

Awareness And Practices Of Preventive Behaviors Toward Intestinal Parasitic Infection Among Mothers Of Preschool Children

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Abstract

Intestinal parasitic infections are of the most prevalent diseases in the world, predominantly in developing countries. Around 1.5 billion people, mostly children Up to 300 million preschool children were infected with intestinal parasites. **Aim:** Determine the awareness and practices of preventive behaviors toward intestinal parasitic infection among mothers of preschool children. **Design:** Descriptive correlational design. **Sample:** A purposive sample of 300 mothers with preschool children in Menoufia Governorate. **Instruments:** Self-administered questionnaire that included three parts. Part1: Socio-demographic characteristics of mothers, part2: Assessment of mother's awareness about intestinal parasitic infections. Part3: Assessment of mother's practices of prevention and control of intestinal parasitic infections. **Results:** The majority of the studied mothers had low level of good awareness about intestinal parasites; most of them didn't practice the measures to prevent intestinal parasitic infections, mother education, mother occupation and father education were factors affecting mother's awareness and practice of preventive behaviors of intestinal parasitic infection. There was a positive correlation between total awareness score and total practices score of preventive behaviors toward intestinal parasitic infection among mothers of preschool children. **Conclusion:** Lack of good awareness and practices among mothers of preschool children regarding prevention and control of intestinal parasitic infections, **Recommendation:** Planning and conducting health education programs in the different community health care settings and mass media for the public, especially the mothers are highly recommended because it can play significant effects in improving their awareness and practices for prevention of intestinal parasitic infections among their children.

Keywords: Intestinal Parasitic Infections, preschool children, Awareness.

1. Introduction

Intestinal parasitic infections (IPIs) represent a significant global public health alert in both developing and developed nations because it results in high morbidity and mortality (Singer et al., 2020). Infections caused by protozoa and helminthes causes suffering, economic loss and

even death (Candela, et al., 2021; Igore, et al., 2020).

Intestinal parasitic infections are conditions in which parasites infect the gastro-intestinal tract of human and other animals. Such parasites can live anywhere in the body, but most of them prefer the intestinal wall (Wiser, 2021; Hailu, 2020). Intestinal parasites include both multicellular helminths and unicellular protozoa; Multicellular

helminthes are worms including tapeworms, pinworms, and roundworms which can live, but typically not reproduce, inside the human intestine. On the other hand, unicellular protozoa are single-celled organisms that can multiply inside the human body such as *Giardia* and *Cryptosporidium* (Braseth et al., 2021; Bhunia, 2018).

Intestinal parasitic infections can be transmitted through fecal-oral route; infection is initiated by ingestion of contaminated water, food or hands (Alemu, et al., 2020). Drinking water contaminated with raw sewage in areas with poor sanitation, eating raw shellfish that have been cultivated in contaminated water, eating raw fruits and vegetables irrigated or washed with contaminated water, swimming in pools that have not been adequately disinfected or in lakes that are contaminated with sewage are major source of infection (Alemu, et al., 2020; Wong, et al., 2020). The most potential risk factors for IPIs including, overcrowding, lack of environmental sanitation and safe water, poor hygienic living conditions, severe malnutrition, warm and humid climate, low educational background and lack of personal hygiene (Igere, et al., 2020). Children of all ages including infants, toddlers and preschool children are vulnerable to get IPIs (Centers for Disease Control and prevention "CDC", 2020), especially preschool children. They considered the most group at risk to IPIs due to frequent exposure to unhygienic environment, poor hand washing after defecation, finger sucking and playing with soil, in addition to immature immune systems (World Health Organization "WHO", 2022).

Intestinal parasitic infection can cause multiple signs and symptoms to the children including diarrhea, abdominal pain, malnutrition, general malaise, weakness and impaired physical development. In addition, IPI can be associated with many symptoms including nausea, vomiting, mal-absorption, weight loss and fever (Hernández et al., 2019). These symptoms are negatively impact nutritional status because of decreased absorption of micronutrients, loss of appetite, weight loss, and intestinal blood loss that can often results in anemia. It can also cause physical and mental disabilities, delayed growth and skin irritation around the anus and vulva (Barati, et al., 2021).

The most common consequences of IPI are nutritional deficiency, destruction of cells and tissues, decreased immune system, growth retardation, reduced mental development, school absenteeism and low academic performance. The very high intensity infection can cause intestinal obstruction that should be treated surgically (Allain & Buret, 2020; Anantha krishnan & Xavier, 2020). Neglected or untreated IPIs have serious consequences on child health, such as induce hepatomegaly, pancreatitis, liver abscesses, pleuropulmonary abscess, brain abscess and esophageal varices (USAID's Neglected Tropical Diseases Program, 2019).

