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Article

Epidemiological Management of Preeclampsia-Eclampsia Cases in the Intensive Care Unit Before and During the Health Crisis

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Abstract

Health crises represent a challenge in the care of critical conditions such as pre-eclampsia, which puts maternal-fetal life at risk. During the pandemic, ICU response capacity was compromised, requiring adjustments in clinical protocols to ensure safe and effective care. This study aimed to compare the clinical and epidemiological profile of preeclampsia-eclampsia in ICU patients before and during the health crisis in Alto Amazonas, Loreto, between 2015 and 2022, identifying significant changes and areas of improvement for future public health emergencies. A mixed approach with a comparative and cross-sectional design was employed. The sample included patients diagnosed with pre-eclampsia, selected under inclusion criteria and analyzed using the Mann-Whitney U test and Wilcoxon's W test. The results revealed an increase in the frequency of cesarean sections during the pandemic (93.3% vs. 24.2% before the crisis; $p<0.001$), reflecting changes in obstetric protocols. Likewise, obstetric history showed significant differences ($p=0.033$), while disease severity and condition at discharge did not show substantial variations ($p>0.05$). In the qualitative analysis, the specialists pointed out limitations in access to safe blood and referral protocols. These findings are linked to SDG 3: Health and Well-being, highlighting the need to strengthen the system's response capacity.

Keywords: Preeclampsia–eclampsia; clinical management; intensive care; epidemiological profile; maternal health; COVID-19

1. Introduction

Recent health crises have posed unprecedented challenges to health systems, demanding rapid adaptation to public health emergencies and increased hospital demand. In this context, preeclampsia-eclampsia has been identified as a critical obstetric complication, characterized by hypertension and proteinuria, which can progress to seizures and have fatal consequences for both mother and fetus [1]. Globally, the incidence of this condition ranges from 2% to 8% of pregnancies and is influenced by genetic, environmental, and socioeconomic factors [2,3]. In Mexico, the incidence of preeclampsia is 47.3 cases per 1,000 births. This variability underscores the need to implement public health strategies tailored to each region to reduce its prevalence and improve maternal and neonatal outcomes [4,5]. In this regard, UN Sustainable Development Goal 3 emphasizes the

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reduction of maternal mortality and universal access to reproductive health, and underlines the importance of strengthening health systems and prenatal care [6].

Global health crises, such as the COVID-19 pandemic, have profoundly affected the capacity and quality of care in intensive care units (ICUs), highlighting the vulnerabilities of health systems in the face of large-scale emergencies [5]. In the Latin American context, these crises exacerbated obstetric complications, especially preeclampsia and eclampsia, which are responsible for high maternal and perinatal morbidity and mortality [7,8]. In Peru, a 44.4% increase in maternal mortality due to preeclampsia and eclampsia was reported during 2021, with 133 additional deaths compared to previous years [9,10]. This increase reflected the direct impact of the crises on the quality of prenatal and obstetric care, as well as the limited access to health services for pregnant women. Preeclampsia and eclampsia, if not managed properly, can have fatal consequences for patients, highlighting the urgent need to strengthen medical care, especially in disadvantaged areas where resource shortages complicate the management of these critical conditions [11].

In light of this, it was necessary to emphasize that the evolution of the epidemiological management of preeclampsia and eclampsia in ICUs reflected the changes and advances in strategies, procedures, and outcomes related to the treatment of these conditions during periods of health crisis. Before the health crisis, management strategies focused primarily on early identification and treatment based on standardized protocols, with the aim of reducing maternal and perinatal mortality [12]. However, during the health crisis caused by the COVID-19 pandemic, significant changes occurred in these protocols due to the restructuring of resources and the implementation of additional safety measures, which affected the availability of intensive care unit (ICU) beds and specialized medical personnel [13]. The scarcity of resources forced health systems to prioritize the most severe cases and adapt clinical management protocols to optimize outcomes, highlighting the need to develop more flexible and adaptive management strategies in times of crisis [14].

