Intestinal Parasitic Infections among Primary School Children in Al Qurain District, Sharkia Governorate

Yasmin H. H. Hussein [1*], Howaida H. Fahmy[2], Doaa E. A. Sewilam[1]
[1] Department of Family Medicine, Faculty of Medicine, Zagazig University, Egypt.
[2] Department of Community Medicine, Faculty of Medicine, Zagazig University, Egypt.

Abstract:
Background: Intestinal Parasitic Infections (IPIs) are major public health problems, mainly affecting school children. One of the sustainable development goals of the United Nations is to control the transmission of IPIs and the modification of possible risk factors. **Objectives:** To estimate the frequency and risk factors of intestinal parasitic infections among primary school children in Al Qurain district, Sharkia Governorate. **Methods:** a cross-sectional study was conducted on 320 primary school children. Participants' data regarding socio-demographic characteristics, behavioral health habits, and complaints assessment questions were collected via semi-structured questionnaire. Stool samples were collected from students by the aid of their mothers and examined in the family medicine center. **Results:** The study revealed that one third (35%) of studied children had a parasitic infection. The highest percentage (44.4%) of infected children had E.histolytica.Children aged 9-12 years, with low mothers' and fathers' education, large family size, and low social class are more likely to had IPIs. The study found a statistically significant association between all behavioral health habits, all clinical manifestations, and parasitic infection. **Conclusion:** The results of the study reflect a relatively high prevalence rate of parasitic infections demands improved health education on regular hand washing, usage of toilet paper, washing fruits and vegetables, not eating outdoors, and avoid walking barefoot.
Keywords: Hand washing, Rural, Stool Analysis, Urban.

Introduction:

Intestinal parasitic infections (IPIs) are area unit amongst the foremost common infections worldwide, the World Health Organization (WHO) estimate a minimum of a pair of billion folks worldwide are affected, and of those close to three hundred million are sick as results of these infections, five-hundredths of them being school-age children.(1) Fifty-six percent of school children in Egypt are affected by intestinal parasites.(2)

Many factors affecting regional distribution and prevalence of IPIs as geographic, socio-economic aspects, climate, poverty, malnutrition, personal and community hygiene, population density, no clean water, and poor sanitary facilities.(3) Helminthic infections in children are associated with a significant effect on wasting and stunting.(4) Child nutritional status and physical development are commonly affected by IPIs, which will have negative consequences on cognitive function and learning ability.(5)

These adverse health consequences associated with impaired childhood academic performance, increase absenteeism, and subsequent productivity. Also, it affects their physical development and will additionally stop them from taking full advantage of their chance for formal education.(6)

WHO recommends treating all school children at regular intervals with deworming medication in areas wherever the helminthic infection is common, to boost nutritional status, hemoglobin, cognition, and overall health of school children.(7) The first step for watching the progress of management efforts and for the formulation of future intervention methods for

Corresponding author: yasmin_elhusseiny@yahoo.com

IPIs is to measure the frequency and establish the predisposing factors to infection. [8]

The prevalence and regional distribution of IPIs are variable. This reflects the importance of periodical evaluation of the prevalence and risk factors of IPIs in adapting an effective control and prevention strategy. Therefore, this study was conducted to estimate the current frequency and risk factors of IPIs among primary school children in Al Qurain district, Sharkia Governorate.

The aim of the current study is to estimate the frequency and risk factors of intestinal parasitic infections among primary school children in Al Qurain district, Sharkia Governorate.

Methods:

Study design and sampling method: A cross-sectional study was conducted during the academic year 2018-2019 in the period from February 2019 till May 2019. The sample was calculated to be 320 primary school children, based on intestinal parasitic infections prevalence 31% [9] and a total number of primary school children in Al-Qurain district was 11,000 [10], using an online open epi program [11] at 95% confidence interval and 5% confidence limit.

Al- Qurain district includes (13) urban schools and seven rural. Two schools were selected randomly to represent rural and urban residences. Sample units were divided and collected from the selected schools by the proportional allocation method.

Study participants and data collection: The study included primary school children aged from 6 to 12 years; both sex who agree to participate. The students firstly stratified according to their educational grades (1-6), and then randomly selected using class rosters as the sampling frame. A pilot sample (10% of the total sample) was implemented to estimate the time needed to obtain the required information, and there were no administrative or technical obstacles founded (the total sample included the pilot sample).

Written consent was sent with the students for their parents' approval. The study participants (grade 4-6) were interviewed individually in the school by the research team in the presence of the class's teachers for about fifteen minutes after explanation of the purpose of the study using a semi-structured validated (by a panel of experts in community and family medicine departments) pretested questionnaire according to a previous study done in Lebanon [12] and those from grades 1 to 3 were given the questionnaire to be completed by their parents.

The questionnaire consisted of socio-demographic assessment questions, [13] questions about behavioral health habits (hand washing before eating, usage of toilet paper, washing fruits and vegetables, eating outdoors, walking barefoot, biting nails), and clinical manifestations assessment questions. The research team read and explains each item of the questionnaire to the students assisted by the class's teachers.

