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Association between health outcome and physiotherapeutic assistance in patients hospited with COVID-19

Associação entre desfechos em saúde e assistência fisioterapêutica em pacientes internados com COVID-19

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Abstract

Background: COVID-19 is a disease with a broad clinical spectrum and may have different clinical characteristics and health outcomes. Aim: to evaluate associations between patient characteristics, physiotherapeutic care and clinical outcomes in patients hospitalized with a diagnosis of COVID-19. **Methods**: A retrospective cross-sectional observational study was carried out with medical records of patients diagnosed with COVID-19 admitted to the ICU between March 2020 and July 2021. Patients aged 18 years or over, of both sexes, who tested positive for COVID, were included. -19. **Results**: 55 patients were evaluated, of which 60% were men, 95% were mixed race, 51% were elderly (50.9%). Furthermore, 56% were hypertensive, 53% diabetic, 33% obese and 33% smokers. Additionally, 52.7% of patients underwent invasive mechanical ventilation. In total, 28 (50.9%) patients died. The risk of death was higher for the elderly (OR 4.22; 95% CI: 1.37 – 13.03; p = 0.01) and for those who had unplanned extubation (p = 0. 01). Patients who used oxygen therapy for a longer time (p=0.01) and who had a higher level of mobilization (p=0.04) were more likely to be discharged. **Conclusion**: Advanced age and unplanned extubation were associated with a greater chance of death and physiotherapeutic procedures, especially those that included patient mobilization, revealed associations with the discharge outcome.

Keywords: Coronavirus; SARS-CoV-2; Health Status; Risk Factors; Rehabilitation.

Resumo

Introdução: A COVID-19 é uma doença de amplo espectro clínico, podendo possuir caracterização clínica e desfechos em saúde diversos. **Objetivo**: avaliar associações entre as características dos pacientes, os atendimentos fisioterapêuticos e os desfechos clínicos em pacientes internados com diagnóstico de COVID-19. **Métodos**: Realizado um estudo observacional transversal retrospectivo com prontuários de pacientes diagnosticados com COVID-19 internados na UTI entre março de 2020 a julho de 2021. Foram incluídos pacientes com idade igual ou superior a 18 anos, de ambos os sexos com teste positivo para COVID-19. **Resultados**: Foram avaliados 55 pacientes, destes, 60% eram homens, 95% pardos, 51% idosos (50,9%). Ainda, 56% eram hipertensos, 53% diabéticos, 33% obesos e 33% tabagistas. Adicionalmente, 52,7% dos pacientes foram submetidos a ventilação mecânica invasiva. Ao todo, 28 (50,9%) pacientes evoluíram para óbito. O risco de óbito revelou-se mais elevado para idosos (RC 4,22; IC de 95%: 1,37 – 13,03; p = 0,01) e para aqueles que tiveram a extubação não planejada (p = 0,01). Os pacientes que fizeram uso de oxigenoterapia por mais tempo (p=0,01) e que possuíam maior nível de mobilização (p=0,04) apresentaram maior probabilidade de alta. **Conclusão**: Idade avançada e extubação não planejada foram associadas com maior chance de óbito e as condutas fisioterapêuticas, em especial as que incluíam mobilização do paciente, revelaram associações com o desfecho alta.

Palavras-chave: Coronavírus; SARS-CoV-2; Nível de Saúde; Fatores de Risco; Reabilitação.

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INTRODUCTION

COVID-19 is a disease with a broad clinical spectrum and has been acknowledged as a worldwide public health emergency due to its severity. About 5% of patients infected with SARS-CoV-2 progress to the severe manifestation of this illness, presenting respiratory failure, septic shock, multiple organ dysfunction and intensive care demand[1,2]. In addition to the severity of the disease itself, advanced age, hypertension and diabetes mellitus seem to present a significant increase in the mortality risk[3].

The vast amount of people infected with COVID-19 has resulted in extremely high Intensive Care Unit (ICU) admission rates, requiring prolonged periods of hospitalization and use of invasive mechanical ventilation, leading to a multisystem functional impairment with significant loss of peripheral muscle strength, as well as a reduced pulmonary and cardiovascular functions[1,3]. This may be caused by the pathophysiology of the illness attributable to the virus, with the onset of immune system disorders and inflammatory damage resulting from acute infection, along with the expected post-acute sequelae of the critical disease[4-6].

