Global Journal of Medical and Health Science
Volume 9, Number 4; July-August,2022;
ISSN: 2836-5577| Impact Factor: 7.76
https://zapjournals.com/Journals/index.php/Medical-Health/
Published By: Zendo Academic Publishing

THE ROLE OF SOCIOECONOMIC STATUS AND MATERNAL EDUCATION IN BIRTH OUTCOMES IN KAJIADO COUNTY, KENYA

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Article Info

Keywords:
Socioeconomic status, maternal education, birth outcomes, Kajiado County, Kenya

Abstract

This study investigates the pivotal role of socioeconomic status and maternal education in influencing birth outcomes within Kajiado County, Kenya. It delves into the complexities of adverse birth outcomes, including preterm births, low birth weight, and stillbirths, and their relationship with the socioeconomic and educational backgrounds of expectant mothers.

Drawing on a comprehensive analysis of data collected from Kajiado County, the research reveals that socioeconomic factors play a substantial role in shaping birth outcomes. Maternal age, in particular, emerges as a critical determinant, with teenage pregnancies presenting a higher risk of adverse birth outcomes. Additionally, the study uncovers the significant impact of marital status, with single mothers experiencing greater vulnerability to adverse birth outcomes compared to their married counterparts. Residence location emerges as another influential factor, with rural areas in Kajiado County exhibiting a higher prevalence of adverse birth outcomes. This disparity is attributed to limited access to healthcare services, lower education levels, and cultural practices that affect maternal nutrition and health.

The study underscores the importance of improving healthcare accessibility in rural areas, advocating for girl child education, and implementing strategies to prevent teenage pregnancies. By addressing these issues, Kajiado County can work towards reducing the prevalence of adverse birth outcomes and enhancing the overall health and well-being of its maternal and neonatal populations.

1.0 INTRODUCTION

Health at birth is measured by the outcomes. Adverse birth outcomes are unexpected or unfavorable results in a baby at birth (Cherie & Mebratu, 2017). The most common Adverse birth outcomes (ABO) are low birth weight (LBW), birth before full term (preterm births) and fetal still births (SB) (Cherie & Mebratu, 2017). LBW is the weight of less than 2500 grams at birth (up to and including 2499grams) irrespective of gestational age (WHO).

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Birth weight should be taken in the first hour of life prior to significant post natal weight loss. Prematurity is the leading cause of LBW globally. The global prevalence of LBW is 15.5 %, which amounts to about 20 million LBW infants born each year, 96.5 % of them in developing countries. Half of all low birth weight babies are born in South-central Asia where 27 percent are below 2500 grams at birth. In Sub-Saharan Africa LBW rate is estimated at 15 percent with the proportions varying from country to country
(UNICEF-WHO, 2018). In Kenya the prevalence of low birth weight births is 8% of total births (KDHS, 2014). LBW is associated closely with increased fetal and neonatal mortality, morbidity, and impaired growth and cognitive development. LBW babies at birth experience breathing difficulties, hypothermia, neurologic disorders such as intraventricular hemorrhage and difficulties in feeding hence inability to gain weight which in turn results to increased morbidity (WHO, 2015). Neonatal adverse birth outcomes may be depend on maternal socio, economic and demographic characteristics such as maternal age, income levels, residence, marital status, education level, smoking and alcohol use in pregnancy (Diamond *et al*., 2004) . Studies in the past have shown that pregnancies by teenagers, (< 20 years of age) and women of advance maternal age, (≥35 years of age) are at greater risk for stillbirth, preterm birth, and low birth weight. A study conducted in Taiwan found out that ABO was highest at ages of ≤14 years, which then declined to an age of 27 years, and then steadily increased to ages of ≥44 years. The study also noted that the highest risk for stillbirth was ≤ 14 years of age, then declined in ages of 22 – 29 years with the risk increasing steadily at ≥ 44 years. For PB the study found the risk to be highest at ≤ 14 years. For LBW those at ≤14 years had the highest risk. Those aged < 27 years or > 32 years bore a greater risk compared to those between 28 and 31 years. (Weng *et al*., 2014).Women that have their first pregnancy at age ≤ 15 years or age of ≥39 years have higher chances of SB than the rest (KDHS, 2014). Young maternal age is an indicator for one or more other maternal risk factors associated with ABO and not just indication of incomplete maternal growth. Studies done in the past suggested that a young gynecological age (conception within 2 years after menarche) and the effect of a teenager's becoming pregnant before her own growth has stopped might be associated with the increased risk of ABO in teenage pregnancy. A study conducted in the USA in 2007 found that teenage pregnancy increases the risk of ABO that is independent of important known confounders. This finding challenges the accepted opinion that ABO associated with teenage pregnancy is attributable to low socioeconomic status, inadequate prenatal care and inadequate weight gain during pregnancy (Chen et al., 2007).

