Malaria and anaemia prevalence and associated factors among pregnant women initiating antenatal care in Ghana

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Background

❖ Malaria infection during pregnancy contributes to maternal anaemia, low birth weight and other adverse pregnancy outcomes[1,2].

❖ IPTp-SP, ITN use and effective case management of malaria are recommended ANC interventions being implemented to control malaria in pregnancy in Ghana.

❖ Despite improving implementation of ANC interventions and declining malaria infection in pregnancy[3] there has been no reduction in low birth weight and maternal anaemia prevalence over the past decade (Figure 1 & 2).
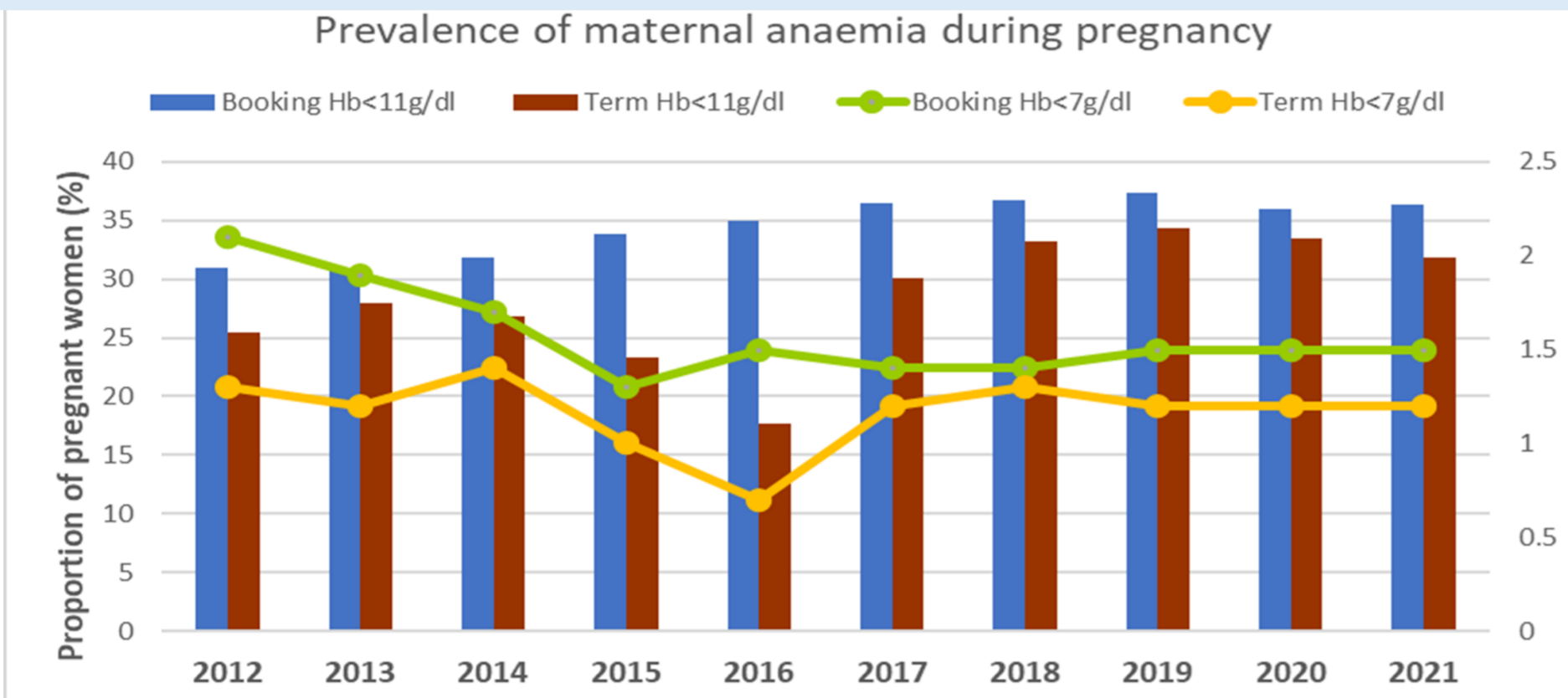

