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Mothers' Knowledge about Intestinal Parasitic Infections among Pre-School Children at Primary Health Care Centers

Rusul Ali Kadhim^{1*}

1. Faculty of Nursing, University of Kufa, Iraq

* Correspondence: rusela.almosaway@uokufa.edu.iq

Abstract: Intestinal parasitic infections constitute a major health problem that adversely affects the population, involving in excess of one billion people worldwide. Preschool children represent a particularly vulnerable population at elevated risk of infection. Maternal knowledge deficits about proper food hygiene practices and personal sanitation represent serious risk factors contributing to the transmission of intestinal parasitic infections among children. Adequate knowledge, a good attitude, and preventive practice against this infection can significantly mitigate the spread of intestinal infection. The current study aims to assess the level of mothers' knowledge about intestinal parasitic infections for pre-school children and examine the association between The descriptive, cross-sectional study design was performed from April 15th, 2025, to October 29th, 2025. A total of (210) mother samples were collected from the Primary Health Care Centers in Al-Najaf city, Iraq. A (113) male child was (53.8%), mother's jobs were (66.2%) of them housewives, primary school was the highest percentage level (32.9%). The general mean showed that the mothers have a good level of knowledge about intestinal worms. Personal characteristics of mothers, such as the number of children in the home, mothers' job, and their levels of education, show a significant association when ($P \leq 0.05$). The current study revealed that the majority of mothers have good knowledge about intestinal worms. Raising awareness about intestinal worms by publishing posters and establishing more programs of continuing education. Advising mothers to visit the nearest healthcare center if they notice any signs or symptoms of Intestinal parasitic infections.

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Introduction

Globally, Intestinal parasite infections (IPIs) is a major health problem that needs serious handling. About 60% of the population suffers from (IPIs) leading causes of morbidity and mortality. Intestinal parasites are protozoan and helminthic parasites that have at least a stage of their life cycle within the intestines [1].

People of all ages can be affected by IPIs. It is a major problem among children due to poor sanitary and hygienic conditions. This disease negatively impacts the patient led to weaken health conditions, nutrition and intelligence so that it economically causes many losses, because it causes loss of carbohydrates and protein and loss of blood (anemia) [2].

The World Health Organization (WHO) has identified Preschool-aged children (PSAC) as a risk group. Millions of PSAC in underdeveloped nations suffer from chronic helminth infections and helminth-related morbidities. Thus, in children, stunted growth,

wasting, and underweight are associated with malnutrition and anemia, which have detrimental effects on development and educational performance [3].

Lack of safe water, sanitation, proper hygiene, and soil-transmitted helminths are significant challenges to global development. Less or unimproved WASH facilities, as well as children who had poor practices of personal hygiene, are more likely to be affected by this infection. In addition to low socio-economic status, poor sanitation, inadequate medical care, especially children's habits of playing in dirty places or handling infected soils, eating with soiled hands, unhygienic toilet practices, and drinking or eating contaminated water and food are attributed to the high prevalence rate of soil-transmitted helminths [4].

Gastrointestinal parasites play significant roles in the morbidity and mortality it causes slow mental and physical growth, produces long-term effects on their educational achievement, leads to a deficiency of iron, protein and other vital nutrients and thus, hampers the growth in local and national economic growth. Other morbidities associated with parasitic infections of the gastrointestinal tract include anemia, chronic dyspepsia, diarrhea, intestinal bleeding, loss of appetite, malabsorption, vitamin A deficiency, and vomiting [5].

Most of the time, IPI do not show clinical signs and symptoms and also have a number of potential carriers, such as food handlers, which makes it too difficult to eradicate and control. The spread of disease by food handlers is a common and persistent problem worldwide. Those food handlers with poor personal hygiene working in the food service settings can easily be infected with enteric pathogens, possibly causing fecal contamination of foods with their hands during food preparation, and finally may be implicated in the transmission of many infections to the public in the local community [6].

Several factors depend on clinical manifestations of these infections, including the parasite's genotype, the amount of inoculum, and the host's age and immunity. Children with high immunity well tolerated of most intestinal parasitic infections. They may present as asymptomatic or with a wide range of non-specific abdominal symptoms, including abdominal pain, diarrhea, flatulence, nausea, anorexia, or weight loss. More than 450 million health issues among children, such as diarrhea, abdominal pain, malnutrition, general malaise, and impaired growth and physical development [7].