Analysis of the periods before and during the health crisis revealed key differences in the clinical and epidemiological management of preeclampsia and eclampsia. Before the crisis, health systems could follow standard protocols with greater stability, allowing for more predictable and consistent care [15]. However, during the health crisis, the need to adapt rapidly to changing conditions and resource scarcity led to the implementation of emergency measures and modifications to existing protocols, which affected the quality of care and the training of medical staff [16]. This situation highlighted the importance of having flexible strategies for managing critical situations during health emergencies, as well as the impact of medical staff training and well-being on the quality of care [12]. The objective of this study was to analyze the evolution of the epidemiological management of preeclampsia-eclampsia in intensive care units during periods of health crisis and to evaluate its impact on maternal and neonatal outcomes. The findings allowed for the proposal of improvements in treatment strategies and clinical management for future adverse health situations. The review of protocol changes and lessons learned served as a model applicable to diverse contexts with the aim of optimizing medical care in both routine and crisis situations.

2. Materials and Methods

2.1. Study Methodology

The research adopted a mixed-methods approach, combining quantitative and qualitative methods, and a clinical-epidemiological and ethnographic design. Its purpose was explanatory, exploratory, and descriptive-comparative, allowing for the analysis of the evolution of preeclampsia-eclampsia management in intensive care units before and during the COVID-19 health crisis. Furthermore, the study had a propositional perspective, aimed at generating evidence-based recommendations. The methodology used was based on established principles in health research and clinical epidemiology [17].

The study variables included the clinical management and epidemiological profile of preeclampsia-eclampsia in patients admitted to the ICU. The independent variable was the study

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period (before and during the COVID-19 pandemic), while the dependent variables included clinical characteristics (type of preeclampsia, severity, signs and symptoms) and epidemiological characteristics (age, marital status, personal and obstetric history). The operationalization of the variables was based on indicators previously defined in the scientific literature [18].

2.2. Participants

The study population consisted of 33 medical records of preeclampsia-eclampsia cases treated in the ICU of facilities in Alto Amazonas, Loreto, between 2015 and 2019, and 15 cases registered between March 2020 and April 2022. Additionally, 48 healthcare professionals who provided continuous care to these cases during this period participated. A non-probability convenience sampling method was used, selecting cases available in hospital records and considering confirmed preeclampsia-eclampsia diagnosis and ICU care as inclusion criteria.

2.3. Tools

Two instruments were used for data collection: a field data recording guide, structured with 20 items to gather information from medical records and logbook notes, and an in-depth interview guide for specialists in epidemiology, gynecology, and public health. Both instruments were designed to assess the clinical and epidemiological profile of preeclampsia-eclampsia before and during the pandemic, considering the advantages and disadvantages of obstetric care [19]. The validity of the instruments was determined through expert judgment, who evaluated the relevance and coherence of the items in relation to the study objectives. The reliability of the field data recording guide was verified using Cronbach's alpha coefficient, which yielded a value of 0.89, indicating high internal consistency in the measurement of the variables. The in-depth interview guide was also reviewed by specialists to ensure the quality and accuracy of the questions.

2.4. Data collection and analysis

The data collection procedure consisted of five phases. In the first phase, meetings were held with key stakeholders to present and obtain approval for the study. In the second phase, data were collected from clinical records and structured surveys. The third phase involved conducting in-depth interviews with maternal health specialists. Subsequently, in the fourth phase, the information was systematized and analyzed. Finally, in the fifth phase, the study conclusions were drafted and the final report was prepared. Descriptive and inferential statistical techniques were used for data analysis. The SPSS software, version 26, was used, and Kolmogorov-Smirnov normality tests and analysis of variance (ANOVA) were performed to compare differences in the clinical and epidemiological profile before and during the COVID-19 pandemic. Logistic regression was also applied to assess the impact of clinical management on maternal and neonatal outcomes.

Ethical considerations were taken into account at all stages of the study. The research was conducted in accordance with the principles set forth in the Declaration of Helsinki [20] and the guidelines of the Belmont Report [21], ensuring respect for the autonomy, confidentiality, and non-discrimination of the participants. Furthermore, approval was obtained from the relevant ethics committees, and informed consent was obtained from the healthcare professionals interviewed, guaranteeing their voluntary participation and confidentiality.

