ECUADORIAN JOURNAL OF PEDIATRICS
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ORIGINAL ARTICLE

Clinical-epidemiological profile of early sepsis in newborns. Single-center observational study

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Received: September 3; 2022
Accepted: November 27, 2022
Posted: December 15, 2022
Editor: Dr. Francisco Xavier Jijón Letort.

Bibliographic letterhead:

Ramírez F, Lara C, Huacón J, Loor S, Urrutia M. Clinical-epidemiological profile of early sepsis in newborns. Single-center observational study Ecuadorian Journal of Pediatrics 2022;23(3):192200. DOI: https://doi.org/10.52011/161

e-ISSN: 27376494

Abstract

Introduction: Early neonatal sepsis is a clinical syndrome characterized by signs and symptoms associated with systemic infection; it occurs in the first 72 hours after birth. This study aimed to determine the clinical-epidemiological profile of early neonatal sepsis in a neonatal intensive care unit of a regional reference center in Guayaquil, Ecuador.

Methods: The present observational study, carried out at the "Teodoro Maldonado Carbo" Hospital from January 2017 to December 2020, included neonates with early neonatal sepsis with a nonprobabilistic sample. The variables were age, gestational age, sex, route of infection, presence of urinary tract infections, weight, genopathies, Apgar at 1 minute, Silverman scale, clinical stages, capillary refill, urinary output, clinical and laboratory variables, haem culture,and causative organism. The analysis is univariate and descriptive with frequencies and percentages.

Results: A total of 278 patients with a mean gestational age of 33 weeks were included, and 59.4% were men. Maternal risk factors were UTI in pregnancy and transplacental infection. Among the factors associated with the newbornwere low weight (56%) and prematurity (67%). The most frequent symptoms were euthermia and tachypnea (54%). In the laboratory profile, neutropenia predominated (49%), while the causative agents were Staphylococcus hominis(7%), Escherichia coli(4.3%), and Klebsiella pneumoniae(4%).

Conclusion: The direct relationship between the epidemiological characteristics and the clinical stages of neonatal sepsis was determined.

Keywords: MESH: Neonatal Sepsis, Epidemiology, Risk Factors, Apgar Score.

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Introduction

Early neonatal sepsis is a clinical picture associated with the invasion and proliferation of pathogens in the blood of newborns. The symptoms appear in the first 72 hours of lifeafter birth, and according to the transmission route,they are classified as vertical and nosocomial. The most frequent etiology is of bacterial origin, given by Streptococcus agalactiae or group B streptococcus (GBS) in children weighing more than 1,500 g at birth and Escherichia coli (E. coli) weighing less than 1,500 g only 1% corresponds to sepsis due to viruses and fungi [1].

The main risk factors include immaturity of the neonatal immune system, exposure to novel microorganisms from the maternal genital tract, childbirth-related factors, invasive procedures performed in the neonatal intensive care area that increase postnatal exposure, and antibiotic resistance. The clinical presentation is diverse and nonspecific; in the initial phase, hypothermia, fever, difficulty in feeding, tachycardia, and apathy are frequently described. As the disease evolves, systemic involvement is generated that can lead to total organ failure [2].

The present investigation was carried out at the Teodoro Maldonado Carbo Hospital, whose objective was to determine the clinical-epidemiological profile of early neonatal sepsis in newborns from 2017-2020. The results determined that the most frequent clinical picture was established during the initial phase in 24 hours, while the most common risk factors were maternal history of urinary tract infections during pregnancy, transplacental infection route, male sex, gestational age between 28 and 36 weeks, low birth weight, mild respiratory distress and APGAR within normal parameters.

The objective of this study was to determine the clinical-epidemiological profile of early neonatal sepsis in the neonatal intensive care unit of the Teodoro Maldonado Carbo Hospital from January 2017 to December 2020 in the city of Guayaquil, Ecuador.

Materials and methods

Design of the investigation

This is an observational, crosssectional, retrospective study.