Students by the aid of their mothers were asked to collect stool specimens using sterile, labeled, clean, dry plastic containers in the early morning before bathing or defecation. The stool specimens transported to the laboratory of the family medicine center within 4 hours after collection. They were examined for the presence of parasites by direct wet mount, Lugol's iodine solution, and formalin-ethyl acetate sedimentation techniques. [14] Formalin-ethyl acetate sedimentation technique is the most accurate in the diagnosis of parasitic and protozoa infections with accuracy rates (98.2% and 100% respectively). [15] Single stool specimen examination, therefore, helps to generate high-quality baseline data, evaluate drug efficacy, and monitor Community interventions rigorously.

Administrative Approval: The study was approved by the education directorate in Al-Qurain district. An official permission letter was obtained from the authority and directed to schools included in the study.

Ethical Approval: Ethical considerations were taken through the whole study including informed written consent was obtained from children's parents and oral permission was taken from the teacher before interviewing with the students in the class. Official approval from the Institutional review board (IRB) was taken (ZU-IRB #5114).

Data mangement: Data were analyzed using the Statistical Package for Social sciences (SPSS) software (Statistical Package for the Sociable Sciences, version 20, SPSS Inc. Chicago, IL, USA).

Qualitative data were expressed as number and percentage and analyzed by using the Chi-square test (X^2) to detect the relation between different qualitative variables. Quantitative data were expressed as mean ± SD.

Results:

Regarding socio-demographic characteristics, more than half of the studied children belonged to age 9-12 years, had preparatory fathers' education, secondary mothers' education, their mothers were housewives, and had medium social class. The majority of their fathers were working and live in rural areas (Table 1).

The study revealed that one third (35%) of studied children had a parasitic infection (Figure 1). The majority (80.4%) of them had a single parasitic infection (Figure 2). The highest percentage (44.4%) of infected children had E. histolytica followed by E. vermicularis and Giardia with percent (38.9%) and (16.7%) respectively (Figure 3).

Children aged 6-<9 years, with low mothers' and fathers' education, large family size, and low social class are more likely to had IPIs. However, the study revealed no significant association between intestinal parasitic infections, child sex, and residence (Table 2).

The study revealed a highly statistically significant association between all children's behavioral health habits and parasitic infection (Table 3). The study revealed a statistically significant association between all clinical

manifestations and the presence of parasitic infections (Table 4).

Discussion:

In many communities, especially in developi ngcountries including Egypt, IPIs remains a pu blic health issue. (16) In the current study among 320 studied primary school children 35% had IPIs. This is almost consistent with the findings of previous Egyptian studies (17-20), estimated the prevalence of IPIs in different Egyptian governorates, and reported that the rate was (33.5%, 30.7%, 30%, and 38.3% in Alexandria, Damietta, Aswan, and Beheira respectively). This finding was agreed with the results of a study conducted in Morocco showed that 34.5% of the children were infected.[21]

On the contrary, other studies revealed a significantly high prevalence rate (79%) in Tanta governorate. [22] A study conducted in Sudan showed that IPIs were detected in 87.2% of the children**.** [23] This high prevalence could be attributed to children's exposure to predisposing factors to intestinal parasitic infections, such as (unsafe sources of water, poor sanitary conditions, and poor housing).

On the other hand, several studies showed a lower prevalence rate. A study conducted in Nigeria reported that only 12.7% were positive for parasitic infection. [24] The lower prevalence rates may be due to residential differences and improved sanitary measures in those areas.

In this study, about (19.6%) of the infected children had mixed parasitic infections. This finding can be attributed to poor sanitation, no routine screening, and treatment. This was consistent with the results of previous Egyptian studies conducted in Assiut governorate [25] and Alexandria Governorate [17], showing that about (12.7%) and (22.7%) of infected children had mixed parasitic infections, respectively.

In the current study, Entamoeba histolytica was the most common parasite by the rate (44.4%) among infected children. This result was in concordance with the results of a previous Egyptian study conducted in Aswan Governorate found that Entamoeba histolytica is the commonest parasitic infection among primary school children. [19] This may be due to the similarity of the socio-economic status of the study areas and behavioral health habits of the study participants.

The second most common intestinal parasite detected in the current study was Enterobius vermicularis, with a prevalence of 38.9%. This result was higher than the results of the Sohag governorate study which reported a rate of 21.7% among the rural population. [26] This high prevalence can be attributed to the highly infectious nature of the parasite, which is easily spread among people with crowded family.

Results of the current study found that (16.7%) of the studied children were infected with Giardia lamblia. This result was in concordance with the results of a study conducted in Assuit governorate, which reported a rate of (16.6%)**.** [25] Other studies showed a higher prevalence rate of Giardia

lamblia infection conducted in Nepal [27] and in India [28] and reported that 58.5% and 73.5% of children with IPIs had Giardia Lamblia infection respectively. Such a high prevalence rate was attributed to autoinfection due to the increasing rate of consumption of junk food.

