International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 3, March 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.3.2025.79

ORIGINAL RESEARCH

Study of cases of protozoal infection and helminthic infestation in antenatal patients

[1]Dr. Maulesh P. Modi, [2]Dr. Bindeeya B. Dhrangiya,[3]Dr. Tejal N. Kansara,[4]Dr. Shivani Mehta, [5]Dr. Samipa J. Shah

[1,2,3]Assistant Professor, Smt. SCL General Hospital, Ahmedabad, Gujarat, India
[4]Second year resident, Smt. SCL General Hospital, Ahmedabad, Gujarat, India
[5]Professor, Smt. SCL General Hospital, Ahmedabad, Gujarat, India

Corresponding Author
Dr. Aditi Deshpande
First Year Resident, Smt. SCL General Hospital, Ahmedabad, Gujarat, India
Department of Obstetrics and Gynaecology, Smt. SCL Hospital, Smt. NHL Municipal Medical College, Ahmedabad, Gujarat, India

Received: 09Jan, 2025 Accepted: 10Feb, 2025

ABSTRACT

Background: Parasitic infections affect a majority of pregnant women worldwide and can lead to adverse maternal. fetal or placental effects. A prospective observational study was carried out at a municipal hospital in East Ahmedabad, Gujarat over a period of 4 months in the indoor patients in the antenatal ward.**Objective:**The aim of this study is to determine the prevalence of parasitic infections in pregnancy and its maternal and fetal outcome along with its association with various factors.**Materials and methods:** Routine stool microscopy was carried out in antenatal patients to rule out parasitic infections and their outcomes were assessed.**Result:** Out of the 772 patients screened for intestinal parasites, the prevalence of the study was 9.1%. Protozoa (80.28%) were more prevalent than helminths (19.7%). The prevalence of parasites were more in women residing in the rural (84.51%) area. Women in the second trimester (49.3%) were affected more than women in the third (39.44%) and first (11.26%) trimester. The most common maternal manifestation was found to be diarrhoea (83.09%), followed by anemia (60.56%).**Conclusion:** Routine screening of stool samples for intestinal parasites, especially in anemic and malnourished women should be considered as a part of routine antenatal care. This study also necessitates the importance of sanitation, hygienic practices and nutrition in antenatal patients. Mass deworming in accordance to the National Deworming Guidelines would play a crucial role to curb the detrimental effects of a parasitic infection. Strict adherence to deworming of mothers before pregnancy and in the second and third trimester is recommended.

Key words: Parasitic infections, antenatal patients, protozoa and helminths, maternal and fetal outcomes, stool microscopy

INTRODUCTION

This study of protozoal and helminthic infestation was carried out in antenatal patients residing in the tropical region in Western India. It focuses on the impact of the infections on the maternal health, its chronicity, its clinical presentations and fetal outcomes. Nearly 1.2 billion people are affected with roundworm (Ascaris lumbricoides) and 700 million are affected with hookworm (Ankylostoma duodenale and Necatoramericans) and whip worm (Truchuristrichuria)[1].Women in developing countries are more susceptible to food borne parasitic infections due their involvement in household chores.Pregnancy has been demonstrated as an independent risk factor for helminthic parasitic infections[2].The aim of this article is to assess the prevalence, incidence of parasitic infections, its maternal and fetal outcomes and the role of prophylactic anti helminthic therapy.

Objectives

1. Study of prevalence of different types of protozoal and helminthic infestation in antenatal patients.
2. Assessing maternal outcome in terms of clinical features in faeco orally transmitted parasite infection.
3. Fetal complications in pregnant women with protozoal infection and helminthic infestations.
4. Role of deworming by anti-helminthic drugs in treating infection and preventing complications.

