EPIDEMIOLOGY OF PARASITICS CO-INFECTION DURING PREGNANCY: ASCARIS AS RISK FACTOR FOR MALARIA INFECTION DURING PREGNANCY

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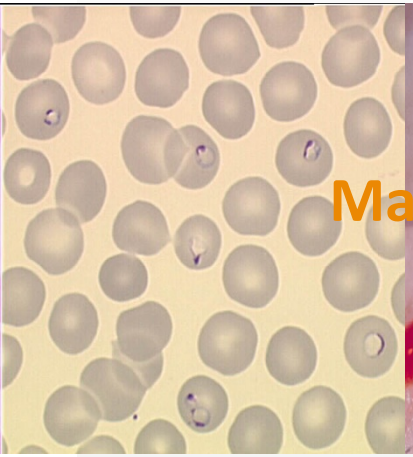
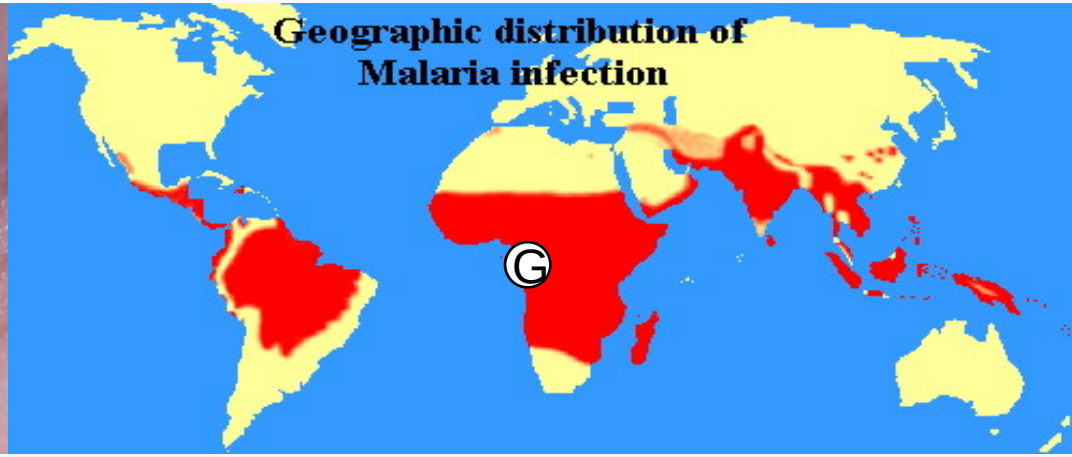
Malaria and Helminth co-infection