Children aged 6-<9 years were about four times more likely to get infected. This may be due to the fact that with the advance of the age there is a greater awareness of health along with some acquired immunity obtained from previous repeated infections. This agreed with the results of a study conducted in Nigeria showed that the infection was significantly more prevalent among children aged 5-9 years. [6] On the other hand, in contrast to a study carried out in Morocco showed that the prevalence of infection was highest among children aged more than 10 years. [21]

Regarding the sex of the studied children, males were 1.39 times more likely to get infected than females. This was attributed to increased exposure of males to the external environment that causes the infections. This was in agreement with the results of the previous Egyptian study in the Minia Governorate. [29] Other studies, On the contrary, have shown that IPIs are more prominent in females, as stated by a study conducted in Sudan[30].This indicates that, depending on the region and living conditions, sex may or may not play a significant role in infection.

This study showed that school children of unemployed and with a low level of education parents were at high risk of contracting IPIs. This may be due to that education increase awareness about the hazards associated with parasitic infection. This agreed with the results of a study conducted in Iran showed that the prevalence was higher among an illiterate mother's children (39.8%) than that of a literate mother's children (13.3%). [31]

As regard family size and social class, the study concludes that children with a large family and low social class are more susceptible to parasitic infections. These findings could be attributed to overcrowding resulting in little care given to children, poor hygienic conditions and multiple and mixed infections may occur. This agreed with the previous Egyptian study in Aswan **[19]** showed that with the low social class the risk of IPIs rises. The same finding was reported in a study carried out in Ethiopia. [32]

This study showed that the association between all behavioral health habits and parasitic infections was highly statistically significant. Most of the children studied did not wash their hands before eating. This is probably due to the children's low knowledge of mainly the fecal-oral transmission of intestinal parasites, or maybe due to the lack of hand washing facilities near the lavatories. This was in line with the results of a study conducted in Saudi Arabia concluded that proper hand washing with water and soap is an important preventive measure to be recommended for IPI prevention during the local health education programs. [33]

The study showed that the association between all clinical manifestations and parasitic infections was statistically significant. These results matched the results of a study in Assiut governorate detecting a positive association between parasite infections and clinical manifestations among the children studied. [34] The presence of clinical symptoms can help to diagnose parasite infections early and minimize the complications. [35]

Limitations: There was a lack of cooperation from some parents, but the researchers persuaded them to participate in the study after explaining the importance, goals, and methodology of the study through the informed written consent that was sent with their children.

Conclusions: The study showed that 35 percent of primary school children studied had an intestinal parasitic infection, and the most common parasite was Entamoeba histolytica. The most affected group was the younger aged children with low social class, low parent education, and occupation.

Recommendations: Special attention must be given to ongoing health education programs and to raise families' awareness of appropriate sanitation and hygienic behavior in and outdoors for these target populations.

Acknowledgment: The authors would like to thank the participants and the selected schools' staff for their help to accomplish this work.

Fund: The research was conducted with no fund.

Conflict of Interest: There was no conflict of interest.

References:

1. Iwunze JI, Amaechi AA, Iheme JN, Njoku FU, Odemenam CC. prevalence of intestinal parasites among primary school children in obowo L.G.A of Imo state, Nigeria. American Journal of Environmental and Geoscience. 2017; 1(1):29–33.
2. Yones DA, Galal LA, Abdallah AM, Zaghlol KS. Effect of enteric parasitic infection on serum trace elements and nutritional status in upper Egyptian children. Trop Parasitol. 2015 Jan-Jun; 5(1):29–35.
3. Amer OS, Al-Malki ES, Waly MI, AlAg-eel A, Lubbad MY. Prevalence of intestinal parasitic infections among patients of King Fahd Medical City in Riyadh Region, Saudi Arabia: A 5-year retrospective study. Hindawi J. Parasitol. Res.2018; Article ID 8076274, 8 pages.
4. El-Sherbini GT, Abosdera MM. Risk factors associated with intestinal parasitic infections among children. J Egypt Soc Parasitol. 2013 Apr; 43(1):287–94.
5. Yones AD, Othman AR, Hassan MT, Kotb MS, Mohamed GA. Prevalence of gastrointestinal parasites and its predictors among rural Egyptian school children. Journal of Egypt [JESP]. Soc. Parasitol. 2019;(3):619–63
6. Aniwada EC, Uleanya ND, Igbokwe LN, Onwasigwe C. Soil Transmitted Helminths; Prevalence, Perception and Determinants

among Primary School Children in Rural Enugu State, Nigeria. Int J Trop Dis Health.2016; 15(1):1–12.

