

FREQUENCY OF WORM INFESTATION AMONG PREGNANT FEMALES PRESENTING WITH ANEMIA TO DOCTORS TRUST TEACHING HOSPITAL SARGODHA

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Abstract

Background and Objectives: Anemia is one of the major contributors to low fetal birth weight as well as maternal mortality in developing countries. Various studies have associated anemia with helminthic infestation. Hence with the elimination of such infestation, anemia may be reduced which will have a positive impact on the delivery outcomes.

Methods: This cross-sectional study was conducted at Doctors Trust Teaching Hospital Sargodha from 1st August 2019 to 31st July 2020 for which we enrolled 130 pregnant females. Blood hemoglobin levels and stool examination for parasite infestation were performed for all these women and recorded on a structured questionnaire. Data was analyzed using SPSS version 24.0.

Results: Among 130 pregnant females, the mean age observed was 29.86 ± 6.61 years while the range was 18 years to 40 years. It was seen that 45.4% of the patients had mild, 26.9% of the patients had moderate while 27.7% had severe anemia. 17.7% of these females who presented with anemia to a tertiary care hospital had worm infestation. Effect modifiers have a significant influence except for age and monthly income. Analysis revealed that BMI was significantly related to worm infestation ($p\text{-value} = 0.005$).

Conclusion: The frequency of worm infestation was found as 17.7% in pregnant females presenting with anemia to a tertiary care hospital. A significant association was found between BMI and worm infestation while no significant association was found in age and income with worm infestation.

Key words: worm infestation, anemia in pregnancy, geohelminths, iron deficiency anemia

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Among all the nutritional problems around the globe, Anemia is the commonest disorder that mainly affects children and pregnant.¹ The two most common reasons for anemia in developing countries like ours are poor nutritional status as well as worm infestation. Recently an increasing prevalence of worm

infestation has been observed in developing countries because of increasing poverty, lack of provision of clean drinking water, and the hot and humid climate of tropical regions in addition to poor hygiene and the low literacy rate.² Prevalence of anemia is higher in developing countries than in developed countries. With anemia affecting 75% of pregnant females, South Asia has recorded the highest prevalence of anemia in pregnancy worldwide.³

Worm infestation is among one of the leading infections of the developing world. According to World Health Organization (WHO), geo-helminthiasis account for more than 40% of the disease burden of tropical diseases⁴. Worldwide *Ascaris lumbricoides* affect 800–1000 million people, *Ancylostoma duodenale* and

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Necator americanus affect 700–900 million, while, 500 million people are affected with *trichiura* every year.⁵

In comparison to non-pregnant women, Pregnant women often encounter more severe infections. Helminthic infestation can occur at any stage of pregnancy but infestations acquired during the first three months are often responsible for grave fetal and placental outcomes as compared to infestations that are acquired later in the pregnancy⁶. To add on, primigravidae are even more so vulnerable to such complications.⁷

Worm infestation leads to the development of anemia, impaired growth, and a poor nutritional status overall. Although acute symptoms are rare, various studies have demonstrated an association between intestinal Ascariasis with anorexia and weight loss. Similarly, hookworm infestation has also been linked to anemia among women of reproductive age⁸. Worldwide, anemia has become an important health issue of the reproductive-age population since the establishment of its association with poor pregnancy outcomes. These outcomes range from maternal sepsis, low birth weight, and premature delivery to postpartum hemorrhage as well as maternal and perinatal mortality.^{9,10} Thus, worm infestation can cause considerable morbidity in these patients. Anemia caused by worm infestation is an Iron Deficiency type of anemia with the exclusion of other dietary deficiencies. Hookworm infestation is associated with blood loss anemia, iron deficiency anemia as well as protein malnutrition. The mechanism behind the anemia caused by hookworm infestation is that the adult worm attaches to the mucosa of the small intestine to ingest host blood and ruptures erythrocytes which degrade the hemoglobin of these cells. Different studies have reported varied frequencies of infestations in pregnant females. Studies conducted in Kenya¹¹, Nigeria¹² and Ghana¹³ reported a frequency of worm infestation in anemic pregnant females as 13.6%, 16.3% and 49.6% respectively. But no local study was available so far to give information regarding the disease burden in our population.

