Volume 1, Issue 7, November-2018: 25-29
International Journal of Current Innovations in Advanced Research ISSN: 2636-6282

Prevalence of Neonatal Sepsis and its Correlates at Kamoto Mission Hospital in Mambwe District, Eastern Province, Zambia

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Abstract

Background: Neonatal sepsis (NS) is an infection that occurs in new born babies during the first 28 days of life and causes the majority of neonatal deaths in low-income countries. In the year 2013 and 2014 at Kamoto Mission Hospital, 66 and 104 neonates respectively were treated for septicemia. However, no study has been conducted to determine the current prevalence of neonatal sepsis and its correlates in Mambwe district of Eastern Province. We studied the prevalence of neonatal sepsis and its correlates at Kamoto Mission Hospital in Mambwe district.

Methods: A retrospective non laboratory study involving 156 neonates who were admitted to Kamoto mission Hospital in Mambwe district in 2016 with neonatal sepsis was conducted. SPSS version 21 was used to analyse data. Univariate and bivariate analyses were performed. Variables that were statistically significantly associated with the outcome in bivariate analysis were considered in a logistic multivariate regression analysis. Adjusted odds ratio (AOR) and its 95% confidence intervals are reported.

Result: The prevalence rate of neonatal sepsis was 3.3%. In bivariate analysis, factors that were associated with neonatal sepsis were baby resuscitation, apgar score and birth weight. However, after logistic multivariate analysis, only neonates with an apgar score of less than 7/10 were 3.64 times (AOR= 3.636; p=.002; 95% CI [1.587,8.329]) more likely to have neonatal sepsis compared to those who had a higher apgar score.

Conclusion: Our study has demonstrated the prevalence of neonatal sepsis at Kamoto Mission Hospital of 3.3% and apgar was independently statistically associated neonatal sepsis in Mambwe district. We recommend district health authorities to devise interventions aimed at curbing neonatal sepsis.

Keywords: Correlates, Kamoto Mission Hospital, Apgar score, Neonatal sepsis**.**

Citation: Hamusonde Sydney, Kabelenga Elijah, Muyunda S. Julia and Mwambazi Mwate. 2018. Prevalence of Neonatal Sepsis and its Correlates at Kamoto Mission Hospital in Mambwe District, Eastern Province, Zambia. International Journal of Current Innovations in Advanced Research, 1(7): 25-29.

Introduction

In Neonates, sepsis is still one of the major causes of mortality and morbidity globally, despite of recent advances in health care units. About 3.1 million newborn deaths occur each year globally representing more than 40%. The majority of these deaths usually occur in low-income countries and almost 1 million of these deaths are attributed to infectious causes including meningitis, pneumonia and neonatal sepsis Waters *et al.*, (2011). Survivors of neonatal sepsis however, are vulnerable to short- and long-term neurodevelopment morbidity. Neonatal sepsis (NS) also known as sepsis neonatorum is an infection that occurs in infant during the first 28 days of life and is one of the major causes of morbidity and mortality in newborn (Hayun *et al.*, 2015). It is categorized as follows according to WHO (2014), neonatal sepsis as early-onset when the diagnosis was performed prior to 72 h in the life of the neonate and usually result from organisms acquired intrapartum. The other one is late-onset neonatal sepsis if the diagnosis was carried out after seven days (7 days).Usually infection is acquired from the environment .Staphylococci accounts for 30-60% of late onset cases and rare most frequent due to intravascular changes. *Escherishia coli* is becoming increasing recognised as a significant causes of late onset NS especially in extreme low birth weight infants (Polin, n.d) These predisposing factors of NS are a great challenge facing health practitioners in Zambia especially in the rural settings where there are no specialist like at Kamoto Mission Hospital (KMH). Due to non-specific signs and symptoms; clinical diagnosis of NS is delayed. In addition, what is even more time consuming is laboratory diagnosis. This imperatively necessitates clinicians initiate empirical antibiotic therapy till the suspected sepsis is ruled out. At the same time, increased multidrug resistant organisms make the treatment options fewer and the effective treatment is delayed.

Gram-negative, Gram-positive bacteria and *Candida* causes Neonatal sepsis and the diversity of organisms causing it varies from region to another and changes over time even in the same place. This attribution is due to the changing pattern of changes in lifestyle and antibiotic use. Susceptibility of the neonate to sepsis is brought about by a lot of factors which can influence the incidence of neonatal sepsis and the presence of a foreign body that traverses the birth canal may facilitate ascending peripheral infection (Grant *et al.*, 2018).

In the year 2013, 66 neonates were treated with septicemia at KMH and one death reported. The number of cases increased to 103 in 2014 though this time there was no mortality reported. However, in 2015 the number declined to 96 cases and one death occurred (KMH, 2016). However, according to our knowledge, no study have been conducted on risk factors to neonatal sepsis in Mambwe district. The aim of this study was to determine the prevalence of NS and its correlates at KMH.

Method

A retrospective non laboratory study was conducted at Kamoto Mission Hospital, which is the only referral hospital in Mambwe district. We randomly sampled and reviewed 156 records for neonates who were admitted to Kamoto Mission Hospital in the year 2016 for neonatal sepsis. Data was collected between July and August, 2018.