Prevention of IPI in general includes good personal hygiene, avoiding drinking or contact with contaminated water or contaminated soil (Shane et al., 2017), frequent hand hygiene especially after using the toilet, before preparing food, before eating, before and after caring for sick person, after touching an animal or animal waste and regular trimming of fingernails. Children should be discouraged from sucking fingers or scratching anal area and encouraged to maintain good food hygiene (Thomas, et al., 2020).

Preschool children entirely depend upon their mothers who are the primary care giver in the family and have significant effect on the health of their children; therefore, it is essentially for the mothers to have the awareness of detection and prevention of IPI to protect the health of their children (Aula, et al., 2021; Ismail, 2018). Consequently, maternal education is the most important determinant of child health and survival. Maternal awareness affects positively in the prevention of IPIs. This can be achieved through providing health educational programs, according to WHO, prevention of IPIs can be carried out through giving health education about hygiene, encouraging healthy behaviors and provision of adequate sanitary environment (WHO, 2022).

Community health nurse has major role in prevention of IPIs through supporting caregiver specially mothers and providing them with important information about IPIs (Dias, et al., 2019), and help them to modify their health habits. Moreover, community health habits' modifications programs designed by the community nurse focused on preventing infection and reinfection of

IPIs through preventive measures as maintaining clean environment, proper food preparation, good personal hygiene and child hygiene and also it's essential to provide them with information about types, mode of transmission, signs and symptoms and complications of IPIs (Biswas, et al., 2021; Thomas, et al., 2020).

Significance of the study

Intestinal Parasitic Infections are categorized as Neglected Tropical Diseases (NTDs) that have been a significant problem in many developing countries as it causes over 33% of deaths worldwide (Singer et al., 2020); 24% of the world's population is infected with IPIs, more than 267 million preschool-age children live in developing countries; where these parasites are intensively transmitted (WHO, 2022). Diarrheal diseases which mainly caused by IPIs are the second leading cause of mortality in children under 5 years globally and mainly kill approximately 525,000 children under the age of 5 annually (Fenta & Nigussie, 2021).

In Africa, the prevalence of IPI was 48 % (Mekonnen & Ekubagewargies, 2019). In Egypt, Intestinal Parasitic Infection in preschool children is a common public health problem which affects nearly 46.2% of children, *Entamoeba histolytica* and *Ascaris lumbricoides* were the most predominant parasites (12.7% per each), followed by *Enterobius vermicularis* (8.6%), *Giardia lamblia* (7.1%), *Cryptosporidium parvum* (1.5%), *Heterophyes heterophyes* (1.4%) and *Hymenolepis nana* (0.7%) (Elmonir et al., 2021; Geneidy, 2019). The prevention and control of intestinal parasitic infections are nowadays more possible than ever before (Gabbad and Elawad, 2018). Thus, with simple preventive measures and increasing mother's awareness of parasitic diseases preventive measures can protect the children from intestinal parasitic infections and its consequences. Therefore, this study will be conducted to determine the factors that affecting the awareness and practice of preventive behaviors toward IPI among mothers of preschool children.

Aim of the study

Determine the awareness and practices of preventive behaviors toward intestinal parasitic infection among mothers of preschool children.

Research questions

- 1- What is the level of awareness about preventive behaviors of IPIs among mothers of preschool children?
- 2- What is the level of practices about preventive behaviors of IPIs among mothers of preschool children?
- 3- What are the factors affecting mother's awareness and practices of preventive behaviors toward IPIs?
- 4- Is there a relationship between awareness and practices of preventive behaviors about IPIs among mothers of preschool children?

2. Methods

2.1 Design: Descriptive correlational design.

2.2 Setting: Two from ten urban maternal and child health centers (MCH) namely Shibin el Kom MCH and Al Shohadaa MCH and four from fifty rural health units namely Al Batanun, Kafr Tanbadi, Aleraquia and Kafr Ashma rural health units were selected randomly from all MCH centers of Menoufia Governorates, Egypt.

2.3 sampling: A purposive sample of 300 mothers with preschool children selected from previously mentioned settings.

2.3.1. Sample size and power of the study

In order to calculate the sample size required to achieve the aim of the study. The sample size was calculated according to the following equation: Sample size $n = \frac{[DEFF * Np(1-p)]}{[(d^2/Z^2_{1-\alpha/2} * (N-1) + p * (1-p)]}$

Where: N = Population size, n = Sample size and DEFF = Design effect. P = % frequency of maternal preventive behaviors of intestinal parasitic infection among preschool children =28 % (from a pilot study). d = Confidence limits as % of 100, Z= 1.96 and $\alpha = 0.05$. Confidence interval 95% was used, with a sample size of 297

participants that approximated to 300 mothers with children from 2 to 5 years who attended the previously mentioned settings (Epi* website, 2021).

