

Perfil dos profissionais de saúde de um hospital público e sua percepção acerca da atuação do fisioterapeuta no enfrentamento da COVID-19

The profile of health professionals of a public hospital and their perception of the physiotherapist's role and performance during the COVID-19 pandemic

 Georgia Silva Menezes¹,  Sávylla Skalabryne Silva Costa¹,  Gustavo Silva de Azevedo¹

ABSTRACT

The current COVID-19 pandemic is a milestone in the history of recent global health. Other health professionals' knowledge of the physiotherapist's performance can increase health care accessibility. **Objective:** To describe the profile and analyze the perception of health professionals in a public hospital regarding the role and performance of the physiotherapist in dealing with COVID-19 infected patients. **Method:** This is an epidemiological, descriptive, cross-sectional study conducted with health professionals of a general hospital. The participants answered a pre-structured questionnaire with questions about physiotherapists common practices in the hospital setting. **Results:** Thirty professionals were included, with an average of 36.83 years of age, and 86.7% were female. The physiotherapy performance was considered necessary in dealing with COVID-19 (100%), despite the different places where the interviewees worked, different health professions, and their educational levels. Motor (100%) and respiratory (100%) rehabilitation were highlighted as a contribution of physiotherapy to treating patients infected by the coronavirus. Procedures such as the implementation of oxygen therapy (96.7%), non-invasive mechanical ventilation (80%), adjustment of mechanical ventilation parameters (100%), and extubation (70%) were mainly considered as the physiotherapy role. The procedures shared by the multi-professional team were also described, such as the implementation of oxygen therapy (80%), adjustment of ventilatory parameters (86.7%), and aspiration of the airway and artificial airway (90%). **Conclusion:** The physiotherapist has an essential role in dealing with patients infected with COVID-19, associated with a multidisciplinary team, especially in cardiorespiratory and musculoskeletal rehabilitation of patients affected by the coronavirus.

Keywords: COVID-19, Patient Care Team, Physical Therapists

RESUMO

A pandemia atual pelo COVID-19 é um marco na história da saúde mundial recente. O conhecimento da atuação do fisioterapeuta por outros profissionais de saúde torna acessível a assistência em saúde pela equipe. **Objetivo:** Descrever o perfil e analisar a percepção dos profissionais de saúde de um hospital público acerca da atuação do fisioterapeuta no enfrentamento do COVID-19. **Método:** Trata-se de estudo epidemiológico, descritivo, transversal. O estudo teve aprovação do CEP pelo parecer 4078528/2020 e todos os participantes apresentaram aceite no TCLE. Os voluntários responderam ficha pré-estruturada, contendo indagações sobre práticas comuns ao fisioterapeuta na área hospitalar. **Resultados:** Participaram 30 profissionais, com idade média de 36,83 anos, sendo 86,7% do sexo feminino. A atuação da fisioterapia foi considerada importante no enfrentamento da COVID-19 (100%), apesar dos diferentes locais de atuação dos entrevistados, diferentes profissões de saúde e nível de escolaridade dos participantes. Em destaque a reabilitação motora (100%) e respiratória (100%) foi vista como uma contribuição da fisioterapia em pacientes acometidos pelo coronavírus. Procedimentos como a implementação da oxigenoterapia (96,7%), ventilação mecânica não invasiva (80%), ajuste de parâmetros da ventilação mecânica (100%) e extubação (70%), foram considerados majoritariamente como das atribuições da fisioterapia. Foram descritos também os procedimentos compartilhados pela equipe multiprofissional, como a implementação de oxigenoterapia (80%), ajuste de parâmetros ventilatórios (86,7%) e aspiração de via aérea e via aérea artificial (90%). **Conclusão:** O fisioterapeuta tem papel importante no enfrentamento do COVID-19, associado a equipe multiprofissional, em especial na reabilitação cardiorrespiratória e musculoesquelética dos pacientes afetados pelo coronavírus.

