ADVERSE EVENTS IN PATIENTS WITH COVID-19 ADMITTED TO INTENSIVE CARE UNITS

EVENTOS ADVERSOS EM PACIENTES COM COVID-19 INTERNADOS EM UNIDADES DE TERAPIA INTENSIVA

EVENTOS ADVERSOS EN PACIENTES CON COVID-19 INGRESADOS EN UNIDADES DE CUIDADOS INTENSIVOS

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ABSTRACT

Introduction: patient safety is defined as reducing the risk of unnecessary harm associated with health care to an acceptable minimum. Adverse events are classified as unintentional harm resulting from care, which results in harm to the patient, and are at greater risk of occurring in patients admitted to intensive care units, such as critically ill patients affected by SARS-CoV-2.

Objective: to assess the prevalence of adverse events in patients with COVID-19 admitted to intensive care units.

Methods: cross-sectional, descriptive study, carried out in a regional referral hospital in the interior of Bahia, with patients of both sexes and aged 18 years or older, admitted to COVID-19 intensive care units in 2020 and 2021. Data tabulation was performed in Microsoft Excel® and statistical analysis occurred in the Statistical Package for the Social Sciences®, version 21.0. The project was approved by the Research Ethics Committee of the State University of Southwest Bahia, according to protocol no. 5,540,827 and CAAE 39003220.1.0000.0055.

Results: 488 medical records were analyzed, with the majority of patients being male (53.3%), elderly (60.5%), black/brown race/color (96.0%) and with systemic arterial hypertension (67.0%). The most frequent adverse events were pressure injury (23.8%), healthcare-associated infections (16.8%) and more than 14 days on invasive mechanical ventilation without performing tracheostomy (15.8%).

Conclusion: the most frequent adverse events may be related to the situation in which critically ill patients with COVID-19 were subjected, requiring mechanical ventilation for long periods, sedated and without much mobility in bed.

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Keywords: Patient Safety. SARS-CoV-2. Intensive Care Units.

RESUMO

Introdução: a segurança do paciente é definida como a redução do risco de dano desnecessário associado à assistência à saúde, a um mínimo aceitável. Os eventos adversos são classificados como dano não intencional decorrente da assistência, que resultam em dano ao paciente, possuindo maior risco de ocorrer em pacientes internados em unidades de terapia intensiva, como os pacientes em estado crítico acometidos pelo SARS-CoV-2.

Objetivo: avaliar a prevalência de eventos adversos em pacientes com COVID-19 internados em unidades de terapia intensiva.

Métodos: estudo transversal, descritivo, realizado em um hospital de referência regional do interior da Bahia, com pacientes de ambos os sexos e com idade igual ou superior a 18 anos, internados em unidades de terapia intensiva COVID-19 nos anos 2020 e 2021. A tabulação dos dados foi realizada no programa Microsoft Excel® e a análise estatística ocorreu no programa Statistical Package for the Social Sciences®, versão 21.0. O projeto foi aprovado pelo Comitê de Ética em Pesquisa da Universidade Estadual do Sudoeste da Bahia, conforme protocolo n° 5.540.827 e CAAE 39003220.1.0000.0055.

Resultados: foram analisados 488 prontuários, sendo a maioria dos pacientes do sexo masculino (53,3%), idosos (60,5%), raça/cor preto/pardo (96,0%) e com hipertensão arterial sistêmica (67,0%). Os eventos adversos mais frequentes foram lesão por pressão (23,8%), infecções relacionadas à assistência à saúde (16,8%) e mais de 14 dias em ventilação mecânica invasiva sem realizar traqueostomia (15,8%).

Conclusão: os eventos adversos mais frequentes podem ser relacionados com a situação em que os pacientes críticos com COVID-19 ficavam submetidos, necessitando de ventilação mecânica por longos períodos, sedados e sem muita mobilidade no leito.

Palavras-chave: Segurança do Paciente. SARS-CoV-2. Unidades de Terapia Intensiva.