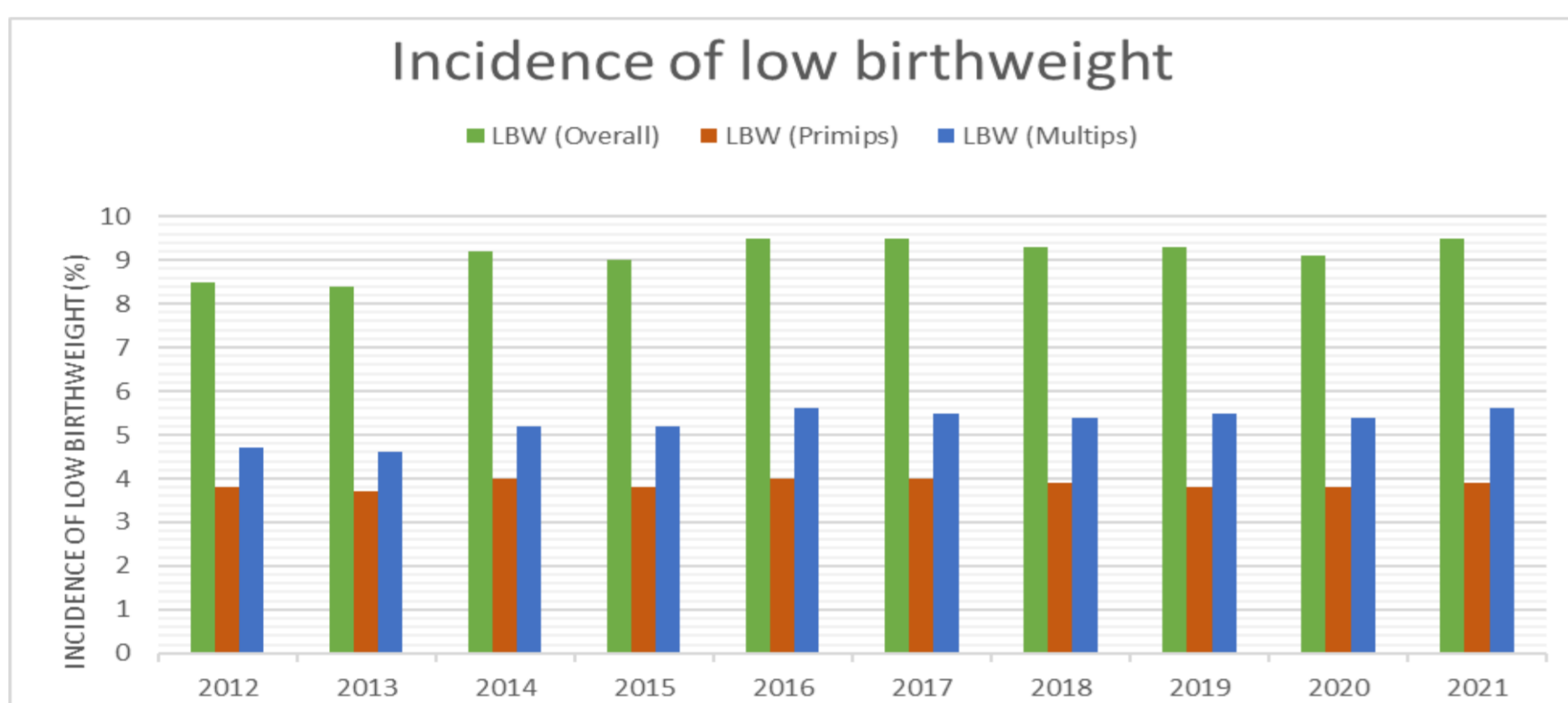Figure 1: Trend of maternal anaemia in pregnancy prevalence in Ghana (DHIMS 2)

Figure 2: Trend of low birthweight incidence in Ghana (DHIMS 2)

❖ Factors currently contributing to maternal anaemia prevalence and low birth weight incidence were investigated in 2 regions of Ghana.

❖ The baseline malaria and anaemia prevalence and associated factors among the women recruited is reported here.

