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Risk Factors and Etiology of Neonatal Sepsis at Baghdad Hospitals, Iraq

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ABSTRACT

Objective(s): To determine risk factors and etiology associated with development of neonatal sepsis at Baghdad hospitals, Iraq.
Methods: The descriptive analytical case control study design technique entails was used for conducting research on neonatal care units in Baghdad governorate in order to identify the causes and risk factors leading to neonatal sepsis. Where it was implemented during the period from November 20th, 2022, to 1st June 2023. The data analyzed by using package SPSS. version 22.
Results: Newborns who developed sepsis with their mother's data and control group were 94 neonates per group. Evaluation of risk factors showed that mothers with a first or second child (parity 1-2) were significantly associated with neonatal sepsis (P = 0.016) and mothers were more likely to have neonatal sepsis on their children (2.092) fold high risk than mothers with multiple births (multiparity). On the other hand, women who undergoing caesarean section, high blood pressure, bleeding disorder, urinary tract, premature rupture of membranes, and perinatal fever were (6.4, 2.279, 2.303, 4.119, 3.476, 2.943 times respectively) more likely to have sepsis. In terms of neonatal risk factors, infants born preterm, before 37 weeks gestation, birth weight less than 2500 grams (18.0), neonatal age (7-28 days), preterm score <7, resuscitation, birth asphyxia, the period when a neonate spends in the incubator ≥ 3 days is a significant risk for neonatal sepsis, and they are more likely to develop neonatal sepsis.
Conclusion: There are many risk factors for the mother and the child that increase the possibility of developing neonatal sepsis
Recommendations: Promoting education and awareness of mothers, especially those who were born prematurely, about hygiene practices and newborn care can help reduce the risk of neonatal sepsis.

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عوامل الخطورة واسباب الانتان لحديثي الولادة في مستشفيات بغداد، العراق

المستخلص

الاهداف : تحديد عوامل الخطر المرتبطة بتطور تعفن الدم عند حديثي الولادة في مستشفيات بغداد ، العراق.
منهجية البحث: تم اجراء دراسة وصفية تحليلية على وحدات رعاية الأطفال حديثي الولادة في محافظة بغداد من أجل تحديد اسباب وعوامل الخطر المؤدية للإنتان في حديثي الولادة. حيث تم تنفيذه خلال الفترة من ٢٠ تشرين الثاني ٢٠٢٢ إلى ١ حزيران ٢٠٢٣.
النتائج: الاطفال حديثي الولادة الذين أصيبوا بالإنتان مع بيانات أمهاتهم والمجموعة الضابطة كانوا ٩٤ وليدًا لكل مجموعة. أظهر تقييم عوامل الخطر أن الأم التي لديها طفل أول أو ثاني (عدد والولادات ١-٢) مرتبطة بشكل كبير بإنتان حديثي الولادة (P = 0.016) وأن الأم كانت أكثر عرضة لإصابة طفلها بالإنتان الوليدي ب (٢,٠٩٢) مقارنةً بالأمهات متعددة الولادات. من ناحية أخرى ، كان للولادة القيصرية ، وارتفاع ضغط الدم ، واضطراب النزيف ، والمسالك البولية ، وتمزق الأغشية المبكر, والحمى اثناء الولادة (٦,٤ ، ٢,٢٧٩ ، ٢,٣٠٣ ، ٤,١١٩ ، ٣,٤٧٦ , ٢,٩٤٣ مرات أكثر عرضة للإصابة بالإنتان الوليدي على التوالي).
فيما يتعلق بعوامل الخطر الخاصة بالوليد، كان الأطفال المولودون مبكرا ، قبل ٣٧ أسبوعًا من الحمل ، وزنهم عند الولادة أقل من ٢,٥٠٠ جرام (١٨,٠) ، عمر حديثي الولادة (٧-٢٨ يوم) ، مقياس ابكار 7> ،والإنعاش ، والاختناق اثناء الولادة ، والمدة التي يقضيها الوليد في الحاضنة ≤ ٣ أيام هي من المخاطر الرئيسة للإنتان الوليدي هم اكثر عرضة للاصابة بالانتان الوليدي.
الاستنتاج: يوجد عدد من عوامل الخطرالمتعلقة بالأم والطفل تزيد من احتمالية الإصابة بالإنتان الوليدي
التوصيات: تعزيز تثقيف الأمهات وتوعيتهن وخاصة اللواتي ولدن قبل الاوان حول ممارسات النظافة ورعاية الاطفال حديثي الولادة يمكن ان يساعد تقليل مخاطر الإنتان الوليدي..