RESUMEN

Introducción: la seguridad del paciente se define como la reducción a un mínimo aceptable del riesgo de daños innecesarios asociados con la atención médica. Los eventos adversos se clasifican como daños no intencionales derivados de la atención, que resultan en daño al paciente y tienen mayor riesgo de ocurrir en pacientes ingresados en unidades de cuidados intensivos, como los pacientes críticos afectados por SARS-CoV-2.

Objetivo: evaluar la prevalencia de eventos adversos en pacientes con COVID-19 ingresados en unidades de cuidados intensivos.

Métodos: estudio descriptivo transversal, realizado en un hospital regional de referencia del interior de Bahía, con pacientes de ambos sexos, mayores de 18 años, ingresados en unidades de cuidados intensivos por COVID-19 en 2020 y 2021. La tabulación de datos se realizó en Microsoft Excel® y el análisis estadístico se realizó con el Paquete Estadístico para las Ciencias Sociales®, versión 21.0. El proyecto fue aprobado por el Comité de Ética en Investigación de la Universidad Estatal del Suroeste de Bahía, según el protocolo n.º 5.540.827 y la CAAE 39003220.1.0000.0055.

Resultados: se analizaron 488 historias clínicas, siendo la mayoría de los pacientes varones (53,3%), adultos mayores (60,5%), de raza negra/morena (96,0%) y con hipertensión arterial sistémica (67,0%). Los eventos adversos más frecuentes fueron lesión por presión (23,8%), infecciones asociadas a la atención médica (16,8%) y más de 14 días con ventilación mecánica invasiva sin traqueotomía (15,8%).

Conclusión: los eventos adversos más frecuentes pueden estar relacionados con la situación en la que fueron sometidos los pacientes críticos con COVID-19, requiriendo ventilación mecánica por largos periodos, sedados y sin mucha movilidad en la cama.

Palabras clave: Seguridad del Paciente. SARS-CoV-2. Unidades de Cuidados Intensivos.

1 INTRODUCTION

Patient safety had an important impact after the publication of the report *To Err is Human* by the *Institute of Medicine* (IOM) in 2000, which reported that in the United States of America (USA) about 98,000 people die per year in hospitals due to adverse events (AE) (Kohn; Corrigan; Donaldson, 2000). According to the World Health Organization (WHO), patient safety is defined as reducing the risk of unnecessary harm associated with health care to an acceptable minimum (WHO, 2009).

AEs are classified as unintentional harm resulting from care, which is not related to the evolution of the underlying disease and results in harm to the patient (WHO, 2009). In addition, AEs are a problem due to the prolongation of hospitalization time and mortality, as well as the increase generated in hospitalization costs (Resende *et al*., 2020; Castling; Tonini; Melo, 2016).

In Brazil, the Ministry of Health instituted the National Patient Safety Program (PNSP) through Ordinance No. 525/2013, establishing several basic protocols in order to avoid AEs: hand hygiene; safe surgery; safety in the prescription, use, and administration of medications; patient identification; communication in health facilities; fall prevention; pressure ulcers; transfer of patients between points of care; and safe use of equipment and materials (Brazil, 2013; Brazil, 2014).

In the environment of intensive care units (ICUs), where patients are in critical condition, being submitted to numerous therapeutic interventions, the risk of AE occurring is even greater, negatively impacting care (Roque; Tonini; Melo, 2016). According to an integrative review conducted by Barbosa *et al*. (2021), the AEs that most compromise the safety of patients in ICUs are the occurrence of pressure injuries, falls, and damage in catheter management, and they are more related to the care provided by the nursing team.

With the pandemic caused by the SARS-CoV-2 virus, health professionals were subjected to conditions that contributed to further compromise patient safety, including a high workload, a shortage in the composition of the team, a greater flow of patients, adaptations in work routines, and a shortage of equipment and medicines (Berggren *et al*., 2023). According to Rosen *et al*. (2022), the increase in COVID-19 cases was significantly associated with an increase in patient safety risks experienced and

perceived. Therefore, this study aimed to evaluate the prevalence of adverse events in patients with COVID-19 admitted to intensive care units.