Musculoskeletal disorders and reduced muscle strength occur mainly due to muscle hypoxia, prolonged immobility, as well as to the prolonged administration of neuromuscular blockers and corticosteroids[4,6-8]. However, the long-term use of these medications may favor the onset of myopathies and polyneuropathies, mainly of the respiratory muscles[7]. As a consequence of the respiratory abnormalities and motor sequelae that often affect intensive care patients, the international guidelines recommend an early rehabilitation to prevent ICU-acquired weakness[9].

Analyzing the physiotherapeutic conducts applied to patients with COVID-19 admitted to the ICU along with their relationship with the outcomes of discharge or death can raise important data for this purpose. This information could help the physiotherapists or further professionals involved in the rehabilitation process to develop safer and more effective treatments for patients affected by this disease, making it possible to guide the health services towards a better management of this population's health costs[10,11].

Therefore, the goal of the present study was to evaluate the associations among patient characteristics, physiotherapeutic care and clinical outcomes in hospitalized individuals diagnosed with COVID-19, moreover, as a secondary objective, this work aims to describe the clinical profile of patients diagnosed with COVID-19 admitted to the ICU.

METHODS

This is a retrospective cross-sectional observational study conducted according to the Strengthening the Reporting of in Epidemiology (STROBE) guidelines. The multiprofessional medical records of patients diagnosed with COVID-19 that were admitted to the ICU from March 25, 2020 to July 18, 2021 were hereby assessed to identify these individuals' clinical characteristics during the hospital stay, as well as the physiotherapeutic interventions applied to such patients and the relationship of these variables with each individual's clinical outcome.

Data were collected at the Medical Archive Service (SAME - *Serviço de Arquivo Médico*) of a University Hospital (UH) located in the city of Petrolina-PE. Given this study's design and profile of the individuals treated by the analyzed service, it was not possible to obtain the signed Informed Consent Form from the patients. Nevertheless, the data collection team was properly trained and oriented to ensure both the privacy and confidentiality of the information.

This study was granted the consent from the institution responsible for the medical records investigated and was approved by the Research Ethics Committee of the University of Pernambuco under the Certificate of Presentation for Ethical Consideration (CAAE - *Certificado de Apresentação para Apreciação Ética*) No. 42858321.5.0000.5191.

The subjects were selected based on the electronic file containing the history of every patient admitted to the UH's COVID-ICUs from their opening date until their last day of activity. As there were no previous records of SARS CoV-2 outbreaks, it was not possible to perform sample calculations. Thus, the researchers chose to collect the data of every hospitalized patient with this disease in the abovementioned hospital unit at the time.

Patients aged 18 years or older, of both sexes, who were admitted to at least one of the two COVID-ICUs or to the UH between March 25, 2020 and July 18, 2021, were included.

The exclusion criteria were: patients who had a negative result for SARS CoV-2 infection according to the Reverse Transcription - Polymerase Chain Reaction (RT-PCR) test or by the rapid antigen test, individuals who did not perform the RT-PCR test or the rapid test, subjects who were admitted to the COVID-ICUs with any main diagnosis other than COVID-19, those who did not receive physiotherapeutic follow-up care, patients transferred from another health service lacking clear documentation regarding the previous hospitalization and interventions performed, individuals who were transferred to another health service before being discharged from the ICU and those who had illegible or confusing medical records.

The clinical characteristics of the subjects were collected along with the history of the physiotherapeutic interventions performed during hospitalization in the UH's COVID-ICU from the patients' physical records, from March 2020 to July 2021.

The information considered relevant to characterize this population (medical record number, sex, color or race, age, vital signs, COVID-19 associated symptoms reported

or presented at the date of hospitalization, as well as the presence of pre-existing diseases along with history of smoking and/or alcoholism) were organized in a data collection form.

Ensuing the complete reading of the medical records, it was registered the test type (rapid test or RT-PCR), the data collection and result dates, the number of days that each patient used vasoactive drugs (VAD), sedation, invasive mechanical ventilation (MV), non-invasive ventilation (NIV) and oxygen therapy, date of orotracheal intubation (OTI), date of extubation, extubation criteria (scheduled or unplanned), if there was reintubation, the reason for reintubation, if there was a tracheostomy, the tracheostomy date and the date of decannulation.

