EPIDEMIOLOGICAL & BACTERIOLOGICAL COMPARATIVE STUDY OF NEONATAL SEPSIS IN AL AZHAR UNIVERSITY HOSPITALS AND MAIN SHAREYANOENATAL INTENSIVE CARE UNITS

By

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ABSTRACT

Background: *Neonatal sepsis is defined as a clinical syndrome in an infant 28 days of life or younger, manifested by systemic signs of infection and isolation of a bacterial pathogen from the blood stream. Diagnosis and management of sepsis are a great challenge facing neonatologists in NICUs.*

Aim and objectives: *The aim of this study is to evaluate and Compare the Epidemiological and Bacteriological Aspects of neonatal sepsis during a period of six months in neonatal Intensive Care units of Al Azhar University Hospitals and Main Shareya NICUs.*

Subjects and methods: *This was A prospective study conducted over a period of six months from 1/7/2018 to 31/12/2018 at NICUs of Al Azhar University Hospitals (Al Hussain &Sayed Galal Hospitals) and Some of Main Shareya NICUs in Grand Cairo, Egypt (Almaza, El-Shohadaa, Istiqamaand 6th October). During the study period, all admitted neonates were recorded, then cases with clinical signs and symptoms of sepsis at the time of admission or who developed sepsis during their hospital stay were assessed (Clinically , Laboratory and Bacteriologically) and included in the study.*

Results: *Out of 1874 of total admitted cases during study period, the incidence of clinically suspected neonatal sepsis among the admitted neonates at the neonatal intensive care units of the included hospitals and Units was 50.3% (942/1874).*

The sepsis was proved in 410 (43.5%) cases by positive blood culture: 361(44.5%) from Main Shareya and 49 (37.1%) from Azhar hospitals.Regarding demographic characteristics of studied cases, presence of neonatal sepsis is more in (full term, CS, urban residence, male neonates and single) cases, with significant difference between both groups in Post-natal age, Sex and Birth number.

Klebsiella is the most organisms in blood cultures in both EOS and LOS of Main Shareya and Azhar cases followed by Staph. Aureus, Proteus, Candida Albicans then E. Coli and finally Strept. Pneumonia .There is no statistically significant difference between types of sepsis regarding to the causative organisms in blood cultures. Death occurs more frequent in EOS than in LOS while improvement is more frequent in LOS. There is no statistically significant difference in Main Shareya and Azhar cases.

Conclusion*: Septicemia is most frequent and severe disease which threatens survival during first few weeks of life. Considering the meager resources available in developing countries a reduction in sepsis related mortality may be possible by using hygienic measures during and after delivery and identifying high risk neonates and targeting them for intensive care and therapy. The changing pattern and frequent emergence of resistant bacteria make the problem more difficult. For best results in infection management, nurseries should periodically review their bacterial sensitivity pattern and the antibiotic policy.*

Keywords: *Septicemia, Sepsis, Neonatal, Epidemiological.*

INTRODUCTION

Globally, sepsis is still one of the major causes of morbidity and mortality in neonates, in spite of recent advances in health care units **(J. H. Wu et al., 2009)**. More than 40% of under-five deaths globally occur in the neonatal period, resulting in 3.1 million newborn deaths each year **(UNICEF et al., 2011)**. The majority of these deaths usually occur in low-income countries and almost one million of these deaths are attributed to infectious causes including neonatal sepsis, meningitis, and pneumonia **(R. E. Black et al., 2008)**.

Neonatal sepsis is caused by Gram positive and Gram negative bacteria and Candida **(D. S. Jumah and M. K. Hassan, 2007)**.The diversity of organisms causing sepsis varies from region to another and changes over time even in the same place **(S. Shrestha et al., 2010) (R. Ghotaslou et al., 2007)**. This is attributed to the changing pattern of antibiotic use and changes in lifestyle. Many factors contribute to the susceptibility of the neonate to sepsis, which can influence the incidence of neonatal sepsis. Incidence also varies from nursery to nursery depending on conditions predisposing infants to infection **(J. O. Klein and J. S. Remington, 2000)**.