2 METHODS

2.1 STUDY DESIGN

This is a cross-sectional, descriptive study, based on the database of the project "Monitoring of patients with COVID-19 from a public hospital in the interior of Bahia".

2.2 BACKGROUND

The research was carried out in a regional referral hospital for urgent and emergency situations and in intensive care in severe cases of COVID-19, during the pandemic period. It is a hospital located in the Southwest region of Bahia, serving a population of more than 600 thousand inhabitants of 26 municipalities. The unit has 370 beds, and during the pandemic period, two new ICUs were opened, totaling five ICUs, three of which were intended for the treatment of the coronavirus, with a total of 29 beds (SESAB, n.d.).

2.3 PARTICIPANTS

Patients of both sexes who were diagnosed with COVID-19 and were admitted to ICUs 1, 2, and 5 during 2020 and 2021 participated in the study. Patients who were younger than 18 years of age and those who stayed less than 24 hours in the ICUs were excluded from the medical records.

2.4 COLLECTION PROCEDURES

Data were collected between September 2022 and November 2023, using the medical records of patients admitted to COVID-19 ICUs in 2020 and 2021. A structured form was developed in *Google Forms*® to meet the objectives of the research. A pilot study was carried out with the form in 10 medical records, which were included after adjustments to the form.

2.5 STUDY VARIABLES

(i) Sociodemographic: sex (female, male), age group (<60 years, >60 years), race/color (black/brown, others), marital status (with partner, without partner).

(ii) Comorbidities: Chronic obstructive pulmonary disease **(**COPD), chronic kidney disease (CKD), diabetes mellitus (DM), systemic arterial hypertension (SAH), immunosuppressed, obesity, asthma (categorized as yes and no).

(iii) Adverse events: misidentification, device removed/ripped out, drain loss, tube loss, catheter loss, access loss, orotracheal tube loss (OTT), accidental extubation, more than 14 days on invasive mechanical ventilation (IMV) without performing tracheostomy (TQT), selective intubation, TQT with false path/pertuito, puncture accident, iatrogenic pneumothorax, unsuccessful puncture, falls, pressure injuries, bronchoaspiration, healthcare-associated infections (HAIs), prescription errors, lack of medication.

2.6 DATA ANALYSIS

Data were tabulated using *Microsoft Excel*® and statistical analysis was performed using *the Statistical Package for the Social Sciences*® (SPSS), version 21.0. Data analysis was performed descriptively for categorical variables, using absolute (n) and relative (%) frequency, and the mean and standard deviation were evaluated for continuous variables.

2.7 ETHICAL ASPECTS

The project was submitted to and approved by the Research Ethics Committee of the State University of Southwest Bahia (UESB), Jequié campus, according to protocol No. 5.540.827 and CAAE 39003220.1.0000.0055, in accordance with Resolution 466/12 of the National Health Council (Brasil, 2012). As this was a study with secondary data, the Free and Informed Consent Form (ICF) was waived.

3 RESULTS

A total of 488 medical records were analyzed and, in relation to sociodemographic data, most patients were male (53.3%), elderly (60.5%) with a mean age of 63.17 years

(SD ±16.95) and black/brown race/color (96.0%). Among the comorbidities, the highest frequency was hypertension (67.0%), DM (45.1%), and obesity (25.1%), Table 1.

