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Original Article

Intestinal parasites and haemoglobin concentrations in pregnant women attending Braithwaite Memorial Specialist Hospital, Port Harcourt

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Abstract

This study was carried out between January to June, 2014 at Braithwaite Memorial Specialist Hospital, Port Harcourt to determine the haemoglobin level and intestinal parasites in pregnant women attending antenatal clinic of the hospital. In total, 200 stool and blood samples were collected from the women. The stool samples were examined using direct wet preparation and formol ether concentration technique while the haemoglobin levels of the women were estimated using cyanmethaeoglobin technique. The overall prevalence of *E. histolytical, A. Lumbricoides*, Hookworm Spp, and *T. trichuria* was 8(4.00), 58(29.00), 8(4.00) and 8(4.00) respectively. The proportion of pregnant women with helminithic infestation was 60 (30.0%) while their mean Heamoglobin concentration was 10.85±0.32g/dl while the pregnant women without helminthic infestation (140(70.0%) had Heamoglobin concentration of 11.03±0.16g/dl (P<0.05). The study has shown that pregnant women with intestinal parasites had low haemoglobin level. This may be attributed to poor socioeconomic status of the women coupled with poor environmental sanitation and lack of clean portable water supply may have contributed to the high prevalence.

1. Introduction

Parasite disease particularly soil transmitted intestinal helminthes infections have been recognized as important public health problems in many developing countries [1-3]. Intestinal parasitic diseases and the tropical zones have remained like Siamese twins [4]. This is due to the inadequate attention given to sanitation and personal hygiene. Intestinal Parasitic infections which are very common in Nigeria have become so important because of the high rates of morbidity and sometimes mortality among patients in Nigeria towns and villages. [4-6]. An earlier survey on the prevalence of helminthic infections in the general populace in Enugu in 2003 [7] established a prevalence rate of 27.9%.

The involvement of protozoan agents *Giardia lamblia*, *Entamoeba histolytica, Balantidium coli*, coccidia agents like Isopora, Cryptosporidium, Microsporidia and Cyclospora and intestinal nematodes constitute the highest groups of parasites known to infect the human health[8,9]. This has primarily been attributed to the absence of potable drinking water, proper sanitary habits, good faecal disposal system, and poor socio-economic concern and over dispersion of parasites within the human communities [10]. Low birth-weight, low productivity in adulthood, stunted growth, low haemoglobin concentration, chronic loss of blood and iron are related to parasite infection [11,12].

The current study focused in pregnant women because of the decreased community in this group and the possible effects on foetal well-being given the high infertility rate, low nutritional status and poor hygiene conditions predominant in developing societies, intestinal helminthes infections during pregnancy may contribute significantly to the degree of anaemia in pregnant women. In Nigeria, the occurrence of intestinal helminth infections is also high and hookworn infections and ascariasis, have been associated with iron deficiency anaemia[13-16]. The hookworm infection prevalence among pregnant women in sub-sahara in Africa for instance has been estimated to be 32% [17].

The study was carried out on Pregnant Women attending Braithwaite Memorial Specialist Hospital (BMSH) to determine the effect of the intestinal parasites on Haemoglobin concentrations in pregnant women attending Braithwaite Memorial Specialist Hospital (BMSH).

2. Methods and Materials

2.1 Subjects

The survey was carried out on 200 pregnant women in attending antenatal clinic at Braithwaite Memorial Specialist Hospital, Port Harcourt between January 2012 and June 2012. Dry clean leak proof plastic universal bottle was given to each subject for collection of their faecal sample. Also 2ml of blood was collected by venepuncture and dispensed into labeled EDTA anticoagulant bottles for the heamoglobin estimation.

2.2 Haemoglobin determination

Haemoglobin concentration was determined using the cyanomethamoglobin method described by Cheesbrough [18]. Ferricyanide present in Drabkins solution oxidizes the iron (II) present in haemoglobin, oxyhaemoglobin and carboxyhaemoglobin into iron (III) giving rise to Methaemoglobin which in the presence of cyanide ion produces cyanomethaemoglobin a stable red compound that is photometrically determined at 540nm. Haemoglobin estimation was done by dispensing 5mls of Drabkins solution into test tube and 0.20ml (20ul) of blood added, mixed and allowed to stand at room temperature for 10 minutes to allow complete conversion to cyanomethamoglobin. The absorbance of the solution was read at 540nm using Drabkins solution as blank.

The value of unknown was extrapolated from the calibration curve already prepared [19].

