Knowledge And Practice of Mothers About Pinworm Infection and Its Prevention in Their Children: Online Survey in Baghdad.

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Abstract

Background: Pin worm infection is caused by Enterobius vermicularis. According to World Health Organization, over a billion people are infected worldwide.
Aim: To assess mother's knowledge, practice and prevention of pin worm infestation among their children and to find the association with demographic features of each of them.
Methods: A cross-sectional study with an analytic element in which 120 mothers participated in the study. Statistical significance is $p<0.05$.
Results: About (68.3%) of participants were under30 years old. Mean age was 29.7, standard deviation =4.6, (82%) of them completed their college or institution. Regarding mode of transmission (68.3%) mothers said it is by contaminated food. They had good knowledge about prevention: hand washing before and after feeding (95.8%), hand washing after using the toilet (95.0%). Good knowledge about treatment was reported. (88.3%) knew that pin worm is treated with oral medicine, (53.3%) knew that all the family members must be treated. Regarding treatment seeking site, (82.5%) choose privet clinics.
Conclusions: Near two-third of the participants had good knowledge about pinworm infestation. The majority had good practice in prevention of infection. There were significant relations between mothers' educational level and total knowledge about treatment and prevention. The majority depend on internet as a source for information and only small number depend on PHC as a source.
Key words: Pin worm infection, children, mothers 'knowledge and practice

Introduction

Pinworm infection (Enterobiasis) caused by Enterobius Vermicularis. It occurs worldwide and affects persons of all ages and socioeconomic levels. Infection occurs most commonly among school-aged and preschool-aged children, institutionalized persons. household members and caretakers of persons with pinworm infection [(1)]. In 2016, a study demonstrated that Enterobiasis is the most common helminthic disease in Iraq. Moreover, the prevalence of helminthic infections was higher in patients with age group between 5-14 years who did not have awareness of personal hygiene [(2).] It has a simple life cycle begins with egg deposition by gravid adult female worms on the perianal folds. Autoinfection occurs by scratching the perianal area and transferring infective eggs to the mouth with contaminated hands. Person-to-person transmission can occur by eating food touched by contaminated hands or by handling contaminated clothes or bed linens. Infection may also be acquired via contact with environmental surfaces (curtains, carpeting) that are contaminated with eggs. In addition, eggs may become airborne, inhaled, and swallowed. Following ingestion, eggs hatch and release larvae in the small intestine. The adult worms establish themselves in the gastrointestinal tract, mainly in the cecum and appendix. Gravid females migrate through the rectum onto the perianal skin to deposit eggs; this usually occurs at night. The larvae inside the eggs generally mature within four to six hours, resulting in infective eggs causing perianal itching, also known as pruritus ani. Although pinworm infection may be symptomless in most patients, some of them may suffer perianal pruritus, insomnia, restlessness, nervousness and irritability particularly in children with high worm burdens, these neurological symptoms may influence child growth [(1,3,4).] Also, it may cause serious morbidities such as appendicitis and eosinophilic enterocolitis and sometimes ectopic infections can result in pelvic inflammatory disease or urinary tract infections in females [(5)]. Pinworms are treated with an oral anti-parasitic medication; first dose should be followed by another dose two weeks later to make sure all the worms are gone. To reduce the risk of re-infection, paediatricians recommend that all the family members and caregivers of an infected child be treated as well. The medications used to treat pinworms are: Pyrantel pamoate (11mg/kg), Mebendazole (100-200 mg)

and Albendazole (200- 400 mg). Special preventive measures include thorough hand-washing before meals and after using the toilet, avoiding scratching in the Ano-genital area and anus-finger-mouth contact (where necessary, use of antipruritic ointments), daily washing of the genital region (from front to back), regular changes of underwear and sleeping garments, as well as strictly exclusive use of towels and flannels by the same person. Onychophagia should be avoided. Based on the foregoing, mothers' knowledge and practice about pinworm infection and prevention can play an important role in decreasing Enterobiasis [1,3,4,6].