2.4 Data collection instrument:

Self-administered interviewing questionnaire was used as an instrument for this study. This questionnaire contained the following parts:

Part 1: This part was developed by the researchers and concerned with socio-demographic characteristics of mothers with preschool children including: age, marital status, occupation, level of education, monthly income, residence, age of children and number of family members, number of children in preschool period and data on infection with intestinal parasites.

Part 2: This part was adopted from Kassaw et al., (2020) and modified by the researcher. It was used to assess mother's awareness about the prevention and control of IPIs and consisted of five sections; the questions were formulated in the form of yes and no questions; **Section 1:** concerned with assessment of mother's awareness about most common types of IPIs. It included eight types of parasites, the responses for these statements were yes and no, where yes=1 and no=0. The total score ranged from 0-8 and was categorized as poor awareness if the score was less than 50% of the total score, fair awareness if the score was 50 to 75% of the total score and good awareness the score was above 75% of the total score. **Section 2:** concerned with assessment of mother's awareness about proper prevention of IPIs. It included 12 statements indicated prevention of IPIs. The responses for these statements were yes and no, where yes=1 and no=0. The total score for this section ranged from 0-12 and was categorized as poor awareness if the score was less than 50% of the total score, fair awareness if the score was 50 to 75% of the total score and good awareness the score was above 75% of the total score. **Section 3:** concerned with assessment of mother's awareness about mode of transmissions of IPIs. It included 12 statements indicated mode of transmission of IPIs. The responses for these statements were yes and no where yes=1 and no=0. The total score for this part ranged from 0-12 and was categorized as poor

awareness if the score was less than 50% of the total score, fair awareness if the score was 50 to 75% of the total score and good awareness the score was above 75% of the total score. **Section 4:-** This section was concerned with assessment of mother's awareness about signs and symptoms of IPIs. It included 10 statements with yes and no responses where yes=1 and no=0. The total score for this part ranges from 0-10 and was categorized as poor awareness if the score was less than 50% of the total score, fair awareness if the score was 50 to 75% of the total score and good awareness the score was above 75% of the total score. **Section 5:-** This section was concerned with assessment of mother's awareness about complications of IPIs. It included 10 statements with yes and no responses where yes=1 and no=0. The total score for this part ranged from 0-10 and was categorized as poor awareness if the score was less than 50% of the total score, fair awareness if the score was 50 to 75% of the total score and good awareness the score was above 75% of the total score. The grand total score of awareness part 3 (the five sections) ranged from 0-52 and was categorized into poor awareness if the score was less than 50% of the total score, fair awareness if the score is 50 to 75% of the total score and good awareness if the score was above 75% of the total score.

Part 3: This part adopted from Kassaw et al., (2020) and modified by the researcher. It included 18 questions to assess mothers' practices of prevention and control of IPIs, the items included washing child hand after defecation, washing child hand before any meal time, shorten the child nails, etc. The responses for these questions were in the form of forced choice likert-type format; where never=1, sometimes=2 and always=3. The total score ranged from 18-54 and was categorized into poor practices if the score was less than 50% of the total score, fair practices if the score is 50 to 75% of the total score and good practices if the score is above 75% of the total score.

2.4.1 Validity of the Instrument:

After revision of translation, the data collection instruments were revised for content validity by a jury of three experts from the Community Health Nursing and recommended modifications were

carried out accordingly based on the jury comments.

2. 4. 2 Reliability of the instrument:

The reliability of the instrument carried out by the researcher to test the internal consistency of the instrument, using test-retest reliability. Test-retest reliability was carried out by administering the same instrument to the same subjects (30 mothers) under similar conditions on two occasions with period of two weeks between the first and second occasions. The data collected from test-retest was entered to the computer using statistical package for the social sciences (SPSS) program and Cronbach' alpha test was used to assess instrument reliability and $r = 0.84$ ($P < .0001$) which indicated that the study instrument was reliable.

2. 4. 3 Pilot study:

A pilot study was carried out on 10% of the total sample (30 mothers) to test the feasibility, applicability, and understandability of the instruments. The needed modifications were done as revealed from pilot study. The subjects of the pilot study were not included in the actual study sample.

