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# The effect of Hymenolepiasis on anemia in pregnant women

# A Cases Report

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## Abstract:

Hymenolepiasis is a parasitic Infection in human caused by one of the tapeworms, such as *Hymenolepis nana* (*H. nana*). The infection most often occurs as an autoinfection where it is transmitted directly from the feces to the mouth without the intermediate host. In the current study, we present two cases of Hymenolepiasis, both cases were pregnant women. "Samples were collected from patients who visited Bint Al-Huda Maternity and Children's Hospital. The first sample was obtained from a 27-year-old pregnant female in her 32nd week of gestation. She presented with symptoms of abdominal pain, diarrhea, vomiting, and general fatigue. The diarrhea occurred at a frequency of four to five times per day. General physical examination and ultrasound assessment of fetal health were within normal limits. Blood analysis revealed anemia with a hemoglobin level of 8.6 g/dL. Stool examination indicated the presence of intestinal parasites, and based on the morphological characteristics of the parasite, the diagnosis was *H. nana* infection .The second sample was obtained from a 22-year-old pregnant female in her 19th week of gestation, residing in a rural area. She exhibited similar symptoms to the first case, including recurrent vaginal discharge. Stool analysis confirmed the presence of *H. nana* eggs. The stool sample showed a higher concentration of *H. nana* eggs compared to other parasitic worms, suggesting that *H. nana* is likely the primary causative agent of the patient's symptoms. Additionally, the patient was diagnosed with anemia, with a hemoglobin level of 8.2 g/dL."

**Keywords:** cyclophyllidean group, *Hymenolepis nana* , pregnant woman, anemia

## 1-Introduction

A parasitic infection known as hymenolepiasis is caused by a tapeworm, *Hymenolepis nana* (*H. nana*). The infection most frequently manifests as an autoinfection, meaning that there is no intermediary host involved and it spreads straight from the excrement to the mouth.(1) Pregnant women can be infected with parasitic diseases, which

are more severe, causing symptoms such as bloody diarrhea, vomiting, and fever, which can lead to premature birth of the fetus due to the pregnant mother's immune deficiency (2) More than a billion people worldwide suffer from intestinal parasite diseases, such as helminth and protozoa infections, particularly in low-income nations The primary mechanism of infection with this species of parasite is thought to be drinking tainted water (3). Inadequate hygiene and a compromised health system greatly accelerate the spread of intestinal parasite diseases Here, we detailed two instances of untreated anemia in pregnant patients. Nonetheless, she benefited from the test for helminth infestation and got good treatment. Her condition significantly improved after the parasit was eradicated. This example showed that stool testing for ova or cysts of parasites should always be part of anemia, even if there isn't a significant history of infection. The symptoms cannot even be slight or unnoticeable (4).

## 2- Related Work

Humans can serve as both definitive and intermediate hosts in the human-to-human transmission method the most common human cestodiasis in the world is hymenolepiasis, which is most common and burdensome among children in crowded, unsanitary communities (2). Hymenolepiasis cases are frequently observed in places like daycare centers and schools where children are crammed together. (3)

The term Hymenolepiasis is used to describe human infections with cestodes that belong to the genus *Hymenolepis*. There are two categories of cestodes: cyclophyllidean and pseudophyllidean. *Hymenolepis* is known to be belong to the cyclophyllidean group and it is distinguished by the existence of four structures in the scolex/head which resemble cups called suckers. The suckers can be classified into armed (with the presence of hook-like features) and unarmed (with no hooks). In *Hymenolepis*, the suckers are equipped with a single ring of hooks. Among the *Hymenolepis* species, *H. nana*, which is a dwarf tapeworm, is considered the main cause of human infections. It also has been recorded to infect rats (4).

The majority of *Hymenolepis* infections are asymptomatic in human which then lead to self-limited illnesses where the parasite is naturally eradicated. However, the most common clinical symptoms include abdominal pain, vomiting, and diarrhea. Pregnant women are a unique population that may be more vulnerable to infections and should receive extra consideration and care. Pregnancy-related infections can impact the health of the unborn child and the pregnant woman herself Additionally, the use of therapeutic measures during pregnancy may cause unanticipated health concerns for the mother and the unborn child (5). Based on previous studies, it was shown that anemia in pregnant women is mostly related to parasitic infections. During pregnancy, women require more blood volume and various type of nutrients. However, intestinal parasitic disease impairs the gastrointestinal tract's ability to absorb micronutrients, which consequentially compromises the transfer of nutrition to the fetus (6).

