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Prevalence of Intestinal Parasites and Awareness of Sample of Patient Attending AL Kindy Hospital

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Abstract

Food is one of the main vehicle to transport parasites, the high demand for food in Baghdad city has a role in safety protocol overlooking, in this study we try to assess the people knowledge about intestinal parasite infection and we take Al kindy hospital as an example about the number of parasite infections in specific area in Baghdad city, the data that were collected by questionnaire (666 reply) and from recording and archive room in Al kindy hospital (1727 result from patients samples) are reported and analyzed, the result showed that Iraqi people have a good information about parasites infections but in general not in specific way, and Giardia and Entamoeba spp were the most common single cell parasite infections in Al kindy hospital in Baghdad city.

Keywords: Parasites, Infection, Awareness prevalence, Hygiene, Iraqi people

1. Introduction

The importance of food as a source of nutrition and energy for human beings is no less significant than its role as a vehicle for transporting parasites, food contamination is the main responsible of about 30–60% of parasite prevalence in people, especially in developing countries (Hajare *et al.*, 2021), the most healthier food like vegetables can transmit parasitic diseases to the human beings, there are a lot of evidence about vegetables contaminations, people strive for healthier lifestyle so they highly depending on vegetables in their daily diet program, the high demanding of vegetables lead the merchants to increasing the production and they overlooking the safety protocol (Dardona *et al.*, 2023; Osafo *et al.*, 2022), same conditions happening in restaurants for similar reasons (high pressure due to high workload), so they haven't times to apply the safety protocols like hand washing after toilet or after touching dirty things, or hand washing before meal or even doing periodic medical checkup (Alem *et al.*, 2023), The

parasites that transferred by the food included the protozoa and helminths, Giardia lamblia, Toxoplasma gondii, Cryptosporidium spp., Sarcocystis spp and Entamoeba spp are an examples of protozoa, Taenia saginata, Taenia solium, Taenia asiatica, Echinococcus spp., Fasciola spp., and Trichinella spiralis are an examples of helminths, In our country (Arab country), Toxoplasma gondii, Cryptosporidium spp., and Sarcocystis spp are most common as a meat-borne protozoan parasites. Taenia is the most common parasite as a helminths (Abuseir, 2021; Saqur *et al.*, 2017b). The normal time to hand sterilizing is from 15 to 20 second according to the sterilization method (alcohol sterilizing method need to 20 second (putting the product and cover the full hand and rubbing them together till it feel dry)) (soap take 15 second the method is putting the liquid, rubbing the hands together, take in consideration product reaching between fingers and under the nail line) in small calculation we find that if the worker washing them hand just 25 time a day (which is not enough to apply the sterilization condition in such place) they will take about

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500 second that's mean they take 8.33 minutes, and that is very long time and impossible to apply under the work pressure (Sax *et al.*, 2007b; Professional, n.d.). The most important point here is that there isn't any vaccine to prevent any of these parasites (Schaefer, 2023; Calvani, 2021). Around the world there is about 3.5 billion persons are affected with parasite every year, and 200000 of them are dying, that considered an extra global burden (Hajare *et al.*, 2021), in countries with low and middle income, the situation becomes worse due to limited recourses, other reasons such war, and people refugee are playing important role in diseases prevalence, in such cases hygiene and sterilization fall at the bottom of the priority list (Mahdi, 2022), around the world about 2.3 billion people lack hygiene facilities, and that help to increase the diseases prevalence (Summary report, n.d.), for example in Iraq people are being displaced several times in few years, that happened due to the war, and the inconsistent policy environment (Migration, Environment, and climate change, 2022), the displaced or refugee people affected the infrastructure which is designed to accommodate a certain number of people, even when the government provided some facilities, they were still designed to meet short term needs and they are not durable enough to last (Summary report, n.d.), the aim of our study is to assess the prevalence of intestinal parasites in Al Kindy Hospital patients and

understand people's perceptions of the intestinal parasite and there awareness of its danger.