2.3 Stool Analysis

The samples were examined macroscopically and reported. A drop of stool from each pregnant subject evenly mixed with a drop of physiological saline on clean grease free glass slide was placed under a microscope to observe for intestinal parasite using X10 and X 40 objectives. Also emulsified stool from each pregnant subject evenly mixed with a drop of iodine on clean grease free glass slide was placed under a microscope to observe for intestinal parasite using X10 and X 40

objective lens with the condenser iris sufficiently closed to gave a good contrast to identify the presence of ova or larvae.. Also sedimentation method using formol ether in which parasites was sedimented by gravity or centrifugal force were employed based on the fact that it concentrates a wide range of parasites with minimum damage to their morphology [19]. Stool sample was transferred into centrifuge tube containing 2ml of formol water, mixed thoroughly while 2ml of diethyl ether was added to the tube, shaken thoroughly and centrifuged at 2000 rpm for 5mins.The supernatant was decanted and the bottom of the centrifuge tube was tapped to re-suspend the sediment. The sediment was transferred to clean grease – free glass slides covered with a cover slip and microscopically observed at x 10 and x 40 objective, lens with the condenser iris sufficiently close to give a good contrast to identify any presence of ova of parasites.

3. Result

The result of the study showed that the haemoglobin of women with intestinal parasite was10.85±0.32 g/dl while Haemoglobin Concentration of women without intestinal Parasite (g/dl) was 11.03±0.16 as shown in table 1 below.

Table 1: Haemoglobin concentration of women with intestinal parasite

Haemoglobin Concentration of women with intestinal Parasite (g/dl)	Haemoglobin Concentration of women without intestinal Parasite (g/dl)	P value
10.85±0.32	11.03±0.16	P<0.05

At age group 20-25 the haemoglobin concentrations (g/dl) include 11.03±0.16, 11.07±0.16 and 11.08±0.24 at first, second and third trimesters respectively while it was 11.00±0.16, 10.74±0.28 and 11.20±0.51at respective trimesters of age group 26-30 as shown in table 2 below. Also At age group 31-35 the haemoglobin concentrations (g/dl) include 0.00±0.00, 10.75±0.66 and 11.8±0.49 at first, second and third trimesters respectively while it was 0.00±0.00, 11.48±0.70 and 10.88±0.53 at respective trimesters of age group 36-40 as shown in table 2 below.

Table 2: Haemoglobin concentration of women with intestinal parasite at different age groups

Age Group (Years)	No of Subjects	1St trimester (g/dl)(N)	2nd trimester (g/dl) (N)	3rd trimester (g/dl) (N)	Number Positive (%) with Intestinal Parasite
20-25	48	11.03±0.16(4)	11.07±0.16(24)	11.08±0.24(20)	16(33.3)
26-30	108	11.00±0.16(4)	10.74±0.28(76)	11.20±0.51(28)	36(33.3)
31-35	28	0.00±0.00(0)	10.75±0.66(16)	11.8±0.49(12)	4(14.3)
36-40	16	0.00±0.00(0)	11.48±0.70(4)	10.88±0.53(12)	4(25)

The result showed that age group 20-25 years had prevalence of 0(0.00), 0(0.00), 0(0.00), and 0 (0.00) respectively for *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical* at first trimester while it was 16(66.7), 8(33.3), 0(0.00) and 0(0.00) respectively *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical* in second trimester. In the third trimester the prevalence of 0(0.00), 0(0.00), 0(0.00), and0 (0.00) respectively was obtained for *A. Lumbricoides, Hookworm, T. trichuria and E. histolytical*. In age group 26-30years *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical had prevalence of* 0(0.00), 0(0.00), 0(0.00), and0 (0.00) respectively in first trimester while in the second it was 16(21.1), 0(0.00), 8(10.5) and 0(0.00) for *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical*.in the third trimester *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical had prevalence rate of* 12(42.9), 0(0.00), 0(0.00) and 0(0.00) respectively.

In age group 31-35 years *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical had prevalence of* 0(0.00), 0(0.00), 0(0.00), and0 (0.00) respectively in first trimester while in the second it was 4(25), 0(0.00), 0(0.00) and 4(25)for *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical*.in the third trimester *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical had prevalence rate of* 4(33.3), 0(0.00), 0(0.00) and 0(0.00) respectively. In age group 36-40years *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical had prevalence of* 0(0.00), 0(0.00), 0(0.00), and0 (0.00) respectively in first trimester while in the second it was 0(0.00), 0(0.00) , 0(0.00) and 0(0.00) for *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical* in the third trimester *A. Lumbricoides, Hookworm, T. trichuria* and *E. histolytical had prevalence rate of* 4(33.3), 0(0.00), 0(0.00) and 4(33.3) respectively as shown in table 3 below.