الكلمات المفتاحية: عوامل الخطر ، الاصابة ،الإنتان ، الوليدي، التمريض.

Introduction

Neonatal sepsis is a clinical condition that affects infants who are 28 days or younger. Despite recent advancements in the healthcare system, it manifests as systemic indications of infection and the isolation of a bacterial pathogen from the bloodstream and is regarded a major cause of morbidity and mortality in new-borns globally [(1).]

Particularly in South-East Asian and sub-Saharan African countries with lower and moderate incomes, it is a severe but ignored public health issue [(2).] Because of this, sepsis-specific mortality has reduced substantially more slowly in these regions than mortality from other causes, such as premature birth or intrapartum issues, despite a declining trend in new born death globally over the past 20 years. Each year, more than six million babies in these regions are affected by sepsis and other catastrophic disorders. Each year, it accounts for over a quarter of all neonatal deaths globally [(3).]

Despite recent improvements in healthcare facilities, sepsis continues to be one of the leading causes of morbidity and mortality in newborns globally. While the majority of the evidence comes from rich nations, the majority of the problem's burden falls on the developing globe. examining the causes and risk factors of newborn sepsis to create solutions to lower morbidity and death [(4)].

Even though sepsis-related mortality is largely preventable with prevention of sepsis itself, timely recognition, rational antimicrobial therapy, and aggressive supportive care, case fatality rates of neonatal sepsis may reach 52%, contributing to almost one million deaths and accounting for 30–50% of all neonatal deaths in developing countries [(5)].

Sepsis is much more common in newborns who are premature and have very low birth weights (less than 1000 grams). Infants of African Americans are more prone to have Late-onset Sepsis (LOS). Sepsis and meningitis are more common in males, especially when gram-negative enteric bacilli are involved [(6)].

By 2018, sepsis would account for almost 41% of neonatal fatalities in Iraq, only preterm and associated sequelae coming before sepsis at 2.66% of under-five

mortality. On the other hand, newborn sepsis survivors continue to be at risk for short- and long-term neuro-developmental morbidity, which affects the child's total productivity as an adult [7].

Neonatal survival can be increased by identifying risk factors, establishing an early diagnosis, and starting treatment in accordance with the local epidemiology and antimicrobial resistance pattern. The prevalence of newborn sepsis, its risk factors, and the main agents that cause it are not well understood in underdeveloped nations. Underweight, admission during the winter, prim parity, and home delivery were linked to community-acquired LONS, according to a case-control study on the condition that was carried out in numerous developing nations [8],[9].

Methods

Study design and setting

The descriptive analytical case control study design technique was used for the purpose of conducting research on neonatal care units in Baghdad governorate in order to identify the risk factors associated with neonatal sepsis. Where it was implemented during the period from November 20th, 2022, to 1st June 2023. The study was carried out in Rusafa Health Directorate/ Baghdad Province. The study sample is distributed through five hospitals include (Al-Elwea Children's Teaching Hospital, Al-Elwea Maternity Teaching Hospital, Ibn Al-Baladi Pediatric and maternity Hospital, Medical City Department, Baghdad Teaching Hospital)

Study samples and sampling

Nonprobability convenience sample was collected through a review of mothers and Neonatal care units (NCUs) records which were selected out from the main hospitals in Baghdad province. The size of sample was (188) neonates divided into two groups each one contains (94) neonates case group and control group. The case group consisted of neonate diagnosed with neonatal sepsis, while the control group consisted of neonate not diagnosed with neonatal sepsis.