MATERIALS AND METHODOLOGY

This prospective observational study was carried out at the government municipal hospital at East Ahmedabad over a period of 4 months. Total772 indoor cases were screened over a period of 4 months. All booked and unbooked antenatal cases admitted in

DOI: 10.69605/ijlbpr_14.3.2025.79

our setup were included in this study. Women with prior antihelminthic treatment and women presenting with labour were excluded. The mother's particulars were tabulated in a proforma which included area of distribution, socio economic status, gravidity, gestational age, dietary intake, and behavioral habits. A routine stool microscopy test along with routine antenatal investigations was given to all the patients and the outcomes were noted. Ultrasonography of the fetus, abdomen and pelvis were carried out to detect any fetal and maternal complication. Prophylactic deworming was carried out in patients presenting with anemia and diarrhoea. Prophylactic deworming was also considered in patients showing eosinophilia in their hemogram. Appropriate intervention was carried out in diagnosed cases of parasitic infections.

RESULTS

A total of 772 antenatal patients were admitted in our hospital's antenatal ward in the course of 4 months. Result of routine stool microscopy of all patients revealed 71 cases with positive for a parasitic infection which indicates 9.1% of all antenatal patients.

Table 1: Incidence of different types of parasites in antenatal patients

Parasites	No. of Cases	Percentage
Amoeba	35	49.29%
Giardiasis	22	30.98%
Ascariasis	12	16.9%
Others(H.nana, hookworm,toxoplasma)	2	2.81%

Out of 71 positive samples, 49.29% showed Amoebic cyst, 30.98% showed Giardiasis cyst, 16.9% showed Ascariasis and the remaining 2.81% cases comprised of Hookworm, H. Nana and Toxoplasma. Other studies conducted in pregnant women by S Phuanukoonnon*etal*., R Sehgal *et al*., A Dersoet *al*., also have reported protozoan infections to be significantly higher as compared to helminthic infections[3, 4, 5].

Table 2: Socio-demographic and obstetric characteristics of pregnant women affecting the incidence of protozoal and helminthics infestation

Parameters	No. of Cases	Percentage
Residence		
▪ Rural	60	84.51
▪ Urban	11	15.49
Period of gestation		
▪ First Trimester	08	11.26
▪ Second Trimester	35	49.30
▪ Third Trimester	28	39.44
Dietary intake		
▪ Vegetarian	31	43.66
▪ Nonvegetarian	40	56.34

Out of the cases, 84.51% patients resided in rural area and 15.49% patients resided in urban region. In our study, 49.30% were diagnosed with protozoal infection/helminthic infestation in second trimester of their pregnancy compared to 39.44% and 11.26% in the third and first trimester respectively. Similar results were observed in studies by Alli *et al*. and Dersoet *al*.[6,7]. 43.66% were vegetarian and 56.34% were non-vegeterian. Thus, incidence is more in patients with non-vegetarian food intake which can attributed to their consumption of raw meat. Interestingly, one of the risk factors for G. lamblia was consumption of raw vegetables in the study finding in East Wollega, Ethiopia[8].

Table 3: Maternal outcome in terms of clinical features

Outcomes	No. of Cases	Percentage
Anemia	43	60.56
Diarrhoea	59	83.09
Electrolyte imbalance	28	39.43
Others(muscle spasms, sinus arrhythmia)	3	4.22

Out of the cases, 60.56% patients presented with weakness, palpitation and on investigation they were found to be anemic. Stool routine microscopy also showed occult blood positive in 32 patients. 83.09% patient presented with watery diarrhea which further lead to electrolyte imbalance which could be seen in

DOI: 10.69605/ijlbpr_14.3.2025.79

39.43% of patients. 4.22% patient presented with muscle spasms and cramps. ECG showed abnormal cardiac rhythm in 1.4% patients.

Hyponatremia and hypokalemia leads to nausea, vomiting, headache, confusion, loss of energy, drowsiness, fatigue, restlessness, irritability, muscle weakness, spasms and abnormal heart rhythms. Hypocalcaemia in pregnancy has been associated with fetal growth restriction, neonatal low bone mass, increased risk of small for gestational age.

