Salahaddin University - Erbil

Knowledge, Attitude and Practice on Prevention and Control of Intestinal Parasitic Infection Among Mothers of Children in Erbil, Kurdistan Region, Iraq

Research Project

Submitted to the department of Biology / College of Education In Partial fulfillment of the requirements for the degree of BSc in Biology.

Prepared by

Rudaw Mohammed hassan

Supervised by

Dr. Khder Niazi Nooraldeen

April- 2024

﴿قُلْ هَلْ يَسْتَوِي الَّذِينَ يَعْلَمُونَ وَالَّذِينَ لاَ يَعْلَمُونَ إِنَّمَا يَتَذَكَّرُ أُولُو الأَلْبَابِ﴾

سورة الزمر / الآية9

SUPERVISOR CERTIFICATE

This research project has been written under my supervision and has been submitted for the award of the degree of BSc. in Biology with my approval as a supervisor.

Signature: 

Name: **Dr. Khder Niazi Nooraldeen**

Date: 07/04/2024

I confirm that all requirements have been fulfilled

Signature:

Name: **Assist. Prof. Dr. Sevan Omer Majed**

Head of the department of biology

Date:

DEDICATION

This work is dedicated to

My self

My family

My special friends

My supervisor

ACKNOWLEDGEMENTS

Thanks for Allah, the only one, and for his bounty, which will not be completed My deepest gratitude to my supervisor Asst. Prof. Dr. Khder Niazi Nooraldeen for her supervision and choosing of this project, scientific guidance, and support during the period of the study.

My deepest thanks to the deanery of the Education College, head and all staff of biology department for their kindness and support.

I would like to express my thanks to the Ministry of Higher Education and Scientific Research and presidency of Salahaddin University /Erbil.

Thanks for all my friends who help me to complete my study and thanks for my family which help me for complete my research.

Contents

LEST OF TABLES

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 100 mothers with preschool children in Erbil. Self-administered questionnaire included three parts: Socio-demographic characteristics of mothers, assessment of mother's awareness about intestinal parasitic infections, 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.

Key word: knowledge, attitude, practice, parasites, mothers, Erbil, Iraq

Introduction

Intestinal parasitic infections (IPIs) are regarded as one of the main public health problems and socio-economic issues adversely affecting the health of millions of people worldwide particularly poor individuals in developing countries (Nyantekyi LA, Legesse M, Belay M, and et al 2010). Intestinal parasites are found in the gastrointestinal tract of human and other animals that include protozoan and helminthes. The common intestinal protozoan parasites of human are *Entamoeba histolytica/dispar, Giardia lamblia intestinalis, Cryptosporidium* and *Cyclospora* species. Parasitic helminthes (worms) that infect humans belong to two phyla, Platyhelminths and Nematoda. The most prevalent and important helminthes in developing countries are the soil-transmitted helminthes such as: *Ascaris lumbricoides*, *Trichuris trichiura*, hookworms, *Hymenolepis nana* and *Schistosomia mansoni*. (Rosendale, 1997).

Parasitic diseases affect and cause illness approximately 3.5 billion and 450 million people worldwide (Maru DS.2017). According to World Health Organization (WHO), over 1.5 billion people are infected with one or more intestinal parasites. Moreover, 700 million people infected with hookworm and 807 million people infected with ascariasis (World Health Organization (WHO) .2015). IPIs are due to *E. histolytica*, *G. lamblia*, *A. lumbricoides*, *T. trichiura*, Hookworms, *Hymenolepis* species, *Taenia* species and *S. mansoni* where the majority of them are transmitted directly by fecal-oral route and others may be transmitted via skin penetration of human (Kidane E, Mekonnen S, Kebede A, and et al 2014). Young children have a high infestation rate and suffer a substantial burden of *A. lumbricoides*, *T. trichiura*, and *Schistosomes*. These parasitic infections cause reduced growth through impaired nutrient utilization, which hinders children from using their full potential in physical performance and education (Kvalsvig JD, Cooppan RM, Connolly KJ. 1991 and Awasthi S,

Bundy DAP, Savioli L. 2003) *E. histolytica* has an annual incidence rate of five million cases, affects approximately 500 million people worldwide, and results in 50 million annual symptomatic diseases and 100,000 death (Ayed L. B. and Sabbahi S., Rose J. B. and Jimenez-Cisneros B. 2017). *G. lamblia/duodenalis* infects 280 million people annually. It results in two and half million cases of diarrhea every year in resource-poor countries alone. Parasite infections are common among preschool children with different causes such as playing with soil, sucking fingers and defecation in open field. Maternal awareness for the prevention and control of intestinal parasite has its own impact on the prevalence. To reduce the impact of intestinal parasites, increasing access to safe water, sanitation and health education are necessary (World Health Organization (WHO). 2002). IPIs are common cause of anemia such as iron, folate, and vitamin B12 deficiencies among lowincome populations and are associated with micronutrient deficiencies such as low plasma vitamin A, loss of weight, diarrhea, chronic blood loss, and stunted growth among children (Casapía M, Joseph SA, Núñez C, et al 2006). Intestinal parasites have a worldwide distribution, some are known to cause malabsorption in human, abdominal pain, severe