Over the last 2 decades, the proportion of women who have been giving birth to their first child at an advanced age has been on the rise and subsequently the other births that follow are also at an advanced age. In a study conducted in Taiwan in 2010 showed having the first child at an advanced maternal age (≥35 Years) increases the risk of having LBW and PTB. (Cheng, 2010).Advanced maternal age (≥ 35 years) has been associated with stillbirths according to a study conducted in
Australia (Flenady *et al*., 2011) .These findings were similar to the ones in a study conducted in the USA (Reddy *et al.,* 2010). The age of the mother as a risk factor of LBW has been identified in many hospital and population studies. In a cross-sectional analytic study that analyzed the 1993 KDHS data, mothers aged < 20 years were found to have the smallest babies at birth. In the same study mothers aged 35 years and older had higher LBW babies compared to those aged 20-34 years. The distribution of LBW by birth order appeared to follow a similar pattern to maternal age (Muchemi *et al*., 2015).

Maternal socioeconomic status (SES) is a crucial determinant of inequity in maternal and fetal health (Luo *et al*., 2006). Women with higher education (from secondary level) have lower odds of experiencing LBW compared to those with no or lower education (primary school) It is believed that high maternal educational attainment

improves birth outcomes by improving women's status and access to information and services however some studies link higher maternal educational attainment with increased incidence of ABO such as premature delivery. It is also possible that some of the background factors, such as maternal education, might influence birth outcomes indirectly through the intermediate factor (Diamond *et al.*, 2004).

A study involving 1016 pregnant women in Ecuador found out that women of low social-economic status had low education levels hence limited knowledge on the indicators of quality antenatal care and were therefore at risk of receiving inadequate antenatal care unknowingly (Paudel.,2017) . A study by Siza 2008 found that mothers without formal education were 4 times more likely to deliver LBW compared to those with formal education. In a similar study conducted in Kenya it was found that mothers with low level of education (lower than secondary school) were at risk of LBW than those with Post primary school education (Wagura *et al*., 2018). According to KDHS 2014, 69% women with higher education (post primary) attended 4 antenatal clinic visits compared to those with lower education (Primary and or no formal education) where only 44% attended 4 antenatal clinic visits hence higher chances of ABO. A study in Canada found that stillbirth rates were higher for mothers with fewer years of education at all gestational interval than those with many years of education (Auger *et al*., 2012). In a study carried out in Kenya it was found out that mothers with no formal education, those of rural residence, those of low socio-economic status, those who gave birth to a male infant and multiple births had higher chances of delivering low birth weight baby (Muchemi *et al., 2015)*. A study in Ethiopia found that ABO were few in women from urban areas than in women from rural areas , this was attributed to inaccessibility of health facilities , long distances , low education levels in rural areas, low income and poor referral mechanisms in rural areas (Abdo *et al*., 2016).