2. Material and methods

This study, aim to assess the knowledge of people about the parasite infection, and to estimate the most parasite prevalence in Al kindy hospital during one year. we create two copies of questionnaire (digital link and physical paper copy) and distributed between Iraqi people in Urban and Rural, the first copy was as a digital copy, it was a link and we distributed online in the groups related to medical subject, and the other one was a physical paper copy, and this copy had been filled from the specialist doctor and the care center employees and other people, we also take an access letter to Al kindy hospital to collect the number of the parasite infections from the records departments and archive during one year (result of last year 2023). The study has been done in Baghdad city, we received about 666 replay from the questionnaire copies, And we get 1727 result from the archive and recorder department from Al kindy hospital, the data were collected during the period between 15th Jan 2024 to 1st April 2024 the participant spanned a variety of age groups, the data was collected and analyzed by using SPSS by static specialist.

The questionnaire includes the following question:

1. Age	20–40 41–60 61 <
2. Sex	Male female
3. Marital status	Single Married Divorced Widower
4. How many children do you have?	1 2 3 4 4 <
5. Residence area	Urban Rural (villages)
6. Do you live next to	Lake Swamp Landfill Others
7. Do you notice insect in your home	Yes No Fly's Mosquitoes
8. Do you notice the spread of rodent in or around your home?	Yes No Mice Rats Others

9. Do you rise pets indoor?	Cats Dogs Rabbits Birds Nothing
10. Do you have any idea about the cause of infection?	Yes No
11. Have you ever infect with parasite or any of your family members?	Yes No
12. How many times have you or any of your family infect with parasite?	Once Twice More
13. Do you have any idea about the symptoms associated with parasite infection?	Yes No Other
14. Do you have any idea about the cause of infection?	Contaminated food Contaminated drink Sexual intercourse Insect bite Living in contaminated environment Infect from infected person Other reason
15. What are the symptoms that you feel it?	Fever and sweating Nose and vomiting Muscle pain Feeling cool and chill Sticky stool with unpleasant odor Abdominal pain, gas and bloating Bleeding from the anus Weight loss
16. Do you know the name of the parasite that infected with?	Yes No
17. In which season you got the infection?	Summer Winter Spring Autumn
18. How were you diagnosed with the disease	By specialist doctor Laboratory test other
19. How were you treated?	Doctor consulting Pharmacist consulting Self healing Others
20. What is the recovery period from the disease	3-7 days 2-4 weeks More than 2 months Other
21. Do you know the name of the parasite that infected with?	yes No No idea
22. Do you think that there is any relationship between the resident place and parasite infection?	Yes No I don't know
23. Do you think that there is any related between season and the parasite infection?	Yes no
24. Do you think that there is any related between season and the parasite infection?	Yes no

3. Results

3.1. The demographical variation

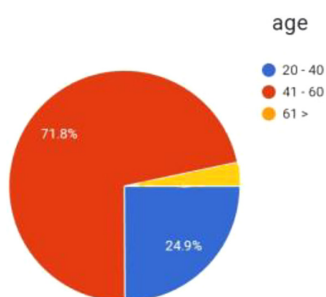


Fig. 1. Show the ages of the participants.

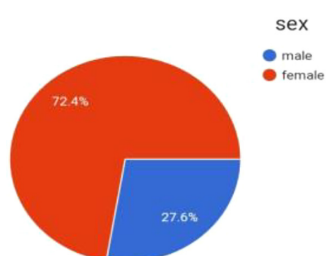


Fig. 2. Show the sex of the participants.

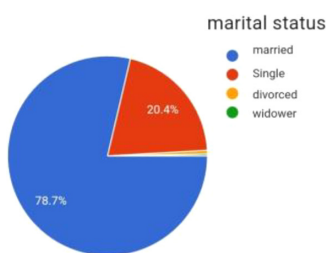


Fig. 3. Show the marital status of the participants.

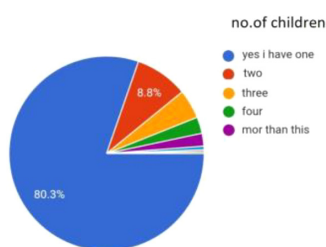


Fig. 4. Show the number of children of the participants.