As anemia is the most prevalent medical condition during pregnancy, its diagnosis usually not associated to the parasitic disease. Due to the occasionally helminth infection casese, it is not included as part of the standard diagnostic meseaurment when it comes to anemia. Here, we described two cases of antenatal patients who had untreated anemia. She did, however, benefit from the helminth infestation screening and received quality care. Following the infection's eradication, her condition greatly improved. This example demonstrated that, even in the absence of a strong history of infection, anemia should always involve stool testing for Parasites ova or cysts. The symptoms can not even be noticeable or minor (7).

## 3- Methodology

**3.1** Collection Samples :- A case report was prepared for two patients who visited Bint Al-Huda Maternity and Children Hospital, a 27-year-old woman who was in the 32nd week of pregnancy.She was complaining of abdominal pain with diarrhea, vomiting, and general fatigue. Diarrhea was repeated at a rate of four to five times a day **.**The second case involved a 22-year-old pregnant woman in her 19th week of pregnancy, living in a rural area. She presented with abdominal pain, loss of appetite, and intermittent vomiting**.**

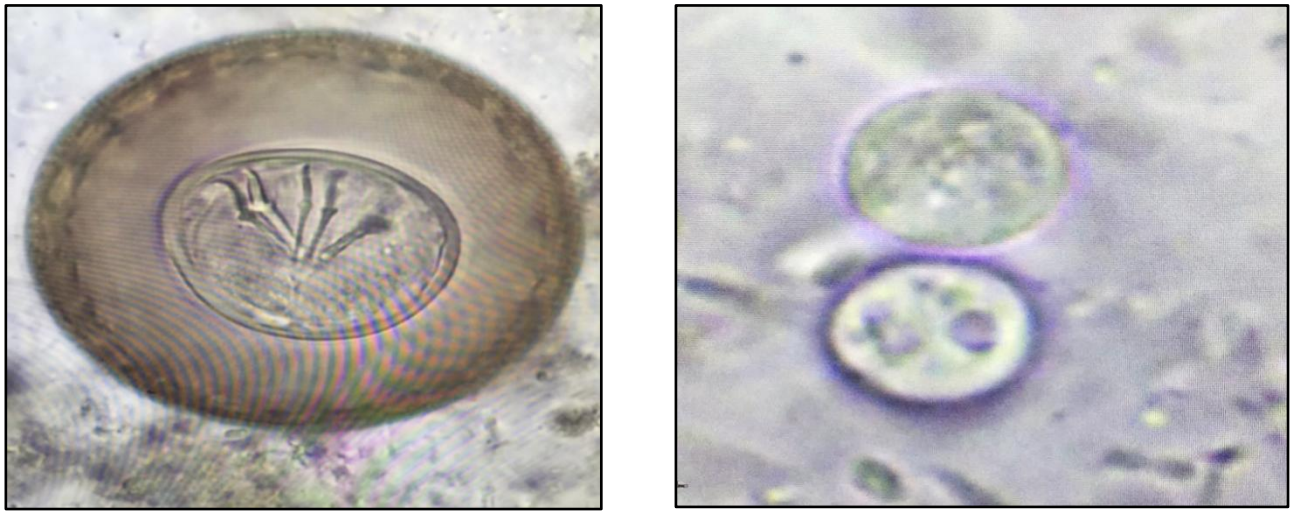
**3.2** Stool samples from patients were examined by direct smearNormal Sline and Lugol's iodine smear methods ( 8) **.**

## 4- Results

**Cases Presentation:**

Among the patients that visited Bint Al-Huda Maternity and Children's Hospital was a 27-year-old woman who was in her 32nd week of pregnancy. She was complaining of abdominal pain with diarrhea, vomiting, and general fatigue. Diarrhea was repeated at a rate of four to five times a day. Her general examination and the ultrasound examination of the fetus health were normal. Her blood analysis shows that she has anemia of( 8.6 g/dl). The examining of the stool showed the presence of intestinal parasites. Based on the appearance of the parasite, the diagnostic was *H.nana*, as shown in Figure (1).

A stool sample was taken from a woman who was in the 19th week of pregnancy. She was 22 years old and lived in a rural area. She suffers from abdominal pain, nausea, lack of appetite, with occasional vomiting and she has anemia of ( 8.2 g/dl). She was also complaining of frequent vaginal secretions. When the stool sample was examined, the presence of *H.nana* eggs was noted. There are more eggs in the stool than other parasitic worms, which are likely the main cause of the symptoms experienced by the patient. As in Table No. (1).