The risk for LBW and PB was high among the unmarried than the married women according to a study conducted in Canada (Shah *et al*.,2011). Lack of established paternity and being unmarried is significantly correlated with and may be important risk factors for PB and LBW deliveries. Health workers should be aware of the potential role of paternal presence and marital status may play with respect to preterm births and low birth weight (Masho *et al*., 2010).Being unmarried is a significant risk factor for LBW and PB however paternal presence may have a protective effect. Paternity in addition to marriage may be a proxy measure for paternal support .In a Study conducted in the USA, it was found out that those who are unmarried are more at risk of LBW and PTB than the married ones (Masho *et al*., 2010). In another study in Kenya it was found out that those who were not married had a higher risk of having LBW. (Muchemi *et al*., 2015).In another similar study unmarried mothers were found to be more likely to give birth to LBW compared to their married counterparts (Siza, 2008). According to a cohort study in the USA, births from unmarried women are at higher risk of SB as compared to births from married women (Balayla *et al.*, 2011)

A study in Ethiopia showed that those mothers of urban residence less likely to develop adverse birth out come as compared to those of rural residence. This due to factors such as inaccessibility of health services in rural areas, low income and low education levels in rural areas and cultural beliefs (Abdo *et al*. 2016).According to KDHS 2014 68% of urban women attended at least 4 antenatal clinic visits compared with 51% of their rural counterparts hence more at risk of ABO.

1.1 Statement of the Problem

Even with the medical advancement in the recent times , ABO are still a problem across the globe. Stillbirth, low birth weight and preterm birth constitute the highest rates of all the adverse birth outcomes and their prevalence in developing countries is higher than developed countries. The prevalence is higher in developing countries due to factors such as poverty, low educational level, multiparty, malaria, poor nutrition and anaemia compared to

developed world (Cherie & Mebratu, 2017).Infant Mortality rate for LBW infants is about 25 times that of the infant mortality rate for normal weight babies. On the other hand, the infant mortality rate for PB babies is almost three times the infant mortality rate for term babies. LBW infants are more likely to have underdeveloped lungs and breathing problems; heart problems (which can lead to heart failure); immature and improperly functioning liver; too many or too few red blood cells hence increased morbidity in the first years of life. (WHO, 2012)
Annually 15 million babies are estimated to be born prematurely globally with at least 1 million dying due to the complications of PB each year. Africa and South Asia contribute to 60 % of all PB; however, it is a global problem. Averagely in the lower-income countries 12% of babies are born too early compared with 9% in higher-income countries (WHO, 2014). Global prevalence of LBW is 15.5 % with 20 million LBW babies estimated to be born each year. The prevalence is higher in developing countries with South Asia recording prevalence of 28 %, Sub Saharan Africa 13 % and Latin America 9% (WHO 2014).Premature babies are likely to suffer lifelong effects such as Cerebral Palsy, mental retardation, visual and hearing impairment and delayed physical development. Globally prematurity is the leading cause of death in children under 5 years of age (WHO 2018).
There were 2.6 million SB globally in 2015 according to WHO with more than 7178 deaths daily. Ninety eight percent of SB occurs in low and middle income countries. Half of all the SB occurs in the intrapartum period. Three quarters of SB occurs in South Asia and Sub Saharan Africa with 60% occurring in rural families, (WHO 2014). In Sub-Saharan Africa LBW rate is estimated at 15 percent with the proportions varying from country to country (UNICEF-WHO, 2018). There are some factors that have been found to be associated with occurrences of ABO across the globe in various past studies which includes some demographic factors, socio economic factors, medical factors, obstetric and lifestyle factors. In Kajiado County teenage pregnancy prevalence is 20% (KDHS, 2014) while the County illiteracy level is 48 % (KDHS, 2014) with these factors featuring prominently as some of the leading factors associated with ABO in many areas. ABO are associated with high morbidities and mortalities in the first five years of life. In Kenya the child mortality rate is 52 per 1000, neonatal mortality rate at 20.9 per 1000 and infant mortality rate 39 per 1000 (KDHS, 2014). The sustainable development goal number 3 aims to achieve good health for all which includes reducing the mortality rates. (WHO, 2018).

2.0 METHODOLOGY

Cross sectional study design was used. The study population was women admitted in post-natal ward at Kajiado county Referral Hospital having delivered within 48 hours. Systematic sampling was used to select the women admitted in post-natal ward. A total of 163 study participants were recruited through systematic sampling. Semi-structured questionnaires were used to collect data from the respondents. Data was analyzed using SPSS version 20. Pearson chi-square test was used to determine the significance of association between each outcome variable and the independent variables. Odds ratio (OR) and 95% CI were used to estimate the strength of association. The threshold for significance was set at $P<0.05$ at all levels of analyses. Summary statistic of independent variables was presented using frequency tables, pie charts, percentages and graphs.