PATIENTS AND METHODS

This was A prospective study conducted over a period of 6 months from 1/7/2018 to 31/12/2018 at NICUs of Al Azhar University Hospitals (Al Hussain & Sayed Galal) and Some of Main Shareya NICUs in Grand Cairo, Egypt (Almaza, El-Shohadaa, Istiqama and 6th October).

1. Inclusion criteria:

1. Gastational Age: Full-term and Pre-term.
2. All admitted neonates with clinical and laboratory evidence of sepsis at the time of admission.

3. Neonates who developed sepsis during their hospital stay.

2. Exclusion Criteria:

Any Newborn Suspected with one of the Following:

1. Inborn Error of Metabolism.
2. Hypoxic Ischemic Encphalopathy.
3. Congenital Heart Disease.
4. Major Congenital Anomalies.

Sepsis is defined as presence of at least 2 out of the following criteria: (Manisha et al., 2013).

i. Presence of risk factors of sepsis (e.g., prematurity, chorioamnionitis, PROM >18 Hours).

ii. Presence of two or more clinical signs of sepsis (poor reflexes, lethargy, respiratory distress, bradycardia, apnea, convulsions, abdominal distension, and bleeding).

iii. Positive Culture and positive CRP.

Iv. According to Haematological Scoring System: 3/7 of Abnormality of these items (total Leucocytes, PMN Count, Immature PMN Count, I: T PMN Ratio, I:M PMN Ratio, Change in PMN, Platelet Count).

3. Ethical consideration:

1. Informed consent will be obtained from Parents or Care Giver of studied newborn.
2. Approval of Ethical committee in Pediatrics Department.
3. Approval of Ethical Committee in Faculty of Medicine – Al Azhar University.
4. No Conflict of Interest in this Study either Financial or Submission.
5. Data and results of the study are confidential.

4. Statistical analysis:

Values were expressed as mean ± standard deviation (SD), median (25%–75% percentiles) or number (percentage) when appropriate. Correlations between parameters were determined by Pearson correlation. $P<0.05$ was considered significant, with a 95% confidence interval (CI). Statistical analyses were performed using computer program Statistical Package for the Social Science (SPSS, Chicago, IL) software version-24 for Microsoft Windows.

RESULTS

During the study period, a total of 1874 neonates were admitted (1614 neonates in Main Shareya units and 260 neonates in Azhar hospitals) then suspected cases of sepsis were enrolled. 942 (50.3%) cases were included in our study as neonatal sepsis on clinical basis. The results are demonstrated in the following tables:

Table (1): Total number of studied cases

	Number	Percent	Total
Total admitted cases	**-Main Shareya:** 1614 **-Azhar :** 260	86.1% 13.9%	1874 (100%)
Total suspected neonatal sepsis cases	**-Main Shareya:** 810 **-Azhar :**132	50.1% 50.7%	942 (50.3%)
Proved neonatal sepsis cases by blood culture	**-Main Shareya:** 361 **-Azhar :**49	44.5% 37.1	410 (43.5%)

This table show that, out of 1874 neonates admitted at NICUs, 942 (50.3%) were clinically suspected as neonatal sepsis. The sepsis was proved in 410 (43.5%) cases by positive blood culture: 361(44.5%) from Main Shareya and 49 (37.1%) from Azhar.