7. Taylor-Robinson DC, Maayan N, Soares-Weiser K, Donegan S, Garner P. Deworming drugs for soil-transmitted intestinal worms in children: effects on nutritional indicators, hemoglobin and school performance. Cochrane Database Syst Rev. 2012 Nov; 11:CD000371.
8. Bayoumy AM, Abd El Raheem MA, Abo Hashim AH, Al Saadawy AS, Karyony IM. Parasitic Profile among Primary School Children in a Rural Area at Beheira Governorate, Egypt. The Egyptian Journal of Hospital Medicine. 2018; 70(12):2042–9.
9. Hassanein NS, El-Ghaiaty HA, El-Behisy MM, Awady MA. The prevalence of intestinal parasitic infection among primary school children in rural and urban community in Gharbia Governorate, Egypt, 2014; Thesis, Faculty of medicine, Menofiya university.
10. Al Qurain Educational Administration Records, Accessed on January, 2019.
11. Open epi. Open source epidemiologic statistics for public health, version 3.01, updated 06/04/2013. [Accessed April 2019]. Available from: http://www.openepi.com/Menu/OE_Menu.htm
12. OsmanM, ElSafadi D, Cian A, Benamrouz S, Nourrisson C, Poirier P, et al. Prevalence and Risk Factors for Intestinal Protozoan Infections with Cryptosporidium, Giardia, Blastocystis and Dientamoeba among School children in Tripoli, Lebanon. PLoS Negl Trop Dis.2016; 10(3):e0004496.
13. Fahmy SI, Nofal LM, Shehata SF, El Kady HM, Ibrahim HK. Updating indicators for scaling the socioeconomic level of families for health research. J Egypt Public Health Assoc. 2015 Mar; 90(1):1–7.
14. Okyay P, Ertug S, Gultekin B, Onen O, Beser E. Intestinal parasites prevalence and related factors in school children, a western city sample—turkey. BMC Public Health. 2004 Dec; 4(1):64.
15. Hussein AH, Rashed SM, El-Hayawan IA, Ali NS, Abou Ouf EA, Ali AT. Intestinal parasite infections and accuracy of direct thin and thick smear, formol-ether sedimentation, centrifugal flotation, and mini-flotac techniques among patients with gastrointestinal tract disorders from the greater Cairo region, Egypt. Am J Trop Med Hyg. 2017; 96(3): 589-594.
16. Al-Delaimy AK, Al-Mekhlafi HM, Nasr NA, Sady H, Atroosh WM, Nashiry M, et al. Epidemiology of intestinal polyparasitism among Orang Asli school children in rural Malaysia. PLoS Negl Trop. Dis.2014 Aug; 8(8): e3074.
17. Kamal NA, Nofal LM. Anthropometric status, anemia and intestinal parasitic infections among primary school children in Alexandria, Egypt. Bull High Inst Public Health. 2012; 42(1):82–102.

18. Mohammad KAE, Mohammad AAE, Abu El-Nour MF, Youssef Saad MY, Timsah AG . The prevalence and associated risk factors of intestinal parasitic infections among school children living in rural and urban communities in Damietta Governorate, Egypt. 2012 ;Vol ;4(5)
19. Dyab AK, El-Salahy MM, Abdelmoneiem HM, Amin MM, Mohammed MF, Mohammed MF. Parasitological Studies on Some Intestinal Parasites in Primary School Children in Aswan Governorate, Egypt. J Egypt Soc Parasitol. 2016 Dec; 46(3):581–6.
20. Bayoumy AMS, Abd El Raheem MA, Hashim AH, Al-Saadawy ASK, Al Karyony IMR. Parasitic Profile among Primary School Children in A Rural Area at Beheira Governorate, Egypt, 2018; Vol. 70 (12), Page 2042–2049
21. Messaad SA, Laboudi M, Moumni M, Sarhane B, Belghyti D, El Kharrim KH. Children intestinal parasites related to socioeconomic factors in Salé hospital, Morocco. Int J InnovAppl Study. 2014; 8(2):833–40.
22. El-sehry NKM, Fouda LM, Hassan LAA. Prevalence of parasitic Infections and its Effect on the Health Status of Primary School Children. Journal of Nursing and Health Science. *2017*; 6(4); PP 41-52
23. Hamad MN, Mokhtar AA, Alameldin M. Prevalence of intestinal parasitic infections among school aged children in Berber locality, River Nile State, Sudan. J Microbiol Exp. 2019;7(2):85–6.
24. Okpara KE, Nyenke CU, Stanley HO, Immanuel OM. Prevalence of Gastrointestinal Helminthes in Students of Rivers State College of Health Science and Technology Port Harcourt. Archives of Current Research International. 2018; 12(3):1–6.
25. Bauomy MA, Hamed AM, Abdelaziz NH, Abdeltawab AH, Monazea EM, Abd Elkreem HE, et al. Prevalence And Risk Factors Associated With Worm Infestation In School Aged Children In Al-Azhar And Assiut University Hospitals, 2010;Vol.8, N. 3.
26. Hamed AF, Yousef FM, Moustafa AF. Common Parasitic Infestation among Rural Population in Sohag Governorate, Egypt. J Am Sci 2013;9(4):596–601.
27. Pradhan P, Bhandary S, Shakya PR, Acharya T, Shrestha A. Prevalence of intestinal parasitic infections among public school children in a rural village of Kathmandu Valley. Nepal Med Coll J. 2014 Sep; 16(1):50–3.
28. Jad B, Dogra S, Mahajan B. Significant Decrease in Prevalence of Intestinal Parasites among Patients Seeking Treatment in a Tertiary Care Hospital in Jammu, ISSN: 2319-7706 Volume 4 Number 11 (2015) pp. 659-664.
29. Ibrahium FA. Prevalence and predisposing factors regarding intestinal parasitic