Scenery

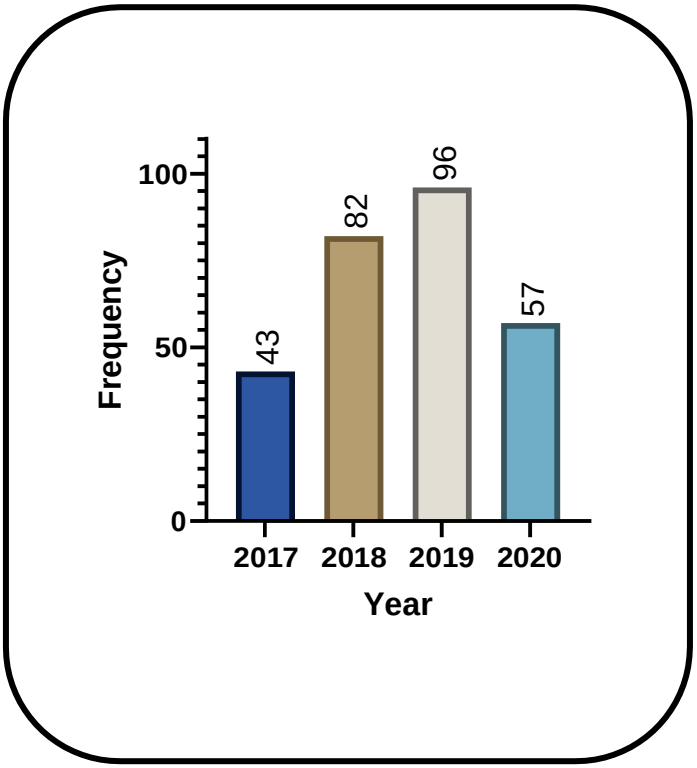
The study was carried out in the neonatology service of the "Teodoro Maldonado Carbo" Specialties Hospital of the Ecuadorian Institute of Social Security, Guayaquil, Ecuador. The study period was from January 1, 2017, to December 31, 2020.

Inclusion criteria

Neonates of both sexes diagnosed with early neonatal sepsis entered the study.Participants with incomplete records were excluded from the analysis.

Study size

The population was composed of patients admitted to the hospital in the neonatal intensive care unit of the institution. The sample calculation was nonprobabilistic, with a census type of all possible cases.



Variables

The variables were age of onset of symptoms, gestational age, sex, history of the mother, route of infection, presence of urinary tract infections, weight, genopathies, Apgar at 1 minute, Silverman scale, clinical stages, filling of capillary, urinary output, state of consciousness, muscle tone, respiratory rate, heart rate,

thermal instability, leukocytes, neutrophils, platelets, PCR, blood culture, and causative organism.

Data sources/measurement

The data were collected from the clinical history in a form designed exclusively for that purpose. The institutional electronic system for case investigation (AS400) was used. The database was coded with serial numbers, thus protecting the confidentiality of the information and identity of the patients.

Statistical method

In the initial phase, the data analysiswas univariate and descriptive, with frequencies and percentages. The statistical package SPSS v.25 (Armonk, NY: IBM Corp.) was used for the analysis.

Results

The study included 278 patients; the annual incidenc e is presented in Figure 1. The year with the highest incidence was 2019.

General characteristics

The clinical characteristics of the patients are detailed in Table 1. It was determined that the most frequent epidemiological characteristics of newborns with earyl neonatal sepsis were the age group 28-36 weeks, with a predominance of males, in addition to evidence that symptoms occur during the first 24 hours of extrauterine life.

Among the maternal risk factors, we found a history of urinary tract infections durnig pregnancy, which was treated in 69.4% andwas the most frequent transplacental infection route.

The neonatal risk factors identified are gestationa l age 28-36 weeks, male prevalence, low birth weight, normal range APGAR, and mild Silverman test (Table 1).

Clinical characteristics

Of the stages of early neonatal sepsis, 30 cases (10.8%) were in a late phase, 94 cases (33.8%) had signs of worsening, and 154 cases (55.4%) had an initial clinical stage. The average frequencies of heart rate, respiratory rate, temperature, tone, activity, diuresis, and capillary refill are presented in Figure 2.

Table 1. Age and sex of the study group.