Table (2): Neonatal risk factors of studied cases

	Main Shareya (n.=810)		Azhar (n.=132)		P value
	No	**%**	**No.**	**%**	
Pre term :	314	38.8%	59	44.7%	**0.00001**
Low Birth Weight (LBW) :	190	23.5%	27	20.5%	**0.0038**
Multiple Pregnancy:	700	86.4%	35	26.5%	**0.00001**
APGAR Score at 5 minutes: ≥ 8 ≤ 7 Unknown	 100 90 620	 12.3% 11.1% 76.6%	 17 90 25	 12.8% 68.2% 19%	 0.645
Male Sex:	492	60.7%	59	44.7%	0.618
Fetal Distress:	102	12.6%	31	23.5%	0.174
Respiratory Distress:	662	81.7%	83	62.9%	0.825
Hypothermia:	97	12%	13	9.8%	0. 98

The difference is being statistically significant for Pre term, low birth weight and multiple pregnancies between Main Shareya and Azhar cases ($P < 0.05$).

Table (3): Maternal risk factors of studied cases

	Main Shareya (n.=810)		**Azhar** (n.=132)		**P value**
	No	**%**	**No.**	**%**	
Anemia:	598	73.8%	72	54.5%	**0.026**
D.M :	82	10.1%	28	21.2%	0.59
HTN:	63	7.7%	33	25%	**0.00001**
PROM: ≥ 18 H	178	22%	64	48.4%	**0.00001**
Fever or Infection (UTI):	604	74.5%	88	66.6%	0.926
Previous Abortion:	296	36.5%	53	40.1%	**0.002**
Smoking:	30	3.7%	19	14.4%	0.175

This table show frequent maternal risk factors for neonatal sepsis in our studied cases regarding PROM, Anemia, Infection, DM, HTN, Abortion and Smoking. The difference is being statistically significant for Anemia, HTN, PROM and Previous Abortion between Main Shareya and Azhar cases ($P < 0.05$).

Table (4): Clinical Presentation of studied cases

	Main Shareya(n.=810)		Azhar (n.=132)		Total (n.=942)		P Value
	No	%	No.	%	No.	%	
General:							
-Fever	**69**	**8.5%**	**25**	**18.9%**	**94**	**9.9%**	0.215
-Lethargy	**342**	**42.2%**	**59**	**44.6%**	**401**	**42.5%**	0.132
-LBW	**190**	**23.4%**	**27**	**20.4%**	**217**	**23%**	0.534
-Poor Feeding	**199**	**24.5%**	**42**	**31.8%**	**241**	**25.5%**	0.512
Respiratory System:							
-Distress	**662**	**81.7%**	**83**	**62.8%**	**745**	**79.1%**	**0.005**
-Apnea	**146**	**18%**	**25**	**18.9%**	**171**	**18.1%**	0.125
CVS:							
-Cyanosis	**146**	**18%**	**25**	**18.9%**	**171**	**18.1%**	0.125
-Mottling	**100**	**12.3%**	**43**	**32.5%**	**143**	**15.1%**	0.08
-Tachycardia	**59**	**7.2%**	**12**	**9%**	**71**	**7.5%**	0.776
CNS:							
-Poor Reflexes	**442**	**54.5%**	**55**	**41.6%**	**497**	**52.7%**	0.114
-Convulsions	**42**	**5.2%**	**39**	**29.5%**	**81**	**8.6%**	0.118
-Muscle Tone	-	-	-	-			
Haematological:							
-Pallor	**217**	**26.7%**	**32**	**24.2%**	**249**	**26.4%**	0.596
-Jaundice	**500**	**61.7%**	**59**	**44.6%**	**559**	**59.3%**	**0.003**
GIT:							
-Vomiting	**25**	**3%**	**3**	**2.2%**	**28**	**2.9%**	0.5
-Abd.distension	**199**	**24.5%**	**69**	**52.2%**	**268**	**28.4%**	0.09

This table show clinical presentation of all studied cases. The most prevalent clinical feature was respiratory distress, then jaundice, poor reflexes and lethargy, the least clinical feature was vomiting then tachycardia and convulsions according to the total number of cases. The differences are being statistically significant for respiratory distress and jaundice between both groups.

Table (5): Distribution of all cases according to type of sepsis

Type of sepsis	Main Shareya		P Value	Azhar		P Value	Total Number	
	No.	%	0.776	No.	%	0.833	No.	%
EOS	354	43.7%		60	45.5%		414	43.9%
LOS	456	56.3%		72	54.5%		528	56.1%
NCI	83	10.2%		10	7.5%		93	9.9%

This table shows no statistically significant difference between types of sepsis in both groups.