Table 4: Fetal outcomes

Outcome	No. of Cases	Percentages
Oligo	1	1.41%
Preterm delievery	2	2.82%
NICU admission	1	1.41%
IUFD	1	1.41%

During fetal monitoring, oligohydramnios was found in 1.41% of patients which could be attributed to diarrhoea. In 2.82% of the patients, there was incidence of preterm delivery which may be an outcome of exaggerated inflammatory response to the parasite. In 1.41% cases the baby was admitted in NICU for septicaemia and in 1.41% of cases it resulted in intrauterine fetal death.

Table 5: Percentage of prophylactic Albendazole treatment in patients of protozoal infection/helminthic infestation

Prophylactic Albendazole	No. of Patients	Percentage
Received	5	7.04%
Not received	66	92.96%

In our study, out of 71 patients of protozoal infection/helminthic infestation, only 5(7.04%) had received prophylactic Albendazole and rest 66 (92.96%) had not received it. The National Guidelines for Deworming in Pregnancy recommend Albendazole as the drug of choice for deworming during pregnancy. Deworming should be done after the first trimester of pregnancy (preferably during the second trimester). A single dose of 400 mg Albendazole is recommended[9].

DISCUSSION

Intestinal parasitic infections pose a global health burden as they affect millions of people. The current study was conducted to determine the prevalence of intestinal parasites in pregnant women and examine its association with various factors.They are more commonly seen in under developed and developing countries due to poverty, malnutrition,lack of sanitation, unhygienic practises, lack of clean drinking water, low literacy rate and also due to tropical climate. Malnutrition leads to increased susceptibility to parasitic infections and theparasitic infection worsens malnurition. Hence, this sets in a chain of events that lead to morbidity in the patients. Villar *et al*., in their study, proposed that chronically malnourished mothers who are infected with parasites but remain asymptomatic should be identified as a high-risk group for targeted nutritional and prenatal care interventions during pregnancy[10].Parasitic infections affect all age groups, but children and pregnant women seem more susceptible. The immune response in pregnancy makes pregnant women more susceptible to parasitic infections than non-pregnant women. Parasitic infection in pregnancy affects the mother as well as the fetus. In this study, the prevalence of Protozoa i.e.,Amoebawas the highest at 49.29% followed by Giardia at 30.98% which is comparable to studies byR Sehgal *et al*., A Dersoet *al*., andS Phuanukoonnon*et al*.[3,4,5]. The decline in the prevalence of soil-transmitted helminths can be attributed to the efforts made by the WHO in deworming at-risk populations, particularly school-aged children, as part of its initiative to achieve the Millennium Development Goals[11].The high prevalence of Protozoa is an indicator of inadequate sanitation[12].This necessitates the need of safe drinking water and maintenance of hygiene. The tropical climate also favours the development and survival of protozoans. They can worsen poor maternal nutritional and health status by causing colitis, diarrhea, lactose intolerance, malabsorption, and dehydration. These illnesses during pregnancy can decrease caloric intake and increase metabolic demands (such as fever and immune responses), thereby reducing nutrient availability to the fetus, especially in already malnourished mothers.[10]Infection with Amoeba has also been linked to poorer maternal iron status and impaired fetal growth.[13] 49.30% of patients resided in the rural area, again pointing toward the sanitation problem. Out of the helminthic infections, Ascaris was seen most commonly (16.9%) followed by Hookworm. Ascaris lumbricoides can lead to malnutrition by consuming nutrients essential for the host, disrupting intestinal absorption due to the parasite's damage to the mucosa, and may result in protein-energy malnutrition and night blindness due to a deficiency in vitamin A.[14] The primary concern with hookworm infection is blood loss, which can lead to microcytic hypochromic anemia. This blood loss triggers compensatory volume expansion, resulting in hypoproteinemia,

