



Original Article

Perceived Demographic and Socio-Economic Factors Contributing to Poor Outcome of Neonatal Sepsis at Paediatric Unit Kenyatta National Hospital.

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*Demographic,
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Introduction: Globally sepsis is still a known case of high mortality and mobility rates among neonates. This is despite having been advances in healthcare quality. The World Health Organization estimates that more than 40% of deaths occurring among infants aged below five years happen during the neonatal phase and they result in 3.1 infant deaths annually. Objective: This study sought to establish the perceived demographic and socioeconomic status of poor outcomes of neonatal sepsis at Kenyatta national hospital paediatric unit. Methodology: This was a hospital-based descriptive cross-sectional study conducted in the Paediatric Unit of Kenyatta National Hospital. A total of 175 mothers of neonates with neonatal sepsis admitted in KNH selected using consecutive sampling methods were recruited into the study. A validated researcher-administered semi-structured questionnaire was used to collect the data. Descriptive statistics involved the calculation of measures of central tendencies like means, modes and medians between variables. Association between the study variables was estimated using both chi-square and odds ratio statistics at a 95% confidence interval. The study results were presented in tables, graphs and charts, as appropriate. Results: Maternal demographic factors associated with poor outcomes of neonatal sepsis included - younger or advanced maternal age ($X^2 = 4.735$, $df = 2$, $p = 0.031$); low education level ($X^2 = 6.362$, $df = 1$, $p = 0.012$) and short birth intervals of < 2 years ($X^2 = 5.108$, $df = 2$, $p = 0.023$). Maternal socioeconomic factors associated with poor outcomes of neonatal sepsis included - low household income level ($X^2 = 6.163$, $df = 1$, $p = 0.014$); large family sizes of ≥ 5 members ($X^2 = 4.844$, $df = 1$, $p = 0.028$) and lack of a health insurance cover ($X^2 = 5.382$,

df = 1, p = 0.019). Conclusion: Various maternal demographics, maternal socio-economic were significant perceived determinants of poor outcomes of neonatal sepsis in Kenyatta National Hospital's Paediatric Unit. Recommendations: The national government with the help of county governments and development partners should invest in community empowerment programs that aim to improve the socioeconomic status of caregivers and their households. In addition, further investments in the health care system are needed to make it more affordable to all and particularly to the low-income group.

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INTRODUCTION

In the global scene sepsis is still a known case of high mortality and mobility rates among neonates. This is despite having been advances in healthcare quality. Globally, neonatal deaths due to sepsis were estimated to be 18 deaths for every 1000 births. This estimate means that there were 7,000 neonatal deaths every day caused by sepsis, with mortality rates estimated as ranging between 11% and 25%.

The World Health Organization estimates that more than 40% of deaths occurring among infants aged below five years happen during the neonatal phase and they result in 3.1 infant deaths annually. Neonatal sepsis is estimated to cause about 1 million annual neonatal deaths worldwide (or three out of every ten neonatal deaths) and 95% of the infants who pass on are found in low and middle-income nations (WHO, 2018). The reports indicate that in

Asia Neonatal sepsis deaths are about 7.113 to 38.17 in every 1000 live births. In Africa, the death rate is between 6.519 and 23.15 for every 1000 live births. In the Caribbean and South America, the rates are between 3.59 and 8.910 for every 1000 infants born alive. The rates provided for the US, West Europe and Australia were between 1.5 to 3.5 for Early-onset neonatal sepsis and 6 for Late-Onset Sepsis for every live birth. The total number of deaths due to sepsis for every 1000 births were reported to be 6 to 9 (Fleischmann-Struzek et al., 2018). Studies done in Africa indicate that Neonatal Sepsis accounts for 17-25% of neonatal deaths in the sub-Saharan Africa region (Gebremedhin et al., 2016; Jabiri et al., 2016; Kayom et al, 2018; Adatara et al., 2019). Currently, neonatal sepsis is prevented by way of culture-independent diagnostics, use of prediction scores, use of judicious antimicrobial use, and coming up with preventive ways such as vaccination of the mother. However, neonatal sepsis

is still a serious problem and there is minimal progress that can be said to have occurred (Shah & Padbury, 2014). Therefore, this study is done to determine the demographic and socioeconomic factors contributing to the poor outcome of neonatal sepsis.