2. 5 Ethical consideration:

- The approval to conduct this study was obtained from ethical research committee at Faculty of Nursing, Menoufia University.
- An official letter for data collection was sent from the dean of Faculty of Nursing, Menoufia University to the responsible authority to each setting included the purpose and duration of data collection.
- Verbal and written informed consent was obtained from the study's subjects and they were informed about confidentiality of their information and assured that their information will be used for research purpose only.

2. 6 Data Collection Procedure:

- An official letter from the Dean of the Faculty of Nursing Menoufia University was sent to the responsible authority of each study setting.
- An arrangement to conduct the study was discussed with the authorized person of each study setting.
- At the beginning of the study, the researcher introduced herself to the mothers of preschool children, the purpose and nature of the study was explained for each mother under the study to gain their cooperation with promise of close confidentiality of their data.
- Written informed consent was obtained from each mother after explanation of the purpose of the study.
- Data collection was carried out at the previously mentioned study setting, where safe and quite environment was maintained to confirm privacy and freely reporting information.
- The structured interview questionnaire was distributed to the mothers and they were asked to fill it, while mothers who can't read and write the researcher helped them to fill it; the questionnaire took about 15-20 minutes to be answered.
- The data of this study was carried out for six months in the period from August, 2021 to January, 2022.

2. 7 Statistical analysis

Data of the study was coded and organized into specially designed form to be suitable for computer entry process. The data was entered and analyzed using SPSS (statistical package for the social sciences), statistical package version 24. Graphics were done using Excel program. Data was presented using descriptive statistics in the form of frequencies and percentages. Nominal and ordinal variables were presented in form of numbers and percentages. Numerical data were presented in the form of means(\bar{x}) and standard deviations (SD). For non-parametric variables, independent T test was used to compare the mean score of 2 different categories and ANOVA test was used to compare the mean score of 3 or different categories. Person r was used to test the correlation between bivariate

with interval and ratio variables. The significance level was chosen as ($p < 0.05$) for all significant tests.

N.B: The total sample size was used for data analysis and there were no missing data or cases.

3. Results

The main aim of the current study was to evaluate the awareness and practice of preventive behaviors toward intestinal parasitic infection among mothers of preschool children.

Table 1: Showed that more than half of the studied mothers (54%) aged between 20 and 30 years old, with mean age 27.21 ± 6.69 ; more than two thirds of them (72%) was married and slightly less than half of them (49%) had secondary education while, only 16% had university or higher education. Concerning father education, about two thirds of them (62.3%) had secondary education and only 5% had university or higher education. More than one third (34%) of studied mothers hadn't enough monthly family income, while only 8% had enough monthly family income and can save. As regarded to number of family member, more than one third of studied mothers (36.33%) had more than five family members.

Table (2): Showed that the majority of the studied mothers weren't aware of different types of intestinal parasites with mean score 3.62 ± 0.87 , out of 8. Also, most of them weren't aware about different methods of prevention of intestinal parasite except washing mother's hands before eating and washing hands after changing child dipper, with mean score of 4.61 ± 1.13 , out of 12. Regarding mode of transmission, the majority of the studied mothers weren't aware about modes of transmission of IPIs with mean score of 5.42 ± 0.83 , out of 12. In addition, the majority of them weren't aware about signs and symptoms of IPIs except abdominal pain and itching of anal area with score mean of 4.93 ± 1.37 , out of 10. Concerning complications, most of the studied mothers weren't aware about complications of IPIs except anemia with mean of 5.81 ± 0.81 , out of 10, regarding the grand total score of mother's awareness about IPI of 28.39 ± 8.2 , out of 52. Concerning the total score of mother's awareness about IPIs, slightly less than

two thirds of the studied mothers (62.8%) had fair awareness, while only 18.8% had good awareness. This table answers research question number one

Table (3): illustrated that the majority of the mothers never practice measures of prevention and control of IPIs except wash hands after using toilet and giving the child the appropriate medication in infected as prescribed by the doctor. Most of them (95%) never take their children for a stool examination periodically, (94%) never boil water before use to prevent intestinal parasitic infection and (93%) never wash their children's hands after playing with birds and pets, with total mean 13.43 ± 3.21 . Concerning the total score of mother's practices of preventive measures of IPIs, more than two thirds of the studied mothers (71.9%) have fair practice, while only 19.9% have good practice. This table provides answer to research question number two.

Table (4): showed that there is a statistically significant difference of the mean awareness score and both father and mother educational level at p -value $< .000$. There is a statistical significant difference of the mean awareness score and mother occupation at p -value $< .000$, therefore mother education, mother occupation and father education are factors affecting mother's awareness of preventive behaviors of IPIs .

