NUTRITIONAL AND MATERNAL FACTORS INFLUENCING POSTPARTUM HAEMORRHAGE IN LAMBUSSIE DISTRICT

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Abstract

Maternal excessive bleeding at birth continues to be a global public health challenge, particularly in poor resource settings. Postpartum haemorrhage has been linked to a high proportion of maternal deaths and disabilities at the institutional and community levels. Current data on postpartum haemorrhage is limited to institutional settings and does not consider the community experiences of mothers who suffer from postpartum haemorrhage. This cross-sectional study assessed the nutritional and other maternal risk factors associated with postpartum haemorrhage at the community level. A total of 183 mothers were systematically sampled from six sub-districts. Data was analyzed using SPSS version 22.0. Multivariate logistic and regression models were estimated to assess the association between dependent and independent variables at a confident level of 95%. The results from the study showed that the prevalence of postpartum haemorrhage was 7.1% among the mothers interviewed in the study. Age groups (p<0.001) of mothers influenced postpartum haemorrhage as experienced by some mothers during delivery, and also maternal height (p<0.001), Iron-folic acid (IFA) daily supplements (p<0.020), Gravidity (p<0.001), anaemia (p<0.001) and malnutrition at 36 weeks of pregnancy (p<0.008). Although the prevalence of postpartum haemorrhage is relatively minor, the effects of poor nutrition on excessive maternal bleeding cannot be underestimated. Improving maternal nutritional status could reduce the chances of bleeding during delivery and possibly improve all birth outcomes. Policymakers need to develop nutrition-specific interventions for mothers before and during pregnancy.

Keywords: Postpartum, Haemorrhage, Maternal, Nutrition, Risk-Factors

Introduction

Adequate maternal nutrition is generally recognized to play a critical role in promoting the health of both mothers and babies before and during pregnancy and after childbirth. The nutritional status of the mothers can further inform their health status during and after pregnancy, leading to both short and long-term effects (Cetin & Laoreti, 2015; NICE, 2015). Poor maternal health and nutritional status have been related to adverse birth outcomes such as postpartum haemorrhage and maternal deaths, among others (Abu-Saad & Fraser, 2010). However, the interrelationship between these maternal risk factors and birth outcomes is complex and may be influenced by several other factors such as socioeconomic, biological, and demographic

factors. These may also vary widely among different populations (Abu-Saad & Fraser, 2010). As cited by Mpemba et al. (2014), the previously known risk factors do not currently predict PPH, and almost 7 out of 10 cases of PPH do not have identifiable risk factors.

The complexity of the situation is also due partly because about half of all pregnancies are unplanned (NICE, 2015), and so, most women are not able to build their nutritional stores before conception, which also predispose them to some deficiencies in the face of the increased nutritional requirements due to the pregnancy. For example, anthropometric indicators such as gestational weight gain and body mass index before pregnancy play a significant role in the energy requirements during pregnancy (WHO, 2016; Cetin & Laoreti, 2015). These nutritional status indicators also predict maternal health outcomes, both short-and-long-term. Therefore, it is recommended that improved GWG and pre-pregnancy BMI are necessary to reduce adverse pregnancy outcomes (Cetin & Laoreti, 2015).

Haemorrhage (PPH) is the leading cause of maternal mortality, contributing to one-third of maternal deaths globally (Ashigbie, 2013; Bonnet & Benhamfou, 2016). According to Ashigbie (2013), although maternal deaths had decreased globally, developing countries record higher figures due to postpartum haemorrhage. PPH is defined as blood loss greater than 500mls and continuing. However, clinically significant PPH is more usefully defined as any excessive bleeding that causes the woman to become symptomatic (Oyelese & Ananth, 2010). Globally, PPH is estimated to be 13.6%, with Latin America and Asia reporting 8%, 13% in North America, and as high as 26% in Africa (Calvert, Thomas, Ronsmans, Wagner, Adler, and Filippi, 2012). In the subsequent year, a multi-country survey conducted by the World Health Organization reported a rate of 1.2% PPH across 28 countries (Sheldon et al., 2013). Also, in the US, data showed that about 8% of the total maternal deaths resulted from PPH, between 2-6% in India (Kumar, 2016),

and an institutional prevalence of 15.8% PPH in Ghana (Owiredu et al., 2016).