Laboratory tests and arterial blood gas analysis were assessed. The admission and discharge dates from the health service, the total length of stay in the ICU, the length of hospital stay, if there was any type of transfer of the patient's sector (inter-hospital or intra-hospital) and the outcome (discharge or death) were also collected.

Pulmonary radiographic and CT findings were documented according to the dates of both the exams and the medical records release.

Physiotherapeutic care was described as per the total number of follow-up appointments during the ICU hospitalization period, along with the number of times the Respiratory and Motor Physiotherapy follow-up procedures were conducted according to their specific guidelines.

STATISTICAL ANALYSIS

Statistical analysis was performed using the SPSS software version 22. The Kolmogorov–Smirnov test was applied to evaluate the normality of the data. Categorical variables are hereby expressed in frequencies and percentages, while the continuous variables are presented in two ways: parametric, with the mean and standard deviation; and non-parametric, with the median, first and third quartile. The Levene test for independent samples was used in the inferential statistical analysis of the groups presenting continuous variables; the Mann-Whitney U test was also applied on the abovementioned variables. For the groups with categorical variables, the Pearson's chi-square test and risk estimation was performed, and the findings are expressed herein as frequency and percentage. Results with descriptive levels (p values) below 0.05 were considered significant.

RESULTS

In the present study, 347 medical records were deemed eligible for evaluation (Figure 1). Among these, 55 were found to be inconclusive, being 60% male, 94.5% mixed-

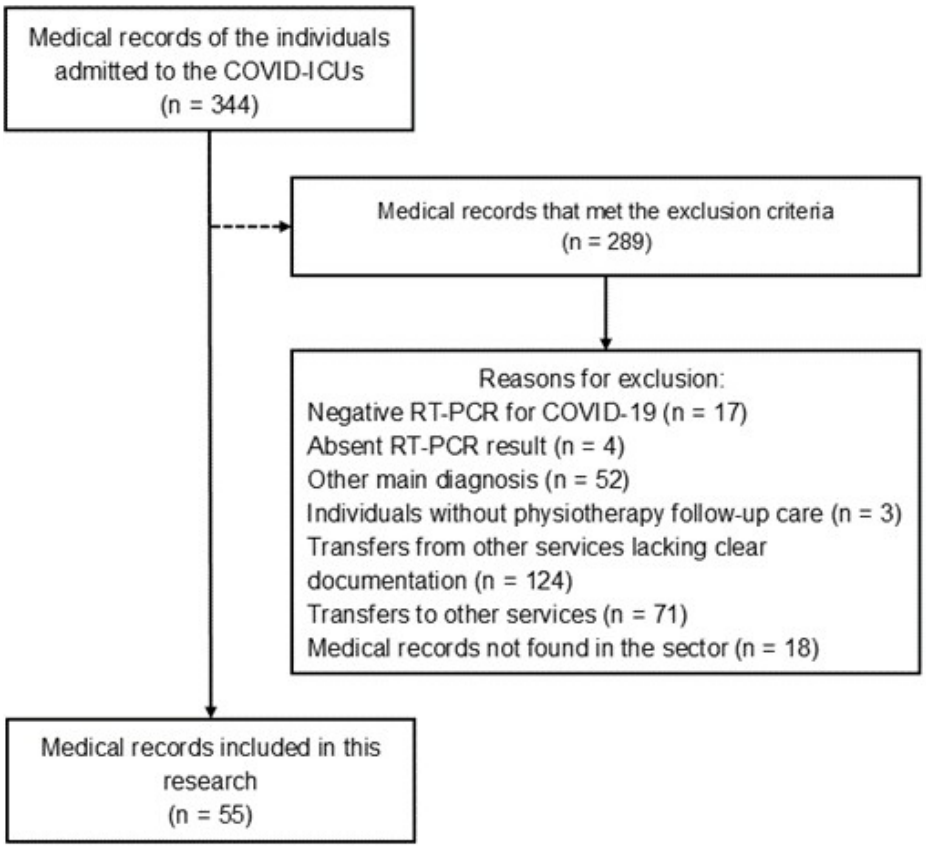

Figure 1. Sample eligibility.
Source: Elaborated by the authors.

race and 50.9% aged 60 years or older. The most frequent comorbidities were systemic arterial hypertension (56.4%), diabetes mellitus (52.7%), obesity (32.7%) and smoking history (32.7%). Dyspnea (67.3%), cough (60%), and fever (56.4%) were the most commonly reported COVID-19-related symptoms at the time of hospital admission.

