Common Parasitic Infestation among Rural Population in Sohag Governorate, Egypt

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Abstract: Intestinal parasitic infestations are endemic worldwide especially in developing countries. The aim of this study is to determine the prevalence of common intestinal parasitic infestations in rural Sohag and factors affecting it. This cross sectional study has been conducted in Zewak Sharqia village, El-Monshaa district, Sohag Governorate, Egypt from August 2010 up to March 2011. A random sample of 516 persons was taken. Data was collected and stool samples were taken. Two hundred and eighty four (55%) of studied population were infested by intestinal parasites. The intestinal parasites that detected were Exuris (21.7%), Amoebiasis (13.2%), Giardiasis (9.9%), *H. nana* (9.9%), *S. mansoni* (0.2%), and Ascariasis (0.2%). Infection rates were significantly higher in children less than 12 years (63.31%), persons with low socioeconomic status (82.10%), using pumped water (79.82%), did not wash vegetable and fruits (90.44%) , did not receive health education (88.32%), did not visit doctor regularly (76.92%) and who were underweight (100%). Higher infection rate was independently associated with age less than 12 years (odds ratio= 2.37 CI=1.17-4.79), low Socioeconomic status (odds ratio= 12.60, CI=5.66-28.08), not wash fruits and vegetables (odds ratio = 2.65, CI=1.19-5.91), not receiving health education (odds ratio =3.54, CI =1.56-8.04) and not visiting doctor regularly (odds ratio=7.78, CI = 3.21-18.85). Gender and source of water were not independently risk factors for higher infection.
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1. Introduction:

Intestinal parasitic infestations are endemic worldwide and it is one of the most common tropical diseases in developing countries, where the prevalence rate ranges between 30 and 60% [1]. Poverty, illiteracy, bad hygiene, unavailability of potable water and hot and humid tropical climate are the factors that increase the risk of intestinal parasitic infestations [2]. Parasitic infestations cause malabsorption, diarrhea, and poor health status [3]. It also causes poor growth, reduced physical activity and impaired learning ability in children [4].

Studies in Alexandria Governorate [5] and in Menoufia Governorate, Egypt [6] showed that about half of the population had intestinal parasitic infestation. There are no studies to examine the prevalence of intestinal parasites in Sohag, Egypt. This aim of this study was to determine the prevalence of common intestinal parasitic infestations in rural Sohag and its predisposing factors.

2. Material and methods:

Study setting:

This cross sectional study has been conducted in Zewak Sharqia village, El-Monshaa district, Sohag Governorate, Egypt from August 2010 up to March 2011 (i.e. about 8 months). A written request has been sent to Sohag Health & Population Directorate seeking the approval of the health authority to carry out this study on the study setting. Then they approved and expressed their full cooperation through a written letter to the rural health unit Personnel.

Sampling:

The total population of Zewak Sharqia village is approximately six thousand peoples. Supposing that 50% was the prevalence in Egypt [5; 6] with acceptable difference of 5% and desired 95% confidence interval (CI), the needed sample size was 361. A systematic random sample was taken from houses of the village (each fifth house), and we included 516 persons in this study.

Methods of data collection:

Personal interviews were done with the 516 sampled persons to collect data using well-structured questionnaires.

Clinical examination:

Examination of general condition were performed to detect any abnormalities. Chest, heart and abdominal examination were done to detect any gross abnormality. Weight and height was also measured.

Laboratory investigation:

Stool samples were taken from all persons in the study. Stool analysis of the collected samples was done in the laboratory of Parasitology department by the researchers.

Statistical analysis:

The statistical analysis was performed using Intercooled Stata program for window, version 9.2. Chi-square test was used for comparison of categroical data. Logistic regression analysis was made to identify independent risk factors parasitic infestations. P value

was considered significant if less than 0.05

3. Results:

Characteristics of studied population:

Characteristics of studied population were shown in table (1). As regard Socio-demographic characteristics of the studied population, 37.8 % were under age of twelve years and 56.2% were females. About half of the studied population was from low socio-economic level (49.8%) while only (12%) were from high socio-economic level. Table (1) also showed some environmental and cultural characteristics of the studied population**.** About 56.8% of the studied population used tap water while 43.2% of them used handle pump water. Approximately half (51.4%) of the studied population washed vegetables & fruits before eating and 46.9% of them were received health education while 34.5% visited doctor regularly.