Table (6): Correlation between results of blood cultures and type of sepsis in all admitted cases

Organism in blood culture	Main Shareya NICUs (n.=810)				Al Azhar Hospitals (n.=132)				Total(n.=942)		P Value
	EOS		LOS		EOS		LOS		Total	%	0.597
	No.	%	No.	%	No.	%	No.	%			
Klebsiella	88	10.8%	98	12.1%	9	6.8%	10	7.5%	205	21.7%	
Staph. Aureus	72	8.8%	39	4.8%	6	4.5%	10	7.5%	127	13.5%	
Proteus	20	2.5%	8	0.9%	2	1.5%	3	2.2%	33	3.5%	
Candida Albicans	5	0.6%	15	1.8%	1	0.7%	3	2.2%	24	2.5%	
E. Coli	3	0.3%	4	0.5%	0		1	0.7%	8	0.8%	
Pseudomonas	2	0.2%	0		1	0.7%	0		3	0.3%	
E. Coli + Staph.Aureus	2	0.2%	3	0.3%	0		2	1.5%	7	0.7%	
Strept. Pneumonia	2	0.2%	0		1	0.7%	0		3	0.3%	
Total	**194**	**23.9%**	**167**	**20.6%**	**20**	**15.1%**	**29**	**21.9%**	**410**	**43.5%**	

This table shows that Klebsiella (21.7%) is the most organisms in blood cultures in both EOS and LOS of Main Shareya and Azhar cases followed by Staph.Aureus (13.5%), Proteus (3.5%), Candida Albicans (2.5%) then E.Coli (0.8%) and finally Strept. Pneumonia (0.3%).There is no statistically significant difference between types of sepsis regarding to the causative organisms in blood cultures.

Table (7): Distribution of cases according to their outcome

Outcome	Main Shareya		P Value	Azhar		P Value	Total Number	
	No.	%		No.	%		No.	%
Improved	726	89.6%	0.307	111	84.1%	0.285	837	88.9%
Died	78	9.6%		21	15.9%		99	10.5%
Referred	6	0.8%		0	0%		6	0.5%
							942	100%

This table shows outcome of admitted sepsis cases, there is no statistically significant difference between both groups.

Table (8): Comparison of prognosis among type of sepsis in Main Shareya&Azhar NICUs

Prognosis	Main Shareya					Azhar				
	EOS		LOS		P Value	EOS		LOS		P Value
	No.	%	No.	%		No.	%	No.	%	
Improved	242	29.9%	484	59.7%	0.197	83	62.8 %	28	21.2 %	0.916
Death	71	8.7%	7	0.9%		12	9%	9	6.8 %	
Referred	6	0.8%	0	0%		0	0%	0	0%	
Total	**319**	**39.4%**	**491**	**60.6%**		**95**	**71.9 %**	**37**	**28.1 %**	

This table show comparison of prognosis among type of sepsis, Death occurs more frequent in EOS than in LOS while improvement is more frequent in LOS. There is no statistically significant difference in Main Shareya and Azhar cases.

DISCUSSION

During study period, a total of 1874 neonates were admitted (1614 neonates in Main Shareya units and 260 neonates in Azhar hospitals) then suspected cases of sepsis were enrolled. 932 cases were excluded from study as they were not neonatal sepsis, or according to exclusion criteria in study protocol and 942 cases were included in our study as neonatal sepsis on clinical basis. The main results of the study were as following:

The incidence of clinically suspected neonatal sepsis among the admitted neonates at the neonatal intensive care units of the included hospitals and Units during the study period was 50.3% (942/1874). The sepsis was proved in 410 (43.5%) cases by positive blood culture: 361(44.5%) from Main Shareya and 49 (37.1%) from Azhar. Our results are supported by study of **El-Din et al.,2015** as they reported that the incidence of suspected neonatal sepsis among the admitted neonates at the neonatal intensive care units during the study period was 45.9% (357/778), while **Shitayeet al.,2010** found that, out of the 302 sepsis cases investigated, 135 (44.7%) were positive for blood culture.

