

Factors Influencing Adverse Birth Outcomes in an urban informal settlement of Nairobi County, Kenya

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ABSTRACT

Adverse birth outcomes, comprising low birth weight, maternal mortality, infant mortality, premature births, and stillbirths continue to pose a serious challenge in Kenya. Although a number of factors influencing adverse birth outcomes have been documented, these are likely to vary by setting hence the need to understand them in Africa's largest and poorest informal settlement, Kibra, in Nairobi City. The main objective of this study was to assess the factors influencing adverse birth outcomes in Kibra sub-county. The specific objectives were to identify; socio-demographic; obstetric emergencies; and health facility factors that contribute to adverse birth outcomes. The study used a cross sectional research design and targeted 384 women of reproductive age. The findings showed employed women were 52% less likely to experience adverse birth outcomes as compared to the unemployed [OR= .472, 95% CI (.281, .793), $p < 0.05$]. Education level of the women was associated with adverse birth outcomes, whereby a high education level was associated with low adverse birth outcomes ($\chi^2 = 15.554$, p -value < 0.05). Notably, women who received ANC services were 50% less likely to experience adverse birth outcomes compared to those who took more than two hours to be attended [OR=0.495, $p=0.038$ 95% CI (0.269, .993), $p=0.038$].

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1. Introduction

In informal settlements of Nairobi city, maternal and child mortality rates are 50% higher than the national average. In Kibra, the largest and poorest informal settlement in Africa, located in Nairobi city, 50% of births are through skilled delivery and this is considerably lower than the overall 75% for Nairobi County (African Population and Health Research Center (APHRC 2014). Despite the strides of the Government of Kenya in ensuring there is accessible health care, adverse birth outcomes are high among people living in Kibra informal settlement. This poses an increasing challenge in national efforts in improving birth outcomes. A report of the Nairobi's Informal Settlements of the Nairobi Cross-sectional Slums Survey findings, showed that the neonatal mortality rate in Nairobi slums is at 14.4 deaths per 1000 births and Infant mortality rate is 39.2 deaths per 1000 births (APHRC, 2014). Whereas the maternal mortality ratio in Kibra is at 559 deaths per 100000 births, higher than the national average of 362 births per 100000 births (APHRC 2014). Kibra's infant mortality rate is 33.2 deaths per 1000 births (Alwenya 2009), neonatal deaths at 9.3 deaths per 1000 Live births. This poses a challenge to the national efforts in improving birth outcomes. Factors that contribute adverse birth outcomes can be grouped as Socio-demographic factors such as age, race, ethnicity, marital status, income and education, Health facility factors such as distance, availability of staff and maternal health services and obstetric emergencies such as miscarriage, ectopic pregnancy, placental abruption, placenta previa, pre-eclampsia and eclampsia and premature rupture of membranes (Nwobodo, 2012).

However, these factors are likely to vary by unique contexts in each urban setting. Hence the purpose of this study was to understand the multiethnic urban population for positive birth outcomes (APHRC, 2014). The findings will inform targeted interventions to help improve birth outcomes in this urban setting.

2. Materials and Methods

2.1 Study area

The study was conducted in Kibra sub-county, which is located in Nairobi County and lies 1.3133° S, 36.7846° E. Kibra sub-county is one of the seventeen sub-counties in Nairobi County. The 2009 Kenya Population and Housing Census report cites Kibra sub-county as the largest informal settlement in Kenya, and the largest urban slum in Africa with a population of 170,070. Kibra sub-county has 61 approved health facilities. It has 5 administrative wards namely Sarangombe with a population of 28,182, Woodley with a population of 35,355, Makina with a population of 25,242, Laini saba with a population of 22,818 and Lindi 35158. It has 9 community units namely Kianda, Ngondo, Makina, Kichinjio, Golfcourse, Diane Kumar, Samuel, Soweto east and Soweto west. (Nairobi County AWP 2016-2017).