( 40x) (10x)

**Figure. 1: Direct stool wet mount showing egg of *Hymenolepis nana***

**Table (1) Data of patients in the study**

| Patient information | Patient 1 | 2Patient |
|---|---|---|
| Age | 27 - year | 22-year |
| duration of pregnancy | 32nd week | 19 th week |
| the most important symptoms | abdominal pain, diarrhea, vomiting, and general fatigue | abdominal pain, diarrhea, vomiting and recurrent vaginal discharge, |
| Blood hemoglobin levels | 8.6 g/dL | 8.2 g/dL |

## 5- Evaluations and Discussion

*H. nana* is considered one of the most widespread helminths around the world. In (8, 9) they described the infection in a pregnant woman in her 37th week. The patient present similar symptoms to the cases in our current study which includes abdominal pain, frequent defecation, and anemia. In Kandi and Bhoomigari study, they mentioned that the *H. nana* eggs cannot adapt to a hot environment and due to that reason, most infection occur in less hot seasons. Sometimes *H. nana* infection is considered as self-infected when its transmitting occurs directly from the feces to the mouth of the same person. (9) study indicates that Heliminths infection transmitted through the soil in tropical and subtropical countries. The study also showed as women suffer from anemia during their pregnancy, both the women and their children suffer long-term consequences. The study also noted that soil-transmitted of helminth infection has long-term negative consequences on both the mother and the child (10,11) .
Many studies such as (12) have shown that intestinal parasitic infection during pregnancy is a major global health concern. These infections are common and extremely dangerous, and many of these cases affect long-term pregnant women. Intestinal parasite infections impact about a billion individuals globally in underdeveloped nations especially pregnant women.(13). Contaminated water is one of the most frequent carriers of intestinal parasite disorders, and protozoa are the parents of helminths. (14) study, Given the current circumstances and the middle-class way of living, it is evident that the infection may have resulted from an unsanitary environment and the presence of mice in the patient's living quarters, which have long-term harborage of the parasite. This is demonstrated by the presence of eggs in the feces, which have been linked to membrane infections in research on this parasite. The aforementioned issue required attention and effort because of negative effects on the fetus, and the incidence of early birth (15) . The spread of the infection from person to person and the persistence of the parasite in the environment are both facilitated by overcrowding. Therefore, in order to avoid infections or at least lower the prevalence of the parasite, laboratory identification and preventative treatment are crucial, particularly among the sensitive population ( 14,15)
The current result is consistent with what was mentioned in Burnett, D., and Crocker, J. (1999) (8) study.
A tropical parasite disease that is often overlooked is hymenolepiasis. Preventive chemotherapy does not always stop reinfections, even though it gets rid of existing illnesses (16). Numerous variables, including aging, poor nutrition, overcrowding, poor hygiene, and inadequate sanitation, could be to blame for this. In spite of preventive treatment, overcrowded families in underprivileged rural and urban regions may serve as foci for intestinal helminth infections.(17)
According to a recent study, people who live in impoverished districts are more likely than those in other communities to have intestinal parasites and other parasitic disorders. It is important to note that the rates of spread of these diseases were not significantly influenced by demographic variables like age or gender. The study's primary findings demonstrated that, in these regions, the Hymenolepis nana parasite was more common than any other parasitic infection. Effective preventative and treatment approaches are required to address this public health concern since it is thought that the substandard living and health circumstances in disadvantaged communities greatly increase the vulnerability to these diseases ( 18).

In a study on the relationship between intestinal parasitic infections and the resulting anemia, it was observed that the findings highlight the need to enhance the focus on studying the *H. nana* parasite, and to expand the research scope to include protozoan parasites transmitted via the fecal-oral route, as well as helminths, considering them emerging disease causatives. This matter is particularly important in areas that have seen a decline in other traditionally associated parasitic infections linked to anemia. Interventions related to improving water, sanitation, and hygiene services are considered essential elements for achieving sustainable progress in the health conditions of these populations, including the alleviation of anemia.(19).Studies indicate that the parasitic worm H. nana is currently the most prevalent, a condition consistent with reports from areas such as India, Africa and Latin America. H. nana infection has been associated with the onset of anemia, where hemoglobin levels are observed to drop to between 9 and 11.(20). Although it is a common infection among children in tropical areas, our understanding of its health effects remains limited. Symptoms associated with H. nana infection in children include diarrhea, abdominal pain, irritability, headache, fever, fatigue, and delayed growth, according to previous studies. However, few studies have shown a direct link between this infection and anemia.(21). The infection is transmitted mainly by hand-to-mouth contact, and self-infection is common, as the infection can persist in the intestinal villi for long periods if left untreated. This leads to inflammation and dysfunction of the intestine, causing micronutrient leakage and low blood levels of vitamin B12 and folate. This may also explain the lack of a clear relationship between the number of worm eggs in the stool and the degree of anemia in infected individuals.(22).

## 6- Conclusion

Populations in endemic areas may be impacted by the zoonotic illness hymenolepidiasis. Pregnant women may be exposed to serious environmental dangers because of this zoonotic disease, as evidenced by the pathology and presence of *H. nana* eggs in this case report. To stop the spread of these illnesses, locals need to be taught about hygienic practices and how to get rid of rodents.

## Conflicts of Interest

The authors don't have any conflict of interest

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