Then again, maternal anaemia in pregnancy has been found to predict adverse postpartum haemorrhage (Frass, 2015; Sheldon et al., 2013). According to Frass (2015), haemoglobin level of <10g/dl increased women's risk of PPH up to almost 30 times. Owiredu et al. (2016) similarly found the Hb level of mothers to be significantly associated with their status of PPH during delivery. Maternal obesity is another nutritional factor found to be related to postpartum haemorrhage. According to Kumar (2016), a higher body mass index increases the risk of atonic uterine haemorrhage rapidly. BMI greater than 40kg/m2 increased the risk to 13.6% and 5.2% with instrumental and normal deliveries, respectively (Kumar, 2016). Also, with infants, foetal macrosomia ≥4000g is reported to significantly increase PPH risk (Ononge et al., 2016).

Also, maternal factors such as age (Sheldon et al., 2013), multiple pregnancies (Mpembe et al., 2014; Ononge et al., 2016), and parity (Calvert et al., 2012; Sheldon et al., 2013; Cetin & Laoreti, 2015; WHO, 2016) were related to some adverse birth outcomes including PPH. For instance, pregnant adolescent girls are still undergoing some growth at the time of conception, experiencing additional nutrient needs due to the developing foetus, thus predisposing them to undernutrition (Cetin & Laoreti, 2015). Then again, institutional factors such as the mode of delivery (Calvert et al., 2012), lack of health facilities and trained health care providers (Der et al., 2013; Ononge et al., 2016; Calvert et al., 2012; Mpemba, Kampo & Zhang, 2014).

According to Mpembe et al. (2014), the previously known traditional PPH risk factors do not significantly predict PPH. This is because some cases of PPH do not have identifiable risk factors (Mpembe et al., 2014), this necessitates the need to evaluate every pregnant woman for individual and other risk factors to offer prevention and early intervention as and when they do happen. For instance, the Northern part of Ghana is particularly known for higher maternal deaths, mainly due to

postpartum haemorrhage (Program for Appropriate Technology in Health [PATH], 2014). Because there has been delayed progress to specifically prevent PPH at both the health facilities and community level, where births still do occur, and nearly half of pregnant women deliver at home, reinforcing the need for community-based measures to prevent PPH (PATH, 2014). There is, therefore, the need for community-grown preventive measures that seek to optimize maternal and nutritional factors to reduce the risk of PPH, even in resource-constraint settings.

Maternal nutrition is one of the cardinal measures that can influence birth outcomes and, it is against this background that the study sought to assess the maternal and nutritional risk factors influencing PPH to help improve the health status of rural women. Moreover, given the numerous consequences of PPH on the quality of life, it is of great importance to identify factors contributing to PPH and hence understand the relation between maternal risk factors and PPH, which would provide the basis for developing maternal sensitivity and specific interventions that will improve birth outcomes and long-term quality of life and reduce disease occurrence, deaths, and hospital stay and health-care costs, even among the rural women in remote places like Lambussie. This study sought to provide local-level information on the prevalence of these PPH and its associated maternal factors in the Lambussie District.

Materials and Methods

Study Site and Design
The study was a facility-based cross-sectional survey covering 25 public health facilities in Lambussie, a district in Ghana. Lambussie is one of the 11 districts in the Upper West Region. The study covered the six sub-districts in the Lambussie district. These sub-districts comprised five health centres, one polyclinic, and nineteen CHPS zones. These sub-districts were evenly sampled to represent a mix of Dagaaba, Moshi, and Sissala Communities, peri-urban and rural populations, therefore ensuring that the distribution in social groups of the study population was assumed to be similar to the entire population of the District. The study population consisted of all lactating mothers aged 15 to 49 years. However, only women who deliver at the required health facility and by a midwife, community health officers, medical officer, or physician assistant were included in the study to measure the outcome variables.