¹ Secretária de Saúde do Estado de Goiás, Hospital Estadual Geral de Goiânia

Address for correspondence

Georgia Silva Menezes
E-mail: georgiamenezes.fiso@gmail.com

Submitted: February 14, 2021

Accepted: March 23, 2022

How to cite

Menezes GS, Costa SSS, Azevedo GS. The profile of health professionals of a public hospital and their perception of the physiotherapist's role and performance during the COVID-19 pandemic. Acta Fisiatr. 2022; 29(2):75-80.



10.11606/issn.2317-0190.v29i2a181882



©2022 by Acta Fisiátrica

This work is licensed under a Creative Commons - Attribution 4.0 International

Palavras-chaves: COVID-19, Equipe de Assistência ao Paciente, Fisioterapeutas

INTRODUCTION

In early December 2019, a case of pneumonia of unknown origin was identified in Wuhan, the capital of Hubei.¹ At the end of January 2020, the World Health Organization (WHO)² declared a Public Health Emergency of International Concern due to the outbreak of the disease caused by a novel coronavirus (COVID-19). The WHO designated the disease as a pandemic on March 11, 2020.

COVID-19 is an infectious and potentially fatal disease caused by the SARS-COV2³ coronavirus. The pathophysiology of the disease suggests that the virus binds itself to the Angiotensin-Converting Enzyme 2 (ACE2) receptor by the spike protein and that the lung tissue's epithelial cells are the virus's primary target.⁴ ACE2 can also be found in epithelial cells of the intestine, kidney, and blood vessels.⁵ Hypoxemic respiratory failure is a symptom in moderate and severe cases, requiring oxygen therapy or ventilatory support and causing functional decline.⁶

The pandemic overloaded health systems worldwide, generating extreme demands on health professionals, distressing the physical and emotional well-being of these individuals, and, consequently, negatively impacting their ability to deliver health care.^{7,8} Given this circumstance, physiotherapy plays a fundamental role in caring for patients with complications from COVID-19. The ethical, scientific, and social regulation and control of physiotherapists is led by the Federal Council of Physiotherapy and Occupational Therapy (COFFITO), a Brazilian federal agency created under Law No. 6316 of December 17, 1975.⁹

The physical therapist is the health professional qualified to determine the diagnosis of functional kinetic disorders, the prescription of physical therapy procedures, their ordering, delivery to the patient, functional clinical status evolution monitoring, and the criteria for discharge.¹⁰ Cardiorespiratory physiotherapy intervention in acute and chronic respiratory conditions may contribute to patient recovery, even in a hospital environment.¹¹

Understanding the physiotherapist's role by other health professionals may promote functional and educational rehabilitation interventions, preventive actions for general population health maintenance, and better health care prescription.¹²

OBJECTIVE

This study aims to describe the profile of health professionals in a public hospital and demonstrate their perception of the physiotherapist role during the COVID-19 pandemic.

METHODS

This study has an epidemiological, descriptive, and cross-sectional design, and was conducted at a medium-complexity general hospital, Goiás, Brazil, the Hospital Estadual Geral de Goiânia – Dr. Alberto Rassi (HGG). This hospital serves the entire Midwest Region and other states of the country. It is a public health unit administered by the State Health Department of Goiás (SES/GO). This hospital has been a reference health unit for COVID-19 infected patients since the

announcement of the spread of community transmission of the virus.

Upon the slightest suspicion of COVID-19, patients were assigned to respiratory isolation until a medical diagnosis was established, and patients highly suspected to be infected were referred to COVID-19 dedicated units. Some cases with imminent urgency risk were classified in the orange and yellow categories, being treated at the HGG in isolation wards.

The population of this study was the health professionals of the HGG, a convenience sample with snowball recruitment. The local manager of each medical specialty indicated the first professional of their category to answer a questionnaire. This one participant was asked to indicate another colleague, who, in their turn, would indicate another, and so on. The questionnaire was composed of a form with pre-structured questions, and data were collected between August and September 2020. The Research Ethics Committee approved the study with registration number 4078528/2020, and all participants signed the Informed Consent Form (ICF).