The mean length of ICU stay was 15.26 days (14.86 days for the death group and 15.67 days for the discharge group), which was similar to the hospital stay mean length of 15.87 days (14.93 days for the death group and 16.85 days for the discharge group). Among the 55 patients eligible for the study, 28 (50.9%) died and 27 (49.1%) were discharged from the ICU (table 1).

The vital signs registered at the ICU admission date, the laboratory tests and arterial blood gas analysis results, along with the medication records and ventilatory support are described in table 2.

Of the 55 investigated patients, 18 were referred to the ICU already intubated and 37 were admitted without any invasive ventilatory support, however, intubations were performed in 11 patients immediately after admission to the sector, with a total of 29 patients intubated and 26 on non-invasive ventilatory support or oxygen therapy. 15 extubations reports were found: 11 carried out on a scheduled basis, 2 unplanned and 2 lacking sufficient documentation in the medical records. Among these extubations, 8 patients were reintubated, 2 due to severe post-extubation laryngospasm, 1 due to hypoxemia and decreased level of consciousness, during post-extubation as well, 1 for orotracheal tube exchange and 4 without clear reasons documented in the medical records. Only 1 tracheostomy was registered, 17 days after the intubation date, lasting 16 days until decannulation.

The outcome (death or discharge) was analyzed taking into consideration the variables gender, race or color, age group, comorbidities (each preexisting disease in isolation) and extubation criteria. Age group and extubation criteria showed statistically significant results: unplanned extubation was found to be associated with the death outcome ($p = 0.01$) and the elderly presented four times more risk of death than the adults (OR 4.22; 95% CI: 1.37 – 13.03; $p = 0.01$), as depicted in table 3.

Regarding the number of follow-up procedures performed (table 4), patients who died underwent a median of 40 respiratory physiotherapy interventions and 7 motor physiotherapy appointments throughout their hospitalization. Among the discharged patients, the relationship was inverted, with more motor physiotherapy than respiratory care being implemented (medians of 13.5 versus 8, respectively). Regardless of the outcome, secretion removal therapy was the most frequently performed respiratory physiotherapy, followed by pulmonary expansion therapy.

Table 1. Clinical profile of the studied sample (n = 55).

Variables	Frequency (n)	Percentage (%)
Sex		
Male	33	60
Female	22	40
Color or race		
Mixed-race	52	94.5
Black	2	3.6
White	1	1.8
Age group		
Elderly	28	50.9
Adult	27	49.1
Comorbities		
Systemic arterial hypertension	31	56.4
Diabetes mellitus	29	52.7
Obesity	18	32.7
Smoking history	18	32.7
COPD	4	7.3
Asthma	3	5.5
EVA	3	5.5
Alzheimer's disease	3	5.5
Alcohol history	3	5.5
Simptoms		
Dyspnea	37	67.3
Cough	33	60
Fever	31	56.4
Asthenia	9	16.4
Tachypnea	7	12.7
Migraines	7	12.7
Myalgia	7	12.7
Rhinorrhea	6	10.9
Diarrhea	5	9.1
Anosmia	5	9.1
Nausea	4	7.3
Vomiting	3	5.5
Respiratory failure	3	5.5
Dysgeusia	2	3.6
Ageusia	1	1.8
Odynophagia	1	1.8
Chest Pain	1	1.8
Outcome		
Death	28	50.9
Discharge	27	49.1

COPD: chronic obstructive pulmonary disease; EVA: encephalic vascular accident.
Source: Elaborated by the authors.

Table 2. Vital signs, laboratory tests, blood gas parameters, use of vasoactive drugs, sedation and ventilatory support according to the outcome (n = 55).