Essential measures for controlling IPI include improvement of health education, personal hygiene, environmental sanitation, and availability of drinkable water. Hand hygiene before eating with soap and water for both adults and children should be maintained to avoid the primary mode of transmission through the fecal-oral route. Avoid uncooked food at the right temperature, unwashed fruits with clean water, green vegetables, and salads. In addition, avoid drinking water from ponds, lakes, and streams. There should be proper disposal of human waste and the avoidance of soil contaminated with human feces [8].

Parental knowledge about understanding IPIs is crucial for effective interventions, prevention measures, early detection, and treatment among children to the development of evidence-based strategies that reduce healthcare burden [9].

Community health nursing staff should play a vital role in helping parents and providing them with important information. They should educate caregivers about how to deal with infected children with intestinal infestations through families, and the community [10].

Therefore, this study aims to assess the level of mothers' knowledge about intestinal parasitic infections in pre-school children.

Importance of research

Intestinal parasitic infections represent a serious global health problem, affecting more than one billion people worldwide and ranking among the leading causes of morbidity and death. The World Health Organization classifies preschool children as among the most vulnerable groups, as chronic parasitic worm infections

This study is of critical importance because mothers' knowledge constitutes the first line of defense against the transmission of intestinal parasitic infections to children. A lack of maternal understanding of hygiene practices, modes of transmission, and clinical symptoms represents a major risk factor. By assessing the level of knowledge of mothers in the city of Najaf, Iraq, this study contributes to the development of evidence-based strategies aimed at reducing the health burden of intestinal parasitic infections among preschool children.

Finally, the study's findings underscore the need to invest in women's education and economic empowerment as structural strategies for improving child health, a perspective with significant implications for health policies at both the national and international levels.

Materials and Methods

Study Design: The descriptive, cross-sectional study design was performed from April 15th, 2025 to October 29th, 2025. Aims to assess the level of knowledge of mothers about intestinal worms for pre-school children. Identify the association of knowledge and its demographical characteristics.

Setting of the study: The study was conducted in the Primary Health Care Centers in Al-Najaf city, Iraq.

Sample and Sampling of the study: A non-probability sampling technique, a purposive sample was used in this study. That includes (210) samples of mothers with preschooler children under 5 years old. Selected from the Primary Health Care Centers in Al-Najaf

Questionnaire of the Study: Depending on related literature and previous studies, the researcher constructs the questionnaire to be convenient with social considerations. Then these items were certified by experts. This study focuses on evidence relating to mothers' knowledge about sign, symptoms, transition, prevention, treatment, and health education about intestinal worms.

The validity of the study: Validity, the ability of collect the necessary data through a questionnaire. The Current pilot study was objective to obtain evidence about the reliability of the questionnaire, the recognized ability of the applied instrument, and to estimate the required time to collect data.

Reliability: The Cronbach's Alpha coefficient test was used to define the reliability of the study questionnaire. The value of Cronbach's Alpha coefficient test was (0.71) for the knowledge scale. The result showed an acceptable reliability to begin data collection. **Data Collection:** Participation and agreement in this study were voluntary, obtained from each participant after clarifying the subject of the study and its objectives, the instructions on the way of how to fill out the questionnaire, with kept confidentiality of participants secret.

Results and Discussion

Result

This chapter summarizes the results of the current study. A total of (210) mothers who have children under (5) years (pre-school age) were enrolled in study. The results were analyzed by statistical software SPSS Statistics.

Table 1. Personal characteristics of mothers and their pre-school children.

F (%)	Variables	
113 (53.8)	Male	Gender of child
97 (46.2)	Female	
156 (74.3)	(1-3) child	Number of children in the home
45 (21.4)	(4-6) child	

9 (4.3)	(7-9) child	Work Status
71 (33.8)	Work	
139 (66.2)	House wife	
69 (32.9)	Primary school	Mother's level of education
47 (22.4)	Intermediate school	
26 (12.4)	Secondary school	
64 (30.5)	Graduated	
4 (1.9)	Postgraduate	

Table (1) shows the distribution of personal characteristics of mothers who have children under five years. The sample shows a distribution with slightly more males (53.8%) than females (46.2%) among the preschool children. The majority of families (74.3%) have 1-3 children, indicating predominantly small to medium-sized households. Larger families with 4-6 children represent about one-fifth of the sample (21.4%), while families with 7-9 children are rare (4.3%). Regarding the mother's work status were (66.2%) of them house wives. According to mother's level of education, primary school was the highest percentage level (32.9%).