Malaria



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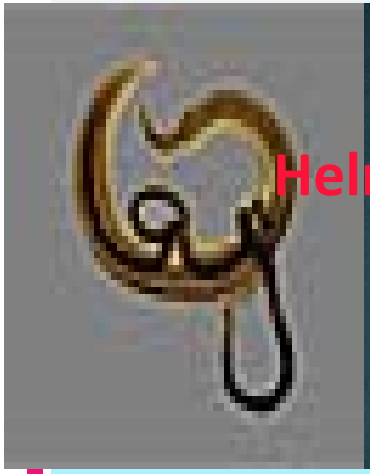
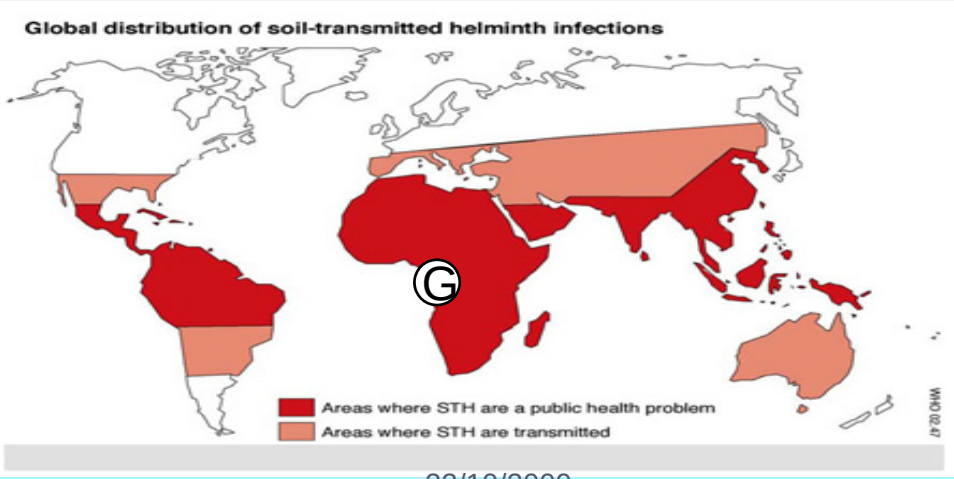
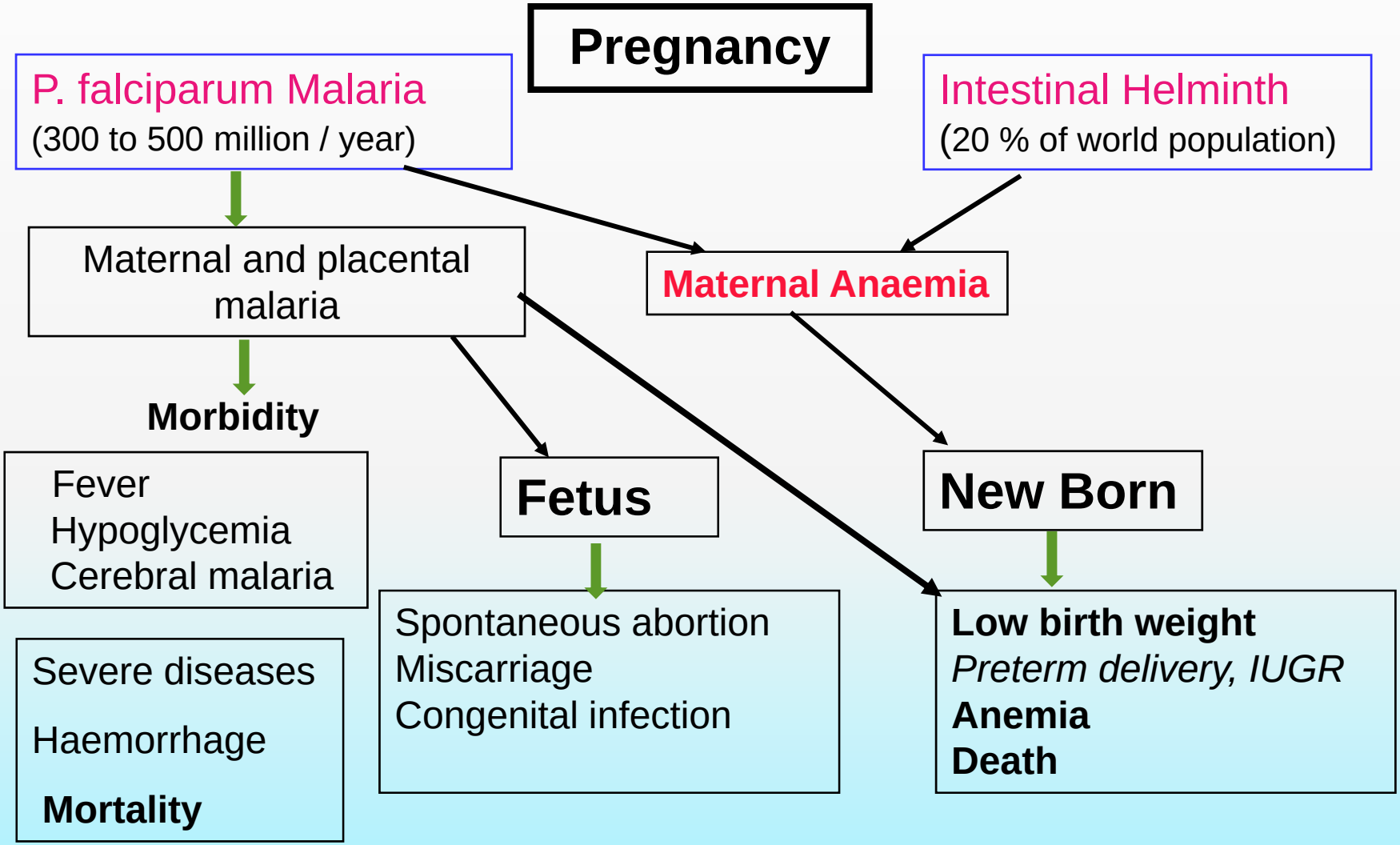