3. Results

3.1. Quantitative results

Table 1 shows the clinical and epidemiological profile of preeclampsia-eclampsia in patients admitted to the ICU before and during the health crisis. Severe preeclampsia predominated in both periods (84.8% before and 86.7% during), with no significant differences (U = 243,000, p = 0.870). Regarding signs and symptoms, proteinuria disappeared during the pandemic (from 15.2% to 0.0%),

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while liver abnormalities increased (from 18.2% to 26.7%), although these changes were not significant (U = 208,500, p = 0.298).

The most significant change was observed in the mode of delivery: before COVID-19, 75.8% of births were vaginal, while during the pandemic this figure decreased to 6.7%, with a significant increase in cesarean sections (from 24.2% to 93.3%, U = 76,500, p < 0.001). This indicates a shift in obstetric strategy to optimize care and reduce complications in overcrowded hospitals. Regarding obstetric complications, HELLP syndrome and eclampsia remained the main complications in both periods (87.9% before and 86.7% during), with no significant differences (U = 244,500, p = 0.907). Maternal mortality increased from 12.1% to 20.0%, although without reaching statistical significance (U = 228,000, p = 0.478), suggesting that the health crisis may have put pressure on health services, but clinical outcomes were not substantially modified.

The epidemiological profile of the patients remained stable in both periods, with no significant differences in mean age (29.4 ± 5.3 years before and 30.1 ± 4.9 years during, U = 235,000, p = 0.768), marital status (90.9% cohabiting before and 100.0% during, U = 225,000, p = 0.233), history of preeclampsia (3.0% before and 6.7% during, U = 235,500, p = 0.679) and access to inadequate prenatal controls (84.8% before and 86.7% during, U = 243,000, p = 0.870). The results show that, although the pandemic did not significantly alter the severity of preeclampsia-eclampsia, there was a significant change in the delivery method, with an increase in the cesarean section rate. This suggests that the evolution of obstetric management during the health crisis was geared towards reducing risks in a context of hospital overcrowding and limitations in medical care.

Table 1. Clinical and epidemiological profile of preeclampsia – eclampsia in ICU patients, treated before and during the health crisis.

Clinical and epidemiological profile of preeclampsia-eclampsia	**Cases before COVID-19 (2015-19)**	**Cases during COVID-19 (2020-22)**	**Mann-Whitney U**	**Wilcoxon's W**	**Z**	**p-value**
Clinical profile						
Type of preeclampsia/eclampsia						
Severe	28 (84.8%)	13 (86.7%)	**243,000**	**363,000**	**-0.164**	**0.870**
Moderate	5 (15.2%)	2 (13.3%)				
Signs and symptoms						
Proteinuria	5 (15.2%)	0 (0.0%)				
Liver disorder	6 (18.2%)	4 (26.7%)	**208,500**	**769,500**	**-1.041**	**0.298**
PA +Proteinuria	1 (3.0%)	0 (0.0%)				
All of the above	21 (63.6%)	11 (73.3%)				
Method of delivery						
Normal	25 (75.8%)	1 (6.7%)	**76,500**	**637,500**	**-4.406**	

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Caesarean section	8 (24.2%)	14 (93.3%)				**P<0.001 (Significant)**
Obstetric complications						
HELLP + eclampsia	29 (87.9%)	13 (86.7%)	**244,500**	**805,500**	**-0.116**	**0.907**
Other	4 (12.1%)	2 (13.3%)				
Condition upon discharge						
With treatment	29 (87.9%)	12 (80.0%)	**228,000**	**789,000**	**-0.709**	**0.478**
He dies	4 (12.1%)	3 (20.0%)				
Epidemiological profile						
Age						
Average age (years)	29.4 ± 5.3	30.1 ± 4.9	**235,000**	355,000	**-0.295**	**0.768**
Gestational age						
<27 weeks	4 (12.1%)	2 (13.3%)	**244,500**	**364,500**	**-0.116**	**0.907**
28-36 weeks	29 (87.9%)	13 (86.7%)				
Marital status						
Married	3 (9.1%)	0 (0.0%)				
Cohabitant	30 (90.9%)	15 (100.0%)	**225,000**	**786,000**	**-1.193**	**0.233**
Level of education						
Without instruction	2 (6.1%)	0 (0.0%)				
Primary	27 (81.8%)	13 (86.7%)	**231,500**	**792,500**	**-0.550**	**0.583**
Secondary	4 (12.1%)	2 (13.3%)				
Personal background						
Diabetes/hypertension	27 (81.8%)	13 (86.7%)	**235,500**	**355,500**	**-0.413**	**0.679**
Diabetes	6 (18.2%)	2 (13.3%)				
Poor obstetric history						
previous CST	3 (9.1%)	3 (20.0%)				
Previous preeclampsia	1 (3.0%)	1 (6.7%)				
Preeclampsia/gestational diabetes	21 (63.5%)	11 (73.3%)				
CST + preeclampsia	8	0 (0.0%)	**167,500**	**287,500**	**-2,131**	**0.033**