The risk factors that may be associated with neonatal septicemia are premature rupture of membrane, prematurity, urinary tract infection, poor maternal nutrition, low birth weight, birth asphyxia, and congenital anomalies **(Prabhu et al.,2010)**,

while in our study it werepremature rupture of membrane, prematurity, hypothermia, urinary tract infection,low birth weight, maternal (diabetes, anemia, hypertension, smoking).

Regarding demographic characteristics of studied cases, presence of neonatal sepsis is more in (full term, CS, urban residence, male neonates and single) cases, with significant difference between both groups in Post-natal age, Sex and Birth number with male to female ratio of 1.4:1.Our results are supported by study of **Thapa & Sapkota, 2019** as they found that out of total 516 neonates, septicemia was confirmed in 56 (10.8%) neonates. Of these 56 neonates, 32 (57.1%) were inborn, while the other 24 (42.8%) were out born, out of which 37 (66%) were males and 19 (33.9%) were females with predominant male to female ratio of 1.9:1.

In our study, presence of neonatal sepsis is more in full term cases (60.4%) than pre term (39.6%) and more in male sex (58.5%) than female (41.5%).Our results are in agreement with study of **Thapa & Sapkota, 2019** as they reported that in this study neonatal septicemia was more common in males 66% than in females 33.9% which correlates with the findings of previous studies which revealed that incidence of septicemia was higher in males ranging from 59% to 82% **(Schreiber & Berger, 1992)**.Also, the present study shows that the presence of neonatal sepsis is more in CS cases (74.5%) than NVD cases (25.5%) only and more in single pregnancy (91%) than multiple pregnancy (9%) only. Our results are in agreement with study of **El-Din et al., 2015** as they found that the incidence of sepsis was higher in neonates born via CS than in those born via VD. This finding is similar to other previous studies **(Utomo, 2010** & **Gandhi et al., 2013)**. For example, in the study of Utomo, 2010, in Indonesia (Surabaya), it was reported that infants delivered via CS have 1.89 times higher risk developing sepsis than non-caesarean.

In our study, there are frequent neonatal risk factors for neonatal sepsis, where the difference is being statistically significant regarding Pre term, low birth weight and multiple pregnancies between Main Shareyacentresand Al Azhar hospitals cases and frequent maternal risk factors as PROM, Anemia, Infection, DM, HTN, Abortion and Smoking. The difference is being statistically significant for Anemia, HTN,

PROM and Previous Abortion between Main Shareya and Azhar cases ($P < 0.05$).

Our results are not supported by study of **Mudzikati & Dramowski, 2015**, as they reported that LCBI (laboratory-confirmed bloodstream infection) was not related to gender, birth weight, gestational age and mode of delivery in their study, and this has been reported previously by **(Macharashvilliet al.,2009)**.

The present study shows that the most prevalent clinical feature was respiratory distress (79.1%), then jaundice (59.3%), poor reflexes (52.7%) and lethargy (42.5%), the least clinical feature was vomiting (2.9%) then tachycardia (7.5%) and convulsions (8.6%) according to the total number of cases. The differences are being statistically significant for respiratory distress and jaundice between both groups. Our results are supported by study of **Al-Shamahy et al., 2012** as they reported that the commonest symptoms among the cases studied were respiratory distress (72.2%), jaundice (62.2%), cyanosis (51.1%, and lethargy (47.8%). On the other hand, lethargy, apnea, poor feeding and unconsciousness showed significantly low rates of occurrence among positive bacterial culture cases. In general, the presenting clinical symptoms and signs in our study agreed with the WHO clinical criteria for neonatal sepsis **(WHO, 1990)**.