Study instruments

The questionnaire is one of the means to help collect data that contribute to achieving the results expected by the study, so the researcher designed this questionnaire, which aims to clarify the study objectives and significance by obtaining answers to the study's questions.

Data collection and study instruments

The actual data collection took from January 14th to May 4th 2023. After obtaining the approval of the Rusafa Health Directorate and verifying the validity and reliability of the study instruments.

The participants (Mothers of Neonate) were interviewed with an explanation for the instructions, their questions answered their questions regarding the form, urged them to participate and thanked them for the cooperation. The interview techniques were used on individual bases, and each interview take (30-60) minutes after taking the important steps that must be included in the study design and include the following:

- Socio-demographic Information
- Maternal Risk Factors of Neonatal Sepsis
- Neonatal Risk Factors of Neonatal Sepsis
- Medical Risk Factors of Neonatal Sepsis
- Etiology of Neonatal Sepsis

Validity and reliability of the questionnaires

The study instrument underwent a series of reviews and modifications and was completed by experts from various scientific branches. The researcher suggested that each expert member review the study tool in terms of content, simplicity, suitability, style, and appropriateness. The tool was modified based on expert recommendations. The Reliability Coefficients of the Pilot Study concerning Inter and intra Examiners. The Reliability Coefficient for the pilot study were calculated using Al-Naqeeb Formula. In addition to that we can concluded within the pilot study: the items of the questionnaire were clear and understood, time required for each interview ranged from (20-30) minutes for each case generally, and time required for each interview ranged from (20-30) minutes for each cases generally.

Reliability Coefficients	Actual values %
Inter Examiners	100 (0:260)
Intra Examiners	100 (0:260)

Ethical considerations

Official permissions and approval were obtained from the Council of the Nursing College/University of Baghdad for this study on (Issue No. 4 IN 12/12/2022). Data were collected anonymously, and no names or identity information were required from the participants. Consent was obtained from each participant before enrolment in the study by selecting acceptance to participate in the survey. This acceptance was considered informed consent for enrolment in the current study. Throughout the survey, confidentiality was maintained as no questions were asked regarding participants' identities or personal information. Participants were informed that the study would be used solely for scientific purposes.

Data analysis

Statistical data analysis approaches such as: Frequencies, and Percentages, Mean, and Standard Deviation, Reliability Coefficient for the Pilot study, Relibility value were used in order to analyse and assess the results of the study under application of the statistical package (SPSS) version 22.

Results

Table 1. Socio-demographical Characteristics of studied samples

SDCv.	Groups		Study		Control		C.S. (*)
	Classes		No.	%	No.	%	P-value
Maternal Age Groups Yrs.		15-19_	5	5.3	6	6.4	CC = 0.133 P = 0.496 NS
		20-24	24	25.5	21	22.3	
		25 -29	32	34.0	32	34.0	
		30-34 _	27	28.7	22	23.4	
		35 >	6	6.40	13	13.8	
	Mean ± SD		26.86 ± 4.99		28.00 ± 5.98		
Education levels	Illiterate		12	12.8	9	9.6	CC = 0.096 P = 0.186 NS
	Read and write		9	9.6	10	10.6	
	Elementary		9	9.6	17	18.1	
	Middle School (MS)		27	28.7	12	12.8	
	High School		14	14.9	15	16.0	
	Institute		11	11.7	15	16.0	
	College		12	12.8	16	17.0	
Occupational	Housewife		80	85.1	77	81.9	CC = 0.044 P = 0.832 NS
	Employed (Emp.)		11	11.7	13	13.8	
	Students		3	3.2	4	4.30	
Monthly Income	Sufficient		9	9.6	23	24.5	CC = 0.135 P = 0.063 NS
	Somehow Enough		48	51.1	46	48.9	
	Insufficient		37	39.4	25	26.6	

(*) Sig at P>0.05; Testing based on Contingency's Coefficient test; **OR**= Odds Ratio (Study: Controlled).