infections among rural primary school pupils at Minia Governorate, Egypt. J Public Health Africa. 2011 Sep;2(2):e29.

30. Suliman MA, Magboul AM, Mohammed HY, Tamomh AG, Bakhit HA. Prevalence of Intestinal Parasitic Infections and Associated Risk Factors among School Children in White Nile State, Sudan. J Infect Dis Diagn. 2019;4:125.
31. Daryani A, Sharif M, Nasrolahei M, Khalilian A, Mohammadi A, Barzegar G. Epidemiological survey of the prevalence of intestinal parasites among school children in Sari, northern Iran. Trans R Soc Trop Med Hyg. 2012 Aug; 106(8):455–9.
32. Birmeka M, Urga K, Petros B. Intestinal parasitic infection and nutritional status of elementary school children aged 7-14 in Enemorena-Ener district, Gurage zone, Ethiopia. Journal of EC nutrition. 2017; 9(3): 129-141.
33. Bakarman MA, Hegazi MA, Butt NS. Prevalence, characteristics, risk factors, and impact of intestinal parasitic infections on school children inJeddah,Western Saudi Arabia. J Epidemiol Glob Health 2019;9(1):81-87
34. Monib ME, Hassan AA, Attia RA, Khalifa MM. Prevalence of intestinal parasites among children attending Assiut University Children's Hospital, Assiut, Egypt. J. Adv. Parasitol. 2016; 3(4):125–31.
35. Jayarani K, Sandhya RT, Jayaranjani K. Intestinal parasitic infections in preschool and school going children from rural area in Puducherry. Curr. Res. Microbiol. Biotechnol. 2014; 2: 406-409.

Table (1): Socio-demographic Characteristics of the Children

Variables	No (320)	%
Child age (years): mean± SD (range)	8.58±1.61 (6-11)	
▪ 6-<9 ▪ 9-12	154 166	48.1 51.9
Child sex ▪ Female ▪ Male	 160 160	 50 50
Father's education ▪ Preparatory ▪ University	 190 130	 59.4 40.6
Mother's education ▪ Read & write ▪ Secondary	 145 175	 45.3 54.7
Father's occupation ▪ Not work ▪ Work	 43 277	 13.4 86.6
Mother's occupation ▪ Not work (housewives) ▪ Work	 189 131	 59.1 40.9
Family size ▪ 6 family members ▪ 5 family members	 145 175	 45.3 54.7
Residence ▪ Rural ▪ Urban	 206 114	 64.4 35.6
Social class ▪ Low ▪ Medium	 145 175	 45.3 54.7

Table (2): Relation between Parasitic Infection and Socio-demographic Characteristics of Children

Variable	Infected (n=112)		Non infected (n=208)		Total (n=320)		OR* (95%CI)	P-value **
	No	%	No	%	No	%		
Child age (years)								
▪ 6-<9	78	50.6	76	49.4	154	48.1	3.98	
▪ 9-12	34	20.5	132	79.5	166	51.9	(2.43→6.52)	**<0.001*** **
Child sex								
▪ Female	50	31.2	110	68.8	160	50	1.39	0.160
▪ Male	62	38.8	98	61.2	160	50	(0.88-2.21)	
Father's education								
▪ Preparatory	76	40	114	60	190	59.4	1.74	**0.023*** **
▪ University	36	27.7	94	72.3	130	40.6	(1.08→2.82)	
Mother's education								
▪ Read & write	88	60.7	57	39.3	145	45.3	9.71	**<0.001*** **
▪ Secondary	24	13.7	151	86.3	175	54.7	(5.63→16.7)	
Father's occupation								
▪ Not work	24	55.8	19	44.2	43	13.4	2.71	**0.002*** **
▪ Work	88	31.8	189	68.2	277	86.6	(1.41→5.21)	
Mother's occupation								
▪ Not work	76	40.2	113	59.8	189	59.1	1.77	**0.019*** **
▪ Work	36	27.5	95	72.5	131	40.9	(1.09→2.87)	
Family size								
▪ Six members	88	60.7	57	39.3	145	45.3	9.71	**<0.001*** **
▪ Five members	24	13.7	151	86.3	175	54.7	(5.63→16.7)	
Residence								
▪ Rural	78	37.9	128	62.1	206	10.9	1.43	0.149
▪ Urban	34	29.8	80	70.2	114	89.1	(0.88-2.34)	
Social class								
▪ Low	88	60.7	57	39.3	145	24.4	9.71	**<0.001*** **
▪ Medium	24	13.7	151	86.3	175	75.6	(5.63→16.7)	