3.0 RESULTS 3.1 Socio demographic and Socioeconomic Characteristics of Study Respondents

A total of 163 respondents with a mean age of 25 ± 5.6 years, a minimum age of 15 years and maximum age of 39 years were recruited in the study. Most (38%) of the mothers were aged 20 – 24 while 7.4% were aged 35 years and above. Majority (84.7%) of the respondents were married while 15.3% were single. With respect to education level, most (38.7%) of the respondents had secondary school level education followed by primary school education (31.9%).Majority (51.5%) of respondents resided in urban areas (Table 1).

Table 1: Socio demographic characteristics of the respondents

Variables	N=163	%
Age category of the mothers ≤19 years	24	14.7
20 - 24 years	62	38
25 - 29 years	44	27
30 - 34 years	21	12.9
≥35 years	12	7.4
Religion Catholic	19	11.7
Protestant	138	84.7
Muslim	6	3.7
Marital status Single	25	15.3
Married	138	84.7
Level of Education No Formal Education	12	7.4
Primary School	52	31.9
Secondary School	63	38.7
College	33	20.2
University	3	1.8
Occupation Housewife	71	43.6
Employed (Formal Sector)	14	8.6
Employed (Informal Sector)	27	16.6
Business Lady	27	16.6
Farmer/Livestock Herder	3	1.8
Lives with Parents	21	12.9
Residential area Rural	79	48.5
Urban	84	51.5
Family approximate income in Kshs. 0-10,000	77	47.2
10,001-20,000	68	41.7
20,001-30,000	16	9.8
30,000 and above	2	1.2

3.2. Prevalence of adverse birth outcome among the study respondents' neonates

The prevalence rate for preterm birth was 23.1 %, low birth weight was 23.1% while stillbirth prevalence was 6.5%. The overall prevalence of occurrence the adverse birth outcomes was 32.5%. Among the 3 ABO prevalence of preterm births was 43.8%, low birth weight was 43.8 while stillbirth was 12.4 % (Figure 1).

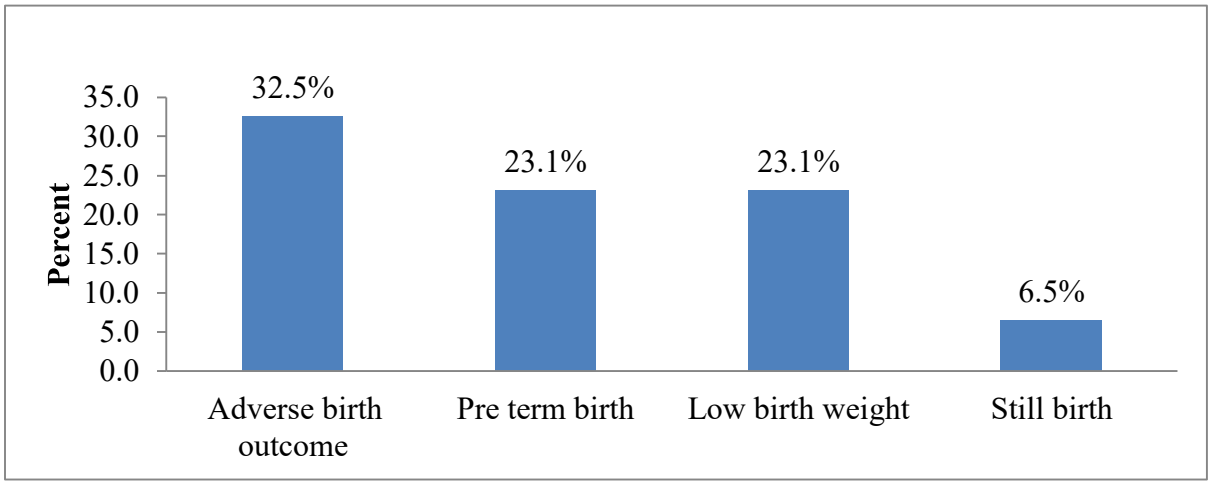

Figure 1: Prevalence of Any adverse birth outcome, Pre-term birth, Low birth weight and stillbirth