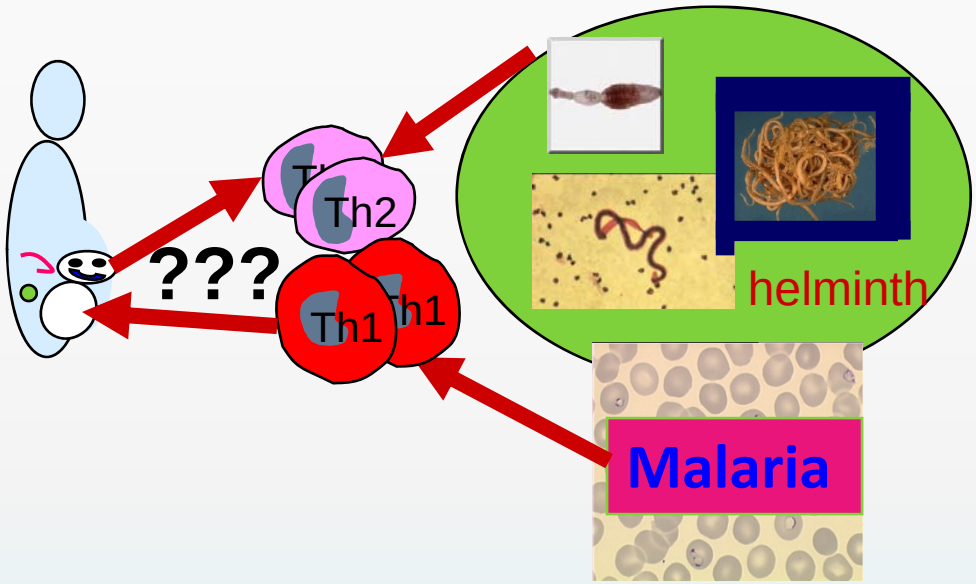
Helminth



Epidemiology of malaria and helminth associated pregnancy



What is the situation of parasitics co-infection in pregnant women?



What is the implication of the parasitic co infection during pregnancy?

Methodology 1

Study was conducted at the Medical Research unit of the Albert Schweitzer Hospital from May 2003 to July 2004

Pregnant women were recruited at the two ANC which serve the city of Lambaréné and surrounding

Study population: Pregnant women were enrolled at their 2nd trimester of pregnancy and monthly followed-up for malaria and helminths (filariasis, shistosomiasis, *A. lumbricoides T. trichiura and hookworm) infections*

Inclusion criteria: -

-Attended ANC and resided in Lambaréné area at least for six months

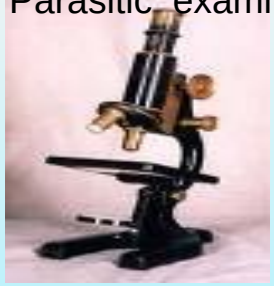
-**Exclusion criteria**: Complicated pregnancy

Methodology 2

The ethic committee of the international foundation of the Albert S. Hospital approved the project

Written informed consent was obtained from all pregnant women

Parasitic examination



Intestinal Helminthiasis	Stool	Smear	*Kato Katz (A.l; T.t; hw)*
Malaria, filariasis	Blood	Smear	Thick smear (plasmodia)
Shistosomiasis	Urine	filtration	S. hematobium eggs

Study population characteristics

N=388	n (%)
Mean (SD) age, year 24.4(6.6)	
<19	83(21)
19-21	76(20)
22-25	84(22)
26-31	74(19)
>31	71(18)
Parity	
Primiparous	111(29)
Secondiparous	87(22)
Multiparous	190(49)
Household crowding	
1-4	111(29)
5-10	202(52)
>10	75(19)

Study parasitic infection characteristics

N=388	n (%)
26-31	74(19)
Helminths infection *	221 (65)
Intestinal helminth	170(49)
A. lumbricoides	112(33)
T. trichiura	83 (24)
N. americanus	34(10)
S. heamatobium	41(12)
Filariasis	21 (5)
P. falciparum infection	98 (25)
coinfection with any helminths	63(63)
Any parasitic co-infection	74(22)
Bi-infection	57 (16.5)
More than three helminths	18(5)