**OR* =Odds Ratio, CI=Confidence Interval ** Chi-Square Test ***Statistically significant

Table (3): Relation between Parasitic Infection and Behavioral Health Habits among Children

Behavioral health habits	Infected (n=112)		Non infected (n=208)		Total (n=320)		OR* (95%CI)	P-value**
	No	%	No	%	No	%		
Eating outdoors								
▪ Yes	92	55.1	75	44.9	167	52.2	8.16	**<0.001*** **
▪ No	20	13.1	133	86.9	153	47.8	(4.66→14.3)	
Washing vegetables & fruits	40	19	171	81	211	65.9	8.32	**<0.001*** **
▪ Yes	72	66	37	34	109	34.1	(4.92→14.1)	
▪ No								
Using toilet paper								
▪ Yes	30	18.4	133	81.6	163	50.9	4.85	**<0.001*** **
▪ No	82	52.2	75	47.8	157	49.1	(2.92→8.07)	
Washing hands before eating	40	19	171	81	211	65.9	8.32	**<0.001*** **
▪ Yes	72	66	37	34	109	34.1	(4.92→14.1)	
▪ No								
Biting nails								
▪ Yes	92	62.2	56	37.8	148	46. 2	12.49	**<0.001*** **
▪ No	20	11.6	152	88.4	172	53.8	(7.04→22.1)	
Walking barefoot								
▪ Yes	62	77.5	18	22.5	80	25	13.1	**<0.001*** **
▪ No	50	20.8	190	79.2	240	75	(7.11→24.4)	

**OR* =Odds Ratio, CI=Confidence Interval ** Chi-Square Test ***Statistically significant

Table (4): Relation between Parasitic Infection and Clinical Manifestations among Children

Clinical manifestations	Infected (n=112)		Non infected (n=208)		Total (n=320)		OR* (95%CI)	P-value**
	No	%	No	%	No	%		
Abdominal colic								
▪ Yes	96	66.7	48	33.3	144	45	20	**<0.001*** **
▪ No	16	9.1	160	90.9	176	55	(10.8→37.2)	
Loss of appetite								
▪ Yes	79	71.2	32	28.8	111	34.7	13.2	**<0.001*** **
▪ No	33	15.8	176	84.2	209	65.3	(7.57→22.9)	
Vomiting & nausea								
▪ Yes	62	66	32	34	94	29.4	6.82	**<0.001*** **
▪ No	50	22.1	176	77.9	226	70.6	(4.02→11.6)	
Sleep disturbance								
▪ Yes	70	59.3	48	40.7	118	36.9	5.56	**<0.001*** **
▪ No	42	20.8	160	79.2	202	63.1	(3.37→9.16)	
Feeling tired								
▪ Yes	70	59.3	48	40.7	118	36.9	5.56	**<0.001*** **
▪ No	42	20.8	160	79.2	202	63.1	(3.37→9.16)	
Weight loss								
▪ Yes	80	83.3	16	16.7	96	30	30	**<0.001*** **
▪ No	32	14.3	192	85.7	224	70	(15.6→57.7)	