Aim of the study

This study aims to assess mothers' knowledge and practice about pinworm infection and prevention among their children and to find the association between knowledge and practice with their demographic features.

Materials and Methods

Method Setting and study design.

A cross-sectional study with an analytic element lasted about s 6 months from 1st of January to 30th of June 2020. At the beginning the researchers decided to collect the information and data by interviews with the mothers who attending primary health care centers (PHCs) of Al-Resafa health directorate using a questionnaire structured by the researchers after review of many literatures, researches, and previous studies.

The researchers collected a pilot study of 20 mothers from PHCs (AL Idrisi and Bab AL-Moa'dhem primary health centers) which were not involved in the present study. The insights gained from the pilot study led to improvement in the questionnaire design and the study plan. Then after starting complete curfew of COVID19 pandemic in Iraq the questionnaire changed to online Google forms and delivered through email, Viber, WhatsApp applications and Facebook groups for mothers and relatives' group (which included not less than 20 members).

Contacts with 250 women were done to clarify how to answer the research. Two hundred women fit with the included criteria; 120 mothers participated in this study. All of them had children aged 12 years old and below. The answers downloaded from the online form (Google-form) to the computer as an excel file then to (SPSS) ver. 23 to be analysed. Frequencies and percentages calculated; Chi-Square-test were used ($P < 0.05$).

Ethical issues

After taking the ethical and scientific approval of the AL-Resafa health Directorate and AL-Resafa sector a note was delivered to all recipients included the importance of the study, the freedom to participate in it and the privacy of the participant's details.

Sampling technique:

Convenient samples of mothers who have access to online link of the questionnaire, (through the researcher email inserted in social media sites, and through mothers' groups) and accepted to enrol in the study. The Google form site collecting the answers as an excel file which later downloaded to the researcher computer for analysis.

Definition of cases, inclusion criteria:

Any mother with children aged 12 years or less, who access the online link of questionnaire and accept to enrol in the study.

Exclusion criteria:

1.Mothers who refuse to participate in the study.

2.Mothers of children with disabilities or children with chronic diseases.

3.The pilot study sample.

The questionnaire and family information

Sociodemographic data of children's families were taken from a questionnaire contains the following sections:

1.**demographic data**: consisted of 8 items of question which is age, educational level of the mother and her husband, number of family members, number of children, number of rooms per home, mothers' and fathers' jobs.

2.**Social data**: included: Type of water supply (tap, filtered, Boiled, &RO) type of sewage used in the house, type of toilet commonly used (squat, seat and both).

3.**Behavioural habits, attitude and practice of the family:** consist of eight questions six of them are close-ended questions **(**Always, sometimes and never) did your family clean their hands? Did your children wash their hands with soap after bathroom? Did your children (who are older than six years) wash their hands for at least 25 seconds? did you wash fruits and vegetables?

Did your child suck his finger? (Yes, No). what was the practice to prevent your child from finger sucking habit? (multiple-choice questions). History of previous pinworm infestation: closed-ended question the answer by (yes or no) if the answer is yes the next question is with (multiple choice question), who? (Yourself, family member, relatives and friends).

4. **Mothers' Knowledge about pinworms:**
This section consists of eight items testes mothers' knowledge about pinworms, four of these items are close-ended question (yes, no and don't know) the rest four are multiple-choice questions, the close ended questions are: how can the pinworms spread (by contaminated food and household items? by blood transfusion? by breastfeeding? by sexual intercourse. How the pinworms are treated (by oral medications, or no-need to treatment),what are the methods of pinworms prevention (multiple-Choice questions) ; by handwashing after and before eating or after using toilet, nail cutting, prevent children from Finger sucking and anal scratching, by Sterilizing bed sheets and blankets with boiling water, no way to prevention, what is the right methods of bathing to prevent the spread of infection and re-infection(standing, sitting, or by using a bathtub), is it possible to recover completely from pinworms infection? (Yes, no), if you or any family member develops night anal scratch what should you do? Go to the PHC center, hospital, pharmacy, a private clinic, do nothing. the complications of Enterobiasis (chronic anaemia, growth problems, and weight reduction) (Yes, no), If any member of the family has been diagnosed with pinworms infection, all the family member over two years of age should take a medication (yes, no).