The aim of this study was to determine the frequency of worm infestation among pregnant females presenting with anemia to a tertiary care hospital. As

the available literature has shown considerable variation in different geographical region with a dearth of literature on local level, this study will bridge this gap and will provide information of the local disease burden helping the obstetrician to screen the females for worm infestation at an earlier stage and manage accordingly before the development of anemia. This will lead to a considerable decrease in morbidity due to this preventable and treatable disease.

METHODS

For this cross-sectional study, we recruited 130 anemic pregnant women from the outdoor department of Medicine and Gynecology and Obstetrics at Doctors Trust Teaching Hospital Sargodha over a duration of one year, spanning from August 1st, 2019, to July 31st, 2020. Pregnant females aged 18–40 years at >16 weeks of gestation (determined by history and last menstrual period) with Hemoglobin levels < 11 mg/dl and peripheral smears showing Microcytic Hypochromic anemia with low MCV, MCH & MCHC levels were selected through purposive sampling. While multi-gravida (with >5 live births), malnourished with a history of pelvic and GI blood loss, women taking anthelmintic drugs during the last 3 months or known thalassemic (as determined on history and medical record) or women with splenomegaly of any cause (determined on history and examination) as well those not willing to participate were also excluded from the study.

Anemia was classified according to the WHO classification system which labels MILD anemia as 9.0–10.9 g/dl of hemoglobin (Hb), MODERATE anemia as 7.0–8.9 g/dl of Hb, and Severe anemia at hemoglobin level less than 7 g/dl.

After documenting hemoglobin levels below 11 mg/dl all patients were referred to the participating physicians for further evaluation of anemia to exclude the nutritional, GI, Pelvic, any other blood loss, and other causes of anemia. After taking informed consent socio-demographic data was recorded on a proforma. For the collection of stool samples, all the females were provided a clean, dry, leakproof, wide-mouthed, 6

inches diameter, plastic containers. Participants were informed to collect fresh early morning stool samples directly into the container and bring the sample within 2 hours of collection. Samples were then labeled and sent to the pathology lab for microscopy for worm ova and cyst within 4 hours of collection by the investigator and collected the next day. Identifying single ova in the provided sample was taken as evidence of worm infestation and recorded in the proforma. The privacy and confidentiality of the data were safeguarded and all the patients with documented evidence of worm infestation were given a prescription by the primary physician involved in early evaluation. The data was inputted and analyzed utilizing SPSS version 24.0. The numerical variable i.e. age was summarized as mean and standard deviation. A qualitative variable like sex was presented in the form of frequency and percentages. Data was stratified for age and total monthly income. Post-stratification Chi-square test was used as a test of significance taking p-value <0.05 as statistically significant.

RESULTS

The mean age of 130 anemic pregnant females was 29.86 ± 6.61 years which ranged from 18 to 40 years. The BMI recorded ranged from 26 to 34 with a mean and standard deviation of 30.19 ± 2.63 . Regarding the socio-economic status almost half, 62 (47.7%) of the patients had a total family monthly income of <20000 PKR. Further analysis revealed that 59 (45.4%) of the patients had mild anemia, 35 (26.9%) had moderate, and 36 (27.7%) patients had severe anemia. Worm infestation was found in 23 (17.7%) patients with anemia. A significant association was found between the severity of anemia and the presence of hematological abnormalities (p-value <0.001). Another significant association was found between BMI and the presence of worm infestation (p-value = 0.005). However, no association was found between monthly income and the presence of worm infestation (p-value 0.350).

DISCUSSION

The present research was aimed at determining

the frequency of worm infestation in pregnant females presenting with anemia at a tertiary care hospital. It was conducted at the Gynecology and Obstetrics Department of Rai Medical College/ Doctors Trust Teaching Hospital. Recruitment of One hundred and thirty pregnant females presenting with anemia and fulfilling the inclusion was done through nonprobability consecutive sampling.

From 130 patients, it was observed that the mean age was 29.86 ± 6.61 years, while range 18 to 40 years. The mean BMI was calculated as 30.19 ± 2.63 which ranged from 26 to a maximum of 34.