Problem Statement

The third Sustainable Development Goal for child health aims to reduce new-borns mortality rate to 12 deaths per 1000 live births by 2030. This cannot be met without reducing neonatal mortality due to sepsis because it accounts for 25% of annual neonatal deaths in sub-Saharan Africa (Tewabe et al., 2017). Kenyatta National Hospital is the biggest Kenyan public referral health facility and admits approximately 15 neonates per day in its paediatric unit. Neonatal sepsis accounts for about 80% of the total neonate admissions in the hospital. These admissions are attributable largely to referrals from other hospitals in different parts of the country while others are from the hospital's postnatal wards. A study done in KNH by Nasiema (2015) revealed that out of 308 neonatal admissions, 49% died of neonatal sepsis. Another study done in the same hospital by Muthwii (2016) established that the severity of neonatal sepsis in the hospital was high as out of 107 neonates admitted, 37.4% had severe sepsis. Hospital records at KNH reveal that the incidence of poor outcomes of NS among neonates admitted in the hospital's paediatric and newborn units has been on the rise as evidenced by a 32.6% increase over the last 6 months.

Several studies have been done globally on determinants of NS including Jabiri et al. (2016) in Tanzania; Gebremedhin et al. (2016) in Ethiopia; Kumar et al. (2016) in India; Hammad and Zainab (2018) in Malaysia; Mitra et al. (2018) in Bangladesh; Al-Matary et al. (2019) in Saudi Arabia and Adatara et al. (2019) in Ghana, but in Kenya despite more effort and research being done on risk factors contributing to neonatal sepsis in Kenyatta National Hospital, there is inadequate research on what contributes to the poor outcome which has led to the increasing rate of neonatal mortality. To address this research gap, this study will seek to identify the perceived demographic and socioeconomic factors contributing to the poor

outcome of neonatal sepsis at the Paediatric Unit of Kenyatta National Hospital

Objective

To establish the perceived demographic and socioeconomic factors contributing to the poor outcome of neonatal sepsis.

Research Question

What are the perceived demographic and socioeconomic factors contributing to the poor outcome of neonatal sepsis?

MATERIALS AND METHODS

The study adopted a descriptive cross-sectional design. The study area was the paediatric unit of Kenyatta national hospital, it is the largest public hospital in Kenya found about four kilometres from the Nairobi city centre, off Ngong road on Hospital Road. The current bed capacity of the hospital is about 2,000. The KNH Paediatric Unit is located on the third floor and has a bed capacity of 320. The paediatric Unit admits paediatric patients with a wide range of illnesses from other KNH wards as well as referrals from other facilities across the country. The study population of this study were caregivers of neonates with neonatal sepsis admitted to the Paediatric Unit of Kenyatta National Hospital. Average, 320 cases of neonates with neonatal sepsis are managed in KNH's Paediatric Unit every month. Hence, the study population N: 320.

Inclusion criteria: Caretakers of neonates with poor outcomes of neonatal sepsis.

Exclusion Criteria: Caregivers of neonates admitted with neonatal sepsis who are critically ill, with mental illness and abandoned neonates.

The sample size was 175 reached using the Fisher *et al.* (1998) formula, and a consecutive sampling method was used to obtain the study sample. Data gathering was done using a researcher administered semi-structured questionnaire. Authorization to do the research was obtained from the Kenyatta National Hospital and University of Nairobi Ethics and Research Committee. Permission to gather data at Kenyatta National Hospital was requested from the facility Director of Nursing Services, the

Nursing Officer-In-Charge of the Paediatric Unit and the targeted patients. Respondents consented individually before their participation. The questionnaires were administered to the study respondents by the principal researcher. The respondents were made aware of the study purpose and they consented before being part of the research. The researcher provided guidance to the respondents in answering the questionnaires to ensure that they answer the questions properly for easier analysis. Once the respondents gave their feedback on the data gathering tool, the researcher reviewed the tool checking for completeness before coding the answers. The filled-in questionnaires were then stored safely under lock and key in readiness for data entry and analysis. The data collection exercise took 30 days.

RESULTS

Age

Results on maternal age indicated that most of the mothers of neonates admitted with neonatal sepsis

in KNH's Paediatric Unit were aged between 25 and 34 years with 43.1% (n = 56) being aged 25 - 29 years and 26.2% (n = 34) being aged 30 - 34 years.