5.**Source of mother's information (she can choose multiple choices)** PHC seminars, private doctors, relatives, friends, TV or radio, internet, books and nongovernmental organization (NGO).

Pilot study:
A pilot study was carried out from the period 12th of February to the 22nd of February, to determine the reliability of the study instrument's, the pilot study was carried on 20 mothers from two PHCs of AL-Resafa directorate (AL_ Idrisi and Bab AL_ Moa'dhem PHCs) which were removed from the final sample size, the mothers in the pilot study have the same criteria of the original study sample, the reliability of the questionnaire performed through test and retest to achieve the following objectives:

1.To ascertain the study instrument clarity and adequacy.

2.To estimate the time needed for answering the questions (which was not more than 10-15 minutes).

3.To determine the study instrument's reliability.

Data analysis and Coding of answers
The questionnaire answers for knowledge were coded as 3 for correct answer, 2 for I don't know 1for incorrect answer in the knowledge section.

Total transmission(5Q)	poor knowledge (5-8)
	Fair knowledge (9-11)
	good knowledge (12-15)
Total treatment(4Q)	Poor knowledge (4-6)
	Fair knowledge (7-9)
	good knowledge (10-12)
Total prevention(8Q)	poor knowledge (8-13)
	Fair knowledge (14-19)
	good knowledge (20 -24)
Total treatment seeking site(6Q)	poor knowledge (6-9)
	Fair knowledge (10-14)
	good knowledge (15 -18)

And for practice as Total washing (5Q) (Correct answer =3, sometimes = 2, incorrect answer =1), so poor practice (5-8), fair practice (9-11), good practice (12-15).

Results

One hundred and twenty mothers enrolled in this study, the highest Percentage of them (68.3%) are under 30 years old. The mean age is 29.73, the standard deviation =4.6 and 36 (30%) of them were 31- 40 years old. About 117 (98%) of them from urban area. Mothers' sociodemographic characters can be seen in table 1.
The study showed that 32 participants (26.7%) depend on RO water supply, 31 (25.8%) depend on tap water with ozone filter, 30 (25%) using purified water bottles and only (1.7%) depend on pure tap water. The majority 106 (88.3%) had swage line, 12 (10%) had septic tank. Only 2 (1.7%) didn't know the type of swage. Regarding type of toilet 74 (61.7%) had toilet seat type, 21 (17.5%) had oriental (squat) toilet, 25 (20.8%) had both types in their home.
Mothers' knowledge about pinworm's transmission, prevention, treatment, and treatment's seeking site are shown in table2.

The result of mothers 'washing and swimming practice is shown in table 3.
Seventy-four mothers (61.7%) reported that their children didn't suck their fingers, while 39 (32.5%) reported sometimes, and only 7 (5.8%) said that their children always suck their fingers. from these 46 (38.4%) mothers 23 (50%) prevented finger sucking by threatening and hitting the child, 12 (26.09%) didn't prevent it and 11 (23.9%) used positive reinforcement.

The present study revealed that high percentage of participants had good practice in washing (Hand washing, duration of hand washing, hand Washing after using toilet, washing of fruits and vegetables) as in figure 1.

We found significant statistical relations between total knowledge of treatment and participants' level of education (p. value =0.34) and swage type (0.039), but no relation was found with participants' ages 0.205, jobs 0.510, husbands' level of education 0.141, husbands' jobs 0.540, no. of family members 0. 537, no. of children 0.146, no. of rooms 0. 110, type of water supply 0. 578, type of toilet 0.421.