Variables	Frequency (n)		Outcome		*p*
	Death	Discharge	Death	Discharge	
Age	28	27	64.75 ± 15.68	53.48 ± 18.00	0.02
Heart rate	26	26	95.77 ± 20.37	96.77 ± 25.22	0.88
Respiratory rate	18	20	21.89 ± 7.04	25.65 ± 6.66	0.10
SBP	25	27	128.40 ± 31.51	137.67 ± 27.54	0.26
DBP	25	27	69.28 ± 16.58	84.19 ± 22.79	0.01
pH	25	23	7.36 ± 0.09	7.42 ± 0.14	0.10
paO_2	24	24	111.03 ± 76.43	92.98 ± 38.65	0.31
HCO3	22	21	22.99 ± 3.50	23.63 ± 5.24	0.64
BE	10	7	-0.05 ± 4.10	-0.53 ± 7.82	0.87
Lactate	21	15	2.36 ± 2.20	1.57 ± 1.03	0.21
Hb	26	23	11.77 ± 2.53	12.15 ± 1.90	0.56
Leukocytes	23	21	13,338.70 ± 6,902.53	13,292.05 ± 5,212.95	0.98
Platelets	26	21	301,307.69 ± 129,832.44	328,666.67 ± 159,624.04	0.52
SpO_2*	27	25	94 (86–98)	97 (95–98)	0.45
$paCO_2$*	25	22	43.9 (36.35–52.40)	34.3 (30.4–40)	0.03
$SatO_2$*	18	18	96 (92,25–97,30)	96.6 (95–98.2)	0.42
PaO_2/FiO_2*	24	22	99 (84,5–173)	164.5 (118–283)	0.03
CRP*	18	15	90,3 (0–241,35)	29.35 (0–132)	0.28
VAD days*	27	27	4 (2,5–6)	0 (0–3)	0.00
Sedation days*	28	27	9 (4–18,5)	1.5 (0–13)	0.45
MV days*	28	27	10 (7,5–21)	2.5 (0–14)	0.37
NIV days*	27	27	0 (0–1)	0 (0–0)	0.40
Oxygen therapy days*	28	27	0 (0–1)	3 (1–4)	0.00

SD: standard deviation; SBP: systolic blood pressure; DBP: diastolic blood pressure; pH: hydrogen potential; paO_2: partial oxygen arterial pressure; HCO_3: bicarbonate; BE: base excess; Hb: hemoglobin; SpO_2: peripheral oxygen saturation; $paCO_2$: partial carbon dioxide arterial pressure; $SatO_2$: arterial oxygen saturation; PaO_2/FiO_2: partial pressure of oxygen and the fraction of inspired oxygen ratio; CRP: C-reactive protein; VAD: vasoactive drugs; MV: mechanical ventilation; NIV: noninvasive ventilation. *Values presented in median, first and third quartile.

Source: Elaborated by the authors.

DISCUSSION

The present study investigated the clinical outcomes and physiotherapeutic care of patients diagnosed with COVID-19 admitted to the ICU. According to the data presented, it was concluded that the individuals submitted to a longer oxygen therapy time and with higher levels of mobilization were more likely to be discharged from the hospital. On the other hand, the risk of death was higher in the elderly and in those with unplanned extubation.

Regarding the clinical outcomes of this research, they were classified as death (50.9%) or discharge (49.1%). Notwithstanding, a higher risk of death was found in elderly patients when compared to the adults. This result is consistent with previous studies[12,13,15]. Silva et al.[16] investigated exclusively hospitalized patients who did not survive COVID-19 and analyzed a total of 3,001 deaths. Their findings revealed that this population consisted of predominantly men, with an mean age of 69 years, mixed race, hypertensive and diabetic[16]. Souza et al.[17] observed that 57% of the most critical cases and 59% of deaths were likewise males aged 50 years or over, diabetics and with cardiovascular diseases. Further Latin America data also corroborate the findings herein and leads to the conclusion that individuals aged 50 or over are considered at high risk for COVID-19, with a higher probability of death[18].

Table 3. Risk analysis of the categorical variables in relation to the clinical outcome (n = 55).