The professionals were selected according to pre-established criteria developed by researchers. The participants should be 18 years old or above, of both sexes, and a health professional, with a complete technical or higher education level who worked at the HGG. Health professionals with a conflict of interest with this research, as the researchers themselves, were not included in the study.

The volunteers were invited to answer the pre-structured questionnaire generated by the research team. We chose to carry out the self-application of the questionnaire due to secrecy and safety issues regarding the participant and researcher and avoid jeopardizing the participant's labor activities. It was standardized that the researcher could only provide essential clarifications concerning the questionnaire if the participants had doubts, avoiding bias, as the volunteers could have different degrees of knowledge regarding the physiotherapist role during the COVID-19 pandemic.

Assessments

An anamnesis form was applied individually after the ICF was signed. This form contained demographical data such as age, profession, length of profession or total work experience, service station, professional role during the pandemic outbreak, and primary outcomes of the patients they treated or assisted;

The study questionnaire. This assessment was an evaluation tool about the role of the physical therapist for oxygen therapy, management of mechanical ventilation, aspiration of upper and artificial airways, implementation of non-invasive ventilation (NIV), performance during extubation of patients under mechanical ventilation, rehabilitation after COVID-19 infection, and safety in physical therapy sessions during the COVID-19 pandemic. The questionnaire consisted of objective scoring questions and a scaling question ranging from 0 to 10 for the safety level.

The data were transcribed into an Excel® spreadsheet and exported for data analysis in the Statistical Package for Social Sciences (SPSS) version 20.0. The descriptive analysis presented categorical variables as an absolute frequency (f) and relative frequency (%) and continuous variables as mean \pm standard

deviation.

The averages obtained for each variable did not probabilistically have, with significant confidence, the correlations among the data studied. Normality was tested with the Shapiro-Wilk test. Correlations were tested with the Spearman correlation test. The significance level was set as 5% ($p < 0.05$), and a confidence interval of 95% was shown for all analyses. We considered the inferential analysis of the variables, however, they had no statistical significance, with a great chance for Type-II (beta error), limiting the application of statistical tests to suitably compare means.

RESULTS

The study sample was composed of 30 health professionals from the HGG. The mean age was 36.83 ± 9.93 years, 86.7% were females, and 13.3% were males. The average profession length was 10.88 ± 8.01 years and the average experience time at the HGG was 5.27 ± 5.86 years. The mean weekly working hours was 42.97 ± 20.57 hours.

Table 1 shows the distribution of HGG health professionals according to their technical profile, income, and role during the COVID-19 pandemic.

The COVID-19 pandemic caused medical leave for 36.7% of health professionals, where 16.7% were due to a diagnosis of COVID-19, and 13.3% presented symptoms of the disease without having access to medical exams. The time of absence longer than two days occurred in 33.4% of the cases.

On the 0 to 10 scale, the mean safety level of physical therapists' performance when coping with COVID-19 patients was 8.60 ± 2.01 , whereas the physical therapist's importance during the pandemic reached a mean of 9.73 ± 0.58 on the same scale. Finally, 100% of the professionals knew the physical therapist's role during the COVID-19 pandemic.

Table 2 presents health professionals' perceptions regarding the physical therapist's role in standard hospital practices.

DISCUSSION

The current COVID-19 pandemic is a milestone in recent world health history.⁶ Our study aimed to determine the perception of the various health professionals in a public hospital regarding the attitudes of physical therapy practice in the hospital environment. We observed the ideal use of resources, technical-scientific knowledge, team motivation, and the guidelines of assertive practices in health promotion, especially during the COVID-19 pandemic. As it is a general hospital, the medical team identified and classified the COVID-19 cases, referred them to smaller units, or delivered the interventions at the hospital.