Table (5): showed that there is a statistical significant difference of the mean practice score and both father and mother educational level at p -value $< .000$. There is a statistically significant difference of the mean practice score and mother occupation at p -value $< .000$. Therefore mother education, mother occupation and father education are factors affecting mother's practices of preventive behaviors of IPIs. Table 4 and table 5 provide answer to research question number three.

Table (6): clarifies that there was a statistically significant positive correlation between total awareness score and total practices score of preventive behaviors toward intestinal parasitic infection among mothers of preschool children ($P=0.000$). Also there is statistically significant positive correlation between subcategory

awareness score and total practices score of preventive behaviors toward intestinal parasitic infection among mothers of preschool children ($p = 0.000$ for all of subcategories). This table provides answer to research question number four.

Table 1: Distribution of studied mothers according to socio-demographic characteristics (n= 300).

Variables	No	%
Age		
less than 20	51	17.0
20 to less than 30	162	54.0
30 to less than 40	81	27.0
40 and up	6	2.0
Mean \pm SD	27.21\pm 6.69	
Mother's marital status		
Married	216	72.0
Divorced	48	16.0
Widow	36	12.0
Mother's education		
Primary	33	11.0
Preparatory	72	24.0
Secondary	147	49.0
University or higher	48	16.0
Mother's Occupation		
Housewife	126	42.0
Employee	54	18.0
Seller	72	24.0
Farmer	48	16.0
Father's Education		
Unable to write read	72	24.0
Primary	14	4.7
Preparatory	12	4.0
Secondary	187	62.3
University or higher	15	5.0
Father's Occupation		
Employee	125	41.7
Skilled work	175	58.3

Monthly Income		
Not enough	102	34.0
Enough only	174	58.0
Enough and can save	24	8.0
Number of Family Members		
5 or less	191	63.67
More than 5	109	36.33
Number of Newborn		
None	282	94.0
1.00	15	5.0
2.00	3	1.0
Number of Preschool Children		
1.00	141	47.0
2.00	141	47.0
3.00	12	4.0
More than 3	6	2.0
Type of Family		
Nuclear	96	32.0
Extended	204	68.0
Residence		
Urban	72	24.0
Rural	228	76.0

Table 2: Distribution of studied mothers according to their score of awareness about intestinal parasitic infection (n= 300)

Awareness of Intestinal Parasite	Know		Do not know	
	No	%	No	%
Types of known intestinal parasite/s.(total score=8)				
Entamoeba	105	35.0	195	65.0
Giardia	27	9.0	273	91.0
Ascaris	45	15.0	255	85.0
Cryptosporidium	18	6.0	282	94.0
Hookworm	36	12.0	264	88.0
H. nana	24	8.0	276	92.0
Pin worm	33	11.0	267	89.0
Fasciola	24	8.0	276	92.0
Mean \pm SD	3.62 \pm 0.87			

Methods of proper prevention of IPI. (total score=12)				
Washing mother's hands before eating.	300	100.0	0	0
Washing child's hands before eating.	105	35.0	195	65.0
Wearing shoes outside.	15	5.0	285	95.0
Cutting nails.	81	27.0	219	73.0
Using clean toilet.	108	36.0	192	64.0
Washing mother's hands after defecation.	225	75.0	75	25.0
Washing hands after changing child diaper.	207	69.0	93	31.0
Washing child's hands after defecation.	54	18.0	246	82.0
Avoiding the child from playing outside.	24	8.0	276	92.0
Cleaning child's hands thoroughly after playing.	54	18.0	246	82.0
Washing mother's hands after handling birds and pets.	27	9.0	273	91.0
Washing the child's hands after playing with birds and pets.	12	4.0	288	96.0
Mean ± SD	4.61 ± 1.13			
The mode of transmissions of IPIs. (total score=12)				
Eating contaminated food	228	76.0	72	24.0
Eating under cooked meat	36	12.0	264	88.0
Drinking contaminated water	87	29.0	213	71.0
Playing with soil	81	27.0	219	73.0