Regarding the results of blood culture, our results show that Klebsiella (21.7%) is the most organisms in both EOS and LOS of Main Shareya and Azhar cases followed by Staph.Aureus (13.5%), Proteus (3.5%), Candida Albicans (2.5%) then E.Coli (0.8%) and finally Strept. Pneumonia (0.3%).There is no statistically significant difference between types of sepsis regarding to the causative organisms in blood cultures. Our results are supported by study of **Mudzikati & Dramowski, 2015** as they reported that K. pneumonia was the predominant pathogen, as has been reported in other studies **(Morkel et al., 2014** & **Al-Shamahy et al., 2012)**. While **Thapa & Sapkota, 2019** reported that Acinetobacter species 32.1% was most commonly isolated organism followed by S. aureus 19.6%; similar findings have been reported by **Mishra et al. 1998**.

Regarding outcome of admitted sepsis cases, our results show that there is no statistically significant difference between both groups. Death occurs more frequent in EOS (83/414 = 20.2%) (8.8% of

total number of cases) than in LOS (16/528=2.9%) (1.7% of total number of cases), while improvement is more frequent in LOS (512/528=97.1%) (54.3% of total number of cases). There is no statistically significant difference in Main Shareya and Azhar cases, while the difference is being statistically significant between both groups. **El-Din et al., 2015** reported that the incidence of suspected neonatal sepsis during the study period was 45.9% with a mortality rate of 51% for proven EOS and 42.9% for proven LOS. Similarly, high rates were previously reported in Egypt **(Moore et al., 2005)**.

CONCLUSION

- The incidence of clinically suspected neonatal sepsis among the admitted neonates at the neonatal intensive care units of the included hospitals and Units during the study period was 50.3%.
- The sepsis was proved in 410 (43.5%) cases by positive blood culture: 361(44.5%) from Main Shareya and 49 (37.1%) from Azhar hospitals.
- Regarding demographic characteristics of studied cases, presence of neonatal sepsis is more in (full term, CS, urban residence, male neonates and single) cases, with significant difference between both groups in Post-natal age, Sex and Birth number
- Klebsiella is the most organisms in blood cultures in both EOS and LOS of Main Shareya and Azhar cases.

RECOMMENDATION

- Further studies on large geographical scale and larger sample size.
- The strict adherence to infection control practices to reduce the incidence of infection.
- Implementation of programs aimed at reduction of unnecessary handling maneuvers.
- Strict protocols for clinicians should be designed to avoid the use of unnecessary antibiotics helping to reduce the emergence of resistant strains.
- Avoidance of risk factors for neonatal sepsis e.g, CS, UTI, PROM.

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دراسة وبائية وبكتيرية مقارنة لحالات التلوث الدموي في الأطفال حديثي الولادة بين مستشفيات جامعة الأزهر بالقاهرة وبعض وحدات رعاية الأطفال حديثي الولادة التابعة للجمعية الشرعية الرئيسية

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يعتبر التلوث الدموي سبب رئيسي من أسباب الوفاة في الأطفال المبتسرين حيث تزداد معدلات الوفاة به من 1.5 % في الأطفال مكتملي النمو إلي 40% في الأطفال ناقصي الوزن غير مكتملي النمو ، وذلك رغم تقدم مستوي الرعاية الصحية المقدمة بوحدات رعاية الأطفال حديثي الولادة.

عالميا ، أكثر من 40% من حالات الوفاة تحت عمر الخمس سنوات تحدث في مرحلة حديثي الولادة مما ينتج عنه وفاة 3,1 مليون طفل سنويا حسب احصائيات منظمة الصحة العالمية وأغلب هذه الوفيات تحدث في الدول الفقيرة أو النامية . كما تشير الإحصائيات إلي أن أكثر من مليون طفل سنويا يرجع سبب وفاتهم إلي أسباب معدية منها التلوث الدموي ، والتهاب الأغشية السحائية ، والالتهاب الرئوي.