* n= 340

Factors associated parasitics infection

Infection	P. falciparum % (n)	Helminth %(n)			Co-parasitic infection
		Intestinal helminth %(n)	filariasis % (n)	S. hematobium infection % (n)	Co-infection % (n)
Parity					
primipare	37(41)	55 (53)	6 (7)	22 (21)	35 (34)
secundi	**22(19)**	37(28)	7(6)	**12(9)**	**15(11)**
multipare	**21(40)**	51(51)	4(8)	**6.5(11)**	**17(29)**
p-value*	**0.006**	0.06	0.58	**0.001**	**0.006**
Age group					
<18 years	36(30)	58 (42)	4 (3)	21 (15)	35 (25)
18-21years	24 (17)	52 (34)	6 (5)	**14(9)**	**23 (15)**
21-25 years	26 (22)	46(34)	8(7)	**12(9)**	**24(18)**
25-31 years	26 (19)	44(30)	4(3)	**6(4)**	**16(11)**
>31 years	17 (12)	43(26)	4(3)	**7(4)**	**8(5)**
p-value*	0.09	0.32	0.6	**0.04**	**0.03**
Household crowding					
1-4	23(24)	39(35)	8(8)	11(10)	18(16)
5-6	23(20)	44(37)	2(2)	13(11)	17(14)
6-9	22(19)	60(42)	6(5)	14(10)	24(17)
>9	31(22)	52(32)	6(4)	6.5(4)	24(15)
p-value*	0.52	**0.05**	0.4	0.51	0.27
Total % (n)	**26 (100)**	**49(166)**	**5(21)**	**49 (41)**	**22 (74)**

***Pearson Chi2**

Ascaris as risk factor for *P. falciparum* in pregnancy

Pregnancy associated	n	P. falciparum % (n)	OR	CI	P	AOR	CI	p
A. lumbricoides								
positive	112	38(42)	**2.6**	**1.5-3.8**	**0.0001**	**2.3**	**1.4-3.8**	**0.002**
negative	276	21(56)	Ref.					
T.trichiura								
positive	83	28	1.7	1.0-2.9	0.046	1.3	0.7-2.3	0.3
negative	305	70	Ref.			Ref.		
Hookworm								
positive	34	10	1.3	0.6-2.7	0.56	0.86	0.37-2	0.7
negative	354	88	Ref.			Ref.		
S. haematobium								
positive	41	36.6 (15)	1.8	0.9-3.6	0.081	1.2	0.6-2.6	0.5
negative	347	24.5 (85)	Ref.			Ref.		
Parity								
Primipares	111	37(41)	**2.2**	**1.3-3.7**	**0.003**	**1.9**	**1.1-3.5**	**0.016**
secundipares	87	22(19)	1.05	0.5-1.9	0.8	1.1	0.6-2.5	0.7
multipares	277	21 (40)	Ref.			Ref.		
Age group								
<19	83	36(30)	2.8	1.3-6	0.009	1.3	0.4-4.3	0.6
19-21	76	22(17)	1.4	0.6-3.2	0.4	1.1	0.4-3.2	0.8
22-25	84	26(22)	1.7	0.8-3.8	0.7	1.3	0.5-3.3	0.5
26-31	74	26(19)	1.7	0.75-3.8	0.2	1.4	0.6-3.3	0.5
>31	71	17(12)	Ref.			Ref.		

Discussion 1

Our results are consistent with the previous report of association of *P. falciparum* infection during pregnancy with *A. lumbricoides* (*yatich et al 2009)* and primiparity (Bouyou et al)

While the co-infection are significantly associated with young aged women and primipares, intestinal helminth as expected is significantly associated with a household crowding.

In agreement with research findings, we found pregnancy as a risk factor for parasitic infections

Discussion 2

Significantly higher prevalence of helminth co infection with malaria parasite in pregnant women, may open the door for a research interest on the co infection study in pregnancy

Our results are limited with a our study sample size and the absence of SES and environemental risk factors assessment

Several other studies with varying methodology do not observe a same association

These discrepancies may simply be explained by the

-epidemiological differences of the study regions.

-methodological differences

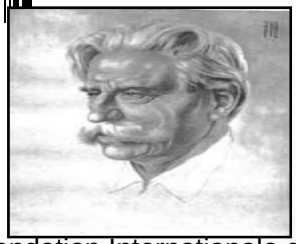
Conclusion

- This study point out the issue of the parasitic co-infection in pregnant women in tropic.
- Therefore the results of this study may have an operational importance in design of parasitic infection study, and encourage the co-infection studies in multi-parasitic endemic area .

Perspectives

- The immunological mechanism behind the high proportion of intestinal helminth during pregnancy
- Immunological and clinical outcomes of malaria co-infection with helminth parasite during pregnancy
- Further investigation is necessary to evaluate the impact of such co-infection at birth on the vaccination response and in development of disease in the early life of infants born to the infected mother during pregnancy

Acknowledgments



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