Unclean long nails	93	31.0	207	69.0
Eating soil (geophagy)	234	78.0	66	22.0
Swimming in river or canals	108	36.0	192	64.0
Walking barefooted	39	13.0	261	87.0
Lack of hygiene	42	14.0	258	86.0
Unclean hands	210	70.0	90	30.0
Playing with animals	30	10.0	270	90.0
Eating unwashed vegetables and fruits	30	10.0	270	90.0
Mean ± SD	5.42± 0.83			
Signs and symptoms of intestinal parasitic infection. (total score=10)				
Abdominal pain	234	78.0	66	22.0
Abdominal cramp	54	18.0	246	82.0
Diarrhea	258	86.0	42	14.0
Chronic fatigue	30	10.0	270	90.0
Vomiting	48	16.0	252	84.0
Loss of appetite	45	15.0	255	85.0
Weight loss	48	16.0	252	84.0
Itching of Anal area	270	90.0	30	10.0
Pallor	24	8.0	276	92.0
Blood in stool	18	6.0	282	94.0
Mean ± SD	4.93 ± 1.37			
Complications from IPIs. (total score=10)				
Anemia	297	99.0	3	1.0
Growth retardation	24	8.0	276	92.0
Under nutrition	21	7.0	279	93.0
Intestinal obstruction	6	2.0	294	98.0
Stunting	9	3.0	291	97.0
Abscesses	6	2.0	294	98.0
Peritonitis	9	3.0	291	97.0
Intestinal bleeding	15	5.0	285	95.0
Hepatomegaly	12	4.0	288	96.0
Decrease the level of intelligence	9	3.0	291	97.0

Mean \pmSD	5.81 \pm 0.81
Total grand score =52, Mean \pm SD	28.39 \pm 8.2
Categories of total grand score of mother's awareness:	
Good	18.8%
Fair	62.8%
Poor	18.4%

Table 3: Distribution of studied mothers according to their practice of prevention and control of intestinal parasite.

Practice items (Total score= 54)	Never		Sometimes		Always	
	No	%	No	%	No	%
Taking the children for a stool examination periodically.	285	95.0	9	3.0	6	2.0
Giving the child the appropriate medication in infected as prescribed by the doctor.	0.0	0.0	195	65.0	105	35.0
Repeat the medication two weeks after the end of the first dose.	276	92.0	9	3.0	15	5.0
Keep child nails short and clean.	12	4.0	270	90.0	18	6.0
Keep kitchen clean from dust and flies.	6	2.0	267	89.0	27	9.0
Wash mother's hands before cooking.	3	1.0	276	92.0	21	7.0
Wash food ingredients before cooking.	6	2.0	249	83.0	45	15.0
Wash fruits & raw vegetables before eating.	79	26.3	173	57.7	48	16.0
Wash child's hand before any mealtime.	165	55.0	123	41.0	12	4.0
Cover the food constantly.	3	1.0	282	94.0	15	5.0
Wash child's hand after eating.	30	10.0	252	84.0	18	6.0
Boil tap water before use.	282	94.0	12	4.0	6	2.0
Keep toilet constantly clean.	18	6.0	228	76.0	54	18.0
Wash hands after using toilet.	12	4.0	57	19.0	231	77.0
Wash child's hand after defecation.	228	76.0	24	8.0	48	16.0
Expose clothes and mattresses to the sunlight.	165	55.0	120	40.0	15	5.0
Wash child's hands after playing with birds and pets.	279	93.0	9	3.0	12	4.0
Wash mother's hands after handling birds and pets.	57	19.0	219	73.0	24	8.0
Mean \pm SD	13.43 \pm 3.21					
Total score of mother's practice:						
Good	19.9%					
Fair	71.9%					
Poor	8.3%					

Table 4: Comparison between the mean awareness score and selected socio-demographic data.

	Sum of Squares	df	Mean Square	F	Sig.
Marital Status					
Between Groups	202.049	2	101.024	1.631	0.198
Within Groups	18397.898	297	61.946		
Total	18599.947	299			
Mother Education					
Between Groups	11322.315	3	3774.105	153.503	.000
Within Groups	7277.632	296	24.587		
Total	18599.947	299			
Mother occupation					
Between Groups	9703.264	3	3234.421	107.612	.000
Within Groups	8896.683	296	30.056		
Total	18599.947	299			
Father Education					
Between Groups	2596.364	4	649.091	11.968	.000
Within Groups	15944.814	294	54.234		
Total	18541.177	298			

Table 5: Comparison between the mean practice score and selected socio-demographic data.