وتتنوع الميكروبات المسببة للتلوث الدموي وتختلف من مكان إلي أخر كما أنها تتغير بمرور الوقت حتي في نفس

المكـــان ، ويرجـــع ذلـــك إلـــي تنـــوع اســـتخدام المضـــادات الحيويـــة وطريقـــة اعطائهـــا ، كمـــا يرجـــع إلـــي طريقـــة واخـــتلاف مســـتوي المعيشة.

وكانـــت هـــذه دراســـة اســـتطلاعية أجريـــت علـــى مـــدى 6 أشـــهر فـــي العنايـــة المركـــزة لحـــديثي الـــولادة مـــن مستشـــفيات جامعـــة الأزهـــر (الحســـين وســـيد جـــلال)) وبعـــض وحـــدات رعايـــة الأطفـــال حـــديثي الـــولادة التابعـــة للجمعيـــة الشـــرعية الرئيســـية بالقـــاهرة ، مصـــر . (ألماظـــة ، الشـــهداء ، الاســـتقامة و 6 أكتـــوبر). خـــلال فتـــرة الدراســـة ، تـــم تســـجيل جميـــع الولـــدان المقبـــولين ، ثـــم تـــم تقيـــيم الحـــالات ذات العلامـــات الســـريرية وأعـــراض التســـمم فـــي وقـــت القبـــول أو الـــذين أصـــيبوا بـــالتلوث الـــدموي أثنـــاء إقـــامتهم فـــي المستشفى وأدرجت في الدراسة.

خـــلال هـــذه الفتـــرة ، تـــم قبـــول مـــا مجموعـــه 1874 حـــديثي الـــولادة (1614 حـــديثي الـــولادة فـــي وحـــدات الجمعيـــة الشـــرعية الرئيســـية و 260 حـــديثي الـــولادة فـــي مستشـــفيات الأزهـــر) ثـــم تـــم تســـجيل حـــالات يشـــتبه فـــي وجـــود تلـــوث الـــدم بهـــا . تـــم اســـتبعاد 932 حالـــة مـــن الدراســـة لأنهـــا لـــم تكـــن تلـــوث دمـــوي ، أو وفقـــا لمعـــايير الاســـتبعاد فـــي بروتوكـــول الدراســـة وأدرجـــت 942 حالـــة فـــي دراستنا.

كشفت النتائج الرئيسية للدراسة أن:

• بلغـــت نســـبة حـــدوث التســـمم الوليـــدي المشـــتبه ســـريرياً بـــين الولـــدان المقبـــولين فـــي وحـــدات العنايـــة المركـــزة لحـــديثي الـــولادة

في المستشفيات والوحدات المشمولة خلال فترة الدراسة 50.3٪.

• ثبت أن الإنتان في 410 حالات (43.5 ٪) من خلال مزارع الدم الإيجابية: 361 (44.5 ٪) من الجمعية الشرعية و 49 (37.1 ٪) من الأزهر.

• فيما يتعلق بالخصائص الديموغرافية للحالات المدروسة ، فإن وجود الإنتان الوليدي يكون أكبر في الحالات (كاملي النمو ، الإقامة الحضرية ، الولدان الذكور والحالاتالفردية) ، مع وجود اختلاف كبير بين المجموعتين في عمر ما بعد الولادة والجنس ورقم الميلاد.

• كلبسيلا هو أكثر الكائنات الحية في المزارع الدموية في كل من التسمم الدموي المتقدم والمتأخر في حالات من الجمعية الشرعية الرئيسية والأزهر تليها ستاف ، بروتيس، كانديدا ثم اي كولاي وأخيرا ستربت ، لا يوجد فرق ذي دلالة إحصائية بين أنواع التسمم فيما يتعلق بالكائنات المسببة في مزارعالدم ، بناءً على نتائجنا نوصي بإجراء المزيد من الدراسات على نطاق جغرافي كبير للتأكيد على استنتاجنا .