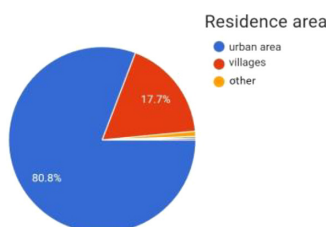


Fig. 5. Show the Residence area of the participants.

Table 1. The results of demographical variation of percipient people.

The demographical variation	Variation	≈ Number of participants	Percentage
1 Age	20-40	165.834	24.9%
	41-60	478.188	71.8%
	61 <	21.978	3.3%
	Total	666	100%
2 Sex	Male	183.816	27.6%
	Female	482.184	72.4%
	Total	666	100%
3 Marital status	Single	135.864	20.4
	Married	524.142	78.7
	Divorced	4.662	0.7%
	Widower	1.332	0.2
	Total	666	100%
4 How many children do you have?	1	534.798	80.3%
	2	58.608	8.8%
	3	38.628	5.8%
	4	19.98	3%
	4 <	13.986	2.1%
	Total	666	100%
	Total	666	100%
5 Residence area	Urban	538.128	80.8%
	Rural (villages)	117.882	17.7%
	Others	9.99	1.5%
	Total	666	100%

3.2. Participants awareness and perceptions about parasites

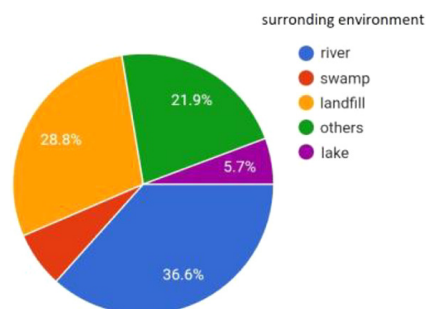


Fig. 6. Show the surrounding environment of the participants.

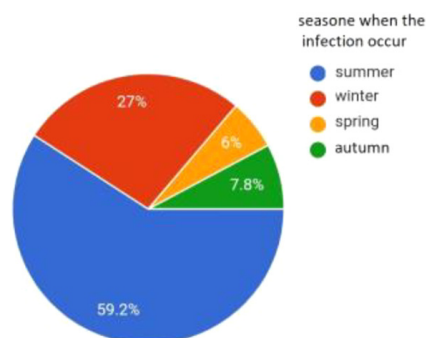


Fig. 7. Show the season when the infection occurs to the participants.

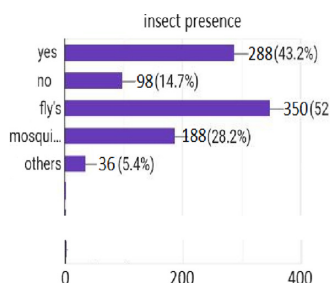


Fig. 8. Show the answer of participants if they note any insect in their environments.

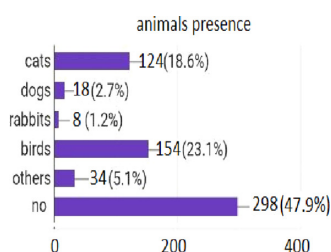


Fig. 9. Show the answer of participants if they note any animals in their environments.

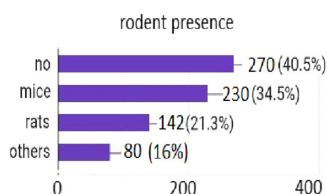


Fig. 10. Show the answer of participants if they note any rodents in their environments.

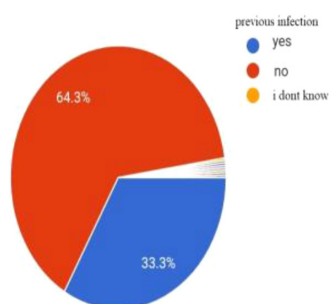


Fig. 11. Show the answer of participants if any of them or their families has been infected with parasite before.