We also found a positive statistical relation between total knowledge about prevention and participants' educational level 0.042, but no relation was found with their ages 0.23, jobs 0.950, husbands' educational levels 0.212, husbands' jobs 0.889, no. of family members 0.707, no of children 0.753, no of room 0.807, type of water supply 0.535, type of toilet 0.876, type of swage 0.466. previous pin worm infection was reported by 46(38.34%) participants as in figure 2. No statistical relations found between total practice of washing and participants' ages 0.182, level of education 0.278, jobs 0.510, husbands' level of education 0.992, jobs 0.332, no. of family members 0.549, no. of children 0.593, no. of rooms 0.275, type of water supply 0.313, type of toilet 0.174, type of swage 0.800.

We also didn't find statistical relation between total knowledge about transmission of pin worms and participants' ages p value =0.312, educational level 0.065, jobs 0.770, their husbands' educational level 0.124, jobs 0.845, no. of family members 0.647, no of children 0.494, no. of rooms 0.947, type of water supply 0.430, type of toilet 0.134, type of swage 0.337.

Regarding source of Information, the vast majority of participants 98(81.6%) said it was from internet. Unfortunately, only 6(5%) depended on PHC and 4 (3.3%) on nongovernmental organisation (NGO) as a source. Figure 3

Table 1. Distribution of participated mothers according to their sociodemographic characters

		Frequency	Percent %
Age Mean= 29.73 Std. Deviation =4.685	≤30 yr	82	68.3
	31- 40 yr	36	30.0
	≥ 41 yr	2	1.7
Participants' educational level	≤secondary school	5	4.2
	institution/college	99	82.5
	post-graduated	16	13.3
Husbands' educational level	≤secondary school	15	12.5
	institution/college	87	72.5
	post-graduated	18	15.0
Number of family members	≤5	86	71.7
	6-10	31	25.8
	≥ 11	3	2.5
Number of rooms	1-2	26	21.7
	3-4	45	37.5
	≥ 5	49	40.8
Participants' job	medical field	17	14.2
	governmental employee	47	39.2
	non-governmental employee	2	1.7
	housewife	54	45.0
Husbands' job	medical field	4	3.3
	governmental employee	79	65.8
	non-governmental employee	37	30.8
No. of Children	One child	58	48.3
	Two children	46	38.3
	Three children	9	7.5
	≥ four children	7	5.8
Total		120	100.0

Table 2. Distribution of participated mothers according to their knowledge about transmission, prevention, treatment, and treatment's seeking site

		Yes		I don't know		No	
		No.	%	No.	%	No.	%
Transmission	Contaminated food	**82**	**68.3**	34	28.3	4	3.3
	Dirty home equipment`s	**73**	**60.8**	40	33.3	7	5.8
	Blood transfusion	2	1.7	54	45.0	**64**	**53.3**
	Sexual intercourse	13	10.8	**57**	**47.5**	50	41.7
	Breastfeeding	0	0	42	35.0	**78**	**65.0**
prevention	hand washing before eating	**115**	**95.8**	0	0	5	4.2
	hand washing after using toilet	**114**	**95.0**	5	4.2	1	0.8
	Bed sheets washing with boiled water	**103**	**85.8**	11	9.2	6	5.0
	children nail cut	**113**	**94.2**	7	5.8	0	0
	prevent finger sucking	**107**	**89.2**	11	9.2	2	1.7
	prevent anal scratching	**110**	**91.7**	9	7.5	1	0.8
	food cleaning	**113**	**94.2**	6	5.0	1	0.8
	I Can't prevent pinworm infestation	**93**	**77.5**	22	18.3	5	4.2
Treatment	Oral drugs treatments	**106**	**88.3**	13	10.8	1	0.8
	No need for treatment	4	3.3	28	23.3	**88**	**73.3**
	All the family members should be treated	**64**	**53.3**	38	31.7	18	15.0
	Re-infection can occur	**74**	**61.7**	42	35.0	4	3.3
Treatment seeking site	PHC	**54**	**45.0**	7	5.8	59	49.2
	pharmacy only	30	25.0	7	5.8	**83**	**69.2**
	hospital	22	18.3	6	5.0	**92**	**76.7**
	Private clinic	**99**	**82.5**	5	4.2	16	13.3
	Do nothing	3	2.5	9	7.5	**108**	**90.0**