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	(24.2%)					
Prenatal care						
Controlled	5 (15.2%)	2 (13.3%)	**243,000**	**80,000**	**-0.164**	**0.870**
Not controlled	28 (84.8%)	13 (86.7%)				

Note:Mann-Whitney U comparison test. Statistical significance values. *p < 0.05 in bold.*

Table 2 presents a comparison of the management of the clinical profile of preeclampsia-eclampsia in ICU patients before and during the COVID-19 health crisis in Alto Amazonas, Loreto, Peru. Regarding advantages, before the pandemic, simplicity (31.3%) and high cost-benefit ratio (37.4%) were the most prominent aspects. During the pandemic, speed of care (46.89%) and high cost-benefit ratio (40.60%) were the most relevant. Regarding disadvantages, before the pandemic, lack of sequentiality (52.1%) and limited personal referrals (22.9%) were the most frequently mentioned. During the pandemic, limited personal referrals (39.58%) and the potential for misinterpretation (27.08%) were the most prominent. The Mann-Whitney U comparison test and the Wilcoxon W test found no significant differences (p > 0.05), indicating that there were no statistically significant changes in the management of the clinical profile of preeclampsia-eclampsia before and during the pandemic.

Table 2. Characterization of the management of the clinical profile of preeclampsia – eclampsia in ICU patients treated before and during COVID-19.

Characterization of the management of the clinical profile of preeclampsia-eclampsia	**Before COVID-19 (2015-19)**		**During COVID-19 (2020-22)**		**Mann-Whitney U**	**Wilcoxon's W**	**Z**	**p-value**
Advantages	**N**	**%**	**N**	**%**				
Simplicity	15	31.3	01	4.25				
Fast service	08	16.7	19	46.89				
High cost/benefit	18	37.4	27	40.60	**1,500**	**191,500**	**-,142**	**0.200**
Suspected agents were identified	07	14.6	01	8.26				
Total	**48**	**100.00**	**48**	**100.00**				
Disadvantages	**N**	**%**	**N**	**%**				
The risk was not quantified	07	14.6	02	4.17				
It lacked sequentiality	25	52.1	14	29.17	**6,000**	**9,000**	**-1,319**	**0.305**
Limited personal references	11	22.9	19	39.58				
It leads to false interpretations	05	10.4	13	27.80				
Total	**48**	**100**	**48**	**100.00**				

Note Mann-Whitney U test. Statistical significance values were not found.

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Table 3 presents the characterization of the management of the epidemiological profile of preeclampsia-eclampsia in ICU patients treated before and during the COVID-19 pandemic in Alto Amazonas (Loreto, Peru) between 2019 and 2022. Regarding the advantages, before the pandemic, 22.9% of cases were managed with structured indicators, while during the pandemic this percentage decreased significantly to 6.3%. The ease of verification and referral for treatments also decreased, from 58.9% to 33.3%. However, knowledge of prevalence and incidence increased from 14.6% to 41.7%, and the analysis of the medical-social context increased from 4.2% to 18.8%. Regarding the disadvantages, before the pandemic, 4.2% of cases did not provide adequate information about the risk, while during the pandemic this percentage increased to 29.2%. Lack of sequentiality decreased from 22.9% to 12.5%, but limited personal references increased from 37.5% to 47.9%. Induction to misinterpretations decreased from 35.4% to 10.4%. Mann-Whitney U and Wilcoxon W statistical tests showed significant differences in the advantages ($p = 0.011$), but not in the disadvantages ($p = 0.655$), indicating significant changes in some management advantages during the pandemic.

Table 3. Characterization of the management of the epidemiological profile of preeclampsia – eclampsia in ICU patients, treated before and during COVID-19.