Common health problems:

The medical history of studied population showed that, the common complaints were abdominal pain (12.6%), chronic diarrhea (7.0%), tenesmus & mucous (9.5%), easy fatigability(15.9%), low concentration(9.3%), suffering from loss of appetite (10.9%). There were 34.9% had no complaint. The main signs found by clinical examination were pallor (15.9%), petriasis alba (13.4%), angular stomatitis (7.2%), fissured coated tongue (6.2%). There were 57.4% were clinically free. Measuring the weight of studied population showed that (40.1%) of them were underweight.

Prevalence of intestinal infestations:

Two hundred and eighty four (55%) of studied population were infested by intestinal parasites. The prevalence of different parasitic infestations were Exuris (21.7%), Amoebiasis (13.2%), Giardiasis (9.9%), *H. nana* (9.9%), *S. mansoni* (0.2%), Ascariasis (0.2%).

Infection rates were significantly higher in children less than 12 years (63.31%), persons with low Socioeconomic status (82.10%), those using pumped water (79.82%), did not wash vegetable and fruits (90.44%), did not receive health education (88.32%), did not visit doctor regularly (76.92%) and those were underweight (100.00%). Gender was not statistically associated with higher infection rate ($P < 0.06$) (Table 2).

Risk factors for intestinal infestations:

Table (3) showed that, higher infection rate was independently associated with age less than 12 years (odds ratio= 2.37 CI=1.17-4.79), low Socioeconomic status odds ratio= 12.60, CI=5.66-28.08), not wash fruits and vegetables (odds ratio = 2.65, CI=1.19-5.91), not receiving health education (odds ratio =3.54, CI =1.56-8.04) and not visiting doctor regularly (odds ratio=7.78, CI = 3.21-18.85). Gender and source of water were not independently risk factors for higher infection.

Table 1. Characteristics of the studied population in Sohag rural area, Egypt.

Characteristics	No.	%
Age		
Less than 12 years	192	37.8
12 years or more	324	62.79
Sex		
Female	290	56.20
Male	226	43.80
Socioeconomic status		
Low	257	49.8
Moderate/High	259	50.2
Source of water		
Tap	293	56.78
Pump	223	43.22
Washing vegetable and fruits		
Yes	265	51.36
No	251	48.64
Health education		
Yes	242	46.9
No	247	53.1
Doctor visit		
Yes	178	34.5
No	338	65.5
Weight		
Normal	309	59.9
Underweight	207	40.1

Table 2. Prevalence of parasitic infestation according to different characteristics of studied population in Sohag rural area, Egypt.

Characteristics	Total	Infected		*P* value
		Number	Percent	
Age				
Less than 12 years	192	121	63.31	0.005
12 years or more	324	163	50.31	
Sex				
Female	290	149	51.38	0.06
Male	226	135	59.38	
Socioeconomic status				
Low	257	211	82.10	<0.0001
Moderate/High	259	73	28.19	
Source of water				
Tap	293	106	36.18	<0.0001
Pump	223	178	79.82	
Washing vegetable and fruits				
Yes	265	57	21.51	<0.0001
No	251	227	90.44	
Health education				
Yes	242	42	17.36	<0.0001
No	247	242	88.32	
Doctor visit				
Yes	178	24	13.48	<0.0001
No	338	260	76.92	
Weight				
Normal	309	77	24.92	<0.0001
Underweight	207	207	100.00	
Total	516	284	55.04	

Table 3. Significant risk factors in multivariate logistic regression analysis of the studied factors and intestinal parasitic infections in Sohag rural area, Egypt.

