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Prevalence of Intestinal Pathogenic Parasites in Basrah City, Iraq

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Abstract: ***Objective: To evaluate the prevalence of intestinal parasites among patients in Basrah city, southern of Iraq. Stool samples were collected from 1026 auditors patient s attended in the Basrah General hospital. Each sample was examined by direct wet mount microscopic examination using both normal saline and Lugol's iodine preparation and Permanent stained smears were performed for intestinal coccidian using modified Ziehl-Neelsen technique. The present study recorded (494)persons infected with gastrointestinal parasites (infection percentage (48.14%) and monthly rate of infection (44.75%) The highest rate on infection with gastrointestinal parasites in December was (58.18%) and the lowest rate percentage of infection was in January (28.76%) . the highest parasite infection was Cryptosoridium parvum(167) cases , (16.27%) ; Followed by parasite Entamoeba. hitolytica. (157) cases (15.3%); Followed by Blastocysist hominis (72) cases (7.01 %) ;followed by infection of Giardia intestinalis (61) cases (5.94 %) . and recorded the lowest indicdence of protozoa with one cases of Entamoeba coli (0.09 %) recorded infection with Enterobius vermicularis (33) cases and the rate infection percentage (3.21%) while infection with Hymenlepis nana (3) cases and (0.29%) . the parasite Cryptosoridium parvum Recorded the highest infection (69) cases in age (20-30) years ,and the lowest incidence in (6-10) years (3) cases . The parasite Entamoeba histolytica recorded the highest infection (48) cases in age(20-30) years and the lowest incidence (8) casess in age (6-10) years. The highest infection (33) cases with Blastocysist hominis at age (20-30)years and lowest (zero) of age (6-10) years . (25) cases highest infection with Giardia lntestinalis at (20-30) years and lowest (3) cases at both age (6-10) years and (11-19)years . only one cases of (1-5) years of Entamoea. coli. The highest incidence of Enterobius vermicularis. (11) cases at (6-10) years ; While lowest one cases at (20-30) years . (2) cases reported at (20-30) years with Hymenolepis nana parasite , one cases at age (31-40) years .***

1. Introduction

Parasitic infection are major public health problem world-wide; particularly in the developing countries and constituting the greatest of illness and diseases [1,2]. in fact , one fourth of known human infectious disease are caused by the helminthes and protozoa [3 & 4]. Indeed, it is estimated that about 3.5 billion people in the world are infected with intestinal parasites, Whom 450 millions are ill [5&6] . The majority is living in tropical and subtropical aria of the world [4]. The intestinal parasites (protozoa and helminthes), pathogenic bacteria and virus are mainly causes of diarrhea disease continues to be a major cause of childhood mortality and morbidity in developing countries [7 & 8] .

A recent analysis of all studies published since 1980 that reported on due diarrhea in children under the age 5 years estimated that globally , there were 1.87 million deaths due to diarrhea in this age group annually (accounting 19% of all children who died) , With most of these deaths occurring in Africa and south east ,Asia [8] .

Infection with intestinal parasitic is relatively among Iraqi people [9] . The prevalence of intestinal parasite depending on degree of personal community hygiene , sanitation and environments factors [10] . Some studies have been carried in different provinces of Iraq [9,10,11_12].

The aim of present study Knowledge of prevalence of intestinal pathogenic parasites in (auditors) reviewers patient who attained to consultation clinic of General hospital of Basrah – province / Iraq during period from 2nd jaunary to 31st December, 2017.

2. Materials' & Methods

Stool samples were collected from 1026 Auditors patient s attended in the Basrah General hospital. Each sample was examined by direct wet mount microscopic examination using both normal saline and Lugol's iodine preparation and Permanent stained smears were performed for intestinal coccidian using modified. Ziehl-Neelsen techniqu according to [13]. The study was conducted in Basrah region between 2nd Jaunway and 31st December 2017.