	Sum of Squares	df	Mean Square	F	Sig.
Marital Status					
Between Groups	28.362	2	14.181	.584	.558
Within Groups	7208.368	297	24.271		
Total	7236.730	299			
Mother Education					
Between Groups	2907.718	3	969.239	66.273	.000
Within Groups	4329.012	296	14.625		
Total	7236.730	299			
Mother Occupation					
Between Groups	2395.180	3	798.393	48.812	.000
Within Groups	4841.550	296	16.357		
Total	7236.730	299			
Father Education					
Between Groups	504.084	4	126.021	5.510	.000
Within Groups	6723.796	294	22.870		
Total	7227.880	298			

Table 6: Relationship between total and subcategory awareness score and total practices score of preventive behaviors toward intestinal parasitic infection among mothers of preschool children (n = 300)

Variables		Total practice Score	Total awareness Score	Types of Intestinal parasite	Prevention of intestinal parasite	Mode of Transmissions of intestinal parasites	Sign and symptoms of intestinal parasite	types of complications from parasitic
Total practice Score	R	1						
	P							
Total awareness Score	R	.884**	1					
	P	.000						
Types of Intestinal parasite	R	.709**	.863**	1				
	P	.000	.000					
Prevention of intestinal parasite	R	.822**	.905**	.697**	1			
	P	.000	.000	.000				
Mode of Transmissions of intestinal parasites	R	.785**	.902**	.694**	.763**	1		
	P	.000	.000	.000	.000			
Sign and symptoms of intestinal parasite	R	.891**	.954**	.823**	.847**	.838**	1	
	P	.000	.000	.000	.000	.000		
types of complications from parasitic	r	.695**	.807**	.751**	.623**	.611**	.735**	1
	P	.000	.000	.000	.000	.000	.000	

** . Correlation is significant at the 0.01 level (2-tailed).

4. DISCUSSION

Intestinal parasitic infections are still representing a significant health problem and important cause of morbidity and mortality all over the world especially in developing countries (Eyayu et al., 2021). Intestinal parasitic infections have serious consequences on child health; such as hepatomegaly, splenomegaly, esophageal varices

and delay in physical development of preschool children (Giorgio & D'Antiga, 2022; Duffy et al., 2021). It's also lower the immune system, decrease the level of intelligence and decrease labor productivity (Mutapi et al., 2021). Therefore the current study was conducted to determine the awareness and practices of preventive behaviors toward IPIs among mothers of preschool children. Regarding mother's level of awareness, in the current study, the majority of the studied mothers weren't aware of different types of intestinal parasites, different methods of IPI prevention, IPI modes of transmission; most of them didn't aware about eating under cooked meat, drinking contaminated water, playing with soil, playing with animals, eating unwashed vegetables and fruits as IPI modes of transmission. Also the majority of the studied mothers weren't aware neither about IPIs signs and symptoms nor IPIs complications. These findings were in agreement with findings reported by Husen et al., (2022); they revealed that half of their sample weren't aware about IPIs. Also, Feleke et al., (2019) reported that slightly less than two thirds of their sample weren't aware about different methods of IPI prevention. In addition, Kassaw et al., (2020) reported that the majority of the studied mothers didn't aware of soil contact, contaminated water, contaminated food, uncooked/unclean vegetables and fruits as mode of transmission of IPIs and only minority of their sample mentioned that diarrhea, abdominal cramps and vomiting as signs and symptoms of IPIs. Moreover, Kebede, (2019) reported that the majority of the sample mentioned that IPIs were neither diseases nor causing serious complication. Furthermore, the current study showed that slightly less than two thirds of the studied mothers have fair awareness about IPIs, while only less than twenty percent had good awareness about IPI. Similar findings reported by Lewetegn et al., (2019), they reported that less than twenty percent of mothers are knowledgeable and slightly less than half was fairly knowledgeable about IPIs. Similarly, Kassaw et al., (2020) reported that more than one third of the women were knowledgeable and more than half of women were unknowledgeable about IPIs. On the other hand, the current findings were in contradiction with the findings reported by Masaku et al., (2017), they found that more than

half of their sample had high level of awareness about IPIs. This difference may be due to what is reported by them that their community targeted with ongoing national school based deworming program since 2012.

Regarding mother's practices of IPIs prevention and control, the current study illustrated that most of the studied mothers never take their children for a stool examination periodically, never repeat the treatment two weeks after the end of the first dose, never boil water before use, never wash their children's hands after playing with birds and pets, more than half of them didn't wash child's hand before any meal time. Also more than one quarter of the studied mothers didn't wash fruits & raw vegetables thoroughly before eating and most of them sometimes keep child nails short and clean. However, most of the studied mothers wash their hands and food ingredients before cooking. Furthermore, the current study showed that more than two thirds of the studied mothers have fair practices about IPIs prevention, while only less than one third had good practices about IPIs prevention. These findings were in agreement with the finding of Asai et al., 2016, in Bolivia, they reported that about two thirds of their sample hadn't mass stool examination. This finding may be due to the lack of mother's awareness about IPIs. Also, Curico et al., (2022) reported that the reinfection with IPIs increased 4 months of treatment in children who didn't repeat the treatment after 2 weeks from the end of the first dose. In addition, Habiyaemye et al., (2021) reported that most of their sample didn't boil tap water. As well as Ahmed & Abu-Sheishaa, (2022) who revealed that slightly less than half of children didn't wash their hands before meals and two thirds of the studied children in contact with pets didn't wash their hands regularly. Results of current study reflects the reason why children didn't practice hand washing when they grow up as they have not been accustomed to washing hands since they were young children.