Table 3: Prevalence of intestinal parasite at different trimesters of pregnancy

	First trimester				Second trimester				Third trimester			
Age group (Years)	*Ascaris lumbricoides*	Hookworm	*T. trichuria*	*E. histolytical*	*Ascaris lumbricoides*	Hookworm	*T. trichuria*	*E. histolytical*	*Ascaris lumbricoides*	Hookworm	*T. trichuria*	*E. histolytical*
20-25	0(0.00)	0(0.00)	0(0.00)	0(0.00)	16(66.7)	8(33.3)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)
26-30	0(0.00)	0(0.00)	0(0.00)	0(0.00)	16(21.1)	0(0.00)	8(10.5)	0(0.00)	12(42.9)	0(0.00)	0(0.00)	0(0.00)
31-35	0(0.00)	0(0.00)	0(0.00)	0(0.00)	4(25)	0(0.00)	0(0.00)	4(25)	4(33.3)	0(0.00)	0(0.00)	0(0.00)
36-40	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	0(0.00)	4(33.3)	0(0.00)	0(0.00)	4(33.3)

4. Discussion

The study showed that women with parasitic infestation were severely anaemic. The study also found a strong association between anemia and helminthic infection, which is similar to the result of earlier studies by Murthy et al[20] and Singh et al[21]. It has been seen around the world that micronutrient deficiency, parasitic infestations and stunting are significantly related problems [22]. A similar study in Nepal found high prevalence of parasitic infection where the associated morbidities like anemia and reduced resistance due to other nutritional disorders made the condition worse and helminthes infestation further aggravated anemia. The occurrence of helminth infection among pregnant women is indicative of faecal pollution of soil and domestic water supply around homes sewage disposal studies in many parts of Nigeria [13,14].

In Nigeria, the occurrence of intestinal helminth infections is also high and hookworn infections and ascariasis, have been associated with iron deficiency anaemia [13-16]. The hookworm infection prevalence among pregnant women in sub-sahara in Africa for instance has been estimated to be 32% [17].

Ascaris lumbricoides was the most prevalence parasite in age group 20-25 years at second trimester while age group 31-35 had *Ascaris lumbricoides* value of 4(25) and 16(21.1) in age group 26-30years. The low prevalence of the infection among the women in the 36 – 40 age groups (22.9%) could be due to exposure to health programmes/lectures usually organized in their ante-natal clinics.

This high prevalence of *Ascaris lumbricoides* is in agreement with studies by Ozumba and Ozumba [7] at Enugu and Alfonso Rodriguez Morales *et al* [23] in Venezuela while Iarocque *et al* [24] reported hookworm as the prevalent parasite in Peru.

The study showed that the incidence of intestinal helminthes in all age groups at first trimester was nil while at second trimester was high. This is in agreement with study by Iarocque *et al*[24] where pregnant women in second trimester had high prevalence of intestinal helminth. The advice normally given to pregnant women to eat plenty of green vegetables must have contributed to the high prevalence of these helminths. These vegetables are normally cultivated in open farms where people defecate and where untreated refuse are also dumped, these coupled with the absence of clean portable water to wash the vegetables properly and the ignorance of the majority of the women on the parasites contributed to the high prevalence.

Parasite disease particularly soil transmitted intestinal helminthes infections have been recognized as important public health problems in many developing countries [1-3]. Intestinal parasitic diseases and the tropical zones have remained like Siamese twins [4].

5. Conclusion

This study has shown that intestinal parasite infestation in pregnancy is significantly related with anemia, hence all women coming to antenatal clinics, should be screened for intestinal helminths infestation. The antenatal care should include de-worming, Health education to prevent anaemia while Pregnant women diet should be fortified with folate and iron supplement.

Reference

[1] Gbakima A. A. Shepard M and White P.T. Intestinal helminth infections in rural school children in Njala Sierra Leone. *East Africa Medical Journal* 1994; 71:792-796.

[2] Gupta M.C. Mithal S., Arora K.L. and Tadon B. N. Effects of periodic deworming on nutritional status of Ascaris infected Pre Scihool children receiving supplementary food. *Lancet*, 1977; 3:108-110.

[3] Kutty V.R.Soman C.R., Kumar K.V. (2002). Pattern of helminthic infestation in primary school children of Thiruvanan theapuram district.www.11KVPCDS.org/publication/Vaman Kutty.Htm Pp1-2.