Table 3. Distribution of participated mothers according to their washing & swimming practice

		always		sometimes		never	
		No.	%	No.	%	No.	%
washing	Hand washing before eating	**87**	**72.5**	30	25.0	3	2.5
	Hand washing for 25 second	**56**	**49.2**	52	43.3	9	7.5
	Vegetables washing	**83**	**69.2**	30	25.0	7	5.8
	Fruits washing	**111**	**92.5**	7	5.8	2	1.7
	Hand washing after using toilet	**116**	**96.7**	1	0.8	3	2.5
Swimming	standing	**103**	**85.8**	10	8.3	7	5.8
	Swimming Bathtub	10	8.3	21	17.5	**89**	**74.2**
	Swimming sitting sit	9	7.5	22	18.3	**89**	**74.2**

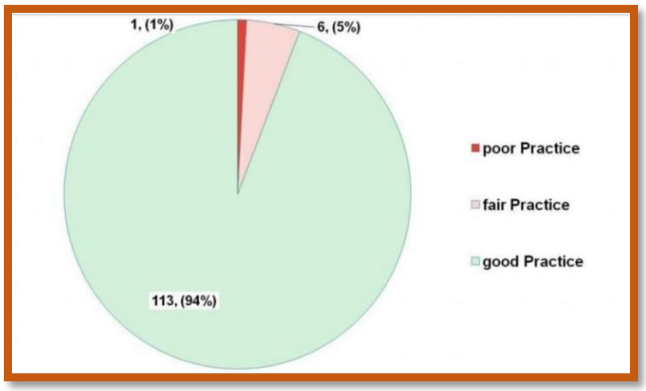

Figure 1. Distribution of participated mothers according to their practice of washing.

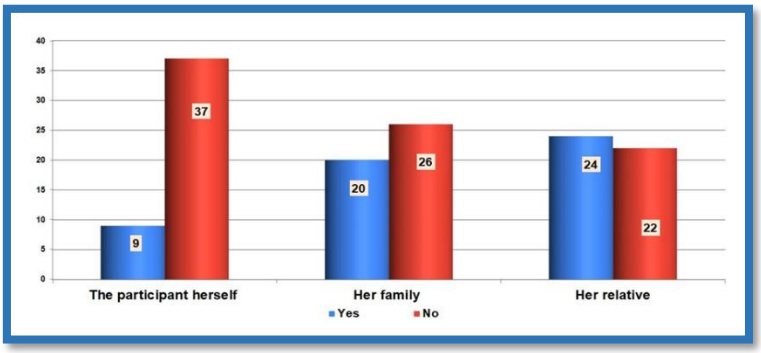

Figure 2. Distribution of participated mothers according to history of previous infestation(N=46).

Table 4. Significant association between Total knowledge about treatment &Total knowledge about prevention with sociodemographic character

ANOVA Total knowledge about treatment						
		Sum of Squares	df	Mean Square	F	Sig.
Educ. level	**Between Groups**	**.752**	**1**	**.752**	**4.613**	**0.034**
	Within Groups	**19.240**	**118**	**.163**		
	Total	**19.992**	**119**			
Swage type	**Between Groups**	**.469**	**1**	**.469**	**4.356**	**0.039**
	Within Groups	**12.698**	**118**	**.108**		
	Total	**13.167**	**119**			
ANOVA Total knowledge about prevention						
		Sum of Squares	df	Mean Square	F	Sig.
Educ. level	**Between Groups**	**.688**	**1**	**.688**	**4.206**	**0.042**
	Within Groups	**19.304**	**118**	**.164**		
	Total	**19.992**	**119**			