A total of 188 neonates (94 cases and 94 controls) were included. The mean (±SD) age of mothers was 26.86 ± 4.99 years in cases and 28 ± 5.98 years in control, ranging from 15to mor than 35 years. Regarding educational level, 28.7% cases were middle school, and 18.1% control were elementary. The highest percentage of occupational in cases and control were housewife 80 (85.1%) and 77 (81.9%) respectively. Forty-eight (51.1%) cases and 46 (48.9%) controls were somehow enough by monthly income (Table 1)

Table 2. Distribution of studied Maternal Risk Factors of the studied groups compare to control.

Maternal Factors	Groups	Study		Control		C.S. (*)
	Classes	No.	%	No.	%	P-value
Parity Groups OR: (1st G.: Other)	1 _ 2	43	45.7	27	28.7	CC = 0.173 P = 0.016 (S) OR=2.092
	3 _ 4	29	30.9	30	31.9	
	5 _ 6	15	16.0	23	24.5	
	≥ 7	7	7.4	14	14.9	
Type of Delivery OR: (Ces.: Norm.)	Normal	21	22.3	61	64.9	CC = 0.394 P = 0.000 (HS) OR=6.410
	Cesarean Section	73	77.7	33	35.1	
Hypertension OR: (Yes: No)	Yes	45	47.9	27	28.7	CC = 0.193 P = 0.007 (HS) OR=2.279
	No	49	52.1	67	71.3	
Bleeding disorder OR: (Yes: No)	Yes	27	28.7	14	14.9	CC = 0.165 P = 0.022 (S) OR=2.303
	No	67	71.3	80	85.1	
UTI OR: (Yes: No)	Yes	75	79.8	46	48.9	CC = 0.307 P = 0.000 (HS) OR=4.119
	No	19	20.2	48	51.1	
History of infectio with STDs	Yes	0	0	0	0	NA Coincidence
	No	94	100	94	100	
Premature Rupture o Membrane "PROM" OR: (Yes: No)	Yes	47	50.0	21	22.3	CC = 0.277 P = 0.000 (HS) OR=3.476
	No	47	50.0	73	77.7	
Fever during Delivery OR: (Yes: No)	Yes	51	54.3	27	28.7	CC = 0.251 P = 0.000 (HS) OR=2.943
	No	43	45.7	67	71.3	
ANC OR: (Yes: No)	Yes	43	45.7	50	53.2	CC = 0.074 P = 0.307 (NS) OR=0.741
	No	51	54.3	44	46.8	

(*) Sig. at P>0.05; Testing based on a Contingency's Coefficient test; **OR**= Odds Ratio (Study: Controlled).

The parity 1-2 for cases was 43 (45.7%) and 27 (28.7%) control. More than three-fourths of neonates 73 (77.7%) were delivered by cesarean section while controls were 33 (35.1%). History of hypertension during pregnancy was found in 45 (47.9%) respondents from cases and 27 (28.7%) respondents from controls. Regarding to bleeding disorder, 27 (28.7%) respondents from cases and 14 (14.9%) respondents from controls suffered from bleeding during delivery. The history of urinary tract infection during index pregnancy was more than three-fourths 75 (79.8%) and 46 (48.9%) in respondents from cases and controls respectively. Both studies groups had no history of infection with sexual transmitted diseases (STDs). In respect to Premature Rupture of Membrane "PROM", half (50%) cases and 21 (22.3) controls had a history of premature rupture of the membrane. Regarding intrapartum fever, 51 (54.3%) respondents from cases and 27 (28.7%) respondents from controls had a history of fever during labor. Forty-three (45.7%) cases and 50 (53.2%) controls attended antenatal care service (ANC) (Table 2).