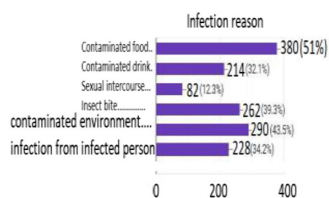


Fig. 12. Show the answer of participants if they have any idea about the infection reason.

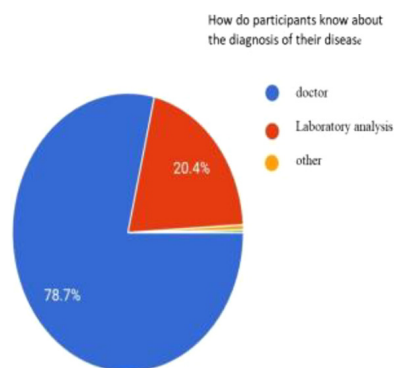


Fig. 13. Show how do participants know about the diagnosis of their disease.

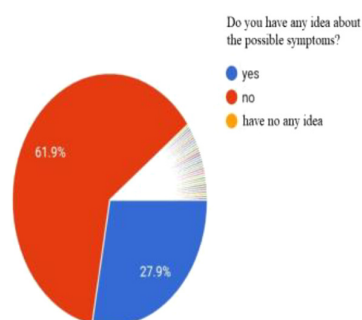


Fig. 14. Show the answer of participants about if they have any idea about symptoms.

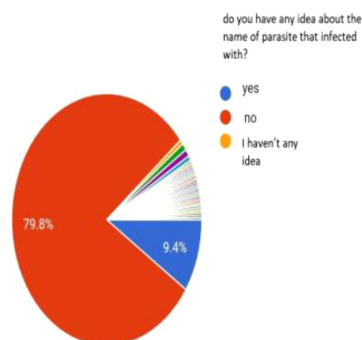


Fig. 15. Show the answer of participants about if they have any idea about parasite name.

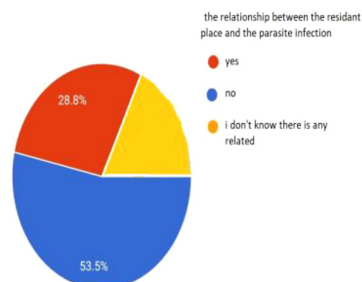


Fig. 16. Show the answer of participants about if they thought that there is any related between their resident place and the infection.

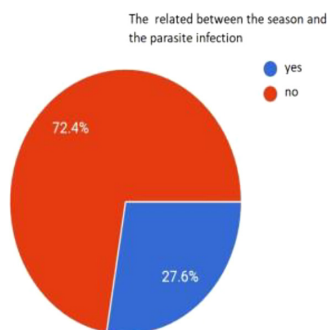


Fig. 17. Show the answer of participants about if they thought that there is any related between the season and the infection.

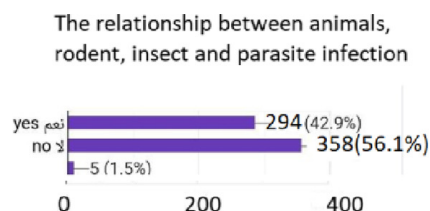


Fig. 18. Show the answer of participants about if they thought that there is any related between the animals, rodent and insect and the parasite infection.

Table 2. The results of other information of percipient people.

The answer of questions	Variation	≈ Number of participants		Percentage	
1 Do you live next to	Lake	37.962		5.7%	
	Swamp	46.62		7%	
	Landfill	191.808		28.8%	
	river	243.756		36.6%	
	Others	145.756		21.9%	
	Total	666		100%	
2 In which season you got the infection?	Summer	394.272		59.2%	
	Winter	179.82		27%	
	Spring	39.69		6%	
	Autumn	51.948		7.8	
	Total	665.73		99.2%	
	3 Do you notice insect in your home	Yes	Fly's	350	52%
Mosquitoes			188	28.8%	
Others			36	5.4%	
No			98	14.7%	
		Total	636	94.9%	
		NOTE: The total here is excluded from the (others), because the participant answered the option "others," another time while they already answered on the mosquitoes and flies options, they meant other insects with the flies and mosquitoes like ants, fruit fly, etc.			
4 Do you rise pets indoor?	Cats	124		18.6%	
	Dogs	18		2.7%	
	Rabbits	8		1.2%	
	Birds	154		23.1	
	Nothing	298		47.9	
	Total	602		93.5%	
	5 Do you notice the spread of rodent in or around your home?	Yes	Mice	230	34%
Rats			142	21.3%	
others			80	16%	
No			270	40.5%	
		Total	642	95.8%	

