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Correlations Between Biochemical Parameters and Intestinal Parasites in Pregnant Women of South Eastern, Nigeria

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ABSTRACT

A total of 118 pregnant women were recruited into the study. The study was designed to reduce the rate of maternal mortality and also the prevalence of vertical transmission in neonates. Blood and stool analysis were collected and analyzed for the following MP, Bilirubin and routine stool analysis using standard biochemical and parasitology techniques for the laboratory investigations.It was observed that there was a high prevalence of malaria parasite infection, high level of bilirubin was also recorded in pregnancy. *Ancylostomaduodenale*, *Ascarislumbricoides* and *Necatoramericanus* had the percentage of 67.8%, 53.4% and 39.8% prevalence rate in pregnancy. The statistical significance of the research was recorded as Pd"0.01 or Pd"0.05 in the correlations analysis of the parameters studied.Therefore, it will be of immense importance to conduct routine screening laboratory tests on pregnant women, to serve as a prerequisite before enrolling them into prenatal care to avoid consequences emanating from infections and Kernicterus in children.

Key words : Intestinal parasites, Biochemical, Pregnant women.

INTRODUCTION

No issue is more central to global well-being than maternal and prenatal health. Every individual, every family and every community at some point is intimately involved with pregnancy and the success of childbirth. Yet every day 1,600 women and 5,000 newborns die due to complications that could have been prevented, (WHO, 2000).

Tropical diseases such as malaria, schistosomiasis, intestinal helminths and filariasis have a dramatic impact on reproductive health. Many cases of unexplained pregnancy loss are due to undiagnosed tropical diseases. Malnutrition or anaemia caused by intestinal worms may be worsened by pregnancy and make the pregnancy difficult, (Ofieno-Nyunya, 1999).

Anaemia is the commonest nutritional deficiency problems afflicting pregnant women, defined by the World Health Organization as Haemoglobin level (Hb) of <11g/dl. It is a major contributor to maternal deaths in 20-40% in developing countries because of poor nutrition and high prevalence of parasitic infestations, specifically hookworm and malaria infections contribute most to anaemia (Viteri, 1994).

Intestinal parasitic infections, especially due to helminthes, increase anaemia in pregnant women (Otieno, 1999, Egwunyenga*et al.,* 2001, Nurdia*et al.,* 2001, Kalenga*et al.,* 2003, Steketee, 2003). Hookworm infections induce deficiencies of iron, total energy, protein and possible folate and zinc (Stephenson *et al.,* 2002). Infact, hookworm infection recognized as the leading cause of pathologic blood loss in tropical and subtropical countries (Pawlowski*et al.,* 1991, Muhangi*et al.,* 2007), since it reduces resistance to blood loss, death may occur from bleeding associated with normal delivery.

Among parasitic infections, malaria and helminthiasis (intestinal nematodes) coexist widely with micronutrient deficiencies and contribute greatly to anaemia. This cycle of retarded growth and development, is undoubtedly much better to enter a pregnancy free of infection and nutritionally replete

than the various alternatives, (Stekette, 2003, WHO, 2003).

Malaria in pregnancy has resulted to maternal death and women with intestinal nematode infection(s) were more likely to have babies with a lower birth weight (LBW) and its associated risks of infections such as severe anaemia, prenatal mortality rates, stillbirths, etc (Allen,2001, Allen *et al.,* 2002, Savioli*et al.,* 2003).

Bilirubin is formed as a result of haemoglobin degradation from repeated malaria infection vis-à-vis bilirubin levels, and also in anaemia that is as a result of a haemolytic process, (Chessbrough 2005, Crook, 2006).

The normal level of bilirubin in the serum of adults is 0.4-17mmol/L. Bilirubin levels increase with liver disorders. Patients may jaundice when serum Bilirubin levels exceed 25mmol/L (Muhangi*et al.,* 2007). Persons with Alpha-thalassemia intermedia usually have an increased Bilirubin level, because of ongoing haemolysis. The Bilirubin production is typically the unconjugated fraction of Bilirubin (Muhangi*et al.,* 2007).

Helminthiases are ancient diseases that continue to cause misery and disability in poor populations. About 2 billion harbor these infections globally, of whom 300 million suffer associated morbidity. Of the total number infected, an estimated 400 million are school-age children, (WHO, 2002). Kalenga*et al.,* (2003) reported that intestinal parasitic infections due to the helminths, increase anaemia in pregnant women. Hookworm infections induce deficiencied of iron, total energy, protein and possible folate and zinc, (Stephenson *et al.,* 2002).

METHODOLOGY

Study centre

The laboratory analysis were carried out at the department of Haematology, NnamdiAzikiwe University Teaching Hospital, Nnewi, Anambra state, Nigeria.

Study population

A total of 118 pregnant women were recruited for the study amongst pregnant women attending their regular antenatal care. The subjects were drawn from 3 health institutions picked in the senatorial districts of Anambra state. Their oral consents were obtained before embarking on the study.

Sample collection

About 5mls of blood were drawn from the pregnant women into EDTA tubes and plain tubes. The blood were used for FBC quantification and malaria parasites and the blood in the plain tubes were used for the determination of Bilirubin levels.

Table 1: Percentage of Age Range of Pregnant Women Infected and Noninfected With Intestinal Parasites

Intestinal parasites	Present	Absent	% Present	% Absent
Ancylostomaduodenale	80	38	67.8	32.2
NecatorAmericanus	47	71	39.8	60.2
Acarislumbricoides	63	55	53.4	46.6

Table 2: Percentage Of Intestinal Parasites In Pregnant Women

Age (Years)	Infected	Noninfected	% Infected	% Noninfected
16 - 20	21	9	17.8	7.6
21 - 25	27	12	22.9	10.2
26 - 30	20	13	16.9	11.0
31 - 35	7	3	5.9	2.5
36 - 40	3	3	2.5	2.5

Also in the same subjects, stool samples were collected for examination of presence of intestinal helminths.