Further, a statistically significant association was established between mothers' age [of below 25 years or 35 years and above] and poor outcome of neonatal sepsis ($X^2 = 4.735$, $df = 2$ and $p = 0.031$). In addition, the odds of poor outcomes of neonatal sepsis were 1.33 times higher among mothers aged below 25 years or 35 years and above compared to those aged between 25 and 34 years. This implied that both younger and advanced maternal age did contribute to the poor outcome of neonatal sepsis in Kenyatta National Hospital

Height

The findings indicated that most (83.8%, n = 109) of the mothers had a height of 150 cm and above while 16.2% (n = 21) had a height of below 150 cm.

Table 1: Association of maternal height with poor outcome of neonatal sepsis

| Height | Neonatal sepsis outcome | | Total | Chi-sq. p value (95% CI) | Odds ratio value [at 95% CI] |
|----------|-------------------------|------------------|-------|-----------------------------|---------------------------------|
| | Good [N = 48] | Poor [N = 82] | | | |
| < 150 cm | 4 | 17 | 21 | | 1.45 |
| ≥150 cm | 44 | 65 | 109 | 0.039 | [0.693 - 2.881] |

A statistically significant association was established between the mothers' height of below 150 cm and poor outcome of neonatal sepsis ($X^2 = 4.188$, $df = 1$ and $p = 0.039$) as shown in Table above. In addition, the odds of the poor outcome of neonatal sepsis were 1.45 times higher among mothers with a height of below 150 cm compared to those with a height of 150 cm and above. This implied that short stature among mothers did contribute to the poor outcome of neonatal sepsis in KNH

Education

Results on the education level of the mothers whose neonates were admitted with neonatal sepsis at KNH's Paediatric Unit indicated that 47.7% (n = 62) had primary education, 26.2% (n = 34) had

secondary education while 16.9% (n = 22) had no formal education. Only 9.2% (n = 12) indicated having tertiary education. This showed that most of the mothers had a low education background. In addition, the study established that there was a statistically significant association between the mothers' low education background and poor outcome of neonatal sepsis ($X^2 = 6.362$, $df = 1$ and $p = 0.012$), the odds of poor outcome of neonatal sepsis were 3.07 times higher among mothers with no tertiary education compared to those with tertiary education. This implied that low education levels among mothers did contribute to the poor outcome of neonatal sepsis in Kenyatta National Hospital.

Socio-Economic Status

Maternal Occupation

Results on maternal occupation indicated that 39.2% of the mothers were unemployed, 23.1% were casual labourers and 18.5% were housewives. Further, 12.3% were in business while 6.9% were formally employed. A statistically significant association was established between mothers with no income source and poor outcome of neonatal sepsis ($X^2 = 4.178$, $df = 1$ and $p = 0.040$). In addition, the odds of poor outcome of neonatal sepsis were 1.67 times higher among mothers with no income source (housewives & unemployed) compared to those with an income source (casual labourers, in business & formally employed). This implied that mothers' lack of income source did contribute to poor outcome of neonatal sepsis in KNH.

Financial Support

The study sought to find out whether the mothers received any form of financial support from the child's father. Most (72.3%, $n = 94$) of the mothers indicated that they did not receive any form of financial support from the father of the child in addition, there was a statistically significant association between mothers' lack of financial support from the child's father and poor outcome of neonatal sepsis ($X^2 = 4.390$, $df = 1$ and $p = 0.035$). The odds of poor outcomes of neonatal sepsis were 1.82 times higher among mothers with no financial support from the child's father compared to those who received financial support from the child's father. This implied that mothers' lack of financial support from the child's father did contribute to the poor outcome of neonatal sepsis in Kenyatta National Hospital.

Family Size

The mothers were requested to indicate the size of their families. Most (73.1%, $n = 95$) of the mothers indicated that they lived in families with 5 or more members while 26.9% ($n = 35$) indicated that they lived in families with less than 5 members. The study also found that a statistically significant association existed between larger family sizes and poor outcomes of neonatal sepsis ($X^2 = 4.844$, $df = 1$ and $p = 0.028$). Further, the odds of poor outcomes

of neonatal sepsis were 1.39 times higher among mothers who lived with 5 or more family members compared to those who lived with less than 5 family members. This implied that having larger family sizes did significantly contribute to the poor outcome of neonatal sepsis in Kenyatta National Hospital