In the present study, 73.3% of the participating professionals who worked on the front line in the pandemic, with a weekly workload greater than 40 hours on average, are also requested to execute different jobs with different complexity. In this context, the attributions of each role must be delimited, avoiding excessive workload. We also emphasize as another impacting factor the imposed isolation and the use of various personal protective equipment (PPE) essential for the care of patients with COVID-19.⁶

Table 1. Profile of health professionals during the COVID-19 pandemic at a public hospital in Brazil (n= 30)

Variables	f	%
Profession		
Nurse	4	13.3
Nursing technician	4	13.3
Nutritionist	3	10
Nutrition technician	2	6.7
Speech therapist	4	13.3
Psychologist	5	16.7
Social worker	3	10
Physician	4	13.3
Occupational Therapist	1	3.3
Educational level		
Technician	4	13.3
Bachelor	3	10
Specialized	23	76.7
Working in other facilities		
Yes	12	40
No	18	60
Working outside Goiânia city		
No	27	90
Yes	3	10
Monthly income		
1 to 2 minimum wages	3	10
3 to 5 minimum wages	9	30
6 to 7 minimum wages	8	26.7
Above seven minimum wages	10	33.3
Service station at the hospital		
ICU	7	23.3
Inpatient ward	16	53.3
Outpatient or telemedicine	1	3.3
ICU and inpatient ward	3	10
ICU, inpatient ward, and outpatient and telemedicine	2	6.6
Inpatient ward, and outpatient / telemedicine	1	3.3
Played a role during the COVID-19 pandemic		
Yes	22	73.3
No	8	26.7
Patients with confirmed or suspected COVID-19 infection assisted		
1 to 3	6	20
4 to 6	5	16.7
7 to 9	5	16.7
10 or more	11	36.7
Did not assist any patient	3	10
Patients with COVID-19 under intubation		
Yes	22	73.3
No	8	26.7
The outcome of patients with COVID-19		
Hospital discharge in up to 7 days	4	13.3
Hospital discharge from 8 to 14 days	3	10
Hospital discharge from 15 to 21 days	8	26.7
Hospital discharge from 22 to 28 days	4	13.3
Hospital discharge after 30 days	3	10
Death	12	40

ICU: Intensive care unit; f: absolute frequency; %: relative frequency; Minimum wage in July 2022: R\$1.212,00

Some studies describe that professionals in direct contact with COVID-19 infected patients have undergone work-related psychological stress, with frequent somatic symptoms, high levels of exhaustion, fear of infection, fear that someone close to them may be infected, and the fear that they may infect a family member. In addition, the restriction of social contact negatively affected the quality of life and mental health of such professionals.^{7,8}

In our study, the physical therapist was unanimously considered an essential professional facing the COVID-19 pandemic. However, on a numerical scale from 0 to 10, the average safety level of the physical therapist's performance in dealing with the coronavirus was rated as 8.60. The participants' different levels of knowledge about the Physiotherapy role caused oscillations in the perceived safety concerning the performance of the physical therapist, despite the notorious acknowledgment of their importance during the COVID-19 pandemic.

The Intensive Care Physiotherapy professional, who works in a hospital setting, prescribes and executes physiotherapeutic practices according to the kinetic-functional assessment, management of spontaneous, invasive, and non-invasive ventilation, the introduction of non-invasive mechanical ventilation support, weaning, and extubation of, in addition to the assessment, and the titration of oxygen therapy.¹³ All participants in this study (n= 30) demonstrated that they knew that the physical therapist addresses the cardiorespiratory and neuro-musculoskeletal rehabilitation of critical or potentially critical patients, including those with COVID-19.

Hypoxemia related to acute respiratory distress syndrome (ARDS) in adults with COVID-19 is a relevant factor, present in about 19% of this population, and oxygen therapy is the most prominent treatment.¹⁴ The Brazilian Health Regulatory Agency (Anvisa), in its resolution #70/2008, considers oxygen as a medical gas.¹⁵ In our study, 96.7% of participants consider that the physical therapist can implement oxygen therapy, and 80% admit that it is a shared role within the multi-professional team and that it is not an exclusive function of the physical therapist. The physical therapist is trained to perform the titration of oxygen therapy in a hospital setting.¹³

As an alternative to treating patients for whom the oxygen therapy alone is insufficient, interventions such as non-invasive ventilation (NIV) and high-flow nasal cannula can be used, given that the professionals can apply such interventions with safety.¹⁶ In our study sample, 80% of respondents consider that the physical therapist can implement NIV. The literature has also evidenced beneficial results of non-invasive interventions in patients with ARDS by the coronavirus, as long as it is associated with an assertive categorization to avoid contamination by aerosols. It is necessary to observe the correct indication and the disease progression to avoid delay in orotracheal intubation.¹⁷