Table 2. Clinical information of children

No	Yes	Questions	No.
F (%)	F (%)		
153 (72.5)	57 (27.5)	A child having a worm investigation problem at the time of the study	1
117 (55.5)	93 (44.1)	The child complained of an intestinal worm in the past	2
38 (18)	172(81.5)	Bring a child to a physician if they complain of diarrhea	3
150 (71.4)	60 (28.6)	The child frequently plays with soil	4

The current table (2) represents the clinical information of children; the majority of them (72.5%) do not have intestinal worms during the time of the current study. Additionally, more than half of them (55.5%) have not complained of worms in the past. While the highest percentage (81.5%) of children will bring to a physician if they complain of diarrhea. As well as two-thirds of them (71.4%) were not playing with soil.

Table 3. Level of mother's knowledge about intestinal worms

Assessment	Mean $\pm$ SD	Items	No.
Good knowledge	2.77 $\pm$ 0.601	Abdominal worms are a type of parasitic germs that lives in the intestines of humans and feed on their food	1
Good knowledge	2.72 $\pm$ 0.628	An intestinal worm can be transmitted directly (hand-to-hand contact)	2
Good knowledge	2.86 $\pm$ 0.454	An intestinal worm can be transmitted by contact with contaminated food or water and from environmental surfaces	3
Good knowledge	2.87 $\pm$ 0.446	Fast food on the road may not be completely clean	4

Good knowledge	2.67 ±0.612	People of all ages can be affected by intestinal worms	5
Fair knowledge	1.95 ±0.874	An intestinal worm can affect the mental development of children	6
Good knowledge	2.53 ±0.777	An intestinal worm can affect the physical development of children	7
Good knowledge	2.61 ±0.663	The affected child suffers from a severe loss of appetite and an inability to eat	8
Good knowledge	2.74 ±0.597	A child infected with worms suffers from severe anal itching	9
Good knowledge	2.62 ±0.662	A child with intestinal worms suffers from severe abdominal pain accompanied by a disorder of the digestive system	10
Fair knowledge	2.15 ±0.854	A child with worms has diarrhea	11
Fair knowledge	2.35 ±0.823	Anemia is associated with infections in children	12
Fair knowledge	1.90 ±0.885	Abdominal worms can cause dysentery (bloody diarrhea)	13
Good knowledge	2.88 ±0.442	Washing hands well before eating prevents worm infection	14
Good knowledge	2.84 ±0.472	Clean and cut fingernails to prevent the infestation of intestinal worms	15
Fair knowledge	2.32 ±0.824	worms can be treated at home by eating some foods, such as onions and garlic	16
Good knowledge	2.55 ±0.751	worms are treated with medicines by an antiparasitic	17
Fair knowledge	2.43 ±0.823	Having pets in the house is considered a carrier of worms	18
Fair knowledge	2.37 ±0.855	Worm eggs can spread in the house, clothes, and bedding	19
High knowledge	2.53 ±0.298	General mean	

Scoring: (1-1.6= low knowledge, 1.7-2.3= fair knowledge, 2.4-3= good knowledge)

Table (3) demonstrates mothers' responses regarding different questions on knowledge for each question. That revealed majority of them have Moderate self-esteem about themselves. Regarding the first five questions, the mothers had good knowledge about these questions. Otherwise, in the sixth question, they had fair knowledge. However, by observing, we can notice mothers' good knowledge from the 7th to the 10th question. But, moving to questions 11, 12, and 13, their good knowledge starts diminishing. While in both questions 14 and 15, mothers' good knowledge about them is clearly observable. As it is clear and according to obvious results, the mothers' knowledge about question 16 is fair. Once again, they exhibit a good level of knowledge in question 17. And last but not least, mothers' fair knowledge about both questions 18 and 19 is obviously noticed. Thus, in the general mean, it is quite observable that the mothers of pre-school children have a good level of knowledge about intestinal worms.

Table 4. Association of Mother's Knowledge and demographical characteristics by using X2 (n=210)

df	Sig.	Levels of knowledge			F&%	Demographical characteristics	
		Low knowledge	Fair knowledge	Good knowledge			
4	0.003	0	46	110	F	(1-3) child	Number of children in the home
		0	29.5	70.5	%		
		2	14	29	F	(4-6) child	
		4.4	31.2	64.4	%		
		0	3	6	F	(7-9) child	
		0	33.3	66.7	%		
2	0.001	0	15	56	F	Work	Mother's work
		0	21.1	78.9	%		
		5	67	67	F	House wife	
		3.6	48.2	48.2	%		
8	0.004	0	24	45	F	Primary school	Mother's level of education
		0	34.8	65.2	%		
		1	15	31	F	Intermediate school	
		2	32	66	%		
		1	9	16	F	Secondary school	
		3.8	34.7	61.5	%		
		0	14	50	F	Graduated	
		0	21.8	78.2	%		
		0	0	4	F	Postgraduate	
		0	0	100	%		

S: Significant at ($P \leq 0.05$)

Table (4) shows the significant associations between mothers' knowledge and their demographic characteristics. Highly significant association of knowledge and number of children in the home ($P \leq 0.05$). Mother's work represents a high association with their knowledge when ($P \leq 0.05$). Also, their levels of education show a significant association with their levels of knowledge when ($P \leq 0.05$).