Characteristics	Adjusted odds ratio (95% CI)*	*P* value
Age		
Less than 12 years	2.37 (1.17-4.79)	0.02
12 years or more	1.00	
Socioeconomic status		
Low	12.60 (5.66-28.08)	<0.0001
Moderate/High	1.00	
Washing vegetable and fruits		
Yes	1.00	0.02
No	2.65 (1.19-5.91)	
Health education		
Yes	1.00	0.002
No	3.54 (1.56-8.04)	
Doctor visit		
Yes	1.00	<0.0001
No	7.78 (3.21-18.85)	

*** Adjusted for other factors in the table.**

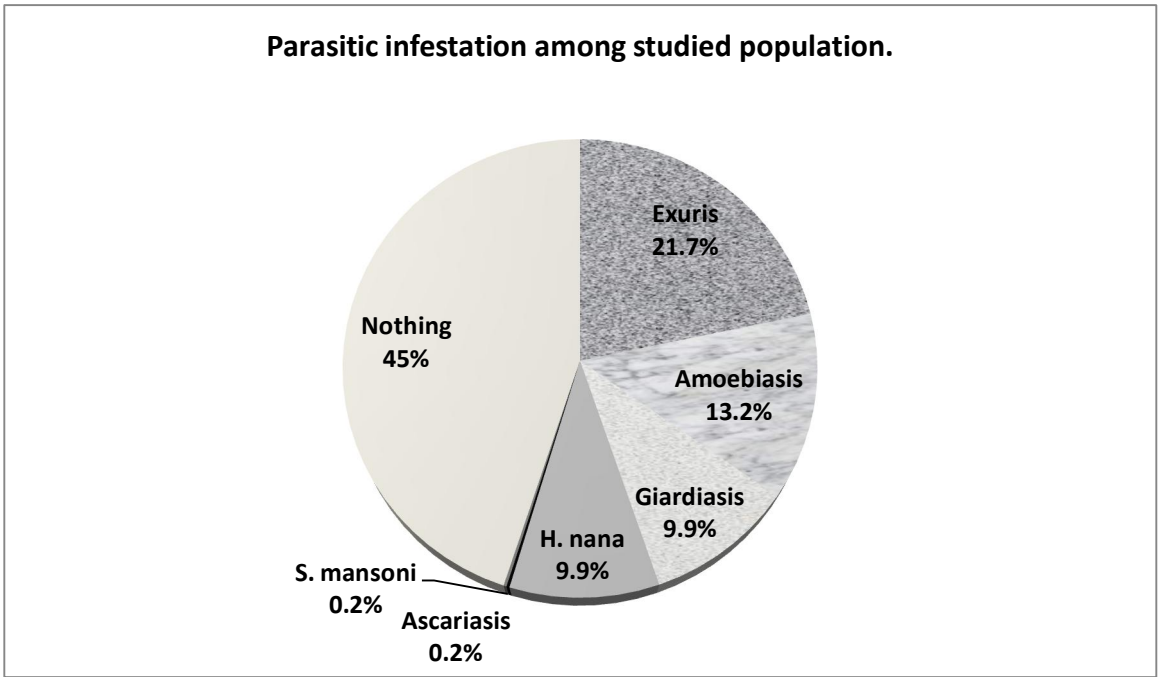

Figure 1. Prevalence of parasitic infestation in stool examination, in Sohag rural area, Egypt.

4. Discussion:

In Sohag governorate, to our knowledge, there is no study investigate the prevalence of intestinal parasitic infestation and its impact predisposing factors. This study investigates this issue in a rural area in Sohag governorate and revealed that intestinal parasitic infestations are still a public health problem as more than half (55%) of the studied population were infected by intestinal parasites. This finding is near the result reported from study in among young workers in urban and rural areas of Alexandria Governorate, Egypt [5] where the prevalence was approximately 50% and from a study in a village in Menoufia Governorate, Egypt [6], where the prevalence was 47.8%.