[4] Bello, C.S.S., Tanyigna K.B and olutu, C.O. Intestinal parasites in Jos: four your review: *Nigeria Medical Practitioners* 1997; 34; 11-13.

[5] Okpala I.A. A survey of the incidence of intestinal parasites. *West Africa Medical Journal* 1966; 10:148-157.

[6] Adedoyin, M.A, Awogun, I.A and Juergenses, T. Prevalence of intestinal parasitoses in relationship to Diarrhea among children in llorin. *West African Medical Journal,* 1980; 9: 83-88.

[7] Ozumba U.C. and Ozumba N. Patterns of Helminth infection in the human gut at the University of Nigeria Teaching Hospital Enugu Nigeria. *Journal of Health Scienece* 2002; 48:263-268.

[8] Estevez E.H. Levine J.A. Warren J. Intestinal parasites in a remote village in Nepal. *Journal of Clinical Microbiology* 1983; 7:160-161.

[9] Geollman R. Incidence of disease in Patan hospital in General OP. *Journal of Nepalese Medical Association*, 1988; 26:921.

[10] Rai S.K., Bajracharya K., Budhathoki S., Khadha J.B., Rai KK *et al*. Status of intestinal parasitoses of T.U teaching Hospital .*Journal of the institute of Medicine*, 1995; 17:134-142.

[11] Sigulem D.M., Tudisco E.S. Goldberg P.A. Thaide MMM. Vaisman E. Anaemia Feropriva E. M. Griancas No Municipio de sao Paulo. *Rev Saude Publica*: 1978; 12:168-178.

[12] Salzano A.C., Torres M.A.A. Bastia Fillo M, Romani S. A. M. Anaemias EM Crinancas De Dois Services De Saude De Recife PE (Brasil) *Rev Saude Publica* 1985; 19: 499-507.

[13] Nwosu, A.B.C. The community ecology of soil transmitted helminth infections of humans in a hyperendemic area of Southern Nigeria. *Ann Trop Med Parasitol* 1981; 75:175-203.

[14] Udonsi, J.K. *Necator americanus*: a cross sectional study of rural community,a relation to some clinical signs. *Ann. Tropical Med Parasitol* 1984; 78:443-448.

[15] Migasena S. and Gilles, A.M. Hookworm infection in: *Beilere's clinical Trop. Med and Com Disease* 1987; 2:617-627.

[16] Obiamiwe B.A. and Nmorsi D. Human gastrointestinal parasites in Bendel State Nigeria. *Angrew Parasitology* 1991; 32:173-183

[17] Bundy D.A Chan M.S. Saviola L. Hookworm infection in pregnancy. *Trans Royal Society of Tropical Medicine Hygiene* 1995; 89:521-522

[18] Cheesbrough M. (2000). Measurement of Hemoglobin: in *District Laboratory Practice in Tropical Countries.* Part II: 299-302, Cambridge University Press Ltd, England.

[19] Cheesbrough M. Parasitological Tests in: *District laboratory practice in: tropical countries*. Cambridge University Press London, 2000; 178 – 306.

[20] Murthy, G. L., Sahay, R. K., Srinivasan, V. R., Upadhaya, A. C., Shanfaram, V., Gayatri, K., Clinical profile of falciparum malaria in a tertiary care hospital. *Journal of Indian Medical Association*, 2000; 98(4): 160-162,169.

[21] Singh, N., Shukia, M.M., Sharma. Epidemology of malaria in pregnancy in central India. *Bulletin of World Health Organisation*; 1999; *77*(7), 567-572.

[22] Jinabhai, C. C., Taylor, M., Coutsoudis, A., Coovadia, H. M., Tomkins, A. M., & Sullivan, K. R. A. Health and nutritional profile of rural school children in Kwazulu Natal, South Africa. *Annals of Tropical Paediatrics*, 2001; 21(1), 50-58.

[23] Rodrı´guez-Morales A.J, Barbella RA, Case C, Arria M, Ravelo M, Perez, H., Urdaneta, O., Gervasio, G., Rubio N., Maldonado A., Aguilera Y., Viloria A., Blanco, J.J., Colina, M., Hern´andez, E., Araujo, E., Cabaniel, G., Benitez, J. and Rifakis, P. Intestinal parasitic infections among pregnant women in Venezuela. *Infectious Diseases in Obstetrics and Gynecology*, 2006; (23125):1-5.

[24] Larocque R., Casapia M., Gotuzzo E., Gyorkos T.W. Relationship between intensity of soil-transmitted helminth infections and anemia during pregnancy. *American Journal of Tropical Medicine and Hygiene,* 2005; 73: 783–789.