Methods

❖ Study design: Non-interventional health facility-based prospective cohort study.

❖ Study site: Antenatal clinics in selected districts of Ashanti and Volta regions of Ghana (Figure 3).

❖ Study participants: Pregnant women of any age, parity and gestational age visiting the ANC clinic for the first time.

❖ Study procedures: At enrolment, data on socio-economic, demographic, obstetric history, presenting complaints, ITN ownership and use and results of laboratory tests: full blood count, malaria parasites, HIV, sickling, syphilis, G6PD, Hepatitis B, schistosomiasis and helminths were collected electronically from consenting women.

❖ Data analysis: Descriptive and inferential statistics were conducted using STATA version 16 to determine risk factors of malaria parasitaemia and anaemia at first antenatal care visit.

Results and discussion

❖ 5196 women were recruited between 2018 to 2020; mean (SD) age and gestational age were 27.3 (6.5) years and 15.5 (8.37) weeks respectively and 54.9% were multigravidae.

❖ Bed net use was lower than ownership; 59.8% versus 80.8%.

❖ Overall malaria prevalence was 5.7%, comparable to current reports in the country[3] and globally[4] but higher in Ashanti compared to Volta region (10.24% [95% CI: 8.92 – 11.68] versus 2.63% [CI: 2.07 – 3.29]).

❖ Parasite density was lower in Ashanti (982/μl) than Volta region (18226/μl) possibly due to reduced induced antimalarial antibodies in the lower prevalence area.

❖ Overall, 55.2% had anaemia; higher in Volta (65.6% [95% CI: 63.78 – 67.31]) than Ashanti (42.6% [95% CI: 40.53 – 44.60]).

❖ Lower socio-economic status and younger age of women in Volta and possibly submicroscopic parasitaemia, reported to be higher in lower transmission areas[5], may have contributed to higher maternal anaemia prevalence in Volta region.

❖ Study region, gestational age at booking, wealth status, maternal age and malaria infection were associated with maternal anaemia (Table 1).

❖ Study region, gestational age at booking, wealth status, gravidity and
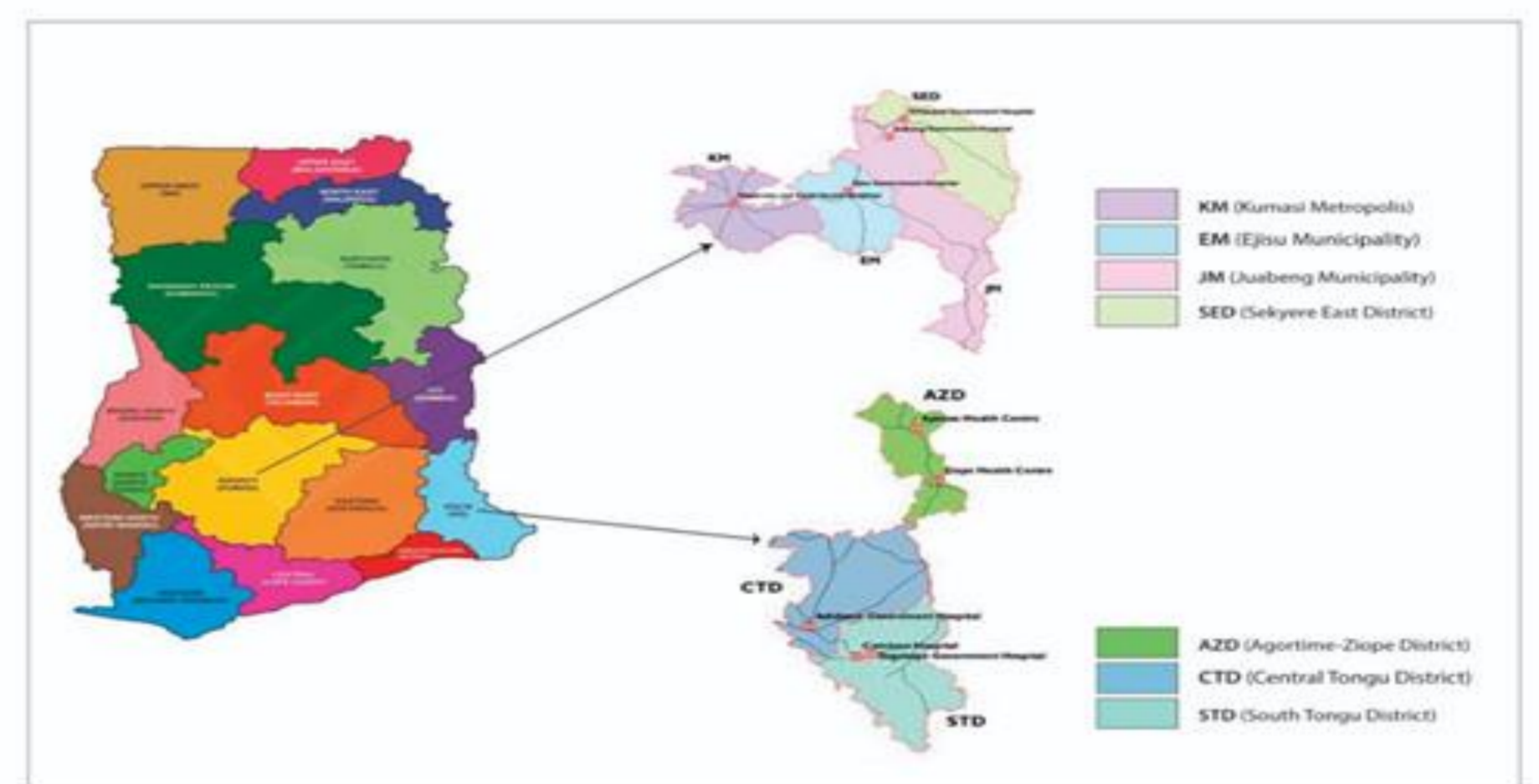