In our study sample, 83.3% of professionals considered that the physical therapist may perform orotracheal intubation with the clinical team. About 73.3% of the patients treated at the hospital underwent orotracheal intubation. Furthermore, given its high risk of contamination, personal protective equipment is imperative, and it is recommended that no other personnel, except the professionals who conduct the orotracheal intuba-

Table 2. Questionnaire on the health professional's perception regarding the role of physiotherapists during the COVID-19 pandemic (n= 30)

Questions / Answers	f	%
Do Physiotherapists implement oxygen therapy?		
Yes	29	96.7
No	1	3.3
Is oxygen therapy an exclusive activity of physiotherapists?		
Yes	6	20
No	24	80
Do Physiotherapists implement non-invasive ventilation?		
Yes	24	80
No	6	20
Do Physiotherapists assist in orotracheal intubation?		
Yes	25	83.3
No	5	16.7
Do physiotherapists adjust ventilation parameters?		
Yes	30	100
No	0	-
Are ventilation adjustments an exclusive activity of the physiotherapist?		
Yes	4	13.3
No	26	86.7
Do physiotherapists perform airway ventilation or artificial airway ventilation?		
Yes	30	100
No	0	-
Are airway ventilation and artificial airway ventilation exclusive activities of the physiotherapist?		
Yes	3	10
No	27	90
Can a physiotherapist perform extubation?		
Yes	21	70
No	9	30
Do physiotherapists play a role in motor rehabilitation?		
Yes	30	100
No	0	-
Do physiotherapists play a role in respiratory rehabilitation?		
Yes	30	100
No	0	-

f: absolute frequency; %: relative frequency

tion, stay in the room during the procedure.¹⁸ Orotracheal intubation is an exclusive activity for the physician,¹⁹ but there is assistance from the multidisciplinary team.

A sensitive issue in a hospital setting is the airways aspiration, which may be artificial. The procedure is described as an aerosol generator, and it should preferably be performed with a closed suction circuit and the use of PPE.²⁰ All interviewees consider that it is the physical therapist's role to perform aspiration of airways and artificial airways. However, 90% of the participants do not consider it an exclusive role of physical therapists.

Progressive weaning from mechanical ventilation until

extubation is also regulated as a physical therapist's role in an intensive care setting.¹³ An ideal protective ventilation strategy is required, and weaning should be performed with low inspiratory and expiratory pressures.¹⁸

In our study, 70% of participants suggest that mechanical ventilation extubation is the physical therapist's responsibility. Regarding the adjustment of ventilatory parameters, all participants (n= 30) consider that the procedure is the physical therapist's role. However, 86.7% considers it not an exclusive role for physical therapists. The Brazilian Federal Nursing Council recently defined the nurses' role for patients in mechanical ventilation in a hospital or outpatient setting.²¹

Procedures such as the assembly, testing, and installation of invasive and non-invasive mechanical ventilation devices, monitoring, checking alarms, fixing, and centralizing the tracheal tube, as well as monitoring the cuff pressure, its correct positioning, and the assessment and realization of airways aspiration in patients under mechanical ventilation are also roles of nurses.²¹ In integrated multi-professional care, the initial adjustment and management of mechanical ventilation parameters, both in the invasive and non-invasive strategies, must be carried out under medical coordination.²¹

A considerable result of this study indicates that all the participants consider the physical therapist's role in respiratory and motor rehabilitation to be relevant, similar to the observations of Physiotherapy practices during the COVID-19 pandemic.⁶

Studies show that COVID-19 infection can have serious consequences, such as dyspnea, fatigue, dynapenia, and mental related health.²² In this context, rehabilitation with individualized protocols is essential for functional recovery.²²

During COVID-19 infection, physiotherapy is positively associated with gait recovery, reduction of oxygen demand, and early discharge.⁶ However, the participants identified that among the patients assisted by physiotherapists, 26.7% were discharged between 15 and 21 days, and the prevalence of death was about 40%.