variables	n=278 (%)
Age of onset of symptoms (Hours)	
< 24 hours	275 (98.9%)
24 to 48 hours	2 (0.7%)
49 to 72 hours	1 (0.4%)
Gestational age	
<28 weeks	20 (7.2%)
28 to 36 weeks	187 (67.3%)
>36 weeks	71 (25.5%)
Sex	
Women	113 (40.6%)
Men	165 (59.4%)
Pathological history of the mother	
Urinary tract infection	220 (79.1%)
Premature rupture of membranes	52 (18.7%)
Does not register	6 (2.2%)
Route of infection	
Birth canal	32 (11.5%)
Transplacental	246 (88.5%)
Urinary tract infection in the mother	
Treaties	193 (69.4%)
Not treated	85 (30.6)
Birth weight	
Great for e.g.	14 (5.0%)
Low birth weight newborn	155 (55.8%)
Newborn of adequate weight	109 (39.2%)
Genopathies	
Presents	19 (6.8%)
Missing	259 (93.2%)
APGAR at 1 minute	
Normal	189 (68.0%)
Moderate difficulty	74 (26.6%)
Severe difficulty	15 (5.4%)
Silverman's assessment	
No difficulty	26 (9.4%)
Mild	157 (565%)
Moderate	73 (26.3%)
Severe	22 (7.9%)

In the laboratory data, an absence was identified in the medical records, and most of the causative organisms were isolated in a late phase (Table 2). Leukocyte changes, a drop in nuclear polymorphs with a normal platelet range (77.3%), PCR with a high risk of infection (43.2%) in 60% of patients, and blood culturewere performed; however, the vast majority of the results were not recorded.

Table 2. Laboratories in newborns with early neonatal sepsis.

Variables	n=278 (%)
Leukocytes	
Normal	158 (56.8%)
Leukocytosis	111 (39.9%)
Leukopenia	8 (2.94%)
Neutrophil count	
Normal	113 (40.62%)
Neutrophilia	27 (9.7%)
Neutropenia	137 (49.3%)
Platelets	
Normal	215 (77.3%)
Thrombocytosis	12 (4.3%)
Thrombocytopenia	50 (18.0%)
C-reactive protein	
Lower risk of infection	113 (40.6%)
Increased risk of infection	120 (43.2%)
Not registered	45 (16.2%)
Blood culture	
Done	200 (71.9%)
Unrealized	78 (28.1%)
Causative organism	
Not registered	240 (86.4%)
Staphylococcushominis	19 (6.8%)
Escherichia coli	12 (4.3%9
Enterococcus faecalis	7 (2.5%)

Table 3. Clinical characteristics and outcome.

	Initial clinic n=154	Late phase n=30	Signs of aggravation n=94	*P*
Gestational age				
28 36 GW	104	17	66	<0.0001
>36 GW	45	3	23	0.083
<28 GW	5	10	5	<0.0001
Sex				
Woman	61	13	39	0.9219
Men	93	17	56	
Weight				
LGA	9	1	4	0.7742
LBW	89	21	45	0.0783
NAW	56	8	45	0.06512
Death				
No	154	0	94	<0.0001
Yes	0	30	0	

GW: gestational weeks, RN: newborn. GPEG: large for gestational age. LBW:low birth weight. NAW: Newborn of adequate weight, LGA: Large for gestational age.

Relationship between epidemiological characteristics and evolution of SNT

There was a higher frequency of neonates with early sepsis in the initial phase, with a gestational age of 28-36 weeks and a male predominance. Mortality is related to the late phase; all neonates in this phase died.

Discussion

According to the epidemiological profile of SNT, it was established that the average gestational age for the development of the pathology was 33 weeks, with an increase in cases in 2019 (35%), where the age group with the highest prevalence was between 28and 36 S (67%), and a predominance of the male sex (59%) similar results found in the study prepared by Borja (Ecuador 2019)that describes a more significant number of cases of NS in male newborns (80%), premature (60%) with low weight (73.1%).

Both neonatal and maternal risk factors had a significant result; the most prevalent in terms of the mother was the history of urinarytract infections during pregnancy (79%), where the majority are identified, treated, but not cured, which increases the risk of ascending infection compromising the placental membranes and the fetus. The present study determined that transplacental infection was the most frequent,at 88%. Among the factors associated with the newborn, low birth weight, prematurity, and being male were the ones with the highest risk for developing NTS. These results are similar to those of Ulloa et al. (Mexico 2019), where the incidence of urinary infections and the transplacental route was 60% in newborns with NTS.

The clinical characteristics observed in the study indicate that the mean onset of symptoms is 4 hours; these results are similar to those detailed by Odabasi (Turkey 2020),who indicates that the initial symptoms occur during the first 18 hours in the most significant number of cases.