3. Results

By the examination of (1026) stool sample of outpatient (auditors) in General Basrah hospital . The present study recorded (494) persons infected with gastrointestinal parasites (infection percentage (48.14%) and monthly rate of infection (44.75%) (Table 1, Fig 1), The highest rate on infection with gastrointestinal parasites in December was (58.18%) and the lowest rate percentage of infection was in January (28.76%).

Table 1: Infection percentage each month

Month	Percentage of infection	No. Samples Ex.
January	28.76%	73
February	34.21%	76
March	40.65%	91
April	44.62%	121
May	57.42%	101
June	55.88%	34
July	55.22%	67
August	56.62%	83
September	56.60%	53
October	39.28%	112
November	54.28%	105

December	58.18%	110

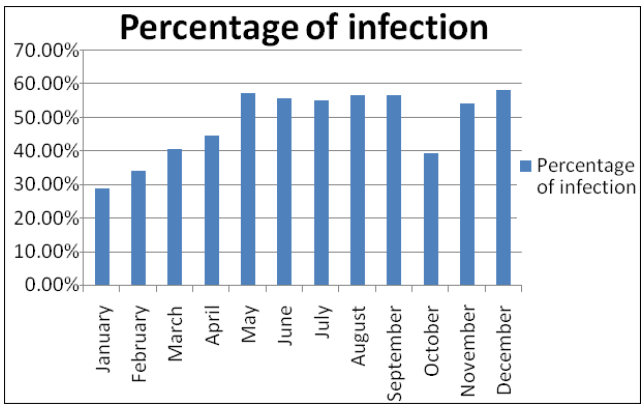

Figure 1: Infection percentage each month

(Table 2, Fig 2) show species representation in positive sample stool with gastrointestinal parasites , the highest parasite infection was *Cryptosoridium parvum*(167) cases , (16.27%) ; Followed by parasite *Entamoeba. hitolytica*. (157) cases (15.3%); Followed by *Blastocysist hominis* (72) cases (7.01 %) ;followed by infection of *Giardia intestinalis* (61) cases (5.94 %) . and recorded the lowest indicdence of protozoa with one cases of *Entamoeba coli* (0.09 %) . The current study recorded infection with *Enterobius vermicularis* (33) cases and the rate infection percentage (3.21%) while infection with *Hymenlepis nana* (3) cases and (0.29%) .

Table 2: Species representation in positive samples stool

Parasite	*No./2026*	*P(%)*
Cryptosporidum	167	16.27
Entamoeba. hitolytica	157	15.3
Blastocysist hominis	72	7.01
Giardia intestinalis	61	5.94
Entamoeba col.	1	0.09
Enterobius vermicularis	33	3.21
Hymenlepis nan	3	0.29

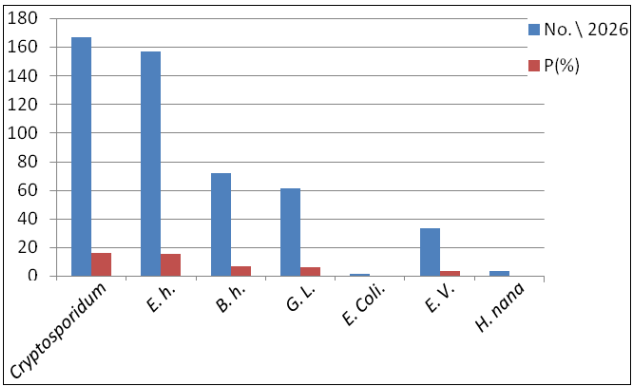

Figure 2: Species representation in positive samples stool.

The present study recorded (Table 3, Fig 3) species representation of gastrointestinal parasites in dependence on sex. the number infected with the parasite Cryptosoridium parvum (106) male and (61) female , (99) male infected with *Entamoeba. hitolytica* , (58) females , (42) male infected with *Blastocysist hominis* ,(30) female . and (34) cases of *Giardia intestinalis* and (27) of both male and females respectively ;only one cases male of infection with *Entamoba. coli*.

As for worms , the study recorded 19 male infected with *Enterobius vermicularis* and 14 female. cases; while 2 cases male and one cases female with *Hymenolepis. nana* .