Discussion of Findings

Based on this study, the maternal demographic factors established as significantly contributing to the poor outcome of neonatal sepsis in Kenyatta National Hospital's Paediatric Unit were younger or advanced maternal age (of below 25 years or 35 years and above), short stature among mothers, low education levels among mothers, shorter birth intervals (that is, birth intervals of less than 2 years), vaginal mode of delivery, mothers' experiencing obstetric/medical complications during pregnancy or delivery and mothers' lack of knowledge of danger signs in relation to a child's health status. This implied that a wide range of maternal demographic factors that related to their age, height, education level, birth intervals, mode of delivery, the experience of obstetric/medical complications during pregnancy or delivery and knowledge of danger signs in relation to a child's health status were significant determinants of poor outcome of neonatal sepsis in Kenyatta National Hospital's Paediatric Unit. Similar results were reported by Siakwa et al. (2014), Kayom et al. (2018) and Adataro et al. (2019) who pointed that that risks of mortality and health impairment attributable to NS were much lower when women avoid childbearing at the extremes of their reproductive life span that is below age 20 and above age 34 years. Very young mothers are not fully mature biologically and their inexperience in taking proper care of the child increases mortality. Conversely, older women experience pregnancy-related complications due to advanced age. Short stature was also reported to have adverse effects on neonatal outcomes in studies by Fottrell et al. (2015) and Demisse et al. (2017); while studies by Murthy et al. (2019) and Muthwii (2016) also found a positive and significant association between low maternal education and poor neonatal sepsis outcomes. They attributed this to the fact that uneducated mothers were unlikely to detect signs of sepsis in the neonate at an early stage and hence were only likely to seek

medical advice when the condition was complicated.

Based on this study, the maternal socioeconomic factors established as significantly contributing to the poor outcome of neonatal sepsis in Kenyatta National Hospital's Paediatric Unit were the mothers' lack of income source, low household income level, mothers' lack of financial support from the child's father, rural residence, having large family sizes (with 5 or more members), lack of a health insurance cover, and the mothers' lack of awareness about neonatal sepsis. This implied that a wide range of maternal socioeconomic factors that related to their occupation, household income level, financial support from the child's father, place of residence, family size, possession of a health insurance cover, observance of proper hand-washing hygiene always and level of awareness about neonatal sepsis were significant determinants of poor outcome of neonatal sepsis in Kenyatta National Hospital's Paediatric Unit. The findings concurred with those of Kayom et al. (2018) and Kumar et al. (2016) who also observed that mothers' low socioeconomic status evidenced by such aspects as low household income level, mothers' lack of income sources and mothers' lack of financial support from the child's father were significantly associated with poor outcomes of NS. Low socioeconomic status, as evidenced by mothers' lack of income, dependence on male spouses for financial support and lack of a health insurance cover, according to John et al. (2015) and Marsha et al. (2019), may affect the mother's choice of place of delivery and her entire welfare during antenatal, delivery and postnatal, in turn increases the odds of poor neonatal outcomes such as from the NS infection. Significant risk factors for poor NS outcomes, according to a study by Mitra et al. (2018), included previous child death in the family; overcrowding; home delivery; unclean cord care and low household income status.

CONCLUSION

Based on the findings of the study, the researcher drew the following conclusions:

Younger or advanced maternal age, short stature among mothers, low education levels among mothers, shorter birth intervals (that is, birth

intervals of less than 2 years), vaginal mode of delivery, mothers' experiencing obstetric/medical complications during pregnancy or delivery and mothers' lack of knowledge of danger signs in relation to a child's health status were the maternal demographic factors that contributed to the poor outcome of neonatal sepsis in Kenyatta National Hospital's Paediatric Unit.

Mothers' lack of income source, low household income level, mothers' lack of financial support from the child's father, rural residence, having large family sizes (with 5 or more members), lack of a health insurance cover, failure to regularly observe proper hand always washing hygiene and the mothers' lack of awareness about neonatal sepsis were the maternal socioeconomic factors that contributed to poor outcome of neonatal sepsis in Kenyatta National Hospital's Paediatric Unit.

Recommendations

Given maternal socioeconomic status has an effect on neonatal care outcomes, the national government with the help of county governments and development partners should invest in community empowerment programs that aim to improve the socioeconomic status of caregivers and their households. In addition, further investments in the health care system are needed to make it more affordable to all and particularly to the low-income groups.

Study Limitations

The researcher used a questionnaire as the data collection tool and therefore under- or over-reporting was likely. To counter this limitation, the researcher requested the study respondents to respond to the research tool honestly and assured them that the information was handled confidentially and only served to provide information related to this research. The study was based on results gathered from a single hospital in the country. Thus, the findings may not be generalized to all other hospitals in the country.