Characterization of the management of the clinical profile of preeclampsia-eclampsia	**Before COVID-19 (2015-19)**		**During COVID-19 (2020-22)**		**Mann-Whitney U**	**Wilcoxon's W**	**Z**	**p-value**
Advantages	**N**	**%**	**N**	**%**				
Structured in indicators	11	22.9	03	6.3				
Easy to verify and reference for treatments	28	58.9	16	33.3	**4,500**	**10,500**	**-2,553**	**0.011**
It allows knowledge of prevalence and incidence	07	14.6	20	41.7				
It allows for analysis of the medical-social context.	02	4.2	09	18.8				
Disadvantages	**N**	**%**	**N**	**%**				
It does not provide adequate risk information.	02	4.2	14	29.2	**30,500**	**135,500**	**-,447**	**0.655**
It lacks sequentiality	11	22.9	06	12.5				
It does not provide complete case references	18	37.5	23	47.9				
It leads to false interpretations	17	35.4	05	10.4				
Total	**48**	**100**	**48**	**100.00**				

Note: Mann-Whitney U and Wilcoxon W tests were used for comparison. Significant differences were found in the advantages ($p = 0.011$), but not in the disadvantages ($p = 0.655$).

3.2. Qualitative results

Co-occurrence of concepts

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The figure illustrates co-occurrence, representing the interrelationship between the main concepts identified in interviews with specialists on the clinical and epidemiological management of preeclampsia-eclampsia in ICU patients before and during the COVID-19 pandemic. Each node reflects a key aspect mentioned by the experts, and its size varies according to the frequency with which it was cited. The connections between the nodes represent the relationship between the various factors that influenced the care of these patients, allowing us to visualize how the main problems and challenges faced in this context were structured.

The co-occurrence map reflects the main problems and challenges in preeclampsia-eclampsia care during the pandemic. Larger nodes, such as "Clinical Management" and "Cesarean Sections," indicate that these were the most frequently mentioned topics in the interviews, suggesting that the pandemic led to significant changes in clinical decision-making. The need for clear intervention protocols, coupled with a lack of professional training, highlights the staff's unpreparedness to handle critical situations in the ICU. Furthermore , a lack of resources and limited access to safe blood emerged as key barriers to timely care, possibly contributing to the increase in cesarean sections as an emergency measure. The interconnection between clinical markers and inadequate referrals suggests that the absence of accurate diagnostic tools hindered early case detection, exacerbating the workload of healthcare personnel.

Furthermore, the findings show that the pandemic not only impacted the logistics of maternal care but also exposed pre-existing structural deficiencies in the health system. It is essential to implement training strategies, improve access to essential clinical supplies, and establish more effective referral protocols to optimize preeclampsia-eclampsia care in future health crises.

4. Discussion

A comparative study of the clinical and epidemiological management of preeclampsia-eclampsia in ICU patients before and during the COVID-19 pandemic in Alto Amazonas (Loreto) revealed significant changes in certain aspects of obstetric management. The most significant difference was in the mode of delivery (Mann-Whitney U test = 76.500; p = 0.001), with a notable increase in the number of cesarean sections during the pandemic (93.3%) compared to the pre-pandemic period (24.2%). This suggests a change in clinical protocols due to health restrictions and the need to care for patients with comorbidities. Similarly, obstetric history showed significant differences (Wilcoxon signed-rank test = 287.500; p = 0.033), reflecting a higher incidence of previous preeclampsia and obstetric complications in the studied cohort.

Obstetric history showed significant differences (Wilcoxon = 287,500; p = 0.033), reflecting a higher incidence of previous preeclampsia and obstetric complications. However, no statistically significant differences were found in the severity of preeclampsia-eclampsia or in clinical signs, suggesting that the patients' baseline condition did not vary substantially between the two periods.

Similarly, the condition at discharge also showed no relevant differences ($p>0.05$), indicating that maternal mortality and treatment response were not significantly affected by the pandemic. These findings are consistent with previous studies that indicate an increase in the cesarean section rate as a strategy to mitigate complications in patients with COVID-19 and preeclampsia-eclampsia [19,22]. However, they differ from studies such as [24], which reported an increase in maternal and neonatal mortality in contexts with less healthcare capacity. The lack of differences in clinical severity could be explained by the implementation of preventive measures that minimize the impact on the course of the disease [23]. Consequently, the pandemic influenced the management of preeclampsia-eclampsia, especially regarding the delivery method, without significantly affecting other aspects of the clinical and epidemiological profile.