2.2 Research Design

This study used a cross sectional research design. Cross sectional research design describes data and characteristics about a population at a certain point in time and makes it possible to yield generalizations that are factual. The design was considered suitable for estimating prevalence of adverse birth outcomes and assessing associated factors.

2.3 Target Population

The target population for this study was women of reproductive age from 15 to 49 years resident in Kibra sub-County.

2.4 Sample Size

The sample size was 384 women determined by using (Cochran's formula, 1934) the sample size calculation is as below $n = Z^2Pq/d^2$ Where: n = the expected sample size, z = the standard normal deviate, which corresponds to 95% confidence level (1.96). p = the proportion in the target population estimated to have a particular characteristic. $q = 1.0 - p$, d = degree of accuracy desired, usually set at 0.5 In this study, p was the proportion of women of reproductive age who were vulnerable to adverse pregnancy in Kibra which was at 50% since the estimate is not known $n = 1.96^2 \times 0.5 \times 0.5 / 0.50^2 = 3.8416 \times 100 n = 384$. An additional 10% Non-response rate was factored in the expected sample size and the final Sample size became 423.

2.5 Sampling procedure

Only households linked to functional community health units were eligible to participate. Population proportion to size sampling was used to calculate the proportion of households in Sarangombe and Makina wards to be included in the study. Therefore, households in Sarangombe ward had a proportion of 0.53 of the total sample size and Makina a proportion 0.47 of the total sample size.

Simply random sampling was used to identify the 384 participants using the household listing by the CHVs the two community units i.e. in Kianda community unit and Kichinjio community unit which are the functional units linked to Sarangombe and Makina wards respectively

2.6 Methods of data collection

Household data was collected using a questionnaire Key Informant Interview Guide. A key informant interview guide was used to collect data from health workers in link health facilities for Sarangombe and Makina wards this was done for data triangulation to enhance validity of information.

2.7 Methods of data analysis

Quantitative data was analysed to explore the relationship between the variables in data collected using questionnaires. Chi square and logistic regression was used to test for the statistical significance Socio-demographic factors e.g. age, religion, Occupation, Education level and marital status with adverse birth outcomes. Chi square and logistic regression was used to test for the statistical significance association between health Facility Factors e.g. Delays in seeking care, distance from the health facility, ANC attendance, Health facility type and services, type of services in the health facility, staff attitude and time taken to access services which contribute to women's vulnerability to adverse birth outcomes. Chi square and logistic regression was used to test for the statistical significance association between obstetric emergencies such as miscarriages, ectopic pregnancies, placenta abruptions, pre-eclampsia and eclampsia that contribute to adverse birth outcomes. Qualitative data analysis was used to explore the relationship between the variables in data collected using the interview guide touching on the three objectives i.e. obstetric emergencies, health facility factors and social- demographic factors that contribute to adverse birth outcomes and a narrative report of the findings was written. Coding of the questions and answers from the questionnaires and interviews was done and was grouped under broad themes of Socio-demographic factors; obstetric emergencies and health facility factors which contribute to

women's vulnerability to adverse birth outcomes. The results were presented using tables, graphs and cross tabulations.

3 Results

3.1 Social demographic factors

3.1.1 Age of the respondents

The highest number of women who attended health facilities for maternal health services were aged between 25 and 29 years representing 32.9% of the total number of women and the lowest were aged between 45 and 49 years representing 1.3% of the total number of women interviewed. (Figure 3.1).

The fertility among study respondents peaked between 25-29 years. There was a steady upward trend of fertility in the early years of reproductive life of the respondents then followed by a steady downward trend recorded from women aged 25-29 years. Age of delivery was not significantly associated with adverse birth outcome in this study with a p value of 0.729 which is greater than 0.05 ($\chi^2 = 9.079, 9.961, 5.793, 7.958, p$ -value >0.05).