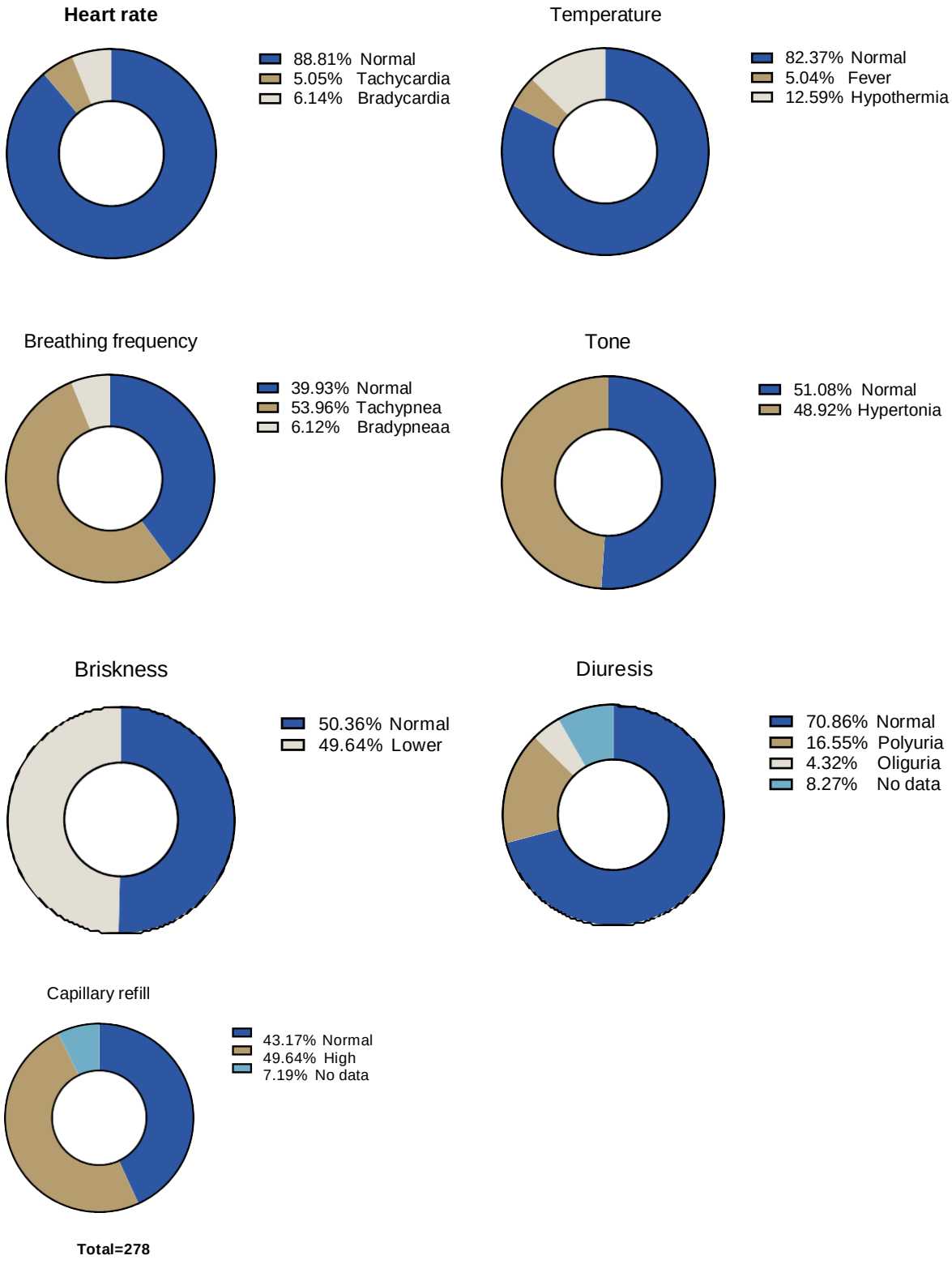


Figure 1. Clinical frequencies of the study group.

On the other hand, the identified clinic did not have significant changes since a large percenta ge presented euthermia (82.4%), standard heart rate (88.5%), unaltered muscle tone (61.1%), active/reactive (60.4%), and urinary output standard (70.8%). However, they presented tachypnea (64%) and increased capillary refill (49.6%). In that case, these data are similar to those established by Fernández et al. (Brasil 2021), where they detail a higher frequency of early sepsis with characterized symptomatology due to euthermia (70%), heart rate within normal parameters (90%), tachypnea (89.1%), normal muscle tone (76.1%), without alterations of consciousness (89%), standard urinary output (92.4%) and without perfusion alterations (87%), thus determining that the clinical pictur may initially present mildly, being confused with tran- sient respiratory distress and worsening as hours pass without treatment. Mortality was closely associated with neonatal sepsis in the late phase with prematurity and male sex, where 13% of deaths wee identified, all being late phase.