Table 1

Sociodemographic variables, lifestyle, and comorbidities of patients with COVID-19 admitted to intensive care units. Bahia, Brazil, 2020-2021

Variables	N	%
Gender (n = 488)		
Male	260	53,3
Female	228	46,7
Age group (n = 488)		
Not elderly	193	39,5
Old	295	60,5
Race/color (n = 374)		
Black/Brown	359	96,0
Other	15	4,0
Marital status (n = 373)		
With partner	149	39,9
No companion	224	60,1
Drinker (n = 488)		
Yes	41	8,4
No	447	91,6
Smoker (n = 488)		
Yes	109	22,3
No	379	77,7
Chronic Obstructive Pulmonary Disease (n = 488)		
Yes	68	13,9
No	420	86,1
Chronic Kidney Disease (n = 488)		
Yes	40	8,2
No	448	91,8
Diabetes Mellitus (n = 488)		
Yes	220	45,1
No	268	54,9
Systemic Arterial Hypertension (n = 488)		
Yes	327	67,0
No	161	33,0
Immunosuppressed (n = 488)		
Yes	11	2,3
No	477	97,7
Obesity (n = 482)		
Yes	121	25,1
No	361	74,9
Asthma (n = 481)		

Yes	15	3,1
No	466	96,9

Source: elaboration by the authors.

Based on the AEs analyzed, the most frequent during care for patients with COVID-19 in the ICU were pressure injuries (23.8%), HAIs (16.8%), and the patient's stay in IMV for more than 14 days without performing TQT (15.8%), as shown in Table 2.

Table 2

Adverse events occurring during the hospitalization of patients with COVID-19 in intensive care units. Bahia, Brazil, 2020-2021

Variables	N	%
Misidentification (n = 488)		
Yes	4	0,8
No	484	99,2
Removed/ripped device (n = 488)		
Yes	38	7,8
No	450	92,2
Loss of drain (n = 488)		
Yes	2	0,4
No	486	99,6
Probe loss (n = 488)		
Yes	20	4,1
No	468	95,9
Catheter loss (n = 488)		
Yes	3	0,6
No	485	99,4
Loss of access (n = 488)		
Yes	10	2,0
No	478	98,0
Loss of TOT (n = 488)		
Yes	1	0,2
No	487	99,8
Accidental extubation (n = 488)		
Yes	16	3,3
No	472	96,7
More than 14 days on IMV without performing TQT (n = 488)		
Yes	77	15,8
No	411	84,2
Selective intubation (n = 488)		
Yes	12	2,5
No	476	97,5
TQT with false path/pertuito (n = 488)		
Yes	2	0,4
No	486	99,6
Puncture accident (n = 488)		
Yes	1	0,2
No	487	99,8
Iatrogenic pneumothorax (n = 488)		

Yes	10	2,0
No	478	98,0
Unsuccessful puncture (n = 488)		
Yes	11	2,3
No	477	97,7
Fall (n = 488)		
Yes	4	0,8
No	484	99,2
Pressure injury (n = 488)		
Yes	116	23,8
No	372	76,2
Bronchial aspiration (n = 488)		
Yes	17	3,5
No	471	96,5
IRAS (n = 488)		
Yes	82	16,8
No	406	83,2
Error in the prescription (n = 488)		
Yes	2	0,4
No	486	99,6
Lack of medication (n = 445)		
Yes	20	4,5
No	425	95,5

Source: elaboration by the authors.

4 DISCUSSION

It was possible to observe that the main AEs found in patients with COVID-19 admitted to ICUs were related to the occurrence of pressure injuries, HAIs, and the patient's stay in IMV for more than 14 days without TQT.

Among COVID-19 patients admitted to ICUs, there was a higher prevalence of males and the elderly. Studies show that men were at higher risk of developing severe forms of COVID-19, possibly due to the influence of male sex hormones on the expression of enzymes, such as angiotensin-converting enzyme 2 (ACE-2), which facilitate the entry of SARS-CoV-2 into cells. In addition, they also demonstrate that advanced age was significantly associated with disease severity, due to the weakening of the immune system and the presence of comorbidities common in older people (Fang *et al*., 2020; Silaghi-Dumitrescu *et al*., 2023).