Our findings suggest a cutting-edge discussion regarding the physical therapy practice, especially in the context of the COVID-19 pandemic, from the point of view of other health professionals in a hospital setting. Such discussions can guide health institutions to improve management and patient care, promoting continuing education programs for better multi-professional integration.

Our study had a small sample size, reducing the generalization, and it might have been biased given the self-selection sampling procedure (snowball), resulting in a non-representative sample. Additionally, the statistical analysis was descriptive due to its methodological characteristic. Nonetheless, our results may direct other studies with a more comprehensive framework.

CONCLUSION

This study addresses health professionals' perception regarding the performance of physiotherapy and its relevance in coping with COVID-19. Motor and respiratory rehabilitation of patients infected by the coronavirus was especially seen as a contribution of physiotherapy. Procedures such as the

implementation of oxygen therapy, NIV, adjustment of mechanical ventilation parameters, and extubation were considered mostly as part of physiotherapy attributions. The implementation of oxygen therapy, adjustment of ventilatory parameters, and airways aspiration were considered procedures shared by the multidisciplinary team.

With other methodological approaches, future studies can promote the stratification of clinical outcomes and hospital discharge of patients with COVID-19, and the systematic follow-up, monitoring, and assessment of multidisciplinary interventions.

REFERENCES

- Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497-506. Doi: [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5)
- Organização Pan-Americana da Saúde. Folha informativa – COVID-19 [texto na Internet]. Brasília: OPAS [citado 2020 Abr 22]. Disponível em: <https://www.paho.org/pt/covid19>
- Rothan HA, Byrareddy SN. The epidemiology and pathogenesis of coronavirus disease (COVID-19) outbreak. *J Autoimmun*. 2020;109:102433. Doi: <https://doi.org/10.1016/j.jaut.2020.102433>
- Liu W, Li H. COVID-19: Attacks the 1-Beta Chain of Hemoglobin and Captures the Porphyrin to Inhibit Human Heme Metabolism. *ChemRxiv*. Cambridge: Cambridge Open Engage; 2020. Doi: <https://doi.org/10.26434/chemrxiv.11938173.v9>
- Wan Y, Shang J, Graham R, Baric RS, Li F. Receptor Recognition by the Novel Coronavirus from Wuhan: an Analysis Based on Decade-Long Structural Studies of SARS Coronavirus. *J Virol*. 2020;94(7):e00127-20. Doi: <https://doi.org/10.1128/JVI.00127-20>
- Jiandani MP, Salagre SB, Kazi S, Iyer S, Patil P, Khot WY, et al. Preliminary observations and experiences of physiotherapy practice in acute care setup of COVID 19: a retrospective observational study. *J Assoc Physicians India*. 2020;68(10):18-24.
- Barello S, Palamenghi L, Graffigna G. Burnout and somatic symptoms among frontline healthcare professionals at the peak of the Italian COVID-19 pandemic. *Psychiatry Res*. 2020;290:113129. Doi: <https://doi.org/10.1016/j.psychres.2020.113129>
- Stojanov J, Malobabic M, Stanojevic G, Stevic M, Milosevic V, Stojanov A. Quality of sleep and health-related quality of life among health care professionals treating patients with coronavirus disease-19. *Int J Soc Psychiatry*. 2021;67(2):175-181. Doi: <https://doi.org/10.1177/0020764020942800>
- Conselho Federal de Fisioterapia e Terapia Ocupacional [homepage na Internet]. Brasília: COFFITO; c2020 [citado 2020 Out 12]. Disponível em: https://www.coffito.gov.br/nsite/?page_id=9