Regarding the laboratory profile, 68.2% presented leukocytes in normal ranges but with a decrease in polymorphonuclear cells or neutropenia (49.3%), without platelet alterations (77.2%), low PCT (52.6%) but with PCR that shows higher risk of infection (43.2%)These results coincide with the study carried out by Almudeer (KSA 2020), where a more significant presence of standard leukocyte numbers (76.7%) and platelets in the normal range (86.7%) was determined, but differs in the values of PCR and PCT with 90% associated with an increased risk of infection. A large part of the neonates studied had blood culture samples and tracheal aspirates; however, the percentage of results notification was minimal; among these, the following microorganisms were identified: Staphylococcus hominis occurred in 7% followed by Escherichia coli 4.3% and Klebsiella pneumoniae 4%. These data are contrasted with those of Almudeer et al., who identified the E. coli agent as the most frequent causative organism of early sepsis in 29%, as well as Ulloa- Ricárdez and Salazar-Espino, where 53.2% reported early sepsis with a predominance of Escherichia coli and Klebsiella pneumoniae as causative agents, and Borja (Ecuador 2019) determined that the mostfrequent causative organism was Staphylococcus aureus (15.9%).

With a probability of 95%, a statistically significant relationship between gestational age 2836 weeks and the development of neonatal sepsis with a predominance of the initial phase is assued. In the future, more prospective and controlled studies should study this relationship.

Conclusions

The prevalence of early neonatal sepsis in the HTMC during 20172020 showed a significant increase in 2019, with a predominance in preterm neonates.

The epidemiological profile of patients with early neonatal sepsis was characterized by a higher frequency of males, an average of 33 S in age, and the most prevalent age group between 28 and 36 weeks.

Among the identified maternal risk factors, a history of urinary tract infection and transplacental infection prevailed.

Neonatal risk factors for the development of TNS are male sex, prematurity, and low birth weight.

The clinical profile in SNT shows a prevalence of euthermia, standard heart rate, good muscle one, and APGAR at one minute but shows the presence of tachypnea and mild Silverman Test.

Laboratory data show leukocyte values in the normal range but with a predominance of neutropenia. There is a slight increase in PCR.

The most frequently identified causative agents were Staphylococcus hominins and E.coli.

Mortality was higher and absolute in children who entered the late phase. There was a statistically significant relationship between gestational age from 28 to 36 S and the development of neonatal sepsis.

Abbreviations

HTMC: Teodoro Maldonado Carbo Hospital.
GPEG: large for gestational age.
RN: newborn.
SG: Weeks of gestation.
SNT: early neonatal sepsis.

Supplementary information

No supplementary materials are declared.

Acknowledgments

We acknowledge and thank the neonatal and statistical intensive care team members at the Hospital de Especialidades Teodoro Maldonado Carbo for their collaboration in this study.

Author contributions

Stefanía Loor Zambrano: Conceptualization, Data preservation, Fundraising, Research, Resources, Software, Writing- original draft.
Marilyn Urrutia Garcés: Conceptualization, Data preservation, Supervision, Fundraising, Research, Resources, Writing: review and editing.
Johanna Huacón Mazón: Conceptualization, Data conservation, Supervision, Acquisition of funds, Investigation, Resources.
Fátima Ramírez Carillo: Data curation, research, fundraising, supervision, methodology.
Cindy Lara Morales: Conceptualization, Data retention, Supervision, Supervision, Methodology
All authors read and approved the final version of the manuscript.

Financing

The authors financed the expenses incurred in the production of this research Laboratory expenses and laboratory tests, including X-rays, are part of the regular activity of the neonatology service and do not constitute an additional expense to the patient or family members.

Availability of data and materials

The data sets generated and analyzed during the current study are not publicly available due to participant confidentiality but are available through the corresponding author upon reasonable scholarly request.

Statements

Ethics committee approval and consent to participate

It was not required for a retrospective database study.

Publication Consent

This does not apply to studies that do not publish MRI/CT/Rx images or physical examination photographs.