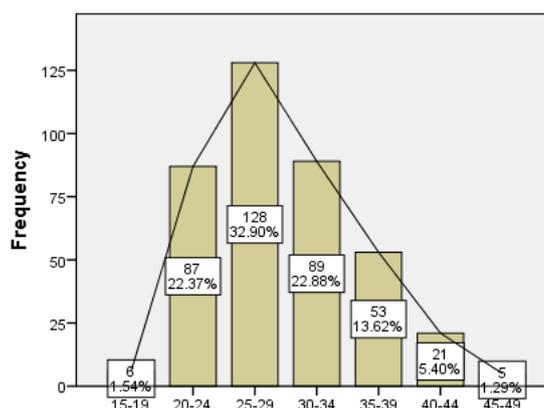


Figure 3.1. Age distribution of women

3.1.2 Age at first birth

Most women gave birth to their first child between the age of 20 and 24 years representing 34% of the women followed by women between 24 and 29 years at 27.5%, 15 and 19 years at 19%, below 15 years at 7.7%, between 30 and 34 years at 7.2%, between 35 and 39 years at 3.1% and only 1.0% were above 40 years. Age at first birth was not associated with adverse birth outcome with a p value of 0.622 which is greater than 0.05 ($\chi^2 = 1.871, 5.103, 3.342, 9.594, p$ -value >0.05).

3.1.3 Religion of the respondents

94.9% were Christians therefore, Christianity was the dominant religion followed by Muslims at 5.1%. No form of religion was associated with adverse birth outcomes with a p value of 0.450 which is greater than 0.05 ($\chi^2 = 2.277, .034, 1.077$ and $.036, p$ -value >0.05).

3.1.4 Marital status of the respondents

Majority of the respondents were married representing 35.0% of the total number of women followed by women who were co-habiting at 24.7%, 18.8% of the women were separated, 13.1% were single, 8.0% were widowed and 0.5% were divorced. Marital status was not significantly associated with adverse birth outcomes with a p value of 0.258 which is greater than 0.05 ($\chi^2 = 3.694, 9.287, 4.239$ and $4.913, p$ -value >0.05).

3.1.5 Occupation of the respondents

Casual laborers were 84% less likely to experience adverse birth outcomes [OR= .159, 95% CI (.031, .816), $p < 0.05$]. Self-employment were 64% more likely to experience adverse birth outcomes [OR=1.645, 95% CI (1.073, 2.520), $p < 0.05$]. Employed respondents had were 52.8% less likely to experience

adverse birth outcomes compared to the unemployed [OR= .472, 95% CI (.281, .793), $p < 0.05$]

3.1.6 Occupation of respondent's partners

The women with unemployed partners were 236.7% more likely to experience adverse birth outcomes [OR= 3.367, 95% CI (1.34, 8.45), $p < 0.05$]. Women with casual laborers as partners were 178.9% more likely to experience adverse birth outcomes [OR= 2.789, 95% CI (1.37, 5.67), $p < 0.05$]. Women whose husbands were self-employed were 116.3% more likely to experience adverse birth outcomes [OR= 2.163, 95% CI (1.11, 4.22), $p < 0.05$] as compared to the employed.

3.1.7 Education level of respondents

Women with university education were 76.5% less likely to experience low adverse birth outcomes [OR=.235, 95% CI (.069, .801), $p = 0.021$], women with college education were 80.7% less likely to experience low adverse birth outcomes [OR=.193, 95% CI (.048, .730), $p = 0.012$], women who completed their secondary education were 81.1% less likely to experience low adverse birth outcomes [OR=.189, 95% CI (.048, .730), $p = 0.014$], women who did not complete their secondary education were 87.2 less likely to experience low adverse birth outcomes [OR=.128, 95% CI (.036, .457), $p = 0.008$], women who completed their primary education were 88.3% less likely to experience low adverse birth outcomes [OR=.117, 95% CI (.069, .801), $p = 0.025$], women who did not complete their primary education were 88.9% less likely to experience adverse low birth outcomes [OR=.111, 95% CI (.089, .109), $p = 0.008$] compared to respondents without education

3.2 Health facility factors

3.2.1 Health Facility Services

The women cited the reasons for not receiving all the services were unavailability of the services at 71.72%, lack of staff at 14.91% and lack of equipment's at 13.37% as shown on figure 3.3.