Table 3: Species representation of parasites in dependence on Sexes

Parasite	No. of infected males	No.of infected Female	Total
Cryptosporidum parum	106	61	167
E. h).(Entamoeba. hitolytica	99	58	157
B. h. Blastocysist homins	42	30	72
G. L). (Giardia intestinalis	34	27	61
E. coli Entamoba. coli	1	0	1
E. V Enterobius vermicularis.	19	14	33
H. nana Hymenolepis. nana .	2	1	3

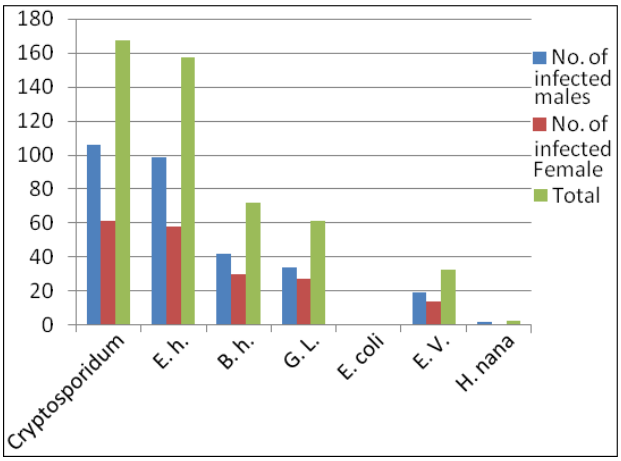

Figure 3: Species representation of parasites in dependence on Sexes

(Table 4, Fig 4) show frequency monthly distribution of gastrointestinal parasites ; The January did not record any infection with *Cryptosoridium parvum* and recorded the highest incidence of parasite in May , August and November (25) cases; while the highest infection with *Entamoeba. hitolytica* in April(24) cases , While lowest infection in June (6) cases . The highest infection with Blastocystis hominis (30) cases was in month December, the lowest infection in month March and June(0). The highest infection with Giardia intestinalis was in May (13) and lowest infection with December(one cases), only one cases reported with *Entamoeba. coli* in October .The highest incidence of *Enterobius vermicularis*(10) cases was month March and non cases (zero) in June, July, August, Septamber ,October and November . the highest infection (10) cases in March with *Enterobius vermicularis* ,While one cases reported in Jun, March and May with H. nana and absence with the rest months.

Table 4: Frequency monthly distribution of gastrointestinal parasites .

Parasite	January	February	March	April	May	June	July	Agust	Sept.	Oct.	Nov.	Dec.	Total
Cryptosporidum	0	2	1	20	25	9	16	25	13	15	25	16	167
E. h.	7	9	19	24	14	6	7	12	9	19	21	10	157
B. h.	2	3	0	6	3	0	6	4	4	7	7	30	72
G. L.	6	6	6	1	13	4	8	6	4	2	4	1	61
E. Coli	0	0	0	0	0	0	0	0	0	1	0	0	1
E. V.	5	6	10	3	2	0	0	0	0	0	0	7	33
H. nana	1	0	1	0	1	0	0	0	0	0	0	0	3