Conflicts of interest

The authors declare they have no conflicts of interes.t

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References

1. Barreto González OJ, Baloa Tovar DC, García León MM.Neonatal sepsis: epidemiology. Rev Digit Graduate. 2020 Jan 3 ;9 (1):e192.
https://doi.org/10.37910/RDP.2020.9.1e192

2. Almudeer AH, Alibrahim MA, Gosadi IM. Epidemiology and risk factors associated with early onset neonatal sepsis in the south of KSA.J Taibah Univ med sci . 2020 December 1;15 (6):509-14.
https://doi.org/10.1016/j.jtumed.2020.08.009
PMid: 33318743 PMCid: PMC7715412

3. Kim SJ, Kim GE, Park JH, Lee SL, Kim CS. Clinical features and prognostic factors of early-onset sepsis: a 7.5-year experience in one neonatal intensive care unit.Korean J Pediatric . 2019 Jan;62(1):36-41.
https://doi.org/10.3345/kjp.2018.06807
PMid: 30304900 PMCid: PMC6351802

4. Dubón GEF, Zelaya REF, Portillo GAC.GENERAL CHARACTERIZATION OF EARLY NEONATAL SEPSIS. 2017;8.

5. Chen S, Shi Y. Progress of Research in Neonatal Sepsis.Sev Trauma Sepsis. 2019 May 28;277-303.
https://doi.org/10.1007/978-981-13-3353-8_16

6. Velaphi SC, Westercamp M, Moleleki M, Pondo T, Dangor Z, Wolter N, et al. Surveillance for incidence and etiology of early-onset neonatal sepsis in Soweto, South Africa. Plos One. 2019;14 (4):e0214077.
https://doi.org/10.1371/journal.pone.0214077
PMid: 30970036 PMCid: PMC6457488

7. Jatsho J, Nishizawa Y, Pelzom D, Sharma R. Clinical and Bacteriological Profile of Neonatal Sepsis: A Prospective Hospital-Based Study. Int J Pediatr. September 1, 2020;2020:1-9.
https://doi.org/10.1155/2020/1835945
PMid: 32952574 PMCid: PMC7481930

8. Odabasi IO, Bulbul A. Neonatal Sepsis.Med Bull Sisli etfal Hosp . 2020 June 12;54(2):143-58.

9. Improve the survival and well-being of newborns [Internet]. [cited November 6, 2021]. Available at: https://www.who.int/es/news-room/fact-sheets/detail/newborns-reducing-mortality

10. Wattal C, Kler N, Oberoi JK, Fursule A, Kumar A, Thakur A. Neonatal Sepsis: Mortality and Morbidity in Neonatal Sepsis due t Multidrug-Resistant (MDR) Organisms: Part 1. Indian J Pediatr. 2020;87(2):112-121.
https://doi.org/10.1007/s12098-019-03106-z PMid: 31828600 PMCid: PMC6974503

11. Ulloa- Ricárdez A, Salazar-Espino B. Epidemiology of early and late neonatal infection in a Neonatal Intensive Care Unit. Rev Hospital Juarez, Mexico. 2019 October 23;86(3):100-105.

12. Yusef D, Shalakhti T, Awad S, Algharaibeh H, Khasawneh W Clinical characteristics and epidemiology of sepsis in the neonatal intensive care unit in the era of multidrug resistant organisms: A retrospective review.Pediatric Neonatol. 2018 Feb;59(1):35-41.
https://doi.org/10.1016/j.pedneo.2017.06.001
PMid: 28642139

13. Berhane M, Gidi NW, Eshetu B, Gashaw M, Tesfaw G, Wieser A, et al. Clinical Profile of Neonates Admitted with Sepsis to Neonatal Intensive Care Unit of Jimma Medical Center, A Tertiary Hospital in Ethiopia. Ethiopian J Health Sci. 2021 May;31(3):485-94.

14. Glaser MA, Hughes LM, Jnah A, Newberry D. Neonatal Sepsis: A Review of Pathophysiology and Current Management Strategies. Adv Neonatal Care. 2021 Feb;21(1):49-60. https://doi.org/10.1097/ANC.0000000000000769 PMid: 32956076

15. Popescu CR, Cavanagh MMM, Tembo B, Chiume M, Lufesi N, Goldfarb DM, et al. Neonatal sepsis in low-income countries: epidemiology, diagnosis, and prevention. Expert Rev Anti Infect Ther. 2020 May;18(5):445-52. https://doi.org/10.1080/14787210.2020.1732818 PMid: 32070161

16. Sorsa A. Epidemiology of Neonatal Sepsis and Associated Factors Implicated: Observational Study at Neonatal Intensive Care Unit of Arsi University Teaching and Referral Hospital, South East Ethiopia. Ethiopia J Health Sci. 2019 May;29(3):333-42. https://doi.org/10.4314/ejhs.v29i3.5 PMid: 31447501 PMCid: PMC6689722

17. Borja JEN, Diaz CE, Cerda EZ. Neonatal sepsis in patients of the General Hospital of the North of Guayaquil IESS Los Ceibos. 2019;38:8.

