Results: The prevalence of Giardia intestinalis was significantly higher (α=0.05, p<0.001) than that of H. nana. Females were found more likely to be infected as compared to males (OR: 1.40, 95% CI=1.03-1.92). Prevalence of both parasites decreased with age and highest prevalence was observed in young individuals belonging to 1-15 years of age group (41.8% and 48.7% respectively for H. nana and G. intestinalis, p<0.001). Abdominal distress (OR: 1.13, 95% CI=0.83-1.53), vomiting (OR: 1.13, 95% CI=1.13-1.81) and rectal prolapse (OR: 4.26, 95% CI=1.38-13.16) were the gastro-intestinal clinical symptoms observed in G. intestinalis. Whereas, bloody diarrhea (OR: 1.56, 95% CI=1.00-2.43) and rectal prolapse (OR: 5.79, 95% CI=1.87-17.91) were associated with H. nana. Prevalence of both parasites decreased significantly with increasing age (p<0.001). There was significant association of age and infection (p<0.001). There were more chances of infection for females (OR: 1.40, 95% CI=1.03-1.92). All the examined symptoms were more common in females. Probable causative factors were investigated and found to be lack of drinking water and poor personal hygiene. The overall prevalence of G. intestinalis and H. nana among Afghan refugees residing in District Mianwali was 16.3% and 6.0% respectively. Materials and methods The study was conducted in District Mianwali (Northwest) of Punjab that is neighboring to Khaber Phutunkhwa Province. After the Soviet invasion of Afghanistan in 1979, millions of Afghan families took refuge in neighboring Pakistan. Most of Afghan refugees (reaching approximately 3.2 million in 1990) were initially hosted in Khyber Phutunkhwa and Balochistan Provinces but later on camps were also established at Kot Chandana, district Mianwali in 1982 (Commissionerate for Afghan Refugees - CAR, 2013). Central Health Unit (CHU) is the only medical care unit working for Afghan Refugees at Kot Chandna camp, under the supervision of CAR Government of Pakistan. A passive study was conducted from February 2007 to December 2009 at Central Health Unit (CHU), to access the prevalence of G. intestinalis and H. nana in the refugees. Prevalence of G. intestinalis infection in developed countries could not be explained by this fact alone and it might comprise of zoonotic transmission as well as fecal contamination from animal sources. High occurrence of Giardia has also been documented in children in an epidemiological investigation conducted in children of Spain and Colombia. Hymenolepis genus constitutes approximately 400 species, almost all of which infect higher vertebrates. Hymenolepis nana (H. nana) generally known as dwarf tapeworm, is most commonly found in children and is more generally present in the warmer climates. The mature parasite resides in host intestine. H. nana varies from almost all the rest of tapeworms in being capable of completing its intact life cycle in a single host. On ingestion of eggs by humans, mice or rats, the oncospheres start crawling inside their shells and eventually reach the lumen of the intestine. Prevalence of Giardia intestinalis and Hymenolepis nana in Afghan refugees population of Mianwali district, Pakistan. Khan Abrar Ul Haq1, Naz Asma Gul2, Hussain Muhammad Hammad3, Yasmeen Bhi3, Asma Bhi1, Javed Mohsan1

1. Institute of Microbiology, University of Agriculture Faisalabad, Pakistan
2. Department of Zoology, Bahauddin Zakariya University, Multan, Pakistan
3. Veterinary Research Center, Ministry of Agriculture & Fisheries, Sultanate of Oman
4. Department of Clinical Medicine & Surgery, University of Agriculture, Faisalabad
5. Department of Livestock & Dairy Development, Lahore, Punjab, Pakistan

Abstract

Background: Present study aimed to investigate prevalence of Giardia intestinalis and Hymenolepis nana in Afghan refugees visiting Central Health Unit (CHU), Kot Chandana (Mianwali, Northern Punjab) during two years period (February 2007 to December 2009).

Methods: A total of 687 stool samples were collected from different age groups of both genders. Samples were processed under sterile conditions after gross examination. Microscopic examination was done on same day along with eggs (H. nana), cyst and trophozoites (G. intestinalis) detection after staining.