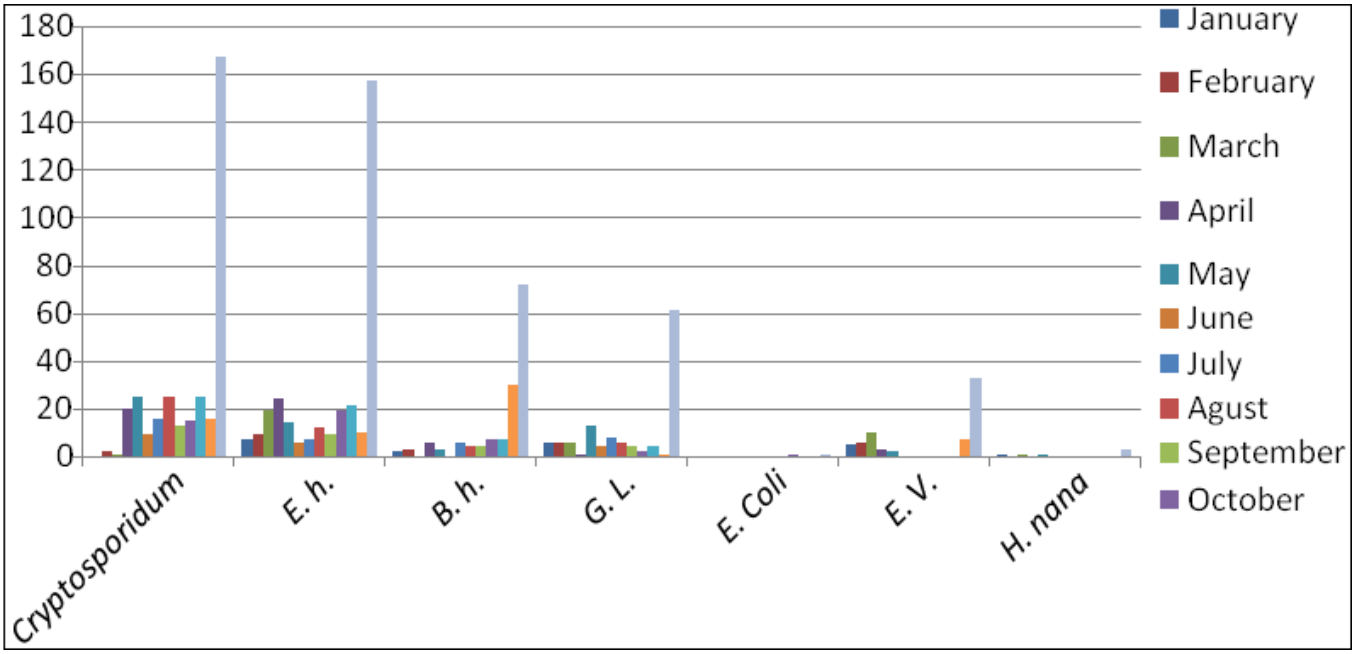

Figure 4: Frequency monthly distribution of gastrointestinal parasites

(Table 5, Fig5) Show the prevalence of gastrointestinal parasite according to age categories , the parasite *Cryptosoridium parvum* recorded the highest infection (69) cases at age (20-30) years ,and the lowest incidence in (6-10) years (3) cases . *Entamoeba histolytica* was record the highest incidence in age (20-30) years (48) cases and lowest infection at age (6-10) years of 8 casess . The highest infection (33) cases with *Blastocysist hominis* at age (20-30)years and lowest (zero) of age (6-10) years. (25) cases highest infection with G. l. at (20-30) years and lowest (3) cases at both age (6-10) years and (11-19)years. Only one cases of (1-5) years of *Entamoeba* coli.

The current study recorded the highest incidence of Enterobius vermicularis. (11) cases at (6-10) years ; While lowest one cases at (20-30) years . (2) cases reported at (20-30) years with H. nana parasite , one cases at age (31-40) years .

Table 5: Prevalence of gastrointestinal parasite according to age categories

Parasite	(1-5)y	(6-10)y	(11-19)y	(20-30)y	(31-40)y	(41-60)y and Over	Total
Cryptosporidium	55	3	6	69	13	21	167
E. h.	35	8	12	48	23	31	157
B. h.	24	0	7	33	5	3	72
G. L.	14	3	3	25	7	9	61
E. Coli	1	0	0	0	0	0	1
E. V.	10	11	4	1	2	5	33
H. nana	0	0	0	2	1	0	3