Regarding comorbidities, SAH was the one with the highest prevalence. According to Ribeiro and Uehara (2022), SAH was associated with an increased risk of developing severe forms of COVID-19 and higher mortality, due to the intensification of inflammatory storms caused by the presence of SAH and the lower protection of organs against injury.

This is due, in part, to the imbalance in the renin-angiotensin-aldosterone system (RAAS), triggered by the binding of SARS-CoV-2 to the ACE-2 enzyme.

In relation to AEs, pressure injuries usually occur in bedridden patients, and the factors that contribute to its appearance can be divided into: intrinsic, which include unconsciousness, immobility, alteration in nutritional status, cardiovascular diseases, such as cerebrovascular accident (CVA); and extrinsic factors are related to the lack of prevention measures, such as the use of an inappropriate mattress, friction and shear of the patient on the bed, and humidity (Ferro *et al*., 2020).

Regarding the pandemic scenario, the study by Melo *et al*. (2023), showed that the prevalence of pressure injuries in patients with COVID-19 admitted to the ICU was 42.5%, and the associated factors were length of stay, prone position, and ventilatory therapy.

Pressure ulcers are a constant AE in the ICU, and can prolong the length of hospital stay, cause pain and discomfort to the patient, increase the risk of infections, and increase costs and patient care (Felisberto; Takashi, 2022). That is why it is important that institutions have standardized protocols to prevent them, and the nursing team is closer to the patient to carry out interventions and provide comprehensive care, both in the prevention and treatment of pressure injuries (Felisberto; Takashi, 2022; Ferro *et al*., 2020).

Another avoidable AE observed was HAIs, which are infections that occur due to patients undergoing care procedures in the hospital environment (Brasil, 2021). According to the literature, invasive devices are directly associated with the risk of infections because they facilitate the entry of pathogens into the body, in addition to their inadequate handling and prolonged use increasing the possibility of infections (Blot *et al.*, 2022). According to Silva *et al*. (2023), most of the HAI found in his study were associated with the use of invasive devices such as MV (53.7%), central venous catheter (CVC) (16.4%), and indwelling urinary catheter (SVD) (3.0%).

Patients who require advanced support in ICUs, such as those who have progressed to severe forms of COVID-19, develop HAI more frequently, mainly due to the duration of IMV and ICU stay, with a higher risk of death (Bardi *et al*., 2021; Damico *et al*., 2023). Therefore, it is necessary for the hospital unit to adopt safety measures to

minimize HAIs, such as the protocol established by the PNSP for hand hygiene, and also the use of *bundles* (Brasil, 2014).

Regarding the duration of IMV, 15.8% of the patients remained on IMV for more than 14 days without undergoing TQT, and TQT is indicated in cases of prolonged orotracheal intubation, that is, when extubation is unlikely to occur before 10 to 14 days (EBSERH, 2020). However, in relation to patients on IMV due to COVID-19, there were questions about the right time to perform TQT, and the fact that this procedure generates aerosols could put health professionals at risk of infection (Ji *et al*., 2022; Rappoport *et al., 2020*).

However, a systematic review and meta-analysis showed that performing early TQT was associated with shorter IMV duration and ICU length of stay, as well as could reduce the incidence of ventilator-associated pneumonia (VAP), although there were no differences in the overall mortality rate (Ji *et al*., 2022).

The three AEs that presented the highest frequencies may be related to the situation in which critically ill patients with COVID-19 were submitted, since long periods in IMV increase the risk of VAP, a type of HAI, and due to sedation, it also makes it difficult to reposition the patient in bed, increasing the chances of pressure injury, which can also lead to the development of HAIs.

The limitations of this study are related to the lack of detailed information in the medical records, and there may be underreporting of AE due to the overload of health professionals at the time of the pandemic. However, it was possible to know the AEs that affected patients during this period and, through this, new studies can be carried out to discuss strategies to improve patient safety.