3.3 Socio demographic and Socio economic factors associated with adverse birth outcomes Marital status was significantly associated with occurrence of adverse birth outcome, P<0.05. Greater proportion of mothers having adverse birth outcome was observed among neonates whose mothers were single (50%) compared to those whose mothers were married (29.4%). Neonates whose mothers were single were 2.40[95%CI= 1.03 – 5.62, P= 0.043] times more likely to have an adverse birth outcome compared to those from married mothers. High proportion of mothers having adverse birth outcome was observed among neonates whose mothers resided in rural areas (49.3%) compared to mothers from urban areas (27.9%). Neonates whose mothers resided in rural areas were 2.52[95%CI= 1.33 – 4.77, P=0.004] times more likely to have an adverse birth outcome compared to those whose mothers resided in urban areas (Table 2).

Table 2: Socio demographic and Socio-economic factors associated with adverse birth outcomes among neonates in KCRH

ABO

	Yes		No			95%CI		
Variables	**n**	**%**	**n**	**%**	**OR**	**Lower**	**Upper**	**P-Value**
Age category of the mothers								
≤19 years	10	40.00%	15	60.00%	1.5	0.36	6.23	0.577
20 - 24 years	23	37.10%	39	62.90%	1.33	0.37	4.8	0.666
25 - 29 years	11	23.40%	36	76.60%	0.69	0.18	2.67	0.589
30 - 34 years	7	31.80%	15	68.20%	1.05	0.24	4.62	0.949
≥35 years	4	30.80%	9	69.20%	Ref			
Religion								
Catholic	8	40.00%	12	60.00%	1.67	0.26	10.79	0.592
Protestant	45	31.70%	97	68.30%	1.16	0.22	6.21	0.862
Muslim **Marital status**	2	28.60%	5	71.40%	Ref			
Single	13	50.00%	13	50.00%	2.4	1.03	5.62	**0.043**
Married **Level of Education**	42	29.40%	101	70.60%	Ref			
No Formal Education	4	33.30%	8	66.70%	0.25	0.02	3.66	0.311
Primary School	18	33.30%	36	66.70%	0.25	0.02	2.94	0.271
Secondary School	19	29.20%	46	70.80%	0.21	0.02	2.42	0.209

College	12	34.30%	23	65.70%	0.26	0.02	3.18	0.292
University **Occupation**	2	66.70%	1	33.30%	Ref			
Housewife	18	25.00%	54	75.00%	Ref			
Employed (Formal Sector)	5	33.30%	10	66.70%	1.5	0.45	4.97	0.507
Employed(Informal Sector)	8	27.60%	21	72.40%	1.14	0.43	3.03	0.788
Business Lady	9	33.30%	18	66.70%	1.5	0.57	3.92	0.409
Farmer/Livestock Herder	3	75.00%	1	25.00%	9	0.88	92.06	0.064
Lives with Parents	12	54.50%	10	45.50%	3.6	0.97	9.73	0.072
Residential area								
Rural	41	49.30%	42	51.70%	2.52	1.33	4.77	**0.004**
Urban	24	27.90%	62	72.10%	Ref			
Family approximate income in Kshs.								
0-10,000	33	40.70%	48	59.30%	0.34	0.03	3.95	0.391
10,001-20,000	14	20.60%	54	79.40%	0.13	0.01	1.53	0.105
20,001-30,000	6	35.30%	11	64.70%	0.27	0.02	3.67	0.327
30,000 and above	2	66.70%	1	33.30%	Ref			

3.4 Socio Demographic and Socioeconomic Factors Associated With Preterm Births

Age of the mothers was significantly associated with occurrence of pre-term births, P<0.05. Greater proportion of pre-term births was observed among neonates whose mothers were aged 19 years or less (60%) compared to those whose mothers were aged above 19 years. Neonates whose mothers were aged 19 years or less were 7.80[95%CI= 1.15 – 52.68, P<0.001] times more likely to have a preterm birth compared to mothers aged more than 19. High proportion of pre-term birth was observed among neonates whose mothers resided in rural areas (54.2%) compared to those whose mothers resided in urban areas (19.8%). Neonates whose mothers resided in rural areas were 2.74[95%CI= 1.71 – 4.39, P<0.001] times more likely to have be preterm birth compared to those whose mothers resided in urban areas (Table 3).