18. López U. OJ, Buriticá H. HM, López U. OJ, Buriticá H. HM. Neonatal sepsis lethality, risk factors, and microbiological characteristics. Andes Pediatr. 2021;(AHEAD):0-0. https://doi.org/10.32641/andespediatr.v92i5.2610 PMid: 35319575

19. Singh M, Alsaleem M, Gray CP. Neonatal Sepsis [Internet]. StatPearls [Internet]. Stat Pearls Publishing; 2021 [cited November 5, 2021]. Available at: https://www.ncbi.nlm.nih.gov/books/NBK531478/

20. Arreaga LDPT, Avilés DAR, Rivera MKB, Caballero JVC. Risk factors and prevention of early neonatal sepsis. RECIMUNDO. December 2019;3 (3 ENG):5-28.

21. Burga-Montoya G, Luna MuñozC, Correa López LE. Risk factors associated with early neonatal sepsis in premature infants at a National Teaching Mother Child Hospital, 2017. Rev face Human Med. 2019 July 10;19 (3):39-42. https://doi.org/10.25176/RFMH.v19i3.2165

22. Ocviyanti D, Wahono WT. Risk Factors for Neonatal Sepsis in Pregnant Women with Premature Rupture of the Membrane. J Pregnancy. October 1, 2018; 2018:4823404. https://doi.org/10.1155/2018/4823404 PMid: 30402288 PMCid: PMC6191960

23. Milián O de la CA, Méndez AMC, Guerra JF, Martínez YP, Benavides NG, Cabana YM. Early-onset neonatal sepsis in a neonatal care unit: associated germs. Cent Medical Act. 2019 April 5;13 (2):159.

24. Klingenberg C, Kornelisse RF, Buonocore G, Maier RF, Stocker M. Culture-Negative Early-Onset Neonatal Sepsis- At the Crossroad Between Efficient Sepsis Care and Antimicrobial Stewardship. Front Pediatr. October 9, 2018; 6:285. https://doi.org/10.3389/fped.2018.00285 PMid: 30356671 PMCid: PMC6189301

25. Puopolo KM, Benitz WE, Zaoutis TE, COMMITTEE ON FETUS AND NEWBORN, COMMITTEE ON INFECTIOUS DISEASES. Management of Neonates Born at ≥35 0/7 Weeks' Gestation With Suspected or Proven Early-Onset Bacterial Sepsis. Pediatrics. 2018 Dec ;142(6):e20182894. https://doi.org/10.1542/9781610020047-part05-management

26. Neonatal infection: antibiotics for prevention and treatment :56. NICE guideline [NG195] Published: April 20, 2021

27. Procianoy RS, Silveira RC. The challenges of neonatal sepsis management. J Pediatric (Rio J). March 1, 2020; 96:80-6. https://doi.org/10.1016/j.jped.2019.10.004 PMid: 31747556 PMCid: PMC9432313

28. Colomer BF, Cotallo GDC, Castrillo "M of" Group of H. Neonatal Sepsis of Vertical Transmision: An Epidemiological Study from the " Group of Hospitals Castrillo " Spanish Neonatal Network. In: American Journal of Perinatology [Internet]. Thieme Medical Publishers; 2019 [cited December 13, 2021]. p. A011. Available at: http://www.thieme-connect.de/DOI/DOI?10.1055/s-0039-1693259 https://doi.org/10.1055/s-0039-1693259

29. Camargo JF de, Caldas JP de S, Marba STM. Early neonatal sepsis: prevalence, complications, and outcomes in newborns with 35 weeks of gestational age or more. Rev Paul Pediatr. 2022 ;40:e2020388. https://doi.org/10.1590/1984-0462/2022/40/2020388 PMid: 34614138 PMCid: PMC8543790

30. Hernández-Martínez A, Martínez-Sánchez LM. Disseminated intravascular coagulation: A topic review. Health Univ . 2018 Aug 31;20 (3):283. https://doi.org/10.22267/rus.182003.132

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