A similar study was conducted on 375 pregnant women, which revealed that 66.4% (249/375) of these pregnant females had anemia while worm infestation was present in 49.6% (186/375) of these females, furthermore out of these 171 (44.0%) had single worm infestations while 15 (4.0%) had co-infections. Presence of Plasmodium species were significantly associated with anemia (13.3%, p<0.001). Analysis also revealed that presence of certain other parasites were also significantly associated and they were Schistosoma Mansoni (5.3%, p = 0.023), Schistosoma haematobium (3.7%, p = 0.008) and hookworm (3.7%, p = 0.008). However, other single infestations were not found to be related to anemia except the cases where evidence of co-infection exist (3.7%, p=0.001). Overall, presence of intestinal parasites were found to be the most significantly associated with anemia in pregnancy (p = 0.001)^[14].

In present study there were 47.7% patients whose family monthly income was < 20000 PKR and 52.3% patients whose family monthly income was > 20000 PKR. Mild anemia was observed in 45.4% patients, moderate anemia was observed in 26.9% patients and severe anemia was observed in 27.7% patients. Worm infestation was found in 17.7% patients of anemia while worm infestation was not found in 82.3% patients.

In another study conducted in Iran, frequency of infestation with at least one parasite was 46 (16.3%) among the study subjects where most common were 24 (8.5%) hookworm, 14 (5.0%) were lumbricoides and Trichuris Trichiura was presented in 2 (0.7%) of these study participants. While the frequency of anemia

among the women was 58.9% (mean = 9.3 ± 1.0). Analysis also revealed that Intestinal parasitic infestation in these pregnant women was significantly associated with age ($P < 0.05$). It also found that the frequency of intestinal parasites was significantly different with parity ($p < 0.05$) where primigravidae had the highest infection rate (27.5%). The differences in hemoglobin levels by age groups was statistically significant ($P < 0.05$). Comparison of mean hemoglobin levels showed that infected pregnant women had lower mean Hb (8.60 ± 0.22 g/dl) than the uninfected (9.72 ± 0.07 g/dl). Significant difference (t-value = 5.660, $P < 0.05$) was observed between the Hb of the infected and uninfected pregnant women.¹⁵

In present research by using chi-square test, significant association was not found between age group and presence of worm infestation with p-value 0.635. Significant association was found between BMI and presence of worm infestation having p-value = 0.005. Significant association was not found between monthly income and presence of worm infestation with p-value 0.350. Significant association was found between severity of anemia and presence of hematological abnormalities with p-value 0.000.

A study from Bengal showed that 82% of the pregnant women were anemic while 25% of these study participants had helminthic infestation. Factors found to be significantly associated with presence of worm infestation were practice of washing hands with soap and water before taking meal, religion was also found to be significantly associated with worm infestation. Age at marriage, handwashing before eating with soap and water, avoiding eating last in the family, use of green leafy vegetable, use of lemon with the meals, fruit and flesh food intake of at least 4 days a week, and use of footwear outside the house were found to be statically significant with hemoglobin concentration.¹⁶

Since present study was conducted in one center and sample included only those pregnant women who were visiting out patient department. This study couldn't include pregnant women with anemia presenting for the first-time during labor in emergency. Due to time constraint and small sample size the results may not be

generalized. Furthermore, reliability and validity of lab test couldn't be accessed due to budgetary constrain.

Table 1: Descriptive Statistics. Total number of test subjects $n = 130$. (S.D: standard deviation, Yrs: years, BMI: body mass index, HbA1c: glycosylated hemoglobin percentage.)

Parameters	Minimum	Maximum	Mean	S.D.
Age (yrs)	18	40	29.86	6.61
BMI (kg/m ²)	26	34	30.19	2.63
HbA1c (%)	5	10	7.75	1.47

Table 2: Distribution of monthly income. PKR: Pakistani rupee.

Monthly Income	Frequency	Percent
$\leq 20,000$ PKR	62	47.7
$> 20,000$ PKR	68	52.3
Total	130	100

CONCLUSION

The frequency of worm infestation was found as 17.7% in pregnant females presenting with anemia to a tertiary care hospital. Effect modifiers have significant influence except age and monthly income.

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