Table 3. Distribution of Neonatal Risk for studied Groups compare to control.

Neonatal Risk Factors	Groups	Study		Control		C.S. (*)
	Classes	No.	%	No.	%	P-value
Gestational Age OR: (< 37 : ≥ 37)	< 37 weeks	82	87.2	25	26.6	CC = 0.522 P = 0.000 (HS) OR=18.000
	≥ 37 weeks	12	12.8	69	73.4	
Birth Weight OR: (≤ 2.5 : ≥ 2.5)	≤ 2.5 kg	76	80.9	23	24.5	CC = 0.492 P = 0.000 (HS) OR=13..34
	> 2.5 kg	18	19.1	71	75.5	
The Gender of the Newborn OR: (Male: Female)	Male	58	61.7	50	53.2	CC = 0.086 P = 0.238 (NS) OR=1.418
	Female	36	38.3	44	46.8	
Neonate Age For Cohort (Study:<7D.) No. of vaild cases of<7=152	< 7 Days	58	61.7	94	89.4	CC = 0.438 P = 0.000 (HS) Cohort: 0.382
	7 - 28 Days	36	38.3	0	10.6	
APGAR Scores OR: (< 7: ≥ 7)	< 7	71	75.5	51	54.3	CC = 0.218 P = 0.002 (HS) OR=2.603
	≥ 7	23	24.5	43	45.7	
Resuscitation OR: (Yes: No)	Yes	63	67	32	34	CC = 0.313 P = 0.000 (HS) OR=3.938
	No	31	33	62	66	
Hospitalization For Cohort: (Study:<7D.) No.valid cases of<7D.=96	< 7 Days.	2	2.1	94	100	CC = 0.707 P = 0.000 (HS) OR: ∞
	1 _ 2 weeks	39	41.5	0	0.00	
	> 2 weeks	53	56.4	0	0.00	
Birth Asphyxia OR: (Yes: No)	Yes	86	91.5	76	80.9	CC = 0.152 P = 0.035 (S) OR=1.439
	No	8	8.5	18	19.1	
Use the Incubator OR: (Yes: No)	Yes	94	100	46	48.9	CC = 0.505 P = 0.000 (HS) OR: ∞
	No	0	0	48	51.1	
Duration in Incubator OR: (≥ 3: < 3)	< 3 Days	2	2.1	46	100	CC = 0.696 P = 0.000 (HS) OR=4278.0
	≥ 3 Days	92	97.9	0	0.00	

(*) **Sig**. at P>0.05; Testing based on a Contingency's Coefficient test; **OR**= Odds Ratio (Study: Controlled).

Table (3) indicates that most of the cases 82 (87.2%) and 25 (26.6%) of controls had a gestation age of fewer than 37 weeks. Also, high frequencies 76 (80.9%) cases and 23 (24.5%) controls had a low birth weight. Male was 58 (61.7%) in cases and 50 (53.2%) in controls. In respect to the neonatal age, thirty-six (38.3%) in cases, while no record of controls in this age of neonates. The proportion of neonates who had an APGAR score <7 was also higher in cases 71 (75.5%) than in controls 51 (54.3%). Sixty-three (67%) cases and 32 (34%) controls were resuscitated at birth. The period of neonatal hospitalization was from 1 to mor than 2 weeks was 92 (97.9%) in cases, in contrast, all neonate in control group discharge from hospital at less than one week. Neonate suffered from birth Asphyxia was 86 (91.5) cases and 76 (80.9%) in controls. All cases need to use incubator, while only46 (48.9%) of controls used incubator. The duration of incubator for three days and mor was 92 (97.9) cases and no control groups have been indicated 46 (48.9%) of controls used incubator. The duration of incubator for three days and mor was 92 (97.9) cases and no control groups have been indicated.