A total of 190 lactating mothers receiving postnatal and child welfare services with babies less than 90 days old were sampled for the study. It was assumed that lactating mothers of a shorter delivery duration (maximum of three months) before the study were more likely to recount their recent experiences in the pregnancies to meet the purpose of the study. The study categorized the District into strata (sub-districts), and each stratum was assigned a proportion (quota) of the sample size regarding the projected population for that particular stratum. Therefore, a sampling interval was obtained for each specific stratum depending on the quota of the sample size assigned to that stratum.

A structured questionnaire was used in collecting quantitative data from respondents by a team of trained community health officers/midwives. Information on maternal postpartum haemorrhage (PPH) status was obtained from the maternal health record booklets given to the mothers. Mothers' PPH status was assessed as the primary dependent variable. Mothers who delivered at home or by unskilled attendants were excluded from the study because mothers or unskilled attendants could not estimate the quantity of blood loss accurately. Other secondary data were extracted from the maternal health record booklets, including ANC services, IFA supplementation, HB testing & counselling, maternal illnesses, pre-existing maternal condition, and the frequency of visits to the health facilities.

Primary data was obtained directly from the respondents on the socio-demographic, socioeconomic, and dietary history. Maternal diet history and socioeconomic data such as education level, marital status, household wealth index,

occupation of caregivers also served as the independent variables. In all, 183 copies of a questionnaire were fully completed by the respondents representing a 96.3% response rate.

Data Analysis

The data was analyzed using SPSS version 22.0. Descriptive statistics included means and standard deviations for continuous variables and frequency distributions and proportions for the categorical variables. Bivariate analyses were done using chi-square statistics to determine the associations between categorical variables with statistical significance set at $p < 0.05$. Multivariate logistic regression models were used to determine the maternal and nutritional predictors of PPH among the study population. All respondents in the study were issued informed consent forms to seek their voluntary participation. Additionally, approval was also given from the District Health Directorate, while ethical clearance was obtained from the Navrongo Health Research Center (NHRCIRB299).

Results

Socioeconomic Characteristics

A total of 183 correctly answered copies of a questionnaire were entered for analysis. The results showed that the District was primarily rural, as 86.9% of the respondents were rural residents and 13.1% were urban residents. The youngest mother in the study was 15years old, the oldest was 44years, and the mean age of the respondents was 27.6±5.526yrs. From the study results, the general prevalence of PPH (>500ml) was 7.1% (13) among the mothers. The majority (84.6%) of the PPH cases came from mothers in rural settings and mothers who underwent spontaneous virginal delivery (92.3%). The study results showed that the Dagaara ethnic group contributed most of the PPH cases (Table 1). Mothers of Christian background contributed 69.2% of the PPH cases, and all the mothers who experienced PPH in the study were formally married or cohabitating with male partners (Table 1).

Table 1: Socioeconomic Characteristics of the Respondents

Variables	Categories	N%	PPH%	P-value
Age	Minimum (15yrs)	Maximum (44yrs)	Mean (27.6±5.526yrs)	
Age Groups of Mothers	<20years	16 (8.7%)	1 (7.7%)	0.751
	20-30years	116 (63.4%)	7 (53.8%)	
	>30years	51 (27.9%)	5 (38.5%)	
Residential Status of mothers	Rural Residents	159 (86.9%)	11 (84.6%)	0.681
	Urban Residents	24 (13.1%)	2 (15.4%)	
Ethnicity	Sissala	51 (27.9%)	4 (30.8%)	0.931
	Dagaara	111 (60.7%)	8 (61.5%)	
	Others	21 (11.5%)	1 (7.7%)	
Religion	Christianity	111 (60.7%)	9 (69.2%)	0.906
	Islam	54 (29.5%)	3 (23.1%)	
	African Tradition	18 (9.8%)	1 (7.7%)	
Education	No formal education	82 (44.8%)	7 (53.8%)	0.827