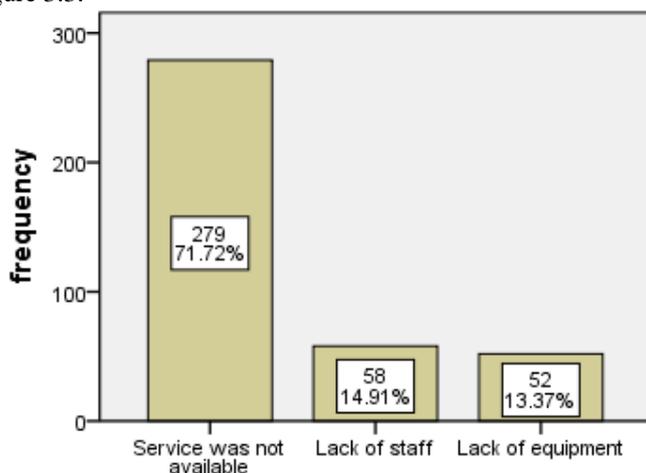


Figure 3.3. Services

3.2.2 ANC parameters

Women who received ANC services were 50.5% less likely to get adverse birth outcomes [OR=0.495, $p = 0.038$ 95% CI (0.269, .993), $p = 0.038$]. Women who did not have blood pressure, weight and height done were 49.9% less likely to get adverse birth outcomes [OR=0.501, 95% CI (0.273, 0.942) $p = 0.024$]. Women who did not have blood test done were 52.7% less likely to experience adverse birth outcomes [OR=0.473, 95% CI (0.249, 0.865) $p = 0.015$]

3.2.3 Distance to the health facility

The distance to the health facility for 15.9% women was below 1km, for 78.1% women was between 1 to 5KM while for

5.9% lived more than 5KM from the health facility. Distance to the health facility was not significantly associated with adverse birth outcomes with a p value of 0.686 which is greater than 0.05 (p -value's > 0.05).

3.2.4 Staff attitude

3.9% of the women rated the staff as extremely good, 68.9% rated the staff as good, 10.5% as fair, 12.1% as bad, whereas 4.6% as bad. Staff attitude was not significantly associated with adverse birth outcomes with a p value of 0.503 which is greater than 0.05 (p -value's > 0.05).

3.2.5 Time taken to the health facility

Women who spent less time waiting to be attended were at a lower risk of experiencing adverse birth outcomes at 46.5% less likely to experiencing adverse birth outcomes [OR=0.535, 95% CI (.225, 1.39) $p = 0.003$] compared to those who took more than two hours to be attended. Those who waited for 1-2 hours were 72.1% less likely to experience adverse birth outcomes [OR=0.279, 95%CI (.119, .653), $p < 0.001$] compared to those who took more than two hours to be attended to.

3.3 Obstetric Emergencies associated with adverse birth outcomes

3.3.1 Obstetric Emergencies

The birth outcomes included preterm births at 17.5%, still births at 13.6%, low birth weight at 20.8% and neonatal deaths 11.3%. The prevalence of adverse birth outcomes was high at 45.2%. The complications experienced during the most recent delivery among the women included miscarriage at 13.1%, Ectopic pregnancy at 3%, Placenta Abruption at 2.3%, Pre-eclampsia at 4.9%, Eclampsia at 3% and Premature rupture of membranes at 3%. Miscarriage was significantly associated with adverse birth outcomes with a p value of 0.01 ($\chi^2 = 13.285$, p -value < 0.05). Premature rupture of membranes was also significantly associated with adverse birth outcomes ($\chi^2 = 5.185$, p -value < 0.05). Ectopic pregnancy was significantly associated with adverse birth outcomes ($\chi^2 = 4.257$, p -value < 0.05). Eclampsia was also significantly associated with adverse birth outcomes ($\chi^2 = 4.733$, p -value < 0.05).