10. Conselho Regional de Fisioterapia e Terapia Ocupacional da 11ª Região [homepage na Internet]. Brasília: CREFITO 11; c2020 [citado 2020 Out 12]. Disponível em: <https://www.crefito11.gov.br/copia-fisioterapia>
11. Thomas P, Baldwin C, Bissett B, Boden I, Gosselink R, Granger CL, et al. Physiotherapy management for COVID-19 in the acute hospital setting: clinical practice recommendations. *J Physiother.* 2020;66(2):73-82. Doi: <https://doi.org/10.1016/j.jphys.2020.03.011>
12. Oliveira G, Andrade ES, Santos ML, Matos GSR. Conhecimento da equipe de saúde da família acerca da atuação do fisioterapeuta na atenção básica. *Rev Bras Promoç Saúde.* 2011;24(4):332-9. Doi: <https://doi.org/10.5020/2090>
13. Conselho Federal de Fisioterapia e Terapia Ocupacional. Resolução n. 402, de 3 de Agosto de 2011. Disciplina a Especialidade Profissional Fisioterapia em Terapia Intensiva e dá outras providências. *Diario Oficial da Republica Federativa do Brasil, Brasília (DF);* 2011 Nov 24 [citado 2020 Out 12]. Disponível em: <https://www.coffito.gov.br/nsite/?p=3165>
14. Wu Z, McGoogan JM. Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72 314 cases from the Chinese Center for Disease Control and Prevention. *JAMA.* 2020;323(13):1239-42. Doi: <https://doi.org/10.1001/jama.2020.2648>
15. Agência Nacional de Vigilância Sanitária. Resolução n. 70, de 1 de Outubro de 2008. Dispõe sobre a notificação de Gases Medicinais. *Diario Oficial da Republica Federativa do Brasil, Brasília (DF);* 2008 Out 2 [citado 2020 Nov 14]. Disponível em: https://bvsms.saude.gov.br/bvs/saudelegis/anvisa/2008/res0070_01_10_2008.html
16. Alhazzani W, Møller MH, Arabi YM, Loeb M, Gong MN, Fan E, et al. Surviving sepsis campaign: guidelines on the management of critically ill adults with coronavirus disease 2019 (COVID-19). *Crit Care Med.* 2020;48(6):e440-e469. Doi: <https://doi.org/10.1097/CCM.0000000000004363>
17. Cabrini L, Ghislanzoni L, Severgnini P, Landoni G, Baiardo Redaelli M, Franchi F, et al. Early versus late tracheal intubation in COVID-19 patients: a "pros/cons" debate also considering heart-lung interactions. *Minerva Cardiol Angiol.* 2021;69(5):596-605. Doi: <https://doi.org/10.23736/S2724-5683.20.05356-6>
18. Righetti RF, Onoue MA, Politi FVA, Teixeira DT, Souza PN, Kondo CS, et al. Physiotherapy care of patients with coronavirus disease 2019 (COVID-19) - a brazilian experience. *Clinics (Sao Paulo).* 2020;75:e2017. Doi: <https://doi.org/10.6061/clinics/2020/e2017>
19. Brasil. Presidência da República. Lei N. 12.842, de 10 de Julho de 2013. Dispõe sobre o exercício da Medicina. *Diario Oficial da Republica Federativa do Brasil, Brasília (DF);* 2013 Jul 11 [citado 2020 Nov 20]. Disponível em: http://www.planalto.gov.br/ccivil_03/_ato2011-2014/2013/lei/l12842.htm
20. Jackson T, Deibert D, Wyatt G, Durand-Moreau Q, Adishes A, Khunti K, et al. Classification of aerosol-generating procedures: a rapid systematic review. *BMJ Open Respir Res.* 2020;7(1):e000730. Doi: <https://doi.org/10.1136/bmjresp-2020-000730>
21. Conselho Federal de Enfermagem. Resolução n. 639, de 6 de maio de 2020. Dispõe sobre as competências do Enfermeiro no cuidado aos pacientes em ventilação mecânica no ambiente extra e intra-hospitalar. *Diario Oficial da Republica Federativa do Brasil, Brasília (DF);* 2020 Maio 8; Seção 1: 222.
22. De Biase S, Cook L, Skelton DA, Witham M, Ten Hove R. The COVID-19 rehabilitation pandemic. *Age Ageing.* 2020;49(5):696-700. Doi: <https://doi.org/10.1093/ageing/afaa118>