	Primary education	54 (29.5%)	4 (30.8%)	
	Secondary education	35 (19.1%)	1 (7.7%)	
	Tertiary education	12 (6.6%)	1 (7.7%)	
Marital Status	Single	4 (2.2%)	-	
	Married/Cohabitation	178 (97.3%)	13 (100%)	
	Separated/Divorced/Widowed	1 (0.5%)	-	
Alcohol Intake	Yes	101 (55.2%)	8 (61.5%)	0.775
	No	82 (44.8%)	5 (38.5%)	
Means of Transport to delivery	Motorbike/Tricycle	114 (62.3%)	9 (69.2%)	0.944
	Footing	55 (30.1%)	3 (23.1%)	
	Lorry/Vehicle	8 (4.4%)	1 (7.7%)	
	Bicycle	6 (3.3%)	-	
Occupation	Farming	132 (72.1%)	11 (84.6%)	0.443
	Petty Trading	27 (14.8%)	1 (7.7%)	
	Formal Sector	8 (4.4%)	1 (7.7%)	
	Housewives	16 (8.7%)	-	
HH Annual Net Income	<100.00ghc	71 (38.8%)	4 (30.8%)	0.863
	101.00-500.00ghc	73 (39.9%)	5 (38.5%)	
	501.00-1000.00ghc	26 (14.2%)	3 (23.1%)	
	>1000.00ghc	13 (7.1%)	1 (7.7%)	

Source: Field survey, (2018)

Also, mothers who used motorbikes/tricycles to their specific facilities for delivery accounted for 69.2% of the PPH cases. Then again, 7.7% were from vehicle users, while 33.1% of the cases came from mothers who walked on foot to the delivery facilities. Also, mothers exposed to alcohol during their pregnancy contributed 61.5% of the cases of PPH, and those without alcohol exposure contributed 38.5%. Farming mothers also accounted for 84.6% of the PPH cases, petty traders 7.7%, and formal sector workers 7.7%. Lastly, mother who earned an estimated household annual net income of <100.00ghc accounted for 30.8% of the cases, 101.00-500.00ghc 38.5%, 501.00 - 1000.00ghc 23.1% and >1000.00ghc 7.7% (Table 1).

Maternal and Institutional Factors and PPH
On the categories of health facilities available to the respondents in the district, 45.4% of them delivered in a clinic/health centre, while 43.7% delivered in a polyclinic and 10.9% delivered in CHPS compounds. Concerning PPH and the type of health facility, 61.5% of the PPH cases were recorded in a polyclinic, 30.8% in health centres, and 7.7% in CHPS compounds. Also, primed mothers made up 25.1% of the sampled population and contributed to 30.8% of the PPH cases. The proportion of the mothers who went through spontaneous vaginal delivery (SVD) was 88%, and 12% delivered through Caesarean Session (Table 2).

Table 2: Maternal and Institutional Factors of Respondents

Variables	Categories	N%	PPH%	P-value
Place of Delivery	CHPS Compound	20 (10.9%)	1 (7.7%)	0.482
	Clinical/Health Centre	83 (45.4%)	4 (30.8%)	
	Polyclinic/Hospital	80 (43.7%)	8 (61.5%)	
Mode of Delivery	Caesarean Session	22 (12%)	1 (7.7%)	0.519
	Natural Virginal Delivery	161 (88.0%)	12 (92.3%)	
Gravidity	first pregnancy	46 (25.1%)	4 (30.8%)	0.599
	2-3rd pregnancy	74 (40.4%)	4 (30.8%)	
	4-6th pregnancy	58 (31.7%)	4 (30.8%)	
	7 & above pregnancy	5 (2.7%)	1 (7.7%)	
Parity	1st child	45 (24.6%)	4 (30.8%)	0.332
	2-3rd child	80 (43.7%)	5 (38.5%)	
	4-6th child	55 (30.1%)	3 (23.1%)	
	>7th child	3 (1.6%)	1 (7.7%)	