Table [1]: Socio demographic and socioeconomic factors associated with preterm births among neonates in KCRH

Variables	Yes n	%	No n	%	OR	95%CI Lower	Upper	P-Value

Pre-term birth

[1] **.5 Socio Demographic and Socioeconomic Factors Of Associated With Still Birth**

Two socio-demographic characteristics were significantly associated with occurrence of stillbirth P<0.05. Age of the mothers was significantly associated with occurrence of still births, P<0.05. Greater proportion of still births was observed among neonates whose mothers were aged 19 years or below (24%) compared to mothers aged above 19 years. Neonates whose mothers were aged 19 years or less were 9.23[95%CI= 1.77 – 48.15, P=0.003] times more likely to be still birth compared to mothers aged more than 19 years. High proportion of still birth was observed among neonates whose mothers resided in rural areas (13.5%) compared to mothers from urban areas (3.5%). Neonates whose mothers resided in rural areas were 10.16[95%CI= 3.37 – 27.78, P<0.001] times more likely to be still birth compared to mothers residing in urban areas (Table 4).

Table 4: Socio demographic and socioeconomic factors associated with stillbirth among neonates in KCRH

Age category of the mothers								
≤19 years	15	60.00%	10	40.00%	7.8	1.15	52.68	**<0.001**
20 - 24 years	9	14.50%	53	85.50%	4.53	0.55	37.58	0.161
25 - 29 years	8	17.00%	39	83.00%	2.84	0.33	24.78	0.344
30 - 34 years	6	27.30%	16	72.70%	4.5	0.48	42.5	0.189
≥35 years **Religion**	1	7.70%	12	92.30%	Ref			
Catholic	5	25.00%	15	75.00%	0.83	0.12	5.72	0.853
Protestant	32	22.50%	110	77.50%	0.73	0.13	3.93	0.711
Muslim **Marital status**	2	28.60%	5	71.40%	Ref			
Single	9	34.60%	17	65.40%	1.99	0.81	4.92	0.134
Married **Level of Education**	30	21.00%	113	79.00%	Ref			
No Formal Education	3	25.00%	9	75.00%	Ref			
Primary School	10	18.50%	44	81.50%	0.68	0.16	2.98	0.611
Secondary School	16	24.60%	49	75.40%	0.98	0.24	4.07	0.977
College	8	22.90%	27	77.10%	0.89	0.19	4.09	0.88
University **Occupation**	2	66.70%	1	33.30%	6	0.39	92.28	0.199
Housewife	14	19.40%	58	80.60%	0.42	0.15	1.2	0.107
Employed (Formal Sector)	5	33.30%	10	66.70%	0.88	0.22	3.48	0.85
Employed (Informal Sector)	4	13.80%	25	86.20%	0.28	0.07	1.1	0.068
Business Lady	6	22.20%	21	77.80%	0.5	0.14	1.76	0.279
Farmer/Livestock Herder	2	50.00%	2	50.00%	1.75	0.21	14.93	0.609
Lives with Parents **Residential area**	8	36.40%	14	63.60%	Ref			
Rural	25	30.10%	58	69.90%	2.21	1.06	4.64	**0.032**
Urban	14	16.20%	72	83.80%	Ref			
Family approximate income in Kshs.								
0-10,000	22	27.20%	59	72.80%	0.19	0.02	2.16	0.179
10,001-20,000	10	14.70%	58	85.30%	0.09	0.01	1.04	0.054
20,001-30,000	5	29.40%	12	70.60%	0.21	0.02	2.85	0.24
30,000 and above	2	66.70%	1	33.30%	Ref			