Results: The prevalence of G. intestinalis was significantly higher (α=0.05, p<0.001) than that of H. nana. Females were found more likely to be infected as compared to males (OR: 1.40, 95% CI=1.03-1.92). Prevalence of both parasites decreased with age and highest prevalence was observed in young individuals belonging to 1-15 years of age group (41.8% and 48.7% respectively for H. nana and G. intestinalis, p<0.001). Abdominal distress (OR: 1.13, 95% CI=0.83-1.53), vomiting (OR: 1.13, 95% CI=1.13-1.81) and rectal prolapse (OR: 4.26, 95% CI=1.38-13.16) were the gastro-intestinal clinical symptoms observed in G. intestinalis. Whereas, bloody diarrhea (OR: 1.56, 95% CI=1.00-2.43) and rectal prolapse (OR: 5.79, 95% CI=1.87-17.91) were associated with H. nana. Prevalence of both parasites decreased with increasing age (p<0.001). There was significant association of age and infection (p<0.001). There were more chances of infection for females (OR: 1.40, 95% CI=1.03-1.92). All the examined symptoms were more common in females. Probable causative factors were investigated and found to be lack of drinking water and poor personal hygiene. The overall prevalence of G. intestinalis and H. nana among Afghan refugees residing in District Mianwali was 16.3% and 6.0% respectively.

Conclusions: Intestinal parasitic infections are common among Afghan refugees and serious preventive measures should be implemented to promote the safety and healthy lifestyle of these people.

Keywords: Giardia intestinalis, Hymenolepis nana, Prevalence, Afghan Refugees, Punjab

DOI: http://dx.doi.org/10.4314/ahs.v15i2.12

Introduction

Intestinal parasitic infection in any country is a common cause of morbidity along with mortality. The incidence is predominantly high in developing countries owing to the poor sanitary conditions, usage of contaminated drinking water and poor personal hygiene. The prevalence rate in the range of 9% to 80% was reported from different countries and target populations. Giardia intestinalis (synonymous with Giardia duodeni- lis, Giardia lamblia and Lambila intestinalis) is a zoonotic protozoan which causes gastroenteritis (giardiasis) in humans. Giardiasis affects humans and domestic as well as wild animals. World Health Organization had reported that, since 1988, there were over 280 million new cases of Giardia intestinalis (G. intestinalis) infection observed every year in Africa, Latin America and Asia. The infection might be asymptomatic or symptomatic and G. intestinalis trophozoites hamper nutrient absorption from the intestine, generating various degrees of malabsorption. Giardiasis is associated with socioeconomic level of a country and its prevalence ranges from 2 to 7% in most of industrialized regions and reaching 40% in developing countries.

In developing countries, food and water, the primary source of infection, are mainly contaminated by human excrement and consequently play an important role in transmission of human infection. However, high incidence of G. intestinalis infection in developed countries could not be explained by this fact alone and it might comprise of zoonotic transmission as well as fecal contamination from animal sources. High occurrence of Giardia has also been documented in children in an epidemiological investigation conducted in children of Spain and Colombia.

Hymenolepis genus constitutes approximately 400 species, almost all of which infect higher vertebrates. Hymenolepis nana (H. nana) generally known as dwarf tapeworm, is most commonly found in children and is more generally present in the warmer climates. The mature parasite resides in host intestine. H. nana varies from almost all the rest of tapeworms in being capable of completing its intact life cycle in a single host. On ingestion of eggs by humans, mice or rats, the oncospheres start crawling inside their shells and eventually reach the lumen of the intestine.

There is broad diversity of clinical symptoms in pa- tients with parasitic infection. Sullivan et al. established a high prevalence of G. intestinalis in children with chronic diarrhea along with malnutrition. Mild infections of H. nana are asymptomatic but severe infections cause abdominal pain, headache, diarrhea and dizziness among other vague symptoms. Cases associated with neurological symptoms have also been reported from ex-Soviet Union. Deaths from these infections have not been reported. In juveniles the infection tends to clear spontaneously. The method of infection and the development of immunity are interconnected.