3.3.2 Mode of delivery

83.80% of the women had normal delivery, 11.05% had vacuum delivery done while 5.14% had caesarean section done as shown in figure 3.4.

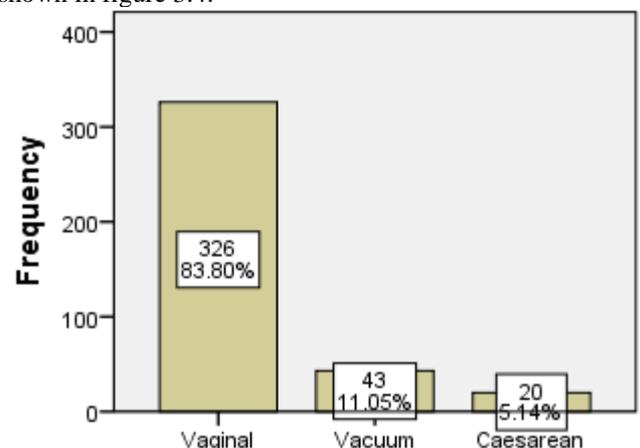


Figure 3.4. Mode of delivery

Mode of delivery was not associated with adverse birth outcomes with a p value of 0.202 which was more than 0.05.

3.3.3 ANC attendance

On ANC attendance, 59.15% of the women attended Antenatal clinics during the first trimester, 25% in the second trimester while only 15.85% started during the third trimester as shown in figure 3.5.

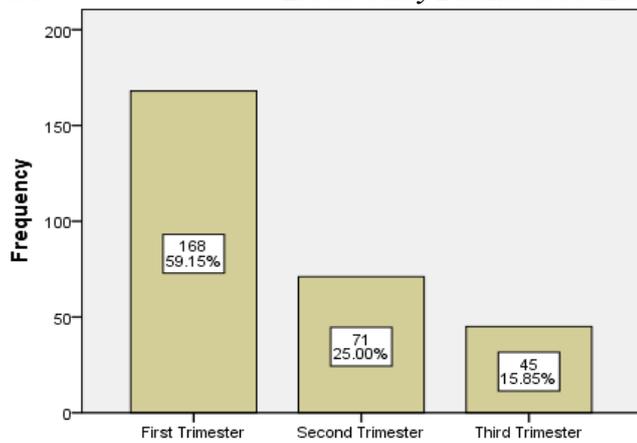


Figure 3.5. ANC attendance

Majority of the respondents representing 72.8% of the women attended ANC during their most recent pregnancy while 27.2% did not attend. ANC attendance of the respondents was significant as those who never attended ANC clinics during the period of pregnancy were associated with adverse birth outcomes with a p value of 0.033 ($\chi^2 = 4.57$, p-value <0.05). The odds ratio obtained from logistics regression presented on table 4.9 indicate that ANC attendance was associated with low adverse birth outcomes as the women who attended were 50.5 less likely to experience adverse birth outcomes [OR=.495, 95% CI (.269, .993), p= 0.033] compared to those who never attended ANC clinics.

3.3.4 ANC attendance decision

58.6% of the women solely made the decision to attend ANC clinics for themselves, 6.7% of the decision to attend ANC were made by their husbands, while 8.0% of the decision to attend ANC were made by their friends. Decision made from relatives accounted for 26.7%. Decision making made by the spouses was not associated with adverse birth outcomes as shown in the results of both chi-square and logistic regression with a p value of 0.168 which is greater than 0.05.

3.3.5 Type of health facility

80.2% of the women attended the public health facilities for maternal health services, followed by 15.2% who attended faith-based health facilities and 4.6% sought health services on private health facilities. For the women who attended public health facilities 10.3% of the women attended the county level hospital and 63.0% attended the sub county level facilities, 7.5% attended health centers and 19.3% received the services they were looking for in the other health facilities.