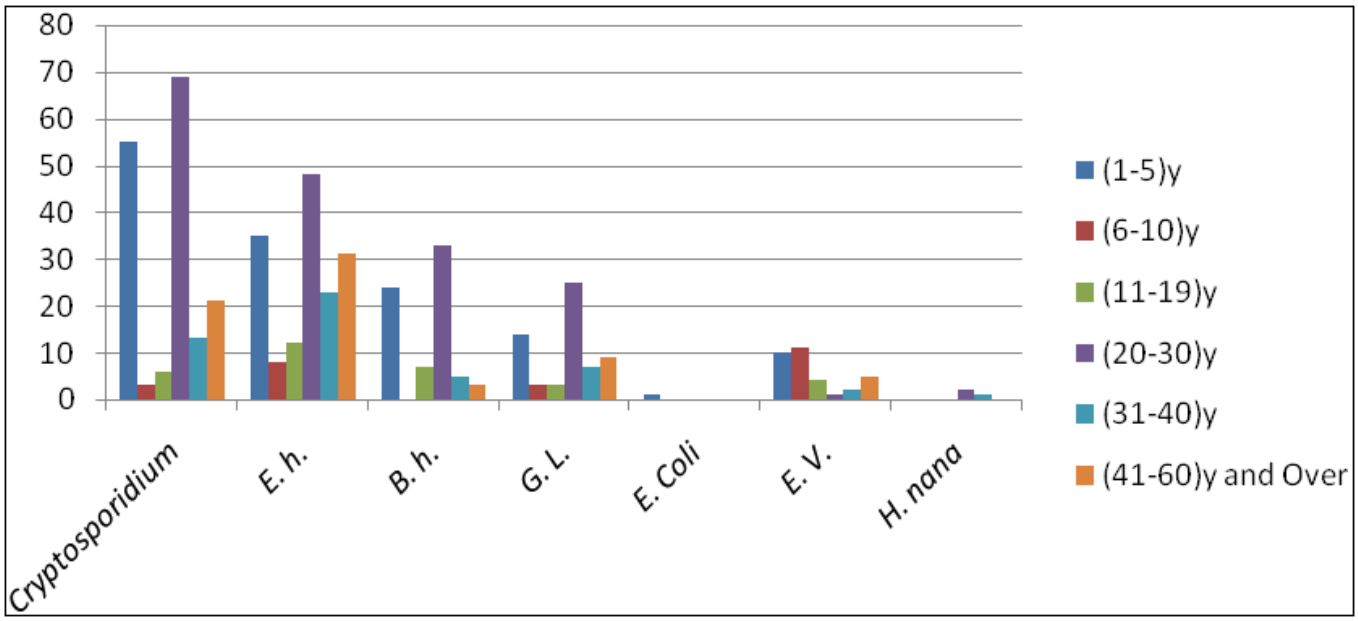

Figure 5: Prevalence of gastrointestinal parasite according to age categories.

4. Discussion

Parasitic infections are endemic worldwide and have been described as constituting the greatest single worldwide cause of illness and disease [5 & 9] These infections are usually associated with poor sanitary habits, lack of access to safe water and improper hygiene. The degree of each factor and the prevalence of infections vary from one region to the other [14]. The current study recorded a rate of infection 48.18% .This result of our study are close to that [12] in Babylon province 48.8% and [9] (50.9%) in Basrah

Province while [11] was record 70.4% in Nineveh province. The present study recorded the highest infection with parasite with *Cryptosoridium parvum* (16.27 %) while [12] and [11] were record (5.6% & 2.5%) respectively .[11 &10] were not recorded this parasite because they were not used modified acid fast stain technique . The parasite *Cryptosoridium parvum* recorded the highest infection (69) cases in (20-30) years ,and the lowest incidence in (6-10) years (3) cases . Infection with *Cryptosoridium parvum* is often detected in individuals with immunodeficient ,e.g in subject with HIV, in the organ transplantation , suffering from other concomitant infection , chronic disease ,oncologic disease [15].

Our study recorded the percentage infection with parasite *Entamoeba histolytica* (15.3%) while [12] and[9] were record 29.5% and 65.2% respectively. *Entamoeba histolytica* has been recorded the highest incidence in age (20-30) years (48) cases and lowest infection at age (6-10) years of 5 cases.