Nutritional Risk Factors and PPH

Nutritional counselling routinely offered at the health facilities was given to 92.9% (170) respondents. Mothers who received this nutritional counselling contributed to 84.6% of the PPH cases. Mothers who took extra meals in addition to their normal food intake due to their pregnancy also presented 69.2% cases of PPH, and 30.8% cases were from mothers who continued with only their everyday meals (Table 3). Dietary diversities also showed disparities in presenting the number of PPH cases. Respondents who ate from 2-3 food groups contributed 53.8% of the cases, and 46.2% cases came from those who ate ≥ 4 food groups. Respondents who fully complied with iron-folic acid (IFA) supplementation presented with 69.2% cases of PPH; 30.8% came from mothers who partially or did not comply at all. Mothers who tabooed some food items presented with 30.8% of the cases. Upon registering their pregnancies with the health facilities, 80.3% of the mothers were of normal body mass index, while 8.7%, 8.2%, and 2.7% were overweight, underweight and obese respectively, (Table 3). Also, during antenatal care registration, 52.5% of the mothers had lower Hb levels of <11g/dl. Subsequently, mothers with lower Hb at ANC registration and 36weeks of pregnancy accounted for 38.5% and 30.8% of the cases, respectively. Lastly, almost all the mothers did not obtain adequate gestational weight gain (GWG) during their pregnancy. These mothers presented with 92.3% of the cases, while the 2.7% who obtained excessive GWG also presented with 7.7% cases of the PPH (table 3).

Table 3: Nutritional factors and PPH Occurrence

Variables	Categories	N%	PPH%	P-value
Nutrition Counseling	No	13 (7.1%)	2 (15.4%)	0.233
	Yes	170 (92.9%)	11 (84.6%)	
Extra Meal in Pregnancy	NO	44 (24%)	4 (30.8%)	0.737
	Yes	139 (76%)	9 (69.2%)	
Dietary Diversity	2-3 food groups	101 (55.2%)	7 (53.8%)	

	4 & above food groups	82 (44.8%)	6 (46.2%)	
IFA Intake in pregnancy	fully complied	152 (83.5%)	9 (69.2%)	0.111
	Partially complied	27 (14.8%)	3 (23.1%)	
	didn't comply	3 (1.6%)	1 (7.7%)	
Food taboos in pregnancy	No	139 (76%)	9 (69.2%)	0.737
	Yes	44 (24%)	4 (30.8%)	
BMI categories at ANC registration	Underweight	15 (8.2%)	1 (7.7%)	0.201
	Normal weight	147 (80.3%)	9 (69.2%)	
	Over-weight	16 (8.7%)	3 (23.1%)	
	Obese	5 (2.7%)	-	
BMI at 36wks/delivery	Normal weight	121 (66.1%)	8 (61.5%)	0.698
	Over-weight	54 (29.5%)	5 (38.5%)	
	Obese	8 (4.4%)	-	
Categories of the net change in GWG	Low G.W. G	169 (92.3%)	12 (92.3%)	0.305
	Adequate G.W.G.	9 (4.9%)	-	
	Excessive G.W. G	5 (2.7%)	1 (7.7%)	
Hb categories at ANC registration	Anaemia	96 (52.5%)	5 (38.5%)	0.390
	Normal Hb	87 (47.5%)	8 (61.5%)	
Hb categories at 36wks/delivery	Anaemia	69 (37.7%)	4 (30.8%)	0.769
	Normal Hb	114 (62.3%)	9 (69.2%)	
BW of infants	LBW	15 (8.2%)	2 (15.4%)	0.605
	NBW	168 (91.8%)	11 (84.6%)	
Apgar score categories of infants	Severe/moderate Asphyxia	17 (9.3%)	2 (15.4%)	0.614
	Normal Apgar score	166 (90.7%)	11 (84.6%)	

