diseases associated with a higher proportion of severe respiratory

Table 8. Proportion of respiratory distress, mortality and use of high-flow oxygen based on lung diseases.

Lung diseases	Total patients (n)	Severe respiratory distress (%)	Deaths (%)
Pneumonia	20	17 (85.0)	9 (45.0)
Bronchiectasis	11	7 (63.6)	2 (18.2)
Tuberculosis	38	10 (26.3)	8 (21.1)
Lung malignancies	38	15 (39.5)	15 (39.5)
COVID-19	10	8 (80.0)	6 (60.0)
COPD/asthma	6	5 (83.3)	0 (0.0)
Lung mycosis	2	1 (50)	0 (0.0)
Lung abscess	1	0 (0.0)	0 (0.0)

COPD, chronic obstructive pulmonary disease; COVID-19, coronavirus disease 2019.

distress. Our observations indicated that pneumonia, chronic obstructive pulmonary disease (COPD)/asthma and COVID-19 were the most prevalent conditions among patients exhibiting severe respiratory distress, with proportions of 85%, 83.3%, and 80% respectively. Additional analysis, consistent with the proportion of respiratory distress, revealed that patients with COVID-19 and pneumonia had the highest proportion of mortality, followed by malignancy (Table 8).

Discussion

To the best of our knowledge, this is the first study to evaluate the mortality and the utilisation of high-flow oxygen devices in respiratory disease patients within Indonesia. Our findings indicate that respiratory distress was more prevalent in males, with a mean age of 51 years, consistent with the demographics observed in our prior research (11). The primary underlying diseases in our patient cohort were infectious diseases, predominantly tuberculosis and lung malignancy. High numbers of tuberculosis patients in this study reflect the high prevalence of tuberculosis in Indonesia, as Indonesia has the second highest prevalence of tuberculosis in the world, with approximately 885,000 tuberculosis cases identified in 2024, with an incidence rate 388 per 100,000 population, with 49 deaths per 100,000 (12). The presence of COVID-19 cases, due to the study's timing during the pandemic and malignancies, given our hospital's role as a national referral centre for respiratory diseases, were also notable. Furthermore, a significant proportion of patients presented with renal insufficiency, a condition associated with increased mortality in hospital and intensive care unit (ICU) settings, particularly in individuals experiencing respiratory distress (13).

In clinical practice, particularly in emergency settings, the term 'respiratory distress' is often used to describe dyspnoea

with an acute onset (14). However, the interchangeable use of 'respiratory distress' and 'respiratory failure' can lead to confusion. Respiratory failure is defined by hypoxaemia, indicated by $\text{PaO}_2 < 60$ mmHg (15). Therefore, the condition where a patient is already in increased respiratory effort/dyspnoea and yet falls into the respiratory failure due to a compensation mechanism for adequate gas exchange and ventilation can be described as respiratory distress. Furthermore, the term of respiratory distress is commonly used as in acute respiratory distress (ARDS) and the consensus definition of respiratory distress has never been well formulated (16).

Our study showed that the severity of respiratory distress based on RDCC contributed to the use of high-flow nasal oxygen and mortality. There is a scarcity of publications in assessing dyspnoea symptoms in emergency settings. Our findings were similar to a previous study in COVID-19 settings, using a similar respiratory distress classification. A study conducted by Elhidsi et al. (17) used the vital signs to determine the risk of respiratory failure in COVID-19 patients. This study showed that vital signs and work of breathing within the first hour in the emergency department can predict acute respiratory failure in COVID-19 pneumonia patients within 72 hr. There is also a similar scale that uses vital signs and consciousness to predict the mortality of dyspnoea patients developed by Campbell et al. (7) Patients with severe respiratory distress who were assessed based on the consciousness, respiratory rate and peripheral oxygen saturation also had a higher risk of use of a high-flow oxygen device and mortality.

The RDCC offers a readily accessible method for assessing the severity of respiratory distress based on three easily obtainable variables in the emergency setting: level of consciousness, respiratory rate and peripheral oxygen saturation. A decreased level of consciousness, potentially resulting from inadequate brain oxygenation, contributes to a higher RDCC score. Moreover, cognitively impaired patients are vulnerable to under-recognition and under-treatment of respiratory distress. Patients who are unable to report their experience of their dyspnoea are vulnerable to under-treatment or over-treatment. An elevated respiratory rate reflects the body's attempt to compensate for inadequate ventilation, but a rate exceeding 26 breaths per min may indicate impending respiratory muscle fatigue and an increased risk of respiratory failure. Peripheral oxygen saturation provides insight into blood oxygen levels, with a peripheral saturation (SpO_2) $< 88\%$ suggestive of hypoxaemia ($\text{PaO}_2 < 60$ mmHg), although the actual range of SpO_2 may lie between 86% and 91% (18). By incorporating these three key components, the RDCC can facilitate rapid identification and classification of respiratory distress, enabling clinicians to expedite appropriate treatment interventions.