An estimated 10 % of world population infected with parasite *Entamoeba histolytica* and with estimated 50-100 thousand death person each year [9&16]. the main mode of transmission of this parasite are by the fecal–oral route [9 ,18&19]. Poor sanitary conditions are known to increase the risk of contracting amebiasis *E. hystolytica* [18]. In the United States, there is a much higher rate of amebiasis-related mortality in California and Texas, which might be caused by the proximity of those states to *E. histolytica*-endemic areas, such as Mexico, other parts of Latin America, and Asia [19]. *E. hystolytica* is also recognized as an emerging sexually transmissible pathogen, especially in male homosexual relations, causing outbreaks in non-endemic regions[20]. As, high-risk sex behaviour is also a potential source of infection[21]. Although it is unclear whether there is a causal link, studies indicate a higher chance of being infected with *E. hystolytica* if one is also infected with HIV [22&23].

The current study recorded percentage of infection of parasite *Blastocystis hominis* (7.01%) close to study of[24] , recording 7.2% and 10.2% in tow hospital of Baghdad while [25] was record 16.4% . In Kuwait 2%: Nepal 54% and New Guinea 33%[17].

The highest infection (33) cases with *Blastocystis hominis* at age (20-30) years and lowest (zero) of age (6-10) years has been recorded in this study . Children and the elderly appear to be highly susceptible to Blastocystis infection [26 &27] while other researchers have suggested that people between 30 and 50 years of age are most prone to being infected by Blastocystis [28 &29] . This parasite has been known since the early 1900s [30],but only in the last decade has the biology and pathogenicity of this parasite undergone more intensive studies. However, the lack of standardization in detection techniques and methods for molecular characterization has led to confusion between Blastocystis and gastrointestinal disorders, skin symptoms, and many ot her problems. Recent epidemiological data demonstrate the association of Blastocystis with a variety of disorders [30&31], such as diarrhea, abdominal pain, fatigue, constipation, flatulence, chronic gastrointestinal illnesses (irritable bowel syndrome, IBS), and skin rash or urticaria [32 &33] . Blastocystis has been found in both patients with gastrointestinal symptoms and asymptomatic individuals[34 &35] . According to a number of studies, the life cycle of Blastocystis and its pathogenic aspects are still unclear. Blastocystis infects at least 5–15% of individuals in developed countries and 50–100% of 5–15% of individuals

in developed countries and 50– 100% of individuals in developing countries[36 &37] . The difference can be partly explained by poor hygiene practices and consumption of contaminated water or food in developing countries [38] . The fecal–oral route is considered to be the main mode of transmission. Controversy regarding the commensal or pathogenic nature of the infection has not changed for decades. Many cases reports and epidemiological and microbiological studies support a pathogenic role of Blastocystis in causing intestinal inflammation and urticarial symptoms [39] , while there are many reports on asymptomatic colonization by Blastocystis [40&41] . Other aspects, including mode of transmission, pathogencity , life cycle, and molecular biology, remain largely unclear.

The prevalence of Blastocystis infection is higher than that of other intestinal parasites, such as *Giardia*, *Entamoeba*, or Cryptosporidium [42] .In immunocompromised individuals, such as those with human immunodeficiency virus (HIV) infection, the prevalence of Blastocystis is between 30 and 38% in developed countries [43&44] . It is suggested that Blastocystis is linked with diarrhea in immunocompromised hosts, such as HIV-infected persons, and nutrition status may be one of the important risk factors associated with co-infections [45].

Six different morphological forms of the parasite have been reported (vacuolar, granular, amoeboid, a vacuolar, multivacuolar, and cystic), with the cyst being the infective stage and the amoeboid form supposedly playing a more active role in the development of clinical manifestations [46]. The vacuolar form is most commonly observed in both laboratory culture and stool samples[47 &48].