Figure 3: : Map of Ghana showing the study sites in the Ashanti and Volta Regions

Table 4: Factors associated with maternal anaemia at booking ANC visit

	Maternal Anaemia (%)			
	No	Yes	Adjusted OR (95% CI)	p-value
Region				
Ashanti	1332 (57.69)	987 (34.67)	Reference	
Volta	977 (42.31)	1860 (65.33)	2.91 (2.41 - 3.53)	<0.001
Malaria				
No	1980 (95.7)	2426 (93.06)	Reference	
Yes	89 (4.3)	181 (6.94)	1.85 (1.31 - 2.61)	<0.001
Age (years)				
Under 25	635 (27.74)	1186 (41.92)	Reference	
25 - 34	1281 (55.96)	1215 (42.95)	0.61 (0.5 - 0.76)	<0.001
35 and above	373 (16.3)	428 (15.13)	0.69 (0.52 - 0.91)	0.009
Trimester at booking				
First	1239 (56.14)	1040 (38.72)	Reference	
Second	785 (35.57)	1318 (49.07)	1.98 (1.68 - 2.33)	<0.001
Third	183 (8.29)	328 (12.21)	2.55 (1.94 - 3.36)	<0.001
Wealth index				
Lower	305 (13.35)	718 (25.43)	Reference	
Lower middle	358 (15.67)	662 (23.45)	0.87 (0.69 - 1.09)	0.212
Middle	446 (19.53)	576 (20.4)	0.75 (0.59 - 0.95)	0.019
Upper middle	543 (23.77)	476 (16.86)	0.68 (0.52 - 0.89)	0.005
Upper	632 (27.67)	391 (13.85)	0.47 (0.34 - 0.67)	<0.001

Conclusions

❖ Although malaria prevalence in the women was low, it is still an important risk factor of maternal anaemia. Efforts towards malaria elimination need to be intensified to aid in improving maternal haemoglobin levels.

❖ Maternal anaemia is of serious public health magnitude among study participants. Geographical location and wealth index appear to be important risk factors. Interventions to reduce malaria and anaemia among pregnant women should focus on geographical and local socio-economic factors.

❖ Sub-microscopic malaria infection and gametocyte carriage in pregnancy's contribution to malaria transmission need investigation to inform malaria elimination strategies.

References

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