SHOULD WE MEASURE MALARIA ENDEMICITY WITH SPLEEN RATE ESTIMATION OR PfPR 2-10

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BACKGROUND

As the world moves towards sequential malaria elimination, there is a need to adequately measure the intensity of malaria transmission in an efficient manner that allows for systematic deployment of tools for effective malaria control. This study aimed to compare spleen rate determination and Plasmodium falciparum parasitaemia prevalence among children two to ten years of age (PfPR 2-10) in a period of low and high transmission.

METHODS

The study was conducted in Wamakko Local Government Area (LGA) of Sokoto State, located in the North Western Nigeria; it has an area of 732.146km² and was inhabited by a population of about 234,860 by 2015. It is located at coordinates [13°2'16"N 5°5'37"E](#).⁸³ The geography of the area is predominantly flat plains with Sudan Savannah type vegetation and stands at an altitude of 292 m above sea level, near to the confluence of the Sokoto and Rima rivers. Its climate is tropical, described as local steppe climate with the highest average temperatures in April, at around 33.2 °C. The lowest average temperatures in the year occur in January, when it is around 24.5 °C with an annual average of 28.4°C.⁸⁴ The average rainfall per annum is about 1000-2000mm with prominent rainy and dry seasons running from June to October and November to May respectively. Subjects were screened by the investigator. Physical examination was carried out, assessing the axillary temperature, mucous membranes for pallor and abdominal examination for splenomegaly, as well as other features of severe malaria. Splenomegaly was determined using Hackett's criteria.

RESULTS

A total of 1136 subjects were screened for inclusion in the study after consenting. 109 were excluded due to having been treated with antimalarials in the 2 weeks prior to enrolment and 10 were excluded due to incomplete data. 1017 subjects were included in the analysis. The overall prevalence of malaria for the study was 34.8% using microscopy and 33.8% using RDT as shown in table II below. There was an agreement between the two diagnostic methods as shown by the kappa statistic. (p <0.001)
TABLE I: PREVALENCE OF MALARIA USING THICK FILM AND RDT

TEST RESULT		THICK FILM		
	RDT	POSITIVE	NEGATIVE	TOTAL (%)
POSITIVE		295	49	344 (33.8)
NEGATIVE		59	614	673 (66.2)
TOTAL (%)		354 (34.8)	663 (65.2)	1017 (100.0)

There was concordance between parasite and spleen rates, in terms of rates and endemicity. There was a statistically significant positive correlation between malaria parasite positivity and palpable splenomegaly among the subjects choosing a significance (alpha) level of 0.05, as shown in table II below

TABLE II: CORRELATION BETWEEN PARASITE AND SPLEEN RATES				Parasitaemia	Splenomegaly
Spleen	Pearson Correlation	1			.602**
	Sig. (2-tailed)				.000
	N	1017			1017
Thick film	Pearson Correlation		.602**	1	
	Sig. (2-tailed)		.000		
	N		1017		1017

the overall spleen rate to be 36.6%, however it was 42.1% and 31.0% in the rainy and dry seasons respectively. The difference was statistically significant (p<0.01), as shown in table III.

DISCUSSION

The proportion of subjects who had palpable spleens in this study (spleen rate of 36.6%) was slightly higher than the parasite rates of 34.8%. It was also statistically significantly higher (p <0.001) during the rainy season than in the dry season, in parallel with parasite rates. However, while in the dry season, the spleen rate was higher than the parasite rate, the reverse was the case in the rainy season. This is probably because both old and new cases of malaria showed splenomegaly in some cases without peripheral parasitaemia during the dry season, but with a higher incidence during the rainy season,

some of the new cases probably had malaria parasitaemia without palpable splenomegaly and these may have outstripped the old cases who had splenomegaly without parasitaemia.

SEASON	TABLE III: PREVALENCE OF SPLEENOMEGALY		
	SPLEENOMEGALY		
	n	PRESENT Freq (%)	ABSENT Freq (%)
RAINY SEASON	511	215 (42.1)	296 (57.9)
DRY SEASON	506	157 (31.0)	349 (69.0)
TOTAL	1017	372 (36.6)	645 (63.4)

CONCLUSION

Malaria prevalence and endemicity estimation should be done using both parasite and spleen rates because there is a good correlation between them but the seasonal variation suggests each has a role in defining changing endemicity.