Data was collected using a pre tested checklist. Collected data was first entered into Microsoft Excel and analysed using SPSS 21 statistical software. Proportions of various variables were compared using Chi square test and only results yielding a p-value of less than 0.05 (p=0.05) were considered to be of statistical significant. Factors that were statistically significantly associated with the outcome in bivariate analyses were considered in a

multivariate logistic regression analysis using a backward variable selection method. Adjusted odds ratio (AOR) with their 95% confidence intervals (CI) are reported.

The study protocol was reviewed and approved by the Tropical Disease Research Ethics Committee IRB Registration Number 00002911 and FWA Number 00003729. Permission to conduct the study was obtained from Mambwe District Health Office. Data collection tools were viewed only by approved study personnel.

Results

A total of 156 records of neonatal with sepsis were reviewed. The majority (82.1%) where born from mothers aged 30 years or less. Interestingly only 19.9% of the neonates were born from known HIV positive mothers. Most (54.5%) of the neonates were born at 37 weeks or more. Nearly 3 out of 4 (67.3%) where born as spontaneous vertex delivery. Table 1 summarises the risk factors associated with neonatal sepsis.

Table 1. Risk factors associated with neonatal sepsis (n=156)

Risk factor	Frequency (%)	p-value
How old in years was the mother at the time of delivery?		
Less than 30 years	128 (82.1)	.110
30 years or more	28 (17.9)	
Total	**156 (100)**	
Where was the delivery conducted from?		
Health centre	105 (67.3)	.217
Hospital	51 (32.7)	
Total	**156 (100)**	
Was the baby exposed to HIV?		
Yes	31 (19.9)	.141
No	125 (80.1)	
Total	**156 (100)**	
What was the Gestation age at delivery?		
Less than 37 weeks	71 (45.5)	.703
37 weeks or more	85 (54.5)	
Total	**156 (100)**	
What was the mode of delivery?		
SVD	105 (67.3)	.217
LSCS	51 (32.7)	
Total	**156 (100)**	
What was the Sex of the baby?		
Girl	91 (58.3)	1.000
Male	65 (41.7)	
Total	**156 (100)**	
What was the Birth weight?		
Less than 2.5 Kgs	7 (4.5)	**.033**
2.5 Kgs and above	149 (95.5)	
Total	**156 (100)**	
What was the Apgar score at birth?		
Less than 7	11 (7.1)	**.008**
7 to 10	145 (92.9)	
Total	**156 (100)**	

Was the baby resuscitated? Yes No **Total**	 14 (9) 142 (91) **156 (100)**	**.016**
Did the mother have any UTI? Yes No **Total**	 4 (2.6) 152 (97.4) **156 (100)**	1.000
Did the mother have any STI? Yes No **Total**	 4 (2.6) 152 (97.4) **156 (100)**	.169
Was there prolonged rupture of membrane? Yes No **Total**	 31 (19.9) 125 (80.1) **156 (100)**	1.000
Was there premature rupture of membrane? Yes No Total	 72 (46.2) 84 (53.8) **156 (100)**	.704
For how long did the mother stay in hospital postnatally? Less than 24 hours More than 24 hours **Total**	 9 (5.8) 147 (94.2) **156 (100)**	1.000

The results of multivariate analysis showed that after adjusting for birth weight and neonatal resuscitation, only apgar score (A/S) remained a significant predictor of neonatal sepsis. Neonates with an A/S of less than 7 were 3.6 times (AOR = 3.636, 95% CI: [1.587, 8.329]) more likely to have neonatal sepsis than those with an A/S of 7 to 10.

Discussion

This study has reviewed that apgar score (A/S) was the only risk factor that was independently statistically associated with neonatal sepsis. This finding is similar to what was found in a study by Hayun *et al.*, (2015) that found that neonates with an A/S less than 7 where 13.45 times more likely to develop neonatal sepsis. Similarly, in a study conducted in Mexico by Leal *et al.*, (2012), it was found that low A/S was a risk factor to neonatal sepsis. This finding suggests that these neonates were asphyxiated and this reduces their immunity, hence easy acquisition of infections (Sunilbala *et al.*, 2015). Equally babies with low apgar score at birth are likely to be subjected to different interventional procedures that lead to acquisition of nosocomial infections. In addition, such babies tend to remain in the hospital longer hence acquire nosocomial infections (Shah *et al.*, 2006).

Our study has identified the need for workers to pay particular attention when performing procedures to asphyxiated babies. The clinicians and other health workers in neonatal units should observe high levels of infection prevention practices.

Conclusion and recommendations

Our study has demonstrated the prevalence of neonatal sepsis at Kamoto Mission Hospital of 3.3% and apgar was independently statistically associated neonatal sepsis in Mambwe

district. We recommend district health authorities to devise basic interventions aimed at curbing neonatal sepsis especially in neonatal units.

Acknowledgements

HS conceptualized the study, participated in the protocol preparations, data collection, drafting of manuscript. EK conceptualized the study, participated in the protocol preparations, analysis and interpretation, drafting and revision of manuscript MSJ and MM edited and revised the protocol.

Conflict of interest: None

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