NOTE: The total here is excluded from the (others), because the participant answered the option "others," another time while they already answered on the mosquitoes and flies options, they meant other insects with the flies and mosquitoes like ants, fruit fly, etc.

NOTE: The total here is excluded from the (others), because the participant answered the option "others," another time while they already answered on the mice and rats options, they meant other rodent with the mice and rats.

(Continued on next page)

Table 2. (Continued)

The answer of questions	Variation	≈ Number of participants		Percentage
6 Have you ever infect with parasite or any of your family members?	Yes	428.238		64.3%
	No	221.778		33.3%
	I don't know	15.984		2.4
	Total	666		100%
7 Do you have any idea about the cause of infection?	Contaminated food	380		51%
	Contaminated drink	214		32.1%
	Sexual intercourse	82		12.3%
	Insect bite	262		39.3%
	Living in contaminated environment	290		43.5%
	Infect Frome infected person	228		34.2%
	Total	Participant choose more than one option; they thought that there is more than one reason to cause the infection.		
8 How were you diagnosed with the disease	By specialist doctor	524.142		78.7%
	Laboratory taste	135.864		20.4
	other	5.994		0.9
	Total	666		100%
9 What are the symptoms that you feel it?	yes	412.254		61.9%
	No	185.814		27.9%
	Have no idea	67.932		10.2%
	Total	666		100%
10 Do you know the name of the parasite that infected with?	yes	62.604		9.4%
	No	531.468		79.8%
	No idea	71.928		10.8
	Total	666		100%
11 Do you think that there is any relationship between the resident place and parasite infection?	Yes	191.808		28.8%
	No	356.31		53.5%
	I don't know	117.882		17.7%
	Total	666		100%
12 Do you think that there is any related between season and the parasite infection?	Yes	482.184		72.4%
	no	183.816		27.6%
	Total	666		100%
13 Do you think that there is any related between season and the parasite infection?	Yes	294		42.9%
	No	358		56.1%
	Total	652		99%
14 What is the recovery period from the disease	3-7 days	100.25		15%
	2-4 weeks	375.5	56.38%	
	Mor than 2 months	190.2	28.5%	
	Total	666	100%	

3.3. The number of infections in Al kindy hospital during one year

Table 3. The results from Al kindy hospital during one year (2023). Distribution of study sample according to type of parasite.

Month	The number of samples	The number of infections	Type of infection
January	46	19	E. Histolytica
		13	Giardia lambilea
		14	Others
February	53	16	E. Histolytica
		10	Giardia lambilea
		27	Others
March	79	21	E. Histolytica
		7	Giardia lambilea
		51	Others
April	57	16	E. Histolytica
		14	Giardia lambilea
		27	Others

(Continued on next page)

Table 3. (Continued)

Month	The number of samples	The number of infections	Type of infection
May	89	26	E. Histolytica
		13	Giardia lamblia
		50	Others
June	38	8	E. Histolytica
		13	Giardia lamblia
		17	Others
July	76	22	E. Histolytica
		20	Giardia lamblia
		34	Others
August	98	19	E. Histolytica
		12	Giardia lamblia
		67	Others
September	75	10	E. Histolytica
		22	Giardia lamblia
		43	Others
October	77	11	E. Histolytica
		15	Giardia lamblia
		51	Others
November	76	17	E. Histolytica
		13	Giardia lamblia
		46	Others
December	63	12	E. Histolytica
		18	Giardia lamblia
		33	Others
Total samples number	1727		
Total gardai lamblia infections	370		
Total entamoeba infections	197		

Note: The archive unit is divided into several units, the samples that we took are from the (single cell parasite infection unit) so we couldn't take the other details about the other parasite, Due to it need a different permeation.