5 CONCLUSION

It was concluded that the most frequent AEs in patients with COVID-19 who required ICU admission were pressure injuries, HAIs, and more than 14 days on IMV without undergoing TQT, and the three can be related to the situation in which critically ill patients with COVID-19 were submitted, requiring IMV for long periods, sedated and without much mobility in bed.

REFERENCES

Barbosa, I. E. B., de Oliveira, A. B., & de Almeida, R. C. (2021). Segurança do paciente: Principais eventos adversos na unidade terapia intensiva. Revista Eletrônica Acervo Saúde, 13(2), e6454. https://doi.org/10.25248/reas.e6454.2021

Bardi, T., Pintado, V., Gomez-Rojo, M., Escudero-Sanchez, R., Lopez, A. A., Diez-Remesal, Y., Castro, J. G., Ruiz-Garbajosa, P., & Pestaña, D. (2021). Nosocomial infections associated to COVID-19 in the intensive care unit: Clinical characteristics and outcome. European Journal of Clinical Microbiology & Infectious Diseases, 40(3), 495–502. https://doi.org/10.1007/s10096-020-04142-w

Berggren, K., Ekdahl, A., Erlandsson, M., Erlandsson, L., & Gunnarsson, M. (2023). Healthcare workers' experiences of patient safety in the intensive care unit during the COVID-19 pandemic: A multicentre qualitative study. Journal of Clinical Nursing, 32(19–20), 7372–7381. https://doi.org/10.1111/jocn.16793

Blot, S., Ruppé, E., Harbarth, S., & Zahar, J.-R. (2022). Healthcare-associated infections in adult intensive care unit patients: Changes in epidemiology, diagnosis, prevention and contributions of new technologies. Intensive and Critical Care Nursing, 70, 103227. https://doi.org/10.1016/j.iccn.2022.103227

Brasil. Agência Nacional de Vigilância Sanitária. (2021). Programa Nacional de Prevenção e Controle de Infecções Relacionadas à Assistência à Saúde (PNPCIRAS) 2021 a 2025. https://www.gov.br/anvisa/pt-br/centraisdeconteudo/publicacoes/servicosdesaude/publicacoes/pnpciras_2021_2025.pdf

Brasil. Conselho Nacional de Saúde. (2013). Resolução nº 466, de 12 de dezembro de 2012. Diário Oficial da União. https://www.gov.br/conselho-nacional-de-saude/pt-br/atos-normativos/resolucoes/2012/resolucao-no-466.pdf/view

Brasil. Ministério da Saúde. (2014). Documento de referência para o Programa Nacional de Segurança do Paciente. Ministério da Saúde. https://bvsms.saude.gov.br/bvs/publicacoes/documento_referencia_programa_nacional_seguranca.pdf

Brasil. Ministério da Saúde. (2013). Portaria nº 529, de 1º de abril de 2013. Institui o Programa Nacional de Segurança do Paciente (PNSP). Diário Oficial da União, 150(62), 43–44. https://bvsms.saude.gov.br/bvs/saudelegis/gm/2013/prt0529_01_04_2013.html

Damico, V., Murano, L., Demoro, G., Russello, G., Cataldi, G., & D'Alessandro, A. (2023). Co-infections among COVID-19 adult patients admitted to intensive care units: Results from a retrospective study. Annali di Igiene, Medicina Preventiva e di Comunità, 35(1), 53–64. https://annali-igiene.it/articoli/2023/1/05-Damico.pdf

Empresa Brasileira de Serviços Hospitalares – EBSERH. (2020). Traqueostomia: Indicações e orientações de cuidado ao paciente adulto. https://www.gov.br/ebserh/pt-br/hospitais-universitarios/regiao-sudeste/hc-uftm/documentos/protocolos-assistenciais/traqueostomia-adulto-final.pdf

Fang, X., Li, S., Yu, H., Wang, P., Zhang, Y., Chen, Z., Li, Y., Cheng, L., Li, W., Jia, H., & Ma, X. (2020). Epidemiological, comorbidity factors with severity and prognosis of COVID-19: A systematic review and meta-analysis. Aging, 12(13), 12493–12503. https://doi.org/10.18632/aging.103579