Variables	Frequency (n) Death	Discharge	χ2	p	OR (95% CI)*
Sex			3.1	0.08	0.37 (0.12 – 1.13)
Female	8	14			
Male	20	13			
Color or race			0.98	0.32	0.50 (0.39 – 0.65)
Mixed-race and Black	27	27			
White	1	0			
Age group			0.65	0.01	4.22 (1.37 – 13.03)
Elderly	19	9			
Adult	9	18			
Comorbidities					
Systemic arterial hypertension			1.45	0.23	1.94 (0.66 – 5.71)
Yes	18	13			
No	10	14			
Diabetes mellitus			0.17	0.68	0.80 (0.28 – 2.31)
Yes	14	15			
No	14	12			
Obesity			0.45	0.5	0.68 (0.22 – 2.11)
Yes	8	10			
No	20	17			
Smoking history			0.23	0.63	1.32 (0.43 – 4.09)
Yes	10	8			
No	18	19			
COPD			1	0.32	3.12 (0.30 – 32.03)
Yes	3	1			
No	25	26			
Asthma			0.39	0.53	0.46 (0.04 -5.43)
Yes	1	2			
No	27	25			
EVA			0.31	0.57	2.00 (0.17 – 23.44)
Yes	2	1			
No	26	26			
Alzheimer's disease			0.31	0.57	2.00 (0.17 – 23.44)
Yes	2	1			
No	26	26			
Alcoholism history			0.39	0.53	0.46 (0.04 – 5.42)
Yes	1	2			
No	27	25			
Extubation criteria			13	0.01	**
Scheduled	0	11			
Unplanned	2	0			

OR: odds ratio; CI: confidence interval; COPD: chronic obstructive pulmonary disease; EVA: encephalic vascular accident. *OR: odds ratio of the first category by the second category of each presented variable. ** it was not possible to calculate the OR and CI due to the zero-numbering present in the variable frequencies

Source: Elaborated by the authors.

Table 4. Comparison of the number and type of Physiotherapy follow-up procedure according to the outcome (n = 55).

Variables	Outcome		*P*
	Death (n = 28) Median (1Q–3Q)	Discharge (n = 27) Median (1Q–3Q)	
Respiratory physiotherapy			
No. of follow-up appointments	40 (21.5–71.5)	8 (0–50)	0.09
SRT	29 (14.5–44.5)	6 (0–36)	0.12
PET	9 (5–16.5)	2 (0–10)	0.23
PEEP titration	1 (0–4.5)	0 (0–0)	0.10
ARM	2 (0–4)	0 (0–0)	0.04
RMT	0 (0–1)	0 (0–0)	0.61
Prone position	0 (0–2.5)	0 (0–4)	0.97
Motor physiotherapy			
No. of follow-up appointments	7 (3.5–20.5)	13.5 (4–28)	0.31
Passive kinesiotherapy	4 (2–8)	3.5 (0–9)	0.93
Active-assisted kinesiotherapy	0 (0–0.5)	2 (1–5)	0.01
Active kinesiotherapy	0 (0–0)	0 (0–3)	0.01
Resistant kinesiotherapy	0 (0–0)	0 (0–0)	0.00
Bed sedestation	0 (0–0.5)	2 (0–4)	0.01
Bedside sedestation	0 (0–0)	0 (0–0)	0.01
Chair sedestation	0 (0–0)	0 (0–0)	0.04
Orthostatic position	0 (0–0)	0 (0–0)	0.07
Ambulation	0 (0–0)	0 (0–0)	0.09
Cycloergometer	0 (0–0)	0 (0–0)	0.15

1Q: first quartile; 3Q: third quartile; SRT: secretion removal therapy; PET: pulmonary expansion therapy; PEEP: positive end-expiratory pressure; ARM: alveolar recruitment maneuver; RMT: respiratory muscle training.

Source: Elaborated by the authors.

When comparing the vital signs between patients in the death group and the discharge group, it was observed that the low diastolic blood pressure (DBP) suggests a possible association with negative outcomes, such as death. However, no statistically significant differences were found for the variables heart rate (HR), respiratory rate (RR) and systolic blood pressure (SBP) among both groups. Despite the statistical difference, DBP values between groups were found to be clinically similar, which may imply that vital signs are not direct indicators of the adverse outcomes.