Though investigations have been conducted on preva- lence of H. nana in different parts of Pakistan; yet no study has been carried out on G. intestinalis and H. nana among Afghan refugees residing in District Mianwali. The present study was designed to investigate the overall prevalence and the relationship between sex and age of the host with these intestinal parasitic infections.

Outcomes of the present investigation were therefore projected to be helpful for devising control strategies and future research programs on these parasites in Pakistan.

Prevalence of Giardia intestinalis and Hymenolepis nana in Afghan refugee population of Mianwali district, Pakistan.

Khan Abrar Ul Haq1, Naz Asma Gul2, Hussain Muhammad Hammad3, Yasmeen Bhi3, Asma Bhi1, Javed Mohsan1

1. Institute of Microbiology, University of Agriculture Faisalabad, Pakistan
2. Department of Zoology, Bahauddin Zakariya University, Multan, Pakistan
3. Veterinary Research Center, Ministry of Agriculture & Fisheries, Sultanate of Oman
4. Department of Clinical Medicine & Surgery, University of Agriculture, Faisalabad
5. Department of Livestock & Dairy Development, Lahore, Punjab, Pakistan

Email: abrarulhaqkhan@gmail.com

Corresponding author:
Khan Abrar Ul Haq
Institute of Microbiology,
University of Agriculture Faisalabad, Pakistan
Email: abrarulhaqkhan@gmail.com

African Health Sciences Vol 15 Issue 2, June 2015

African Health Sciences Vol 15 Issue 2, June 2015
The prevalence of G. intestinalis and H. nana in the studied population. Mehraj et al.,25 reported prevalence of both intestinal parasites was observed in females. This difference in prevalence was not significant in case of H. nana (x²=0.79, p=0.33) and significant in case of G. intestinalis (x²=4.48, p=0.034). Univariate analysis indicated that females were more likely to be infected by H. nana (1.18, 95% CI=0.85-1.63) and G. intestinalis (1.40, 95% CI=1.02-1.92). The number of positive individuals for both parasites decreased with age (Table II).

Table II: Relationship of age and parasitic infestation:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>H. nana</th>
<th>G. intestinalis</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pos./Tested (95% CI)</td>
<td>OR (95% CI)</td>
</tr>
<tr>
<td>0</td>
<td>109/261 (41.8, 35.7-48)</td>
<td>4.24 (2.14-8.40)</td>
</tr>
<tr>
<td>1</td>
<td>58/213 (27.2, 21.4-33.7)</td>
<td>2.22 (1.09-4.48)</td>
</tr>
<tr>
<td>2</td>
<td>35/137 (25.5, 18.5-33.7)</td>
<td>2.03 (0.96-4.27)</td>
</tr>
<tr>
<td>3</td>
<td>11/76 (14.5, 7.5-24.4)</td>
<td>1.00 (0.41-2.45)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NB: Age groups represent as; 0 = 0-15 years, 1 = 16-30 years, 2 = 31-45 years, 3 = above 45 years

The highest prevalence of H. nana was observed in age group 1 (41.8%), followed by group 2 (27.2%), group 3 (25.3%) and group 4 (14.5%), x²=27.15, p<0.001. Similarly, the highest prevalence of G. intestinalis was recorded in age group 1 (48.7%) followed by group 2 (37.1%), group 3 (26.3%) and group 4 (22.4%), x²=28.56, p<0.001. Odds ratio for association between prevalence and age in various age groups regarding each parasite was calculated and presented in Table II.