Felisberto, M. P., & Takashi, M. H. (2022). Atuação do enfermeiro na prevenção e cuidado ao paciente com úlcera por pressão na unidade de terapia intensiva. REVISA, 11(1), 42–47. https://rdcsa.emnuvens.com.br/revista/article/view/332

Ferro, Z. L. A., de Oliveira, A. B., & de Almeida, R. C. (2020). Fatores de risco para lesão por pressão em unidades de terapia intensiva: Uma revisão integrativa da literatura. Brazilian Journal of Health Review, 3(5), 12802–12813. https://doi.org/10.34119/bjhrv3n5-116

Ji, Y., Ma, Z., Zhang, X., Yang, J., Li, S., & Xu, Z. (2022). Tracheostomy timing and clinical outcomes in ventilated COVID-19 patients: A systematic review and meta-analysis. Critical Care, 26(1), 40. https://doi.org/10.1186/s13054-022-03904-6

Kohn, L. T., Corrigan, J. M., & Donaldson, M. S. (Eds.). (2000). To err is human: Building a safer health system. National Academies Press. https://www.ncbi.nlm.nih.gov/books/NBK225182/

Melo, C. de, Santos, I. C. V., de Lima, C. A., & de Araujo, T. L. (2023). Pressure injury in intensive care unit: Prevalence and associated factors in patients with COVID-19. Revista Gaúcha de Enfermagem, 44, e20210345. https://doi.org/10.1590/1983-1447.2023.20210345.en

Rappoport, D., Nielsen, C., & Carvajal, C. (2020). Traqueostomía en pacientes con COVID-19: Recomendaciones actuales. Revista de Cirugía, 72(5), 449–454. https://www.scielo.cl/scielo.php?script=sci_arttext&pid=S2452-45492020000500449

Ribeiro, A. C., & Uehara, S. C. da S. A. (2022). Hipertensão arterial sistêmica como fator de risco para a forma grave da COVID-19: Revisão de escopo. Revista de Saúde Pública, 56, 20. https://doi.org/10.11606/s1518-8787.2022056004311

Resende, A. L. C. (2020). A importância da notificação de eventos adversos frente à segurança do paciente e à melhoria da qualidade assistencial: Uma revisão bibliográfica. Revista Eletrônica Acervo Saúde, 12(10), e2222. https://doi.org/10.25248/reas.e2222.2020

Roque, K. E., Tonini, T., & Melo, E. C. P. (2016). Adverse events in the intensive care unit: Impact on mortality and length of stay in a prospective study. Cadernos de Saúde Pública, 32(10), e00081815. https://doi.org/10.1590/0102-311X00081815

Rosen, A., Haut, E. R., & Hu, C. (2022). Critical care clinicians' experiences of patient safety during the COVID-19 pandemic. Journal of Patient Safety, 18(8), e1219–e1225. https://doi.org/10.1097/pts.0000000000001060

Secretaria de Saúde do Estado da Bahia – SESAB. (n.d.). Hospital Geral Prado Valadares. https://www.saude.ba.gov.br/hospital/hospital-geral-prado-valadares/

Silaghi-Dumitrescu, R., Bodolea, C., Nemes, A., & Hagau, N. (2023). Comorbidities of COVID-19 patients. Medicina, 59(8), 1393. https://doi.org/10.3390/medicina59081393

Silva, B. da, Oliveira, A. C. de, & Silva, R. C. da. (2023). Infecções relacionadas à assistência à saúde em pacientes com COVID-19 internados na UTI de um hospital de referência em doenças infectocontagiosas em Goiás. Research, Society and Development, 12(4), e6212440930. https://doi.org/10.33448/rsd-v12i4.40930

World Health Organization. (2009). Conceptual framework for the international classification for patient safety. https://www.who.int/publications/i/item/WHO-IER-PSP-2010.2