**OR* =Odds Ratio, CI=Confidence Interval ** Chi-Square Test ***Statistically significant

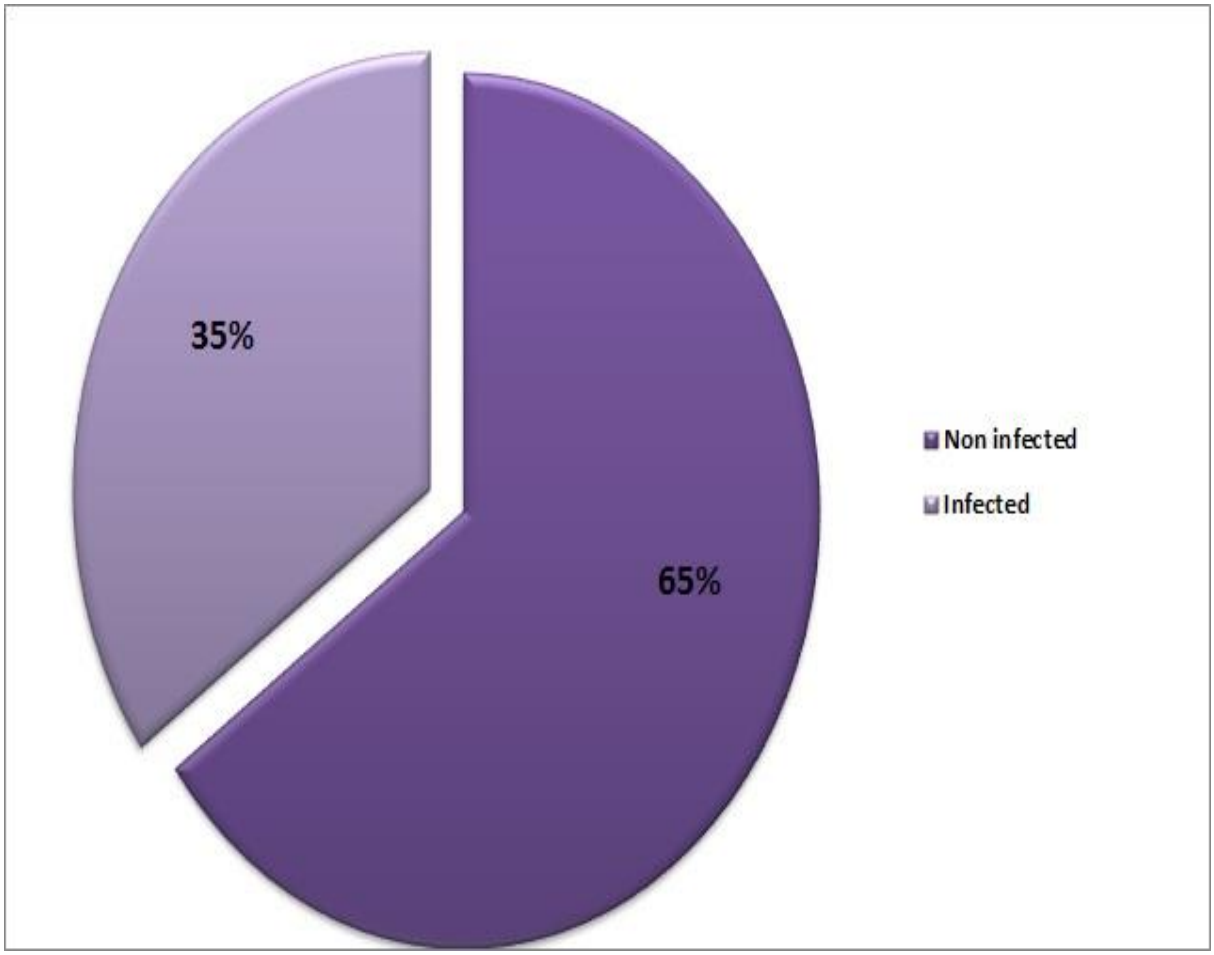

Figure (1): The Frequency of Parasitic Infection among the Children (n=320)

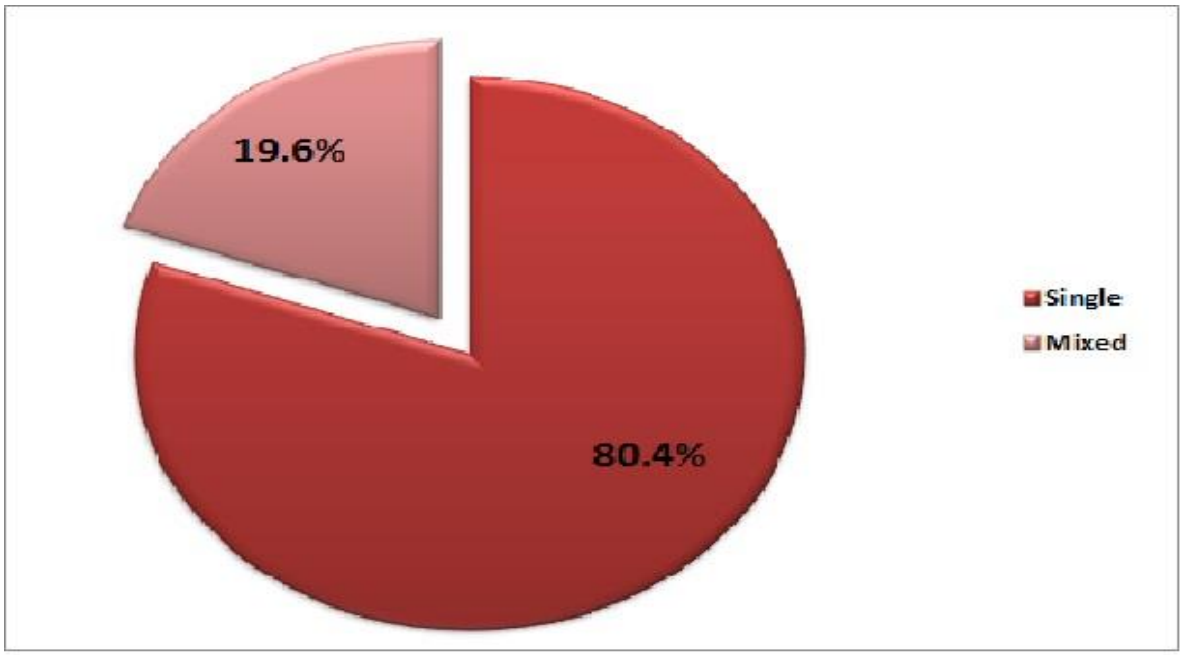

Figure (2): The Frequency of Parasitic Infection Pattern (single or mixed) among the Infected Children (n=112)