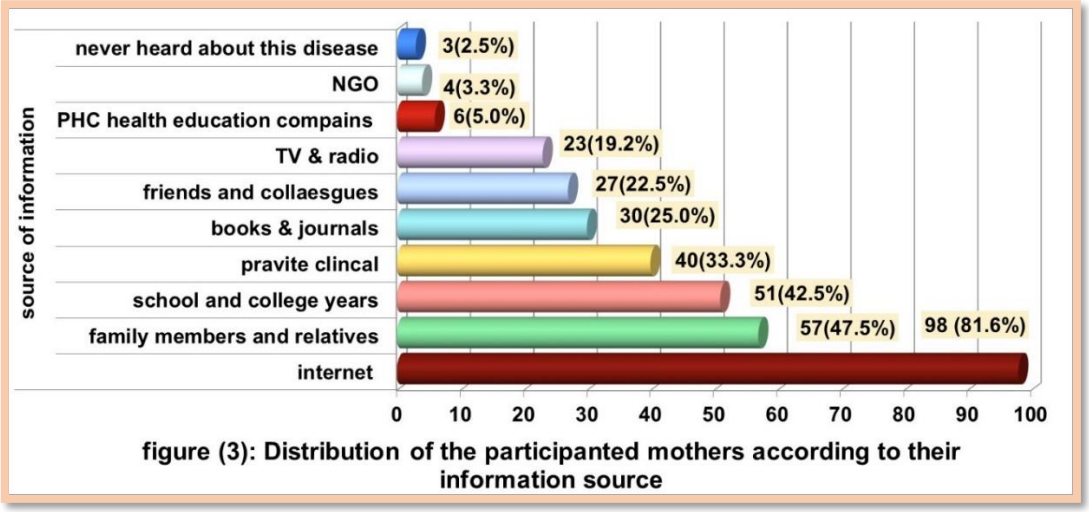

figure (3): Distribution of the participanted mothers according to their information source

Discussion

Enterobiasis is one of the most common human parasitic infections that occur worldwide especially in countries with temperate weather. It occurs in all ages and all socio-economic levels [1,7]. In the current study participants' mean age was 29.73, the highest percentage of them are under 30 years old and about one third of them were (31-40) year old. Most of the participants 82.5% and their husbands 72.5% were graduates of institutes and colleges.

Virtually half of the participants were housewives, this may be a result of the political and social state in Iraq.

The study revealed more than two-third (71%) of the participant's family size were five-members, this is similar to the result of the study of Jawad MK, et al, [7] and approximating the average family size in Iraq which was 6.3 persons according to 2018 Multiple Indicator Cluster Survey (MICS6) Briefing [8].

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Regarding number of rooms, 40.8% of participants had five rooms or more in their homes. More than two third of them had toilet seat and the majority had sewage line. About one third were depending on RO as water supply and only few numbers were using tap water.

Concerning swimming method; they choose standing, not Swimming Bathtub or sitting, this may be because it is not the habit of the Iraqi society.

Assessment of participants' knowledge about treatment of pin worms: the vast majority of them said (yes) it should be treated by oral medicines, only four said no need for treatment. this result agreed with a study done in Pakistan that almost all people said it can be cured by medicines easily [9].

Most of the participants answered yes, when a family member infected by pinworms all the family must be treated even if they were asymptomatic, on the other hand about one third of them don't know this fact. this result disagreed with the result of a study done by Amein NM, et al, in 2014 which stated that only 16% of care giver knew that all the people in the house should receive treatment at the same time [10].

Regarding treatment seeking site, we found that more than three quarters of the participants were seeking treatment in private clinics. This finding was in agreement with Shabila NP, et al and Al Janabi T who reported that there is high preference for using private physicians to provide primary care services, because of the wide availability of private sector health services and easy accessibility [11,12].

Previous infection was reported by 46(38.3%) mothers, 24(20%) said that their relatives were infected and only 9 (7.5%) said that they were complaining from pin worm infection previously. On the other hand, it was mentioned that mothers are more likely to be infected by pin worm [1,13].