The present study recorded the percentage infection with *Giardia intestinalis* . (5.94%) while [12] and [9] were record 13.6% and 30.1% respectively. (25) cases highest infection with *Giardia intestinalis* at (20-30) years and lowest (3) cases at age (6-10) years has been recorded in present study *Giardia intestinalis* was recently included in the World Health Organization's Neglected Disease Initiative [49& 50]. *Giardia intestinalis* is most commonly isolated intestinal parasites worldwide[50]. The incidence of 20 _ 40 %is referred to the developing countries particularly in the paediatric population [51]. In developed countries ,the incidence of giardiasis is stated from 2 – 5% [3]. In Euopean countries , giardiasis has the most frequent occurrence, especially in the eastern Europe and in Turkey [52]. A few reports have described *Giardia* trophozoites in the tumoral mass of pancreatic tissue and gallbladder. While *Giardia intestinalis* trophozoites are generally localized to the proximal small bowel, they may also be identified in the stomach, distal small bowel, or caecum, and studies have reported pancreatic infection with *Giardia* [53 , 54&55]. Although the relationship between pancreatic giardiasis and pancreatic cancer is presently unknown, the coexistence of these 2 diseases may prompt exploration in to mechanisms of carcinogenesis in giardiasis. In another study, following cholecystectomy with liver bed resection and lymph node dissection, intra-operative cytological examination of the patient's bile juice revealed the presence trophozoites *Giardia intestinalis*, and pathological examination revealed gallbladder cancer[55]. However, no cause-to-effect has yet been established between the presence of *Giardia* and the development of cancer.

The current study recorded percentage of infection of parasit *Entamoeba coli* (0.09%) . only one cases of (1-5) years of *Entamoeba coli* . while[10&12]and [9] had been not recorded this parasite .While [56] recorded (p =0.79 %) in Slovakia. *Entamoeba coli* is generally considered as non-pathogenic , although it was identified in the stool of patient with diarrhea and none of know pathogenic species were found in them [56]. *Entamoeba. coli* are mostly harmless parasites, and do not cause harm to the host. However, there have been cases of internal bleeding. Usually, the cytoplasm of the *Entamoeba coli* "does not contain red blood cells, except in the rare cases of patients with intestinal hemorrhage" that leads to blood in the stools of these patients. This may lead to intestinal lesions. Other problems that *Entamoeba coli* causes are usually result from having too many in the large intestine. For example, large populations of *E. coli* may lead to "dyspepsia, hyperacidity, gastritis, and indigestion"; these are common problems of most intestinal parasites. [57].

The present study recorded the percentage infection with *Enteroius vermicularis* (3.21%). This result of our study are close to that [10] and [56] , 3.66 % and 0.22% respectively while [12 & 9] were not recorded this parasite . The highest incidence of *Enterobius vermicularis* in present study (11) cases at (6-10) years and lowest only one cases at (20-30) years. Enterbiosis is equally widespread global disease especially in the countries in temperate zone. The most commonly infected are children [56]. *Enterobius vermicularis* is an intestinal nematode of humans and its principal mode of transmission is direct contact between infected and uninfected persons. Human infections occur when the eggs in the infective stage are accidentally ingested in a contaminated environment. Although the majority of infections are asymptomatic, it induces bothersome symptoms in some cases. This condition is referred to as "enterobiasis" and it includes perianal itching and dermatitis [58].

Adults usually have low worm burdens and are asymptomatic. However, in children, particularly when there are heavy worm burdens, neurological symptoms such as nervousness, restlessness, irritability and distraction may occur, and these may influence on child growth [58 **].** Rarely ectopic infections in the pelvic area or urinary tract occur [59 & 60].

The present study recorded the percentage infection with *Hymenolepis nana* (0.29%) , 2 cases reported at (20-30) years , one cases at age (31-40) years . . [10] was record (p= 5.3),while [12 &9] were not record this parasite.

The dwarf tapeworm or *Hymenolepis nana* is found worldwide. More common in warm parts of South Europe, Russia, India, US and Latin America. Infection is most common in children, in persons living in institutional settings, crowded environments and in people who live in areas where sanitation and personal hygiene is inadequate. Infection is most common in children aged 4–10 years, in dry, warm regions of the developing world. Estimated to

have 50-75 million carriers of *Hymenolepis nana* with 5 to 25% prevalence in children worldwide. One becomes infected by accidentally ingesting dwarf tapeworm eggs, ingesting fecally contaminated foods or water, by touching your mouth with contaminated fingers, or by ingesting contaminated soil, and/or accidentally ingesting an infected arthropod. [61] .

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