Source: Field Survey, 2018

In a stepwise multiple regression modelling, individual factors such as the height of mothers ($p<0.001$) and mothers' age grouping ($P<0.001$) were significantly associated with maternal PPH at delivery. The height of mothers at delivery was a positive predictor of PPH during delivery, whereas the age grouping of the mothers had a negative effect on the PPH status of the mothers at the period of delivery.

Table 4: Maternal and Nutrition Factors Influencing PPH at Delivery

Models	Standardized Coefficients	Sig.	95.0% Confidence Interval	
			Lower Bound	Upper Bound
Height of Mothers	5.873	0.001	0.016	0.034
Mothers' Age Categories	-4.873	0.001	-0.4	-0.164
IFA Intake	-2.459	0.020	-0.271	-0.025

Mothers' Hb at 36weeks/delivery	-3.572	0.001	-0.123	-0.033
BMI Categories at ANC Registration	2.804	0.009	0.054	0.346
BMI Categories at 36weeks/delivery	-2.831	0.008	-0.292	-0.047
Gravidity	3.536	0.001	0.055	0.205
Apgar score of Infant at Birth	4.873	0.001	0.362	0.885

Source: Field Survey, 2018

Gravidity of the mothers also showed a significant influence (p<0.001) on the status of PPH in the study (Table 4). IFA supplementation also showed a significant association (p<0.02) with the mothers' PPH status at the time of delivery. In the current study, maternal supplementation showed a negative influence on the status of PPH at delivery. This indicated that a unit increase in the intake of IFA resulted in a 2.5 times likelihood decrease in their risk of PPH. Then again, anaemic mothers at 36weeks of pregnancy also showed a significant association with the status PPH at delivery. Body Mass Indices (BMI) of mothers at ANC registration (p<0.009) and at 36weeks of pregnancy (p<0.008) were also significant predictors of PPH among the study population. However, BMI is not an accurate indicator of nutrition status due to increased maternal tissues resulting from the pregnancy (table 4). Then again, a unit change in maternal Hb at 36 weeks of pregnancy had an equivalent reduction in risk of PPH by 3.6units. Lastly, the Apgar score (p<0.001) of the infants born to the mothers showed a significant association with the status of PPH of the mothers in the study (Table 4). However, additional meals in pregnancy, BW of infants, the net change in GWG, food taboos in pregnancy, dietary diversity, and nutrition counselling did not indicate any significant association with the status among mothers in the study.

Discussion

Maternal PPH (>500ml bleeding) at delivery among the study population in the Lambussie District was 7.1%. The low prevalence rate in the current study could be due to the small sample size and possibly because community-level or household deliveries were not catered for in this study. Similar prevalence rates were found in Uganda (9%), Pakistan (7.4%) (Ononge et al., 2016), and New Zealand (8.9%) (Fyfe et al., 2012). Comparative to the prevalence rate contained in this study, a higher overall prevalence rate (34%) was observed in Sub-Saharan Africa (Motsi, 2006), and some selected studies in African countries like 23.6% in Cameroon (Halle-Ekane, Emade, Bechem, Palle, Fongaing, Essome, & Fomulu,(2016). and even the 15.8% in Ghana as indicated by Owiredu et al. (2016).

The current study finding was comparatively lower than the range of 17.8%-26.3% PPH prevalence rates across America, Asia, Australia, and Europe (Fan et al., 2017). Also, in another study in Pakistan, the 21.3% prevalence rate was still three times higher than the result of this current study (Gani & Ali, 2013). Gani & Ali (2013) attribute the difference in their prevalence rate to the lack of access to health facilities. However, the women in the current study had access to primary health care services such as pregnancy and delivery services through community-based health planning and services, this could have improved delivery services for these women in the study, reducing PPH.