Still birth

Variables	Yes n	%	No n	%	OR	95 %CI Lower	Upper	P - Value
Age category of the mothers								
≤19 years	6	24.00%	19	76%	9.23	1.77	48.15	**0.003**
20 - 24 years	3	4.80%	59	95.20%	1.07	0.19	5.74	0.935
25 - 29 years	1	2.10%	46	97.90%	0.21	0.01	2.53	0.186
30 - 34 years	1	4.50%	21	95.50%	Ref			

≥35 years	0	0.00%	13	100.00%	UD	UD	UD	1
Religion								
Catholic	2	10.00%	18	90.00%	Ref			
Protestant	9	6.30%	133	93.70%	0.61	0.12	3.04	0.546
Muslim **Marital status**	0	0.00%	7	100.00%	UD	UD	UD	1
Single	3	11.50%	23	88.50%	2.2	0.54	8.91	0.269
Married **Level of Education**	8	5.60%	135	94.40%	Ref			
No Formal Education	2	16.70%	10	83.30%	Ref			
Primary School	5	9.30%	49	90.70%	0.51	0.09	3.01	0.458
Secondary School	2	3.10%	63	96.90%	0.16	0.02	1.26	0.081
College	2	5.70%	33	94.30%	0.3	0.04	2.43	0.261
University	0	0.00%	3	100.00%	UD	UD	UD	1
Occupation								
Housewife	2	2.80%	70	97.20%	Ref			
Employed (Formal Sector)	0	0.00%	15	100.00%	UD	UD	UD	1
Employed (Informal Sector)	2	6.90%	27	93.10%	2.59	0.35	19.34	0.353
Business Lady	3	11.10%	24	88.90%	4.37	0.69	27.78	0.118
Farmer/Livestock Herder	1	25.00%	3	75.00%	11.67	0.81	167.48	0.071
Lives with Parents	3	13.60%	19	86.40%	5.53	0.86	35.49	0.072
Residential area								
Rural	8	13.50%	51	86.50%	10.16	3.37	27.78	**<0.001**
Urban	3	3.50%	81	96.50%	Ref			
Family approximate income in Kshs.								
0-10,000	6	7.40%	75	92.60%	Ref			
10,001-20,000	5	7.40%	63	92.60%	0.99	0.29	3.4	0.99
20,001-30,000	0	0.00%	17	100.00%	UD	UD	UD	1
30,000 and above	0	0.00%	3	100.00%	UD	UD	UD	1

3.6 Socio Demographic and Socioeconomic Factors Associated With Low Birth Weight.

Two socio-demographic characteristics were significantly associated with low birth weight occurrences in neonates, P<0.05. Age category of the mothers was significantly associated with occurrence of low birth weight, P<0.05. Greater proportion of low birth weight was observed among neonates whose mothers were aged 19 years or less (56%) compared to mothers aged more than 19 years (30.8%). Neonates whose mothers were aged 19 years or less were 2.86[95%CI= 1.12 – 11.82, P=0.013] times more likely to have a low birth weight compared to those aged more than 19 years. High proportion of low birth weight was observed among neonates whose mothers resided in rural areas (28.9%) compared to mothers from urban areas (17.4%). Neonates whose mothers resided in rural areas were 1.93[95%CI= 1.13 – 4.00, P=0.009] times more likely to be low birth weight compared to those whose mothers resided in urban areas (Table 5).

Table 5: Socio demographic and socioeconomic factors associated with low birth weight among neonates in KCRH.