The analysis of Tables 2 and 3 provides a comprehensive view of the clinical and epidemiological management of preeclampsia-eclampsia in ICU patients before and during the pandemic in Alto Amazonas (Loreto). Table 2 shows a significant increase in the frequency of cesarean sections (24.2% before vs. 93.3% during the pandemic; Mann-Whitney U = 76,500; p = 0.001), suggesting modifications to clinical protocols to reduce maternal-fetal morbidity and minimize exposure to the virus. This

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trend has been described in other studies, in which cesarean section became the preferred option for women with preeclampsia and suspected COVID-19 [24]. Furthermore, obstetric history showed significant differences (Wilcoxon W = 287,500; p = 0.033), reflecting a higher incidence of previous complications. However, disease severity and condition at discharge did not show significant variations ($p > 0.05$), indicating that maternal and neonatal clinical outcomes were not affected by the pandemic. This stability in outcomes has been documented in cohorts from countries with structured obstetric protocols [25].

Regarding the epidemiological profile (Table 3), a significant decrease in the structuring of indicators was identified ($p = 0.011$), suggesting possible limitations in data collection and analysis during health crises. However, management disadvantages did not show statistically significant changes ($p = 0.655$), indicating that difficulties in caring for these patients existed before the pandemic and persisted during it. Studies conducted in Latin America have indicated that the lack of epidemiological indicators hampered the health response in resource-limited settings [26]. These findings are consistent with studies highlighting that the pandemic affected hospital response capacity without significantly altering the clinical course of patients with preeclampsia [27]. However, they contrast with research that found an increase in maternal mortality in systems with lower capacity [28]. These results underscore the importance of strengthening epidemiological surveillance systems and improving hospital management to optimize the response in future health crises.

Figure 1, corresponding to the qualitative phase of this research, provides a comprehensive view of specialists' perceptions regarding changes in the clinical and epidemiological management of preeclampsia-eclampsia in ICU patients before and during the COVID-19 pandemic. The most recurrent and relevant concepts in the co-occurrence of words were "clinical management" and "cesarean sections," suggesting modifications to the obstetric protocols implemented to reduce maternal-fetal morbidity and minimize exposure to the virus. The preference for cesarean section has been documented in previous studies as a strategy in the face of uncertainty about the effects of COVID-19 on pregnancy [29]. This finding is consistent with the evidence supporting cesarean section as an effective alternative in emergency situations to reduce complications in women with severe preeclampsia [24].