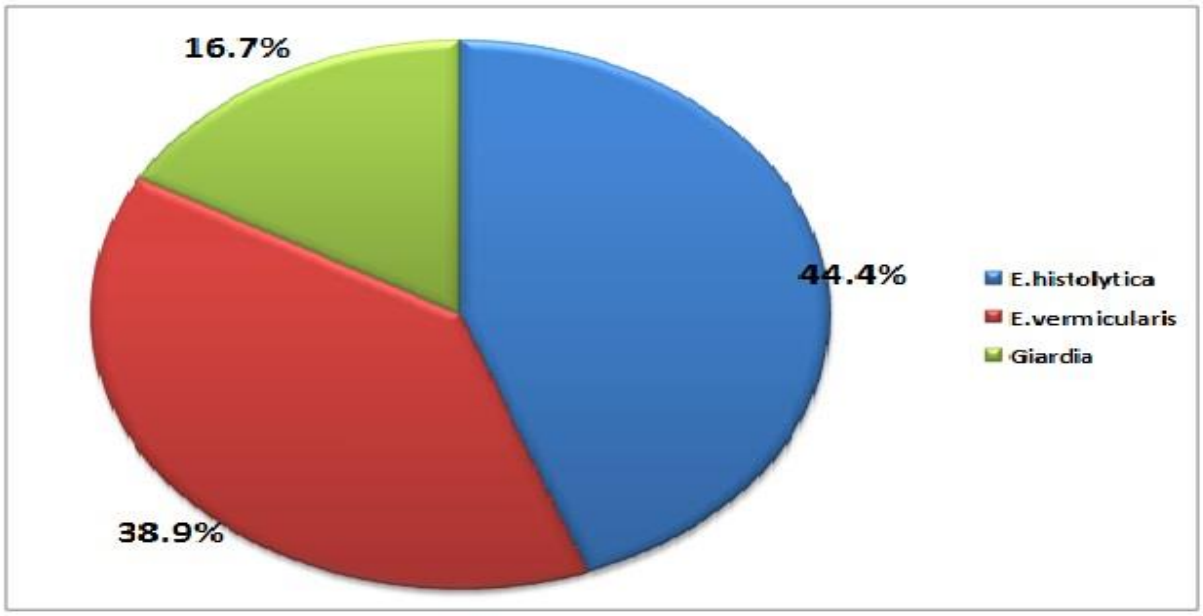

Figure (3): Parasitic Infection Pattern among Children with Single Infection (n=90)

الملخص العربي

الحالة الحالية و عوامل الخطورة المرتبطة بعدوى الديدان المعوية بين اطفال المدارس الابتدائية بمركز القرين، محافظة الشرقية

ياسمين حسينى حسن حسين - هويدا هنرى فهمى -دعاء السيد احمد سويلم

الخلفية: تعتبر عدوى الديدان المعوية من المشاكل الكبيرة فى الصحة العامة التى تؤثر على صحة اطفال المدارس. من أحد اهداف التنمية المستدامة للامم المتحدة الحد من انتشار و التحكم فى عوامل الخطورة لعدوى الديدان المعوية. **الهدف:** قياس معدل و عوامل الخطورة لعدوى الديدان المعوية بين اطفال المدارس الابتدائية بمركز القرين، محافظة الشرقية . **المنهجية وطرق البحث:** أجريت دراسة مقطعية على 320 من اطفال المدارس الابتدائية. تم جمع بيانات المشاركين فيما يتعلق بالخصائص الاجتماعية والديموغرافية ، و العادات و السلوك و الشكاوى الصحية عن طريق استبيان. **النتائج :** كشفت الدراسة أنه من بين إجمالي المشاركين ، كان معدل عدوى الديدان المعوية (35%) حيث وجد ان الأميبا هي الطفيل الأكثر انتشارا (44.4%) . كشفت الدراسة ان العدوى الطفيلية اكثر انتشارا بين الاطفال اللذين تتراوح اعمارهم (6-<9 سنوات). فيم يتعلق بالمستوى المعيشي تبين ان الأسرالتى تتكون من 6 افراد او اكثر و لديهم انخفاض فالمستوى المعيشي والتعليمي , اطفالهم يكونون اكثر عرضة للعدوى الطفيلية. كشفت الدراسة ايضا عن وجود فروق ذات دلالة احصائية بين المجموعتين المصابة وغير المصابة بالعدوى الطفيلية فيم يتعلق بسلوكيات الاطفال و الاعراض المرضية. **الخلاصة :** تعكس نتائج الدراسة ان معدل انتشار العدوى بين الفئة المستهدفة مرتفع لدرجة تتطلب تثقيف صحي للمداومة على غسيل الايدى , عدم المشى بدون حذاء , الغسيل الجيد للخضروات و الفاكهة و تجنب الاكل خارج المنزل.