Level of health facility was not significantly associated with adverse birth outcomes (p-value's 0.529 >0.05)

4. Conclusion

The findings from this study support that social demographic factors such as occupation of the mother and her partner and the level of education of the mother are some of the factors that influence adverse birth outcomes in Kibra. Notably, women with high education level are associated with low adverse birth outcomes, compared to women without education or with low education level that is primary level education. Health facility factors such as; availability and access to Ante Natal Care service and waiting time taken to be attended to for maternal health services are factors that influence adverse birth outcomes. Notably, women who took less time to be attended to were at a lower risk of developing adverse birth outcomes compared to those who took more than two hours to be attended to. Also, obstetric emergencies such as ANC attendance, history

of adverse birth outcomes, and utilization of ANC services are major factors that influence adverse birth outcomes.

References

- Abdo, R., Endalemaw, T., & Tesso, F. (2016). Prevalence and associated Factors of Adverse Birth Outcomes among Women Attended Maternity Ward at Negest Elene Mohammed Memorial General Hospital in Hosanna Town, SNNPR, Ethiopia. *Journal of Women's Health Care*, 1-5. doi:10.4172/2167-0420.1000324
- African Population and Health Research Center (APHRC). (2014). *Population and Health Dynamics in Nairobi's Informal Settlements: Report of the Nairobi Cross-sectional Slums Survey. (NCSS) 2012*. Nairobi: APHRC.
- Alwenya Kennedy (2009). Seasonality of infant mortality in Kibera slums Nairobi Kenya: a case study of Soweto and Katwikeria village. Nairobi, University of Nairobi
- Asundep , N., Carson, A., Turpin C, C., Tameru , B., Agidi , A., Zhang , K., & Jolly , P. (2013). Determinants of access to antenatal care and birth outcomes in Kumasi, Ghana. *J Epidemiol Glob Health*.
- Benojir Ahammed, R. K. (2019). Determinants of different birth intervals of ever married women: Evidence from Bangladesh. *Clinical Epidemiology and Global Health*.
- Campbell, E. &. (2016). The influence of socio-economic status and adverse birth outcomes. *Canadian Journal of Midwifery Research and Practice*, 15, 11-20. .
- Dejun Sua, K. S. (2018). Birth history as a predictor of adverse birth outcomes: Evidence from state vital statistics data. *Preventive Medicine Reports*, 63-68.
- Edward N.Okekea, A. (2018). Health care at birth and infant mortality: Evidence from nighttime deliveries in Nigeria. *Social Science & Medicine*, 86-95.
- Elizabeth M.Coviello, S. N.-C. (2019). Early preterm preeclampsia outcomes by intended mode of delivery. *American Journal of Obstetrics and Gynecology*, 100.e1-100.e9.
- Gabriel D.Shapiro, T. B. (2018). Adverse birth outcomes in relation to maternal marital and cohabitation status in Canada. *Annals of Epidemiology*, 503-509.
- gail, s. j. (n.d.).
- Gruber, K., Cupito, S., & Dobson, C. (2013). Impact of Doulas on Healthy Birth Outcomes. *The Journal of Perinatal Education*, 22(1), 49-58. doi:10.1891/1058-1243.22.1.49
- Hidalgo-Lopez, J.-R. C.-T.-M.-B.-S. (2019). Sociodemographic factors associated with preterm birth and low birth weight: A cross-sectional study. *Women and Birth*.
- Kitui, J., Lewis , S., & Gail , D. (2013). Factors influencing place of delivery for women in Kenya: an analysis of the Kenya demographic and health survey, 2008/2009. *BMC Pregnancy and Childbirth*.
- Jennifer Vanderlaan, R. R. (2019). Associations Between Hospital Maternal Service Level and Delivery Outcomes. *Women's Health Issues*.
- Lawn, J., & Kerber, K. (2006). *Opportunities for Africa's newborns: practical data, policy and programmatic support for newborn care in Africa*. Retrieved from PopLine: <http://www.popline.org/node/179907>
- Leppalahti, S., Gissler, M., Mentula, M., & Heikinheimo, O. (2013). Is teenage pregnancy an obstetric risk in a welfare society? A population-based study in Finland, from 2006 to 2011. *BMJ Open*, 3(1), 1-10. doi:10.1136/bmjopen-2013-003225
- M, M., N, M., & I, D. (2001). Factors associated with unfavourable birth outcomes in Kenya. *Journal of Biosocial Scienc*, 199-225.