Low birth weight Variables	Yes		No		95%CI			
	n	%	n	%	OR	Lower	Upper	P-Value
Age category of the mothers								
≤19 years	14	56.00%	11	44.00%	2.86	1.12	11.82	**0.013**
20 - 24 years	14	22.60%	48	77.40%	0.66	0.18	2.46	0.532
25 - 29 years	4	8.50%	43	91.50%	0.39	0.09	1.64	0.2
30 - 34 years	3	13.60%	19	86.40%	0.84	0.19	3.8	0.825
≥35 years **Religion**	4	30.80%	9	69.20%	Ref			
Catholic	7	35.00%	13	65.00%	1.35	0.21	8.82	0.757
Protestant	30	21.10%	112	78.90%	0.67	0.12	3.62	0.642
Muslim **Marital status**	2	28.60%	5	71.40%	Ref			
Single	8	30.80%	18	69.20%	1.61	0.64	4.04	0.315
Married **Level of Education**	31	21.70%	112	78.30%	Ref			
No Formal Education	6	50.00%	6	50.00%	1	0.07	14.64	0.999
Primary School	12	22.20%	42	77.80%	0.63	0.05	7.57	0.719
Secondary School	12	18.50%	53	81.50%	0.5	0.04	5.95	0.583
College	8	22.90%	27	77.10%	0.59	0.05	7.42	0.685
University **Occupation**	1	33.30%	2	66.70%	Ref			
Housewife	14	19.40%	58	80.60%	0.52	0.18	1.51	0.227
Employed (Formal Sector)	3	20.00%	12	80.00%	0.54	0.11	2.53	0.43
Employed (Informal Sector)	5	17.20%	24	82.80%	0.45	0.12	1.67	0.23
Business Lady	7	25.90%	20	74.10%	0.75	0.22	2.6	0.65
Farmer/Livestock Herder	3	75.00%	1	25.00%	6.43	0.56	73.35	0.134
Lives with Parents **Residential area**	7	31.80%	15	68.20%	Ref			
Rural	24	28.90%	59	71.10%	1.93	1.13	4	**0.009**
Urban	15	17.40%	71	82.60%	Ref			
Family approximate income in Kshs.								
0-10,000	25	30.90%	56	69.10%	0.22	0.02	2.58	0.23
10,001-20,000	8	11.80%	60	88.20%	0.07	0.01	0.82	0.055
20,001-30,000	4	23.50%	13	76.50%	0.15	0.01	2.18	0.166
30,000 and above	2	66.70%	1	33.30%	Ref			

4.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS Summary

The study found out that teenage pregnancy (giving birth at age ≤19 years) was significantly associated with preterm births and low birth weight. Neonates who were born by teenage mothers had higher odds of being preterm and low birth weight than those whose mothers were of higher ages .This concurs with another study in the USA (Chen *et al*. ,2007) and KDHS 2014.Young maternal age is associated with the adverse birth outcomes due to the biological immaturity, low education level at that age, being single and poor antenatal care (Demirci *et al.* 2016).

Neonates born to mothers who were single had higher odds of low birth weight and preterm births compared to those born to married mothers. The study agrees with other similar studies conducted elsewhere by (Shah *et al*., 2011), (Masho *et al*., 2010) and (Muchemi *et al*. 2015). Being single is linked to teenage pregnancy, lack of paternal support and poor antenatal care.

Neonates whose mothers resided in rural area had higher odds of having low birth weight and preterm birth compared to the urban dwellers. This concurs with other studies in Ethiopia (Abdo *et al*. 2016 and Gebremeskel *et al*., 2017).The results are also in agreement with KDHS 2014. The association of rural residence with adverse outcome is due to inaccessibility of health services in rural areas, low education levels, low income and cultural beliefs that may have effect on nutrition status of women by prohibition of certain essential foods

Conclusion

The study revealed that the overall prevalence of adverse birth outcome was 32.5%.The prevalence for low birth weight was 23.1%, preterm birth 23.1% while stillbirth prevalence was 6.5%.. The study alsso concluded that socio demographic and economic factors were significantly associated with adverse birth outcomes were; teenage age (<19 years), being single and rural residence.

Recommendations

The study recommends that there is need to lower the prevalence rates of the adverse birth outcomes which are higher than the global and national rates. This can be done by adopting of strategies such as prevention of teenage pregnancies. This can be achieved by including sexuality and health education in the new competence based curriculum, development of laws with stiffer penalties for punishing those responsible for impregnating teenage girls. The study also recommended the empowerment of girl child through access to education, sensitizing the community against retrogressive cultural practices that lead to early pregnancies such as early marriages. The study also recommends improvement of healthcare access and provision in rural areas.

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