REFERENCES

- Abu-Salah, O. (2011). Unfavourable outcomes associated with late preterm birth: Observations from Jordan. *Journal of the Pakistan Medical Association*, 61(1), 769-772.
- Adatara, P., Afaya, A., Salia, S. M., Afaya, R. A., Konlan, K. D., Agyabeng-Fandoh, E., ... & Boahene, I. G. (2019). Risk factors associated with neonatal sepsis: a case study at a specialist hospital in Ghana. *The Scientific World Journal*, 2019.
- Alemu, M., Ayana, M., Abiy, H., Minuye, B., Alebachew, W., & Endalamaw, A. (2019). Determinants of neonatal sepsis among neonates in the northwest part of Ethiopia: case-control study. *Italian Journal of Paediatrics*, 45(1), 150.
- Al-Lawama, M., Badran, E., & Khuri-Bulos, N. (2014). Neonatal gram-negative sepsis in a tertiary hospital in Jordan: when fever means multidrug resistance. *Pediat Therapeut*, 4(212), 2161-0665.
- Al-Matary, A., Heena, H., AlSarheed, A. S., Ouda, W., AlShahrani, D. A., Wani, T. A., ... & Abu-Shaheen, A. (2019). Characteristics of neonatal Sepsis at a tertiary care hospital in Saudi Arabia. *Journal of infection and public health*, 12(5), 666-672.
- Arowosegbe, A. O., Ojo, D. A., Dedeke, I. O., Shittu, O. B., & Akingbade, O. A. (2017). Neonatal sepsis in a Nigerian Tertiary Hospital: Clinical features, clinical outcome, aetiology and antibiotic susceptibility pattern. *Southern African Journal of Infectious Diseases*, 32(4), 127-131.
- Boia, M., Cioboata, D., & Manea, A. (2017). P373 Clinical aspects and evolution in the early neonatal sepsis. *Archives of Disease in Childhood*, 102(2), A17-A28
- Boundy, E. O., Dastjerdi, R., Spiegelman, D., Fawzi, W. W., Missmer, S. A., Lieberman, E., ... & Chan, G. J. (2016). Kangaroo mother care and neonatal outcomes: a meta-analysis. *Paediatrics*, 137(1), e20152238.
- Bunduki, G. K., & Adu-Sarkodie, Y. (2019). Clinical outcome and isolated pathogens among neonates with sepsis in Democratic Republic of the Congo: a cross-sectional study. *BMC research notes*, 12(1), 303.
- Demisse, A.G., Alemu, F., Gizaw, M.A. & Tigabu, Z. 2017, "Patterns of admission and factors associated with neonatal mortality among neonates admitted to the neonatal intensive care unit of University of Gondar Hospital, Northwest Ethiopia", *Paediatric health, medicine and therapeutics*, vol. 8, pp. 57-64.
- Denscombe, M. (2014). *The Good Research Guide: For Small-Scale Social Research Projects*. Buckingham, England: Open University Press
- Fisher, R.A., Haseman, J.K., Kramer, M., & Greenhouse, S.W. (1998). *Statistical Methods for Scientific Inference*, 5th ed. London: Hafner Press
- Fleischmann-Struzek, C., Goldfarb, D. M., Schlattmann, P., Schlapbach, L. J., Reinhart, K., & Kissoon, N. (2018). The global burden of paediatric and neonatal sepsis: a systematic review. *The Lancet Respiratory Medicine*, 6(3), 223-230.
- Fottrell, E., Osrin, D., Alcock, G., Azad, K., Bapat, U., Beard, J., Bondo, A., Colbourn, T., Das, S., King, C., Manandhar, D., Manandhar, S., Morrison, J., Mwansambo, C., Nair, N., Nambiar, B., Neuman, M., Phiri, T., Saville, N., Sen, A., Seward, N., Shah Moore, N., Shrestha, B.P., Singini, B., Tumbahangphe, K.M., Costello, A. & Prost, A. 2015, "Cause-specific neonatal mortality: analysis of 3772 neonatal deaths in Nepal, Bangladesh, Malawi and India", *Archives of Disease in Childhood - Fetal and Neonatal Edition*, vol. 100, no. 5, pp. F439-F447.
- Gavidia, R., Fuentes, S. L., Vasquez, R., Bonilla, M., Ethier, M. C., Diorio, C., & Sung, L. (2012). Low socioeconomic status is associated with prolonged times to assessment and treatment, sepsis and infectious death in Paediatric fever in El Salvador. *PLoS One*, 7(8), 61.