Moreover, Lewetegn et al., (2019) found that more than one quarter of the studied mothers didn't wash fruits & raw vegetables thoroughly before eating. This could be attributed to poor awareness of mothers about importance of this practice to health. Furthermore, Gizaw et al., (2022) and Shrestha et

al., (2018) reported that more than half of their sample didn't keep child nails short and clean. Similar findings reported by Gizaw et al., (2019), they clarified that most of the sample wash hands before cooking. This can be attributed to practicing hand washing as a habit especially after the spread of Corona virus. Similar findings reported by Sacolo-Gwebu et al., (2019), they reported that less than one third of their sample had good practices on IPIs prevention.

On the other hand, the current findings were in contradiction with the findings reported by Lewetegn et al., (2019); they reported that only one quarter of their sample didn't boil tap water regularly. Also, the findings of the current study were lower than the findings of a study conducted by Kasimayan et al., (2021), they reported that the majority of mothers washed their hands before a meal, cut nail regularly and more than half of them clean children's hands after the play in soil. Moreover, Kassaw et al., (2020) found that more than half of their sample had good practices towards IPI prevention. This difference could be due to the majority of the studied sample in the current study were from rural areas; while other studies conducted their study in urban areas, that reflects the differences between rural and urban cultures.

Concerning factors affecting mother's awareness and practices of preventive behaviors of IPIs, the current study revealed that mother's educational level, father's educational level and mother's occupation were the factors affecting awareness and practices of preventive behaviors of IPIs. The current study findings were in the same line with the findings conducted by Ahmed & Abu-Sheishaa (2022), they reported that mothers' educational level was factor affecting mother's awareness about preventive behaviors of IPIs. In addition, Lewetegn et al., (2019) revealed that maternal education affect practice of preventive behaviors of IPI. Also, Hussein et al., (2021) revealed that, both fathers' and mothers' educations were factors affecting practices of preventive behaviors of IPIs. This may be due to the fact that educated households might have awareness about the transmission and prevention methods of infectious diseases. Education encourages changes in healthy behaviors at the household level. Moreover,

Sitotaw & Shiferaw, (2020) reported that occupation of the parents especially mothers was a factor affecting awareness and practices of preventive behaviors of IPIs. This is might be due to the employee mothers had higher education and awareness. Furthermore, Niazi, (2018) reported that the housewives' mothers often had less education & knowledge about IPIs and methods of disinfection.

On the other hand, the current findings was in contradiction with the findings of a study conducted by Yones et al., (2019), they reported that father's education wasn't factor affecting mother's awareness about preventive behaviors of IPIs, this might be because mothers normally most available caregiver for children. Also Bakarman et al., (2019) revealed that both father and mother education weren't factors affecting mother's awareness about preventive behaviors of IPIs. Moreover, Gadisa & Jote, (2019) reported that mother occupation wasn't factor affecting mother's awareness and practices about preventive behaviors of IPIs. This contradiction may be because the differences in the socioeconomic conditions.

Regarding the relationship between awareness and practices of preventive behaviors toward IPIs among mothers of preschool children, the current study clarified that there was a statistically significant positive correlation between total awareness score and total practices score of preventive behaviors toward IPIs among mothers of preschool children, the current findings came in agreement with the findings of a study conducted by Mationg et al., (2022); they showed that there was significant association between awareness and behavior scores of the studied sample. Also, Minhat & Zakaria (2022) showed that significant positive correlations were found between awareness and hygiene practice. This reflects the fact that improved awareness leads to improving practice. On the other hand, the findings of the current study were in contradiction with the findings of a study conducted by Kassaw et al., (2020); they revealed that there was no correlation between total score of awareness and total score of practice. This might be due to presence of awareness and knowledge about a disease plays an important role in prevention of it.

Conclusion

The current study concluded that there was lack of good awareness and practices among mothers of preschool children regarding prevention and control of IPIs, mother education, mother occupation and father education were the most predominant factors affecting mother's awareness and practice of preventive behaviors of IPIs.

Recommendation

Planning and conducting health education programs in the different community health care settings and mass media for the public, especially the mothers are highly recommended because it can play significant effects in improving their awareness and practices for prevention of IPIs among their children and protect them from the health consequences of IPIs.

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