The most common clinical presentation was recurrent abdominal discomfort (51.8%), diarrhea (28.1%), upper and lower respiratory symptoms (14.7%), bloood in stool (14.0%) and vomiting (11.9%). Less common clinical features were recurrent pneumonia (4.1%) and rectal prolapse (2.0%). Clinical data indicated that majority of the clinical symptoms were not specific for diagnosis of both parasites (Table III). Abdominal distress (OR: 1.13, 95%CI=0.83-1.53), vomiting (OR: 1.13, 95%CI=1.13-1.81) and rectal prolapse (OR: 4.26, 95%CI=1.38-13.16) were more specific gastro-intestinal clinical signs observed in G. intestinalis positive individuals. Bloody diarrrhea (OR: 1.56, 95%CI=1.00-2.43) and rectal prolapse (OR: 5.79, 95%CI=1.87-17.91) were the specific gastro-intestinal symptoms associated with H. nana infection. Respiratory problems (OR: 2.04, 95%CI=1.33-3.11) and pneumonia (OR: 2.28, 95%CI=1.08-4.84) were also found associated with patients infected with G. intestinalis. Moreover, patients suffering from respiratory problems were found more likely to be positive for H. nana infection (OR: 1.49, 95%CI=0.96-2.30).

Table III: Clinical presentations of the patients:

| Clinical Sign | G. intestinalis | | H. nana | |
|---------------|----------------|---------------|----------|
|               | observed (% of Total Positive) | p value | observed (% of Total Positive) | p value |
| Abdominal discomfort | 11.26 (0.897) | 0.483 | 0.82 (0.659) | 0.233 |
| Diarrhea       | 0.785 (0.554)  | 0.469 | 0.97 (0.68)  | 0.878 |
| Respiratory problems | 2.037 (1.331) | 0.001 | 1.49 (0.96) | 0.073 |
| Blood loss     | 0.846 (0.538)  | 0.469 | 1.56 (1.00) | 0.331 |
| Diarrhea       | 33 (12.7%) | 0.649 | 38 (17.8%) | 0.05 |
| Vomitting      | 1.129 (0.705) | 0.613 | 19 (8.9%) | 1.02 |
| Pneumonia      | 16 (6.2%) | 2.28 (1.08, 4.84) | 0.03 | 7 (3.3%) | 1.73 |
| Rectal prolapse| 10 (3.9%) | 4.26 (1.38, 13.16) | 0.009 | 10 (4.7%) | 0.001 |

Discussion

The prevalence of G. intestinalis and H. nana in the excrements of patients suffering from abdominal discomfort was examined in the present manuscript. High prevalence of both intestinal parasites was observed in females. This difference in prevalence was not significant in case of H. nana (x²=0.79, p=0.33) and significant in case of G. intestinalis (x²=4.48, p=0.034). Univariate analysis indicated that females were more likely to be infected by H. nana (1.18, 95% CI=0.85-1.63) and G. intestinalis (1.40, 95% CI=1.02-1.92). The number of positive individuals for both parasites decreased with age (Table II).

The prevalence of G. intestinalis was notably much higher among labor community having very low economic status. This result is in consistence with the finding of Goldin et al.23. The prevalence of H. nana was also found at a high level (31%), similarly to the study conducted by Wadood et al.33, showing H. nana (3.0%) in the city of Abba, South Western, Saudi Arabia. Jalili and Cerven34 reported H. nana (6.0%) in the province of Baghlan (Afghanistan). Machado and Costacruz26 reported 6.7% prevalence of H. nana in the city of Uberlandia, State of Minas Gerais. Azazy and Araba27 estimated the prevalence of H. nana at 12.4% in Chandigarh (Northern India). Our results differ from those described by Omar et al.33, showing H. nana (5.0%) in the city of Jeddah, Saudi Arabia. Siddiqui et al.31, similarly to the study conducted by Wadood et al.33, reported 4.26% prevalence of H. nana in the city of Karachi, Pakistan. These variations may be due to variation in climate and living conditions. The prevalence of G. intestinalis was notably much higher among labor community having very low economic status. This result is in consistence with the finding of Goldin et al.23.
Higher incidence of both parasites was detected in females. Statistical analysis also specified that females were more likely to be infected by these parasites. The relationship between sex of the host and H. nana had also been established in different parts of the world. Results of this study differ from that of Menan et al. who reported that the male subjects were commonly infected than females.