The essential nutrition indicators in the study that were found to have influenced the likelihood of mothers experiencing PPH included iron-Folic Acid (IFA) supplementation. Mothers who

received IFA supplementation in the study had a reduced risk of PPH. Having a reduced risk of PPH may be related to the reduction in anaemia status among the mothers, from 52.5% of anaemia at ANC registration to 37.7% at 36weeks in pregnancy. Anaemia has been found to be a risk factor to PPH (World Health Organization, 2011). A related study has shown that even though intermittent supplementation was shown to have improved iron status more than no supplementation, a systematic review of the research proved that women receiving daily iron supplements tended to have lower haemoglobin and ferritin concentrations. They were equally likely to be anaemic as those receiving intermittent iron supplements (World Health Organization, 2011).

The results in the current study could have been consolidated by the fact that the mothers with normal Hb levels were also at a lower risk of PPH in the current study. An Indian study also revealed that nutrition and health education and IFA supplementation were a positive means of improving mothers' health and nutrition status, together with eradicating anaemia. The study showed that mothers who received IFA supplementation and nutrition education reduced anaemia prevalence from 53.8% to 39% (Monica, 2015), similar to the current study's finding. Again, health education and IFA supplementation have proven to improve significantly (Sen & Kanani, 2012; Bissu, Singh & Chishty, 2015). Contrary to this finding, an RCT of preconception supplementation IFA in Vietnam demonstrated no impact on the prevalence of anaemia or mean haemoglobin concentrations during pregnancy or postpartum (Nguyen, Young, Gonzalez-Casanova, Pham, Nguyen, Truong, Nguyen, Harding, Reinhart, Martorell, & Ramakrishnan, 2016). However, further studies are required to evaluate the significant impact of IFA supplementation on maternal PPH status.

Generally, malnourished mothers in the study were those with BMI scores outside the range of 18.49-24.49kg/m^2. Malnourished mothers at ANC registration with BMI scores outside this specified range were equally predisposed to PPH as the well-nourished mothers in the current study. Contrarily, BMI greater than 30kg/m^2 of women before the third month of pregnancy was strongly associated with PPH among Indian women (Deshmukh, Jadhav & Yelikar, 2016). However, at 36weeks of pregnancy, well-nourished mothers had a reduced risk of PPH. The latter could probably be attributed to the general nutrition counselling services and the mothers' other services when they contacted the ANC clinic from pregnancy to delivery. Comparatively, in New Zealand, Fyfe et al. (2012) specifically found that overweight and obesity were both risk factors for PPH. Obesity mainly had a twofold increase in risk for PPH than nulliparous. Maternal demographic characteristics such as age groupings (smaller age groupings) and height were significant risk factors to PPH. Lower maternal age and height pre-signify poor maternal growth and development before conception. The findings suggest that some of the mothers in the study were not biologically mature and nutritionally balanced to cater to fetal and maternal health needs during pregnancy. This challenge was probably the reflection when mothers with multiple pregnancies had a reduced risk of PPH than primed mothers. Perhaps, this could be attributed primarily to the age of mothers, which is young in the study population. Then again, mothers of infants with lower Apgar scores of less than ten were also predisposed to PPH. Apgar score is also used to predict maternal and child health conditions and access to health services (World Health Organization, 2011).

Conclusion

Although the prevalence of postpartum haemorrhage is relatively minor, the effects of poor nutrition on excessive maternal bleeding cannot be underestimated. Improving maternal nutrition such as IFA supplementation, Hb level, and BMI together with adequate maternal height before delivery will by far reduce the chances of bleeding during delivery and possibly improve all birth outcomes as a whole. Policymakers need to develop nutrition-specific interventions for mothers before and during pregnancy.

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