DOI: 10.69605/ijlbpr_14.3.2025.79

edema, pica, and wasting[15].Hookworm infection during pregnancy may lead to vertical transmission to neonates, potentially through the ingestion of third-stage hookworm larvae present in milk and colostrum.[16] Infections in patients may present with features like abdominal pain, diarrhoea, vomiting, anemia, and muscle spasms. Out of these, diarrhoea was the most common presentation, encountered in 83.09% patients. Diarrhoea impairs nutrient absorption and reduces caloric intake thus also reduces nutrient availability to the fetus. This fails to meet the increased calorie requirement during pregnancy. Diarrhoea can further lead to electrolyte imbalance which could lead to hypokalemia, which may present as spasms. Parasites also impair iron absorption as manifesting as anemia in mothers. This further aggravates the malnourishment in mothers. Pregnancy itself present with physiologic anemia due to hemodilution so causes extra iron requirements.[17] This multiplies the burden of iron deficiency in women with parasitic infections. Anemia is a predisposing factor for maternal morbidity. Our study demonstrated 60.56% of mothers having anemia which is comparable to a study by Dreyfuss Michele L *etal*.[18] The anemia has a microcytic, hypochromic picture. Anemia in the mother can lead to pre term delivery, low birth weight baby, IUGR and can also impact the iron status in the infant[9].Lopez *et al*., in their study have reported that *E.histolytica* requires a high concentration of iron to survive which might cause the decreasing iron load in the host[19].Parasitic infection can also reduce placental perfusion and cause placental insufficiency. The effects on parasitic infection on fetus could manifest as oligohydramnios causing growth restriction and low birth weight. It can predispose to preterm delivery. Its effect can also be as severe as fetal demise. Incidence of parasitic infections could be seen predominantly in the second trimester. As pregnancy progresses, there is an increase in anti-inflammatory responses and a decrease in pro-inflammatory responses. Progesterone, which is generally considered anti-inflammatory, is elevated during the second trimester, which is associated with reduced activity of regulatory Th1 cells and an increased susceptibility to infections. By the third trimester, anti-inflammatory responses are even more pronounced[20].This could explain the higher incidence of infections during the second and third trimesters compared to the first.Although oral iron and folic acid (IFA) supplementation has been a key component of the Anemia Control Program for pregnant women over the past three decades, the expected reduction in anemia has not been achieved with this single intervention. Therefore, it is essential to address the underlying factors contributing to anemia, particularly among pregnant women. Given the proven benefits of deworming, variations in its use, and the suboptimal sanitation and hygiene conditions in many parts of the country, there is a clear need to establish definitive guidelines for the use of antihelminthic drugs during pregnancy.Majority of the patients in our study (92.96%) had not received prophylactic Albendazole. This implies the need for prophylactic deworming in all pregnant women with Albendazole after the first trimester. A single dose of Albendazole (400 mg) is the drug of choice as it is cost effective and has a good compliance[9].

CONCLUSION

As malnourishment and anemia pre-exist in developing countries, parasitic infections act as an added burden that affects the pregnancy and its outcome. This predisposes the need to systematically screen for risk factors of anemia and to lay emphasis on sanitation and hygiene programs. With implementation of WASH (water, sanitation and hygiene) measures, creating awareness about parasitic (food borne and soil transmitted) infections, avoiding raw meat and vegetables, and closed toilets there can be a significant lowering of parasitic infections in pregnancy. Routine screening of stool samples for intestinal parasites, especially in anemic and malnourished women should be considered as a part of the routine antenatal care. Mass deworming in accordance to the National Deworming Guidelines would play a crucial role to curb the detrimental effects of a parasitic infection. Strict adherence to deworming of mothers before pregnancy and in the second and third trimester is recommended.