4. Discussion

In our study we attempt to assess the awareness of Iraqi population about the parasite infection, the largest participant age group was from 41–60 no matter if they male or female in this point (Figs. 1 and 2) that's agree with study done in 2018 by (Suntaravitun & Dokmaikaw, 2018) when the most participant were in same age and this is logically sound due to the distributed digital copy (the link) had been distributed among medical related students groups for the evening study students which reflect the age of this layer of student, and in general this age are more active and they in the age which already they hold the responsibility of the other people in their life, the related results in (Figs. 3 and 4) are sound logically too because this is the suitable age to marry and get children, the results reflect that the majority of the participant are live in urban about (80%) (Fig. 5), we attempt to screen the surrounding environment and the potential intrusion like insects or pets (Figs. 6 and 8 to 10) (36.6%, 7%, and 5.7%) of the participants were live next to source of water such as river, swamp, and lake respectively, and they thought

that the watery environment attracted the insects, this agree with study done by (Selbach *et al.*, 2020) which revealed that the water is an important source for insect accumulation and then parasite infection (Selbach *et al.*, 2020) about 80% of participants said they noted insect in their environment (about 52% are suffering from fly's, and 28% suffering from mosquitoes) they thought that insect play a main role as a cause of parasite infection other study done in 2024 reported that insects are the main cause of parasite infection (What causes parasitic diseases, 2024), about 55.8% of them said they suffer from rodent (rats and mice), and 50.7% of participants reported having pets in their homes. These information in addition to others like in which season they get the infection and if they thought that there is any related between season and infection accurse (Figs. 7 and 17) and about if they thought that there is any relation between the infection and the surrounding environments (Figs. 16 and 18) participants thought that yes there is a relationship between these things and the infections and the thought that these conditions are important to detect the type of parasite and the mode of transmutation, as we see summer was the season when

most people contracted the infection (Fig. 7), and that agree with study done by (Caroline & Vanessa, 2020) it reported that hot seasons recorded the higher parasite infections rate, other information has been taken to assess the awareness of people, 33.3 of them said that they or their family may have infected with parasite (Fig. 11) and the infection may be due to contaminated food 51%, contaminated drink 31%, sexual intercourse 12.3%, or by another infected person 43.5% and other reasons (Fig. 12) and that agree with study done by (Nyantekyi *et al.*, 2014) it reported that contaminated food and drink were the most reasons of parasite infection (Nyantekyi *et al.*, 2014), 78% of the participant were aware of the infection and the diagnosed by a doctor and 20.4% were aware about diagnoses by laboratory analysis (Fig. 13), but 61% of them don't know about the symptoms and 10.2% have no any idea about it (Fig. 14) they said that they go to the doctor because they think that there is some disorder in their bodies and they thought that all parasite have same disorder and that is true somehow and expected because they are still haven't the enough experience to detect the type of disorder and how that will related to specific parasite (Fig. 15).

In (Table 3) we exposed the number of infections for every month in (2023 year) and we can get the results about the most common single cell parasites infection in general, we can't take all details about the other parasite due to the hospital policy in addition to that the data was archived, any way the results showed us the most common parasite infections in this hospital. In general we can see obviously how the infections number rise in summer season, and we see that Giardia infections is three times more than the Entamoeba, and that agree somehow with study done by (Al-Taie, 2009) and (Sadoon & Al-Sabawi, 2023) they reported a similar results about Giardia and Entamoeba prevalence.

5. Conclusion

Giardia lamblia and entamoeba spp are the most common single cell parasite in Baghdad city, Iraqi people have a good information about the parasite infections and the causes of it and they agree to visit the doctor or health center when they have any disorder, but they haven't enough information about the symptoms and the parasite name.

6. Recommendation

We recommend making the widest study including more than one hospital and studying different types of parasites especially the multicellular parasites to limit the types of multicellular parasites.

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