Lab analysis

Giemsa stain was used in carrying out quantification of malaria parasites. Thick and thin blood films were made. Thick blood films were fixed with Giemsa. Thick blood films were fixed with Giemsa stains for 2 minutes and later diluted with distilled water and allowed to stain for 10 minutes. It was washed and air dried, examined with the aid of oil immersion objective. The degree of presence of malaria parasites were recorded as pluses.

The blood in plain tubes were used to determine the various levels of Bilirubin i.e. (conjugated and unconjugated Bilirubin) in the pregnant women. Total Bilirubin was determined in the presence of caffeine by the reaction with diazotized sulfanilic acid while the Direct (conjugated) Bilirubin was determined in the absence of caffeine. The normal range for total Bilirubin is up to 17µmol/L and also for the direct Bilirubin is up to 4.3 µmol/L.

The stool samples were microscopically examined for various intestinal helminths, such as *Ascarislumbricoides*, *Ancylostomaduodenale* and *Nectoramericanus*.

Statistical analysis

The results were segregated as shown in different tables. Data was collected on individual basis and then translated. The data were analyzed and compared between infected and non-infected in each case as shown in tables 1, 2 and 3. The levels of statistical significance in the study was depicted as $P<0.05$ 0r $P<0.1$.

RESULT

A total of 118 pregnant women were recruited and studied, the effect of intestinal parasite infestations and biochemical parameters and MP were investigated, consequently, the relationship was established between the laboratory parameters. The pregnant women were segregated according to their age ranges as 16-20, 21-25, 26-30,31-36 and 36-40 years. It was observed that a total of 66% representing 78 women were affected with intestinal parasites while a total of 34% representing 40 pregnant women were not infected with any of the intestinal parasites. It was also observed that the age ranges of women 16-20, 21-25, 26-30 years had the 17.8%, 22.9% and16.9% respectively. See Table 1.

*Ancylostomaduodenale*prevalence rate amongst the pregnant women was 67.8%, followed by *Ascarislumbricoides*, (53.4%) and *Necatoramericanus*, (39.8%), See table 2.

The level of correlation was determined in the pregnant women studied for the MP, bilirubin and intestinal parasites. The MP infestation was significantly observed amongst the pregnant women at P d" 0.01 level as compared with other parameters while *Ancylostomaduodenale*parasitaemia was statistically significant at Pd"0.05.

The age range of women recruited into the studies were of negative correlation at P d" 0.01. See table 3.

DISCUSSION

The research study revealed that there is a correlation between malaria parasite and worm infestation in pregnant women in South Eastern Nigeria. The findings of Chareonviriyaphap*et al* (2000) reported low malaria transmission and high proportion of intestinal parasites in South East Asia. The finding also revealed that *Ancylostomaduodenale* infestations had the highest prevalence rate among the intestinal parasites studied in pregnant women, showing a positive correlation between malaria parasitemia and bilirubin levels in pregnant women. Other investigators have described higher prevalence rate of P. falciparum in presence of Ascarislumbricoides in pregnant women, (Yatich*et al.,* 2009). This could be attributed to acquire immunity, dirty environmental and poor nutritional status amongst the pregnant women in our locality. Importantly, the age range revealed that infestation of intestinal parasites was high amongst the age range of 16-20 and 26-30 years with respective percentage of 17.8% and 16.9%. The highest prevalence rate of intestinal parasitaemia was observed in the age range of 21-25 with the 22.9%. Ancylostomaduodenale peaked amongst the lowest age group and reached a plateau after 25 years of age, which is similar to the pattern

Table 3: Table Of Correlation Between Bilirubin, MP Infestation And Intestinal Parasites

		Correlations			
		Bilurubin (mmol/l)	**MP degree of infection**	**Ancylostomaduoden aleparasitemia (%)**	**Necatoramericanus parasitemia (%)**
Bilurubin (mmol/l)	Pearson Correlation	1	.913**	.179	-.093
	Sig. (2-tailed)		.000	.066	.344
	N	106	106	106	106
MP degree of infection	Pearson Correlation	.913**	1	.209*	-.014
	Sig. (2-tailed)	.000		.031	.888
	N	106	106	106	106
Ancylostomaduoden aleparasitemia (%)	Pearson Correlation	.179	.209*	1	.130
	Sig. (2-tailed)	.066	.031		.184
	N	106	106	106	106
Necatoramericanus parasitemia (%)	Pearson Correlation	-.093	-.014	.130	1
	Sig. (2-tailed)	.344	.888	.184	
	N	106	106	106	106
Ascarislumbricoides parasitemia (%)	Pearson Correlation	-.176	-.091	-.115	-.120
	Sig. (2-tailed)	.071	.354	.241	.221
	N	106	106	106	106
Age (Years)	Pearson Correlation	-.781**	-.641**	-.172	.090
	Sig. (2-tailed)	.000	.000	.078	.357
	N	106	106	106	106

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

reported from Kenyan pregnant women, (vanEijk*et al.,* 2009).

The research work was designed to reduce the rate of maternal mortality and also transmission of diseases to the unborn children. Therefore, prior to the enrolment of pregnant women to antenatal clinic, laboratory screening tests as outlined above should be a prerequisite for prenatal care.

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