REFERENCES

1. NR De Silva, S Brooker, P Hotez, A Montresor, D Engels, L Savioli. Soil-transmitted helminths: updating the global picture. Trends Parasitol. 2003
2. F.C.CabelloSalmon aquaculture and transmissionof the fish tapewormEmerg Infect Dis(2007)
3. S PhuanukoonnonA Michael W S Kirarock W S Pomat A H Van Den Biggelaar Intestinal parasitic infections and anaemia among pregnant women in the highlands of Papua New GuineaPapua New Guinea Medical Journal201356119119.
4. R Sehgal G V Reddy J J Verweij A V Rao Prevalence of intestinal parasitic infections among school children and pregnant women in a low socio-economic area, Chandigarh, North India2010121003
5. A Derso E NibretAMunshea Prevalence of intestinal parasitic infections and associated risk factors among pregnant women attending antenatal care center at Felege Hiwot Referral Hospital, northwest EthiopiaBMC Infect Dis. 2016;16:53010.1186/s12879-016-1859-6
6. A Alli A F Kolade I O Okonko J C Nwanze V K Dada M Ogundele Prevalence of intestinal nematode infection among pregnant women attending antenatal clinic at the University College HospitalAdv Appl Sci Res. 2011, 2413.

DOI: 10.69605/ijlbpr_14.3.2025.79

7. A Derso E NibretAMunshea Prevalence of intestinal parasitic infections and associated risk factors among pregnant women attending antenatal care center at Felege Hiwot Referral Hospital, northwest EthiopiaBMC Infect Dis. 2016;16:53010.1186/s12879-016-1859-6
8. Mengist H. M., Zewdie O., Belew A. Intestinal helminthic infection and anemia among pregnant women attending ante-natal care (ANC) in East Wollega, Oromia, Ethiopia.
9. National Health Systems Resource Centre.
10. J Villar M Klebanoff E Kestler The effect on fetal growth of protozoan and helminthic infection during pregnancyObstet Gynecol198974691520
11. WHO Reference Number: WHO/CDS/CPE/PVC/2005.12
12. M C Santos J M Costa-cruz C Carvalho-Netco M M R Lima M Cristina Enteric parasites and commensals in pregnant women seen at the university hospital, Federal University of Uberlandia, state of Minas Gerais, BrazilRev Inst Med Trop Sao Paulo199840193610.1590/s0036-46651998000300011
13. M M Weigel A Calle R X Armijos I P Vega B V Bayas C E Montenegro The effect of chronic intestinal parasitic infection on maternal and perinatal outcomeInt J Gynecol Obstet199652191710.1016/0020-7292(95)02442-5
14. D Chatterjee NemathelminthsParasitology Protozoology and Helminthology13theditonCBS Publishers & Distributors Pvt. Ltd. New Delhi200922935
15. C J Kucik G L Martin B V Sortor Common intestinal parasitesAm Fam Physician200469511619
16. Yu Sen-Hai Jiang Ze-Xiao Xu Long-Qi Infantile hookworm disease in China. A reviewActa Trop1995592657010.1016/0001-706x(95)00089-w
17. K Guelzim H Fagouri H Naoui B Laachiri D R Moussaoui M DehayniA Comparative Study of Intestinal Parasitic Carriage in Pregnant-Non Pregnant WomenSch J Appl Med Sci2014218117
18. Dreyfuss Michele L., Stoltzfus Rebecca J., Shrestha Jaya B., Pradhan Elizabeth K., LeClerq Steven C, *et al*. Hookworms, Malaria and Vitamin A Deficiency Contribute to Anemia and Iron Deficiency among Pregnant Women in the Plains of Nepal. Trans R Soc Trop Med Hyg. 2007
19. F López-Soto N León-Sicairos M Reyes-López J Serrano-Luna C Ordaz-Pichardo C Piña-Vázquez Use and endocytosis of iron-containing proteins by Entamoeba histolytica trophozoites. Infect, Genet Evol2009910385010.1016/j.meegid.2009.05.018
20. D P Robinson S L Klein Pregnancy and pregnancy-associated hormones alter immune responses and disease pathogenesis. Hormones Behav2012622637110.1016/j.yhbeh.2012.02.023