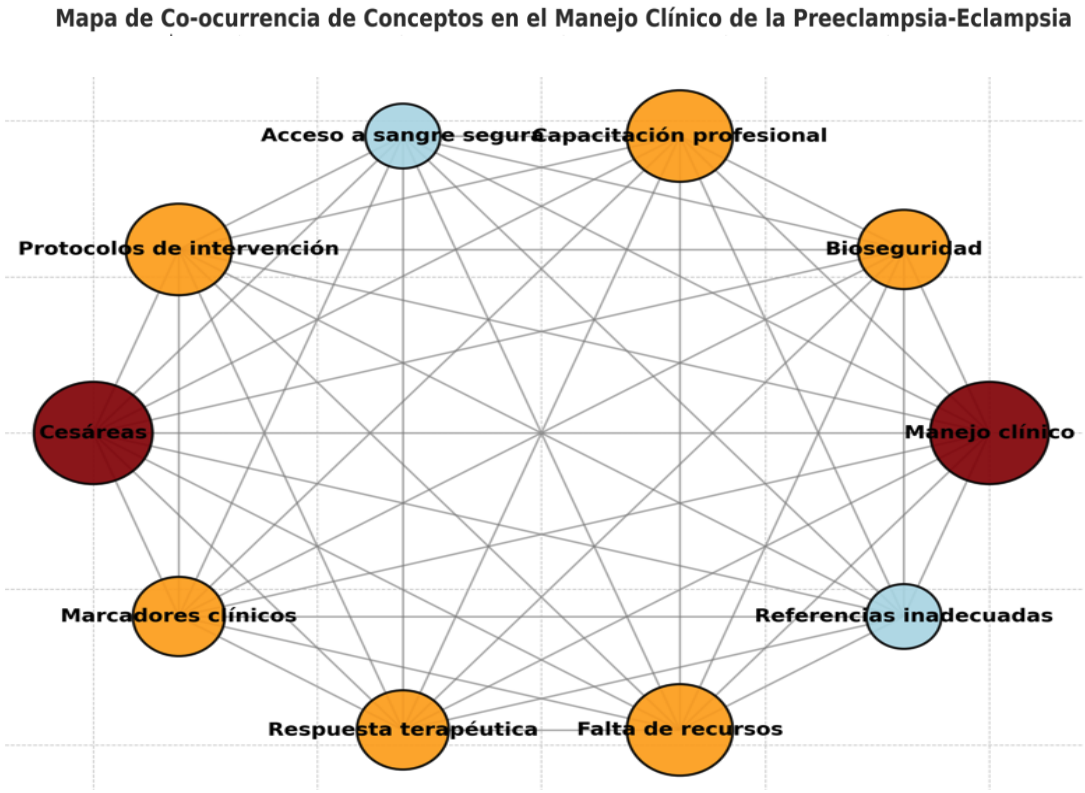

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Figure 1. Network of Co-occurrence of Concepts in the Clinical Management of Preeclampsia-Eclampsia in ICU Patients Before and During COVID-19.

From a clinical perspective, intervention protocols and biosafety were critical factors in decision-making, reinforcing the importance of having adequate measures in place to protect medical personnel and patients [30]. However, the perception of a lack of resources and inadequate referrals highlights the structural deficiencies of the health system. Previous research has indicated that the insufficiency of medical supplies, trained personnel, and diagnostic technology affected the quality of obstetric care during the pandemic [28]. This aligns with the theoretical framework of accessibility and equity in maternal health, which maintains that the lack of hospital infrastructure and inequality in access to clinical resources negatively impact the care of critical obstetric pathologies [26,31].

These findings align with studies highlighting the need to strengthen epidemiological surveillance systems and professional training to improve the response to health emergencies [25,32]. However, they contrast with research in countries with greater capacity to resolve health issues, where the standardization of clinical protocols and timely access to advanced therapies reduced maternal mortality associated with preeclampsia-eclampsia [25,22,33]. In conclusion, the pandemic underscored the need to optimize obstetric care protocols and strengthen hospital infrastructure to improve the management of preeclampsia-eclampsia in future health crises.

5. Conclusions

The study revealed that the COVID-19 pandemic significantly influenced the clinical and epidemiological management of preeclampsia-eclampsia in ICU patients in Alto Amazonas, Loreto. A notable increase in the cesarean section rate was observed (93.3% during the pandemic compared to 24.2% before; $p<0.001$), suggesting modifications to obstetric protocols to minimize maternal-fetal risks. Furthermore, obstetric history showed significant differences ($p=0.033$), while disease severity and discharge condition did not show relevant variations ($p>0.05$). Regarding the epidemiological profile, a decrease in the structuring of clinical indicators was evident ($p=0.011$), indicating deficiencies in data collection and analysis during health crises. On the other hand, the disadvantages of clinical and epidemiological management persisted without significant changes ($p=0.655$), highlighting pre-existing limitations in obstetric care. These findings underscore the need to strengthen epidemiological surveillance systems and improve the capacity of intensive care units (ICUs), aligning with SDG 3: Good Health and Well-being, to optimize maternal care in health emergencies.

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Institutional Review Board Statement: The study was conducted in accordance with the principles of the Declaration of Helsinki and the Belmont Report. Ethical approval was obtained from the corresponding institutional ethics committees prior to data collection. All procedures involving human participants were performed in compliance with national and international ethical standards.

Informed Consent Statement: Informed consent was obtained from all healthcare professionals who participated in the qualitative phase of the study. For the quantitative phase, data were collected from anonymized medical records, ensuring confidentiality and the protection of personal information.

Data Availability Statement: The data presented in this study are available from the corresponding author upon reasonable request. Due to ethical and confidentiality considerations, the data are not publicly available.

Conflicts of Interest: The authors declare no conflicts of interest.

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