Discussion

The present study indicates that more than half of the studied sample had low educational levels including Middle School (MS) and most of mothers occupied a housewife and student, in addition (39.4%) of the studied women are assigned insufficient monthly income, a study in Diyala, Iraq showed that most mothers with children who had sepsis were in primary schools and housewives compared to the control group. Regarding to the monthly income, the results indicated that Somehow Enough accounted (51.1%) and (48.9%) for the study group and the control group, respectively [10].

Maternal Factors

The parity group results indicate the highest percentage in class (1-2) was (45.7%) in study group and (28.7%) in control group. This result was consistent with results conducted by (Peter Adatara 2019) who found that as parity increases their index neonates are less likely to develop sepsis. The primiparous mother was 2.9 times fold to having neonates with sepsis. It may be explained by prolonged delivery duration among primiparous compared to multiparous, which increases exposure to infection [11], or may be related to fact that mother with few parities had low knowledge about baby hygiene.

Regarding to the type of delivery (77.7%) of them was cesarean section in study group, and (35.1%) in control group. It is noted that newborns delivered through CS are not exposed to vaginal and fecal bacteria, but they often experience prolonged hospital stay and late initiation of breastfeeding [12]. Late initiation of breastfeeding after CS may deny the neonate the protective effect of colostrum against different pathogenic microbes that have harmful effects to the survival of the newborn baby and its ability to provide immunity for the neonate [13].

Current results disagree with study conducted in Egypt that found a high percentage of C/S 52 (49.1%) in study group and 54 (50.9%) in control group[14].

Concerning to the hypertension, the highest percentage is 47.9% in study group, and (28.7%) in control group. This result was approached with study result conducted in Egypt. Regarding to the bleeding disorder, the highest percentage was (28.7%) in study group, and (14.9%). This result agree with a study in Egypt "A case control study of maternal and neonatal risk factors associated with neonatal sepsis that show the higher percentage is 127 for study group and 249 for control group[14]. The urinary tract infection indicates highest percentage (79%) in study group and control group. Relating to history of infection with STDs, The percentage was zero in both study and control groups. This result is agree with study conducted in Diyala, Iraq Which showed the higher percentage is 81(56.3%) for study group, and 63 (43.8%) for control group[10].

In respect to the premature rapture of membrane, the highest percentage was (50.%) in study group, and (22.3%) in control group. Regarding to the fever during delivery, the highest percentage was (54.3%) in study group, and (28.7%) control group. Relating to the ANC, the highest percentage was (45.7%) in study group and (53.2%) in control group.

Neonatal Risk Factors

With regard to the gestational age, the result indicates the higher percentage was 82(87.2%), less than 37 weeks in the study group, while in controlled are accounted 25(26.6%). Concerning Birth weight observed that most of the respondents in the study group are assigned less than 2.5 kg, and they are accounted 76(80.9%), while in controlled are accounted 23(24.5%). This was in line with another study from Kirkuk by Faiq [15]. who showed PROM had great risk for neonatal sepsis. When the amniotic sac

ruptures prematurely, the protective barrier between the baby and the external environment is compromised. This exposes the baby to the risk of infection as microorganisms can ascend into the uterus and infect the amniotic fluid or the baby itself. Also, Once the amniotic sac ruptures, bacteria from the vagina or cervix can ascend through the cervix into the uterus. This ascending infection can lead to chorioamnionitis, which is the infection of the placenta and amniotic fluid. Chorioamnionitis increases the likelihood of neonatal sepsis. Furthermore, when there is a significant time lapse between the rupture of membranes and delivery, the risk of infection increases [16].

The gender of the newborn ratio indicates about two third of the respondents in the study group were formed male, and they are accounted 58(61.7%), while in controlled are accounted 50 (53.2%). Also, [17], [18] showed equivalent percentage between gender. Whereas, inverse results showed that males were at 1.7 times more risk with neonatal sepsis compared to females [14].