- Gebremedhin, D., Berhe, H., & Gebrekirstos, K. (2016). Risk factors for neonatal sepsis in public hospitals of Mekelle City, North Ethiopia, 2015: unmatched case control study. *PloS one*, *11*(5).
- Ghosh, R., & Sharma, A. K. (2011). Determinants of tetanus and sepsis among the last neonatal deaths at household level in a peri-urban area of India. *Postgraduate medical journal*, *87*(1026), 257-263.
- GSA. (2019). World sepsis day 2018 – preventable maternal and neonatal sepsis a critical priority for WHO and Global Sepsis Alliance. Available from: [https://static1.squarespace.com/static/58a7025b8419c215b30b2df3/t/59b1b9d52994caee6bc0eba7/1504819673100/Press_Release_WSD_WSC_English_Letterhead+\(PDF\).pdf](https://static1.squarespace.com/static/58a7025b8419c215b30b2df3/t/59b1b9d52994caee6bc0eba7/1504819673100/Press_Release_WSD_WSC_English_Letterhead+(PDF).pdf). Accessed January 08, 2020.
- Hammad, E., & Zainab, M.S. (2018). Meta-Analysis on Factors Influencing Early Onset Neonatal Sepsis. *Scholar Journal of Applied Sciences and Research*, *1*(8), 20-22.
- Jabiri, A., Wella, H. L., Semiono, A., Saria, A., & Protas, J. (2016). Prevalence and factors associated with neonatal sepsis among neonates in Temeke and Mwananyamala Hospitals in Dar es Salaam, Tanzania. *Tanzania Journal of Health Research*, *18*(4), 1–7.
- John, B., David, M., Mathias, L., & Elizabeth, N. (2015). Risk factors and practices contributing to newborn sepsis in a rural district of Eastern Uganda, August 2013: a cross sectional study. *BMC research notes*, *8*(1), 339.
- Kayom, V. O., Mugalu, J., Kakuru, A., Kiguli, S., & Karamagi, C. (2018). Burden and factors associated with clinical neonatal sepsis in urban Uganda: a community cohort study. *BMC Paediatrics*, *18*(1), 355-363.
- Kumar, G. V., Rahman, H. F., & Vatsalakumari & Viswanathakumar, H. M. (2016). Cross-sectional study of risk factors associated with neonatal sepsis in a tertiary care teaching hospital. *Indian J Child Health*, *3*(1), 73-75.
- Mersha, A., Worku, T., Shibiru, S., Bante, A., Molla, A., Seifu, G., ... & Teshome, T. (2019). Neonatal sepsis and associated factors among newborns in hospitals of Wolaita Sodo Town, Southern Ethiopia. *Research and Reports in Neonatology*, *9*(1), 31.
- Mitra, D. K., Mullany, L. C., Harrison, M., Mannan, I., Shah, R., Begum, N., ... & Baqui, A. H. (2018). Incidence and risk factors of neonatal infections in a rural Bangladeshi population: a community-based prospective study. *Journal of Health, Population and Nutrition*, *37*(1), 6.
- Murthy, S., Godinho, M. A., Guddattu, V., Lewis, L. E. S., & Nair, N. S. (2019). Risk factors of neonatal sepsis in India: A systematic review and meta-analysis. *PloS one*, *14*(4).
- Muthwii, F.K. (2016). *Characterization of neonatal sepsis among patients admitted in Kenyatta National Hospital Paediatric Wards*. Unpublished MSc in Nursing, University of Nairobi.
- Siakwa, M., Kpikpitse, D., Mupepi, S. C., & Semuatu, M. (2014). Neonatal sepsis in rural Ghana: A case control study of risk factors in a birth cohort. *Int J Res Med Sci.*, *4*(5), 77–88.
- Tewabe, T., Mohammed, S., Tilahun, Y., Melaku, B., Fenta, M., Dagnaw, T., ... & Belete, H. (2017). Clinical outcome and risk factors of neonatal sepsis among neonates in Felege Hiwot referral Hospital, Bahir Dar, Amhara Regional State, North West Ethiopia 2016: a retrospective chart review. *BMC research notes*, *10*(1), 265.