In further stratified analysis, variables such as diabetes mellitus, renal insufficiency and hepatic insufficiency were found to significantly influence the risk of mortality. Several mechanisms may explain these observations, as these comorbidities frequently co-occur in patients presenting with severe respiratory distress, particularly in the context of underlying sepsis. This is also consistent with a previous multi-centre study that showed renal insufficiency and sepsis condition contribute to mortality in acute respiratory failure patients (19). Additional analysis also revealed that cardiac insufficiency might increase the risk of using high-flow oxygen devices. Pulmonary congestion, a long-recognised cause of dyspnoea, often accompanies cardiac insufficiency. Decreased cardiac output leads to decreased systemic perfusion. Furthermore, the ventilatory pump may be mechanically limited, unable to translate increased efferent stimuli to the lung and chest wall, potentially resulting in neuromechanical dissociation. This dissociation may increase stimulation to the inspiratory neural drive, causing dyspnoea that increases faster ventilation and persists (20).

Additional analysis also showed that pneumonia and COVID-19 provided the highest proportion in respiratory distress and mortality, as these two conditions may develop into ARDS. ARDS is a life-threatening acute hypoxaemic condition, and high mortality persists, either as short-term mortality, or those who survive may face long-term impairments (16). The acute inflammatory lung injury observed in ARDS can affect up to 10% of intensive care unit patients and is a significant precursor to multi-organ failure and high mortality rates, up to 43% (21, 22). ARDS is initiated by a complex cascade of immune activation, leading to diffuse alveolar damage and breakdown of the alveolar-capillary barrier, thereby hindering gas exchange (23). Similarly, COVID-19 provokes a dysregulated immune response, frequently characterised by a 'cytokine storm', that contributes to widespread lung damage and subsequent ARDS (24).

There were concerns regarding happy hypoxaemia that may misclassify the severity of respiratory distress using RDCC, as we also included COVID-19 patients for this study. A particularly insidious manifestation of hypoxaemia is 'happy' or 'silent' hypoxia, a state where patients exhibit surprisingly low blood oxygen saturation levels without the expected signs of respiratory distress, such as dyspnoea or increased work of breathing. This dissociation between oxygen saturation and subjective respiratory distress poses a significant clinical challenge, as it can delay recognition of severe underlying disease and potentially worsen patient outcomes (25).

The precise mechanisms underlying happy hypoxia are not fully elucidated, but several factors are thought to contribute. One prominent hypothesis involves the blunted perception of dyspnoea, potentially due to altered chemoreceptor

sensitivity or neurological processing of respiratory signals, which results in a mismatch between the actual oxygen levels and the perceived need for increased ventilation (25).

We noticed several limitations to our study. We intentionally omitted the assessment of accessory muscle use to create a clinically practical tool accessible even to less-experienced healthcare providers. Next, this study design was a retrospective cohort study, which is susceptible to biases, including selection bias in patient enrolment and recall bias in data abstraction. Such biases could influence the generalisability of our findings to other populations or clinical settings. While a comparative analysis with other scoring systems was not within the scope of this study, we acknowledge its importance and plan to conduct a prospective study to evaluate the RDCC's accuracy against existing scoring systems in future research.

Conclusion

The RDCC assessment tool can serve as an initial assessment method for patients exhibiting clinical signs of respiratory distress. This tool may be utilised as a predictive value in terms of mortality rate and usage of a high-flow oxygen device. Further research is required with a larger sample size to ensure a more comprehensive and balanced data distribution across all levels of severity. Further analysis is required to assess the threshold value of the severity score of the RDCC to achieve more significant statistical outcomes. If new research is conducted, it is possible to analyse the relationship between the degree of respiratory distress and specific abnormalities or other clinical outcomes.

Informed Consent Statement

Informed consent was obtained from the subjects involved in the study.

Conflicts of Interest

The authors declare no conflict of interest.

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