In the present study, a significant difference was perceived only in the paCO2, presenting higher values in the group that evolved to death (median of 43.9; p = 0.03), indicating a tendency to hypercapnia. Although pH values did not show statistically significant differences between groups, individuals who were discharged tended toward alkalemia, which is consistent with the hypocapnia observed in this group. Such results are compatible with former studies, such as the work by Bezuidenhout et al.[13], which associated a high pH with a greater survival rate of COVID-19 and acidemia patients with a worse prognosis, while Estenssoro et al.[14] reported a correlation between a lower pCO2 and the hospital discharge.

Furthermore, the group of individuals who evolved to death had a lower PaO_2/FiO_2 ratio, similar to findings of previous studies from several countries[14,19-21]. The PaO2/FiO2 ratio reflects the lung inflammation severity, with the lower values indicating a lower oxygenation and a greater severity[22]. Despite the fact that the degree of lung lesions was not assessed by tomography, further studies describe that the performance of arterial blood gas analysis at admission can indicate the extent of inflammation and aid in the prognosis[22].

In contrast, patients who used oxygen therapy for longer periods were more likely to recover and be discharged from the hospital. Although evidence on the use of oxygen therapy in severe cases of COVID-19 is still limited, international guidelines and experts recommend this approach[23]. A prospective cohort study conducted in 69 countries identified no significant differences in mortality among patients treated with invasive ventilation,

non-invasive ventilation and high-flow oxygen therapy[12], reinforcing the feasibility of non-invasive methods for ventilatory support.

Regarding the respiratory physiotherapy guideline for follow-up procedures, there is no consensus on the ideal PEEP levels for COVID-19 patients on invasive ventilation. While some studies suggest ventilation strategies similar to those implemented in acute respiratory distress syndrome, others diverge[24-26]. Ball et al.[25], in an observational study in Italy, concluded that an increasing PEEP level from 8 to 16 cmH2O did not promote significant alveolar recruitment in patients with severe COVID-19 and worsened respiratory mechanics. Whereas, Rodriguez et al.[27] reported an improved lung recruitment with higher PEEP levels, despite the reduction in lung compliance[27]. While Ball et al.[25] recommend adjusting PEEP levels only to maintain adequate oxygenation, Rodriguez et al.[27] advocate higher levels in specific cases. In the present study, patients undergoing alveolar recruitment maneuvers presented a higher risk of death, which may also have been influenced by the severity of the clinical condition, reflected in the PaO2/FiO2 ratio and in the poor response to the ventilatory support.

It is also noteworthy that higher levels of mobilization were related to an improvement in the health status of patients, with statistically significant values observed in various mobilization modalities, corroborating the then current recommendations that suggested the implementation of exercises and mobilization strategies in such patients[28]. Even though there was a greater adherence to ambulation by the discharged group (n = 21) when compared to the group that evolved to death (n=2), the orthostatic position and ambulation did not present statistically significant associations. As for the use of the cycle ergometer, it is not possible to say with certainty whether the mobilization was active, since the device allows electronic adjustments that enable both passive and active mobilization of the lower or upper limbs. In addition, information on the type of training (active or passive) was not found in all physiotherapeutic records.

Ultimately, the unplanned extubation is considered an adverse event of great relevance in patients undergoing intubation[29]. Such event is associated with hospital complications and increased mortality[30-32]. Consistent with these findings, the present study also found statistically significant results that indicate a higher risk of death in individuals undergoing unplanned extubation.

STUDY LIMITATIONS

This study's findings describe a better clinical outcome for patients who performed the physiotherapeutic exercises more independently, which is important and emphasize the demand to confirm these correlations by conducting studies in other populations with acute viral infections. With that being said, the present study presents some limitations that should be considered. The results herein are based on a single health center and the study design does not allow us to establish definitive causal relationships.

CONCLUSIONS

More than half of the patients in this study had to undergo invasive ventilation during their ICU stay. Older age and unplanned extubation were associated with a higher chance of death, as well as with worse clinical conditions. Physiotherapeutic follow-up care, especially those involving mobilizations, were found to be correlated with the discharge outcome. Additionally, it was observed that the clinical profile of this cohort was composed of male, mixed-race, elderly and individuals with comorbidities.

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CONFLICT OF INTEREST

Nothing to disclose.

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