About the Neonate age, the results observed that more than one third of the respondents in the study group are assigned (7 – 28) days, and they are accounted 36(38.3%), while in controlled are accounted 10(10.6%). In the line with current results Neonatal sepsis has been recorded Prematurity <37 weeks and weighted lees than 1.5 kg (1.91 and 3.37 more times risk respectively [19]. Their immature physical barriers, such as the skin and mucous membranes, may also be less effective in preventing bacterial invasion and making them more susceptible to infections including neonatal sepsis.

The APGAR score and birth asphyxia a quick assessment of a newborn's overall well-being immediately after birth. A low APGAR score at the fifth minutes indicates potential distress during the delivery process. Newborns who experience difficulties at birth may be more susceptible to infections, including sepsis. Similarly, findings were made for APGAR scores< 7 to found that the odds of developing neonatal sepsis were 2.39 times higher than neonates that had an APGAR score >7 [11]. In addition, the APGAR scores of less than seven were risk factors for early and late-onset of neonatal sepsis [20].

With regard to the Resuscitation, the results indicate that more than two third of the respondents in the study group are assigned positively, and they are accounted 63(67.0%), while in controlled are accounted 32(34.0%). Resuscitation Infants at birth are often those who experienced complications during delivery or had a lack of oxygen. The need for resuscitation suggests a higher risk of neonatal sepsis due to the potential exposure to bacteria or other pathogens during the delivery process. The results supported by previous studies conducted in Iraq [20] as well as studies from different other countries like Tanzania [21], Gondar [22], Ghana [11].

Prolonged hospital stays, particularly in the neonatal intensive care unit (NICU), can increase the risk of neonatal sepsis. Hospitals can be reservoirs for various bacteria, and extended stays increase the opportunity for exposure to these pathogens. Moreover, invasive procedures and the presence of medical devices, such as catheters or ventilators, further increase the risk of infection.

Use of incubator are commonly in the neonatal intensive care unit (NICU) to provide a controlled and warm environment for premature or sick infants. While incubators offer several benefits, including temperature regulation and reduced exposure to pathogens, prolonged use of an incubator can create conditions conducive to bacterial growth, potentially increasing the risk of sepsis especially for long period (≥ 3 days).

With the same approach, A total of 36 studies in 10 countries in Sub Saharan Africa indicate that the same significant risk factor included with the current study (Resuscitation at birth,

low Birth weight, Low Apgar score, Prematurity Premature rupture of membranes (PROM), and Intrapartum fever).

It's important to note that these risk factors do not guarantee that a neonate will develop sepsis. However, they indicate a higher likelihood or vulnerability to the condition. To mitigate the risk, healthcare providers employ various preventive measures, including strict infection control practices, antibiotic prophylaxis, and vigilant monitoring of high-risk newborns. Early recognition and prompt treatment of sepsis symptoms are also crucial for improving outcomes

Conclusion

Few parities, CS, hypertension, bleeding disorders, UTI, PROM, and fever are material risk factors for developing neonatal sepsis. Preterm, low birth weight, low APGAR score, resuscitation, long hospitalization, use of incubator and specifically for long time are risk neonatal risk factors for developing neonatal sepsis.

Recommendations

Enhancing maternal education and awareness: Providing education and raising awareness among mothers, especially those with primiparous, about proper hygiene practices and newborn care can help reduce the risk of neonatal sepsis.

Improving infection control practices by the Ministry of Health: Healthcare facilities must prioritize strict adherence to infection control measures, especially in high-risk settings such as the neonatal intensive care unit to reduce the risk of infection.

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Conflict of interest

None to declare.

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Data availability

The data supporting the findings of this study are not publicly available due to ethical and privacy considerations but may be made available from the corresponding author upon reasonable request and with appropriate approval.

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