- M.Prina, C. K. (2019). Obstetric admissions and outcomes in an intensive care unit in Malawi. *International Journal of Obstetric Anesthesia*.
- Mebratu, C. N. (2017). Adverse Birth Out Comes and Associated Factors among Delivered Mothers in Dessie Referral Hospital, North East Ethiopia. *J Women's Health Reprod Med*.
- Meng, G. (2010). *Social and Spatial Determinants of Adverse Birth Outcome Inequalities in Socially Advanced Societies*. Waterloo, Ontario, Canada.
- Muchemi, O. M. (2015). Factors associated with low birth weights among neonates born at Olkalou District Hospital. *Pan African Medical Journal*.
- Njoroge, D. E. (2011). *The Maternal and Fetal Outcomes among women with obstetric emergencies referred to the Kenyatta National Hospital, Nairobi*. Nairobi.
- Nwobodo, E. &. (2012). Emergency obstetric hysterectomy in a tertiary hospital in Sokoto, Nigeria. *Annals of medical and health sciences research*, 2(1), 37-40. .
- Omariba, D. &. (2007). Determinants of infant and child mortality in Kenya: An analysis controlling for frailty effects. *Population Research and Policy Review*. 26. 299-321. [10.1007/s11113-007-9031-z](https://doi.org/10.1007/s11113-007-9031-z).
- Paul Mkandawire, O. A. (2019). Pregnancy intention and gestational age at first antenatal care (ANC) visit in Rwanda. *Midwifery*, 30-38.
- Preeti K.Mahato, E. n. (2017). Factors related to choice of place of birth in a district in Nepal. *Sexual & Reproductive Healthcare*, 91-96.
- R.N.Ogu, L. N. (2017). Perceptions of women on workloads in health facilities and its effect on maternal health care: A multi-site qualitative study in Nigeria. *Midwifery*, 1-6.
- Reham Khresheh, L. B. (2019). Caring behaviours by midwives: Jordanian women's perceptions during childbirth. *Midwifery*, 1-5.
- Shah PS1, Zao J, Ali S;. (2011). Maternal marital status and birth outcomes: a systematic review and meta-analyses. *Matern Child Health J*.
- Shiyam Sunder Tikmani, S. A. (2019). Trends of antenatal care during pregnancy in low- and middle-income countries: Findings from the global network maternal and newborn health registry. *Seminars in Perinatology*.
- Stephen Obeng Gyimah, B. K. (2006). Challenges to the reproductive-health needs of African women: On religion and maternal health utilization in Ghana. *Social Science & Medicine*, 2930-2944.
- Subramania Raju Rajasulochana, P.-C. i. (2019). Efficiency and Productivity changes in the presence of undesirable outcomes in Emergency Obstetric and Newborn Care. *Journal of Policy Modeling*.
- Udo, A. E. (2013). Teenage pregnancy and adverse birth outcomes in Calabar, Nigeria. *The Internet Journal of Gynecology and Obstetrics*, 17(2), 3210-8.
- WHO. (2015). *Trends in maternal mortality:1990-2015*. Geneva: WHO.
- WHO. (2016). *Time to respond: a report on the global implementation of maternal death surveillance and response*. WHO.