Worldwide the prevalence rates of parasitic infestations were varying. A study in rural and remote areas of West Malaysia reported overall prevalence of intestinal parasite of 73.2% [7]. In an agricultural settlement in the Amazon Basin in Brazil, the prevalence was (53.4%) [8]. In Riyadh Saudi Arabia one-third of the population (32.2%) was infected by intestinal parasites [9]. The higher rates in developing communities may be attributed to improper hygiene and agricultural backgrounds.

The most common intestinal parasites among the study participants were Exuris (21.7%), Amoebiasis (13.2%), Giardiasis (9.9%), and *H. nana* (9.9%). In a village in Menoufia Governorate, Egypt [6], the common parasites were *Entamoeba histolytica* (20%) , *E. coli* (10%), *Giardia lamblia* (10%), *Ascaris lumbricoides* (27.31%). The difference may because of location as our study in Sohag, Upper Egypt while Menoufia is Lower Egypt. *Giardia lamblia* and *E. histolytica* showed high rate also in Saudi Arabia [2; 9] in India [10] and in Pakistan [11]. Usually these infections were related to low socioeconomic status, bad hygiene and bad sanitation and lack of health education. The prevalence of *S. mansoni* was very low (0.2%) as it is not common in Upper Egypt.

This study showed that, higher infection rate was independently associated with age less than 12 years (odds ratio = 2.37 CI=1.17-4.79). The infection rates were significantly higher in children less than 12 years (63.31%). Many studies showed high prevalence of intestinal parasites in children in Egypt (78.8%) [12], India (72.28) [10], West Malaysia (76.7) [7], Abbottabad (81%) [2], urban slum of Karachi Pakistan (52.8%) [11] and Cambodia (54.2%) [13]. The high infection rate among children may be attributed to toilets practices of young children and outdoor feeding in higher age groups.

Low Socioeconomic status (odds ratio = 12.60, CI=5.66-28.08), not wash fruits and vegetables (odds ratio = 2.65, CI=1.19-5.91), not receiving health education (odds ratio =3.54, CI =1.56-8.04) and not visiting doctor regularly (odds ratio=7.78, CI = 3.21-18.85) were associated with higher risk for parasitic infestations. Low socioeconomic status was found to be risk factors in many other studies [7; 11; 14] The effect of socioeconomic status on the risk of parasitic infestations may be due to several factors. These factors include lack of access to clean water, poor hygiene, lack of health education and overcrowded conditions [15; 16]. Bad sanitation , poor health education and not using medical services were found to be risk factors in many studies [7; 1719]. WHO were

considered health education and chemotherapy as major fields of action to reduce the rate of parasitic infestations [20].

All patients with intestinal parasites were under weight. Underweight may be predisposing factor for intestinal infection as the immunity of these patients may be low because of poor nutrition, which is probably because of low socioeconomic status. On the other hand underweight may be a consequence of intestinal parasitic infestations.

Gender was not independently risk factor for higher infection rate. This finding was confirmed in other studies [11; 21; 22]. Water source was found to be significant risk factor in several studies [9; 10; 23; 24]. In this study, we find significant increase rate of infection in those using pumped water. However, when adjusted to other factors, the source of water was not significant risk factor. This indicate that low socioeconomic condition, poor sanitation , lack of health education and lack of seeking medical advice were more important than water source in Egypt and pumped water play less role in transmission of intestinal parasite.

This study had some limitations. We conducted single stool examination, which could have underestimated the prevalence, as optimal diagnosis of intestinal parasitic infestations requires the examination of at least three stool specimens collected over several days. Due to logistic constraints, the stool analysis was delayed three to six hours, so, we could not detect the invasive form of protozoa, i.e. the trophozoites.

From this study, we concluded that intestinal parasitic infestation was still representing public health problem as more than 50% of population were infected in Sohag. Children under 12 years were more liable to infection than adult. Low Socioeconomic status, not wash fruits and vegetables, not receiving health education and not visiting doctor regularly were associated with increased risk for parasitic infestations. Effective poverty reduction programs and proper sanitation could reduce intestinal parasite carriage. There is a need for mass campaigns to create awareness about health, hygiene and importance of medical advice.

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