Discussion

Assessing the knowledge about IPIs is significant for evaluating the current preventive approaches or designing a new one. The current study assesses the mothers' knowledge about IPIs.

This study targeted preschool children as a target group, given the significant impact of infectious diseases on them, in agreement with studies elsewhere by Ferreira et al [11] that showed children are greatly affected, leading to malnutrition and subsequently to physical and cognitive development impairment.

The prevalence of IPI in the current study indicates that nearly thirty percent of preschool children had experienced infections, indicating this is a significant health issue in this population. This finding is supported by Elmonir, W [12] that showed the important risk factors associated with IPIs are preschool age, shortage of safe water, low family's

income, rural residence, lack of hand washing (before meals, after soil contact and after toilet use), eating raw or unwashed vegetables, keeping pets or ruminants at household, and close contact with stray animals.

Regarding the level of mothers' knowledge about intestinal worms, the highest levels of understanding were observed concerning preventive hygiene practices. Regarding clinical symptoms, mothers demonstrated good knowledge of common symptoms, including anal pruritus, abdominal pain with gastrointestinal disturbances, and appetite suppression. Despite overall adequate knowledge, several domains revealed significant deficiencies requiring targeted educational intervention. The most marked lack of knowledge is related to the association between intestinal parasitic infections and cognitive development. This finding is particularly concerning, given the well-documented neurocognitive effects of chronic parasitic infections in children. This finding agrees with a study done in Baghdad by Al-Shatari, S. A., and Kadum, N. S. S. [13] that nearly two-thirds of the participants had good knowledge about pinworm infestation. The majority had good practice in the prevention of infection. There were significant relations between mothers' educational level and total knowledge about treatment and prevention.

That not compatible with study of Education Program to Improve Mother's Knowledge about Management of Children with Pinworms that done by Jawad, et al, [14] that results showed that most mothers had a marked lack of knowledge regarding management of children with pinworms, where clear improvements in mothers' knowledge after the post test of the study group of the educational program on the management of children with pinworms.

Good knowledge was shown about the transmitted mood. This is not compatible with study of Knowledge, Attitude and Practice of Mothers on Prevention and Control of Intestinal Parasitic Infestations that done by Kassaw, M. W., et al, [15] that results showed the level of knowledge is exclusively low, the general level of knowledge, attitude and practice mothers on the prevention and control of intestinal parasites is significantly lower. This result agrees with study from Iraq [16] the results show the higher percentage which were (3.52%) of mothers have low knowledge about methods of prevention from pinworm infection, the transmission methods or even how could control the infection.

Current findings showed a highly significant association of knowledge and the number of children in the home. Mother's work represents a high association with their knowledge. Also, their levels of education show a significant association with their levels of knowledge. These findings are supported by Bisetegn, H., et al [17] who showed significant associations observed between IPIs and some explanatory variables, including mother's education, and family size.

Conclusion

Intestinal parasitic infections pose a major health problem that is not addressed properly. The World Health Organization (WHO) has identified Preschool-aged children (PSAC) as a risk group. Millions of PSAC in underdeveloped nations suffer from chronic helminth infections and helminth-related morbidities. Less or unimproved WASH facilities, as well as children who practice poor personal hygiene, are more likely to be affected by this infection. Poor hygiene practice, inadequate sanitary conditions, and lack of awareness of the correct mode of transmission are some factors that contribute to high intestinal parasitic infection among children. Despite the mothers' sufficient knowledge, infection with these infections is still widespread and causes diseases. This study revealed that the majority of participants have good knowledge about intestinal worms as a mode of transmission, symptoms, and management. The overall knowledge of mothers was good regarding intestinal worms. Moreover, a significant association of mothers' knowledge and their demographic characteristics when ($P \leq 0.05$).

Current study recommended to raising awareness about intestinal worms by publishing posters, establishing more programs of continuing education, and conducting

health surveillance. In addition to advising mothers to visit the nearest healthcare center if they notice any signs or symptoms of IPIs, we also recommend seeking treatment. Improvement of personal hygiene practices, environmental sanitation, health education, and availability of potable water are essential measures for long-term control of Intestinal parasitic infections.

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