Most of the participants had good knowledge about the mode of transmission of pin worm infection, that disagreed with the result of the Egyptian study of El-Minia City which found that 50% of the care giver didn't know any mode of transmission [10].

It was mentioned that pin worm infection can be transmitted during sexual contact [13,14,15,16] Unfortunately, in this study nearly half of the mothers (47.5%) didn't know this fact and 45% of them didn't know that blood transfusion is incorrect mode of transmission, this result is differed from a study done in Pakistan which found all people said pinworms infection does not spread by any contact or blood transfusion [9].

This study showed that more than one third of the participants didn't know that breastfeeding can't transmit the infection, this may reflect the lack of information about breastfeeding.

The study didn't find significant statistical correlations between participants' total knowledge about transmission and their age, educational level, jobs, their husband educational level and jobs, number of family members, number of rooms, number of children, type of toilet, sewage, and water supply. Furthermore, this study revealed that high percentage of the participants (93.3%) had good knowledge about prevention of pinworms infection.

On the other hand, this study showed significant statistical correlation between participants' total knowledge about prevention and participants' educational levels, but not with their ages and jobs, husband educational level and job, number of family members, number of rooms, number of children, type of toilet, type of sewage, and water supply. This emphasizes the importance of mothers' school education in rising health awareness.

Regarding assessment of participants' practice, The current study revealed that the majority of the participants and their children were practicing handwashing for 25 second or even longer, handwashing before and after eating, after using toilet in addition to washing of fruits and vegetables.

Hand washing is one of the important parameters which intervenes with Feco- oral transmission of disease, and this habit can act as primary and secondary barrier to interrupt transmission. so, hand washing must be practiced well before and after taking meals and handling fluid and this must be done with clean water and if possible, with soap or any other cleaning agent [17]. The study also showed that high percentage of mothers were clipping their children's fingernails and preventing finger sucking. All these are helpful in prevention and decreasing the risk of auto infection and transmission [1,16,18,19].

The study found that the majority of the paticipant mothers had good practice in prevention of pinworms infestations and control it among their children and other family members, this could be due to the coincidence of the study with the COVID -19 pandemic and the consequence improvement in health practices through health awareness by different media.

The present study demonstrated that the source for information about pinworm infection was

the internet in (81%) of the participants, family members and relatives (47.5%) and only few numbers of them were depending on PHC as a source for information, this can be explained by the easy accessibility to internet and 24-hour availability, also may be due to a shortage in health education promotion program in PHC. In contrast an Australian survey reported that general practitioner was the child health information source most frequently used by parents (92%), followed by friends and family (78%), web sites and online forums (61%) [20]. Many studies reported that internet general search engines and social media are rapidly becoming important and trusted sources of parenting and health information that mothers turn to when making care decisions for their infants and children [21,22].

Limitation of the study

1.Corona virus curfew impaired the collection of information from PHCs, they were completely empty of clients at the period of data collection.
2.The researchers and their families infected with covid19 which hindered the mobility and discussion about the research because of the quarantine.
3.the limited research time precluded gathering larger number of participants in the study.

Conclusion and Recommendation

The study found that nearly two-thirds of the participating mothers had good knowledge about pinworm infection and the majority demonstrated good practices in preventing pinworm infection among their children and other family members. It was also observed that slightly over one-third of participants reported previous pinworm infection in themselves or their family members. Furthermore, there was a significant statistical association between the participants' level of education and total knowledge about treatment and prevention, although no such association was found with knowledge about transmission. Lastly, the study revealed that the majority of mothers relied on the internet as a source of information about pinworm infection, while only a small number depended on PHC for information. Based on the aforementioned, the study recommended promotion of regular counselling and education sessions for mothers about pinworm transmission, complications and preventions in PHC. Also, promotion of health educations via social media, electronic programs, and training courses to the community. In addition, the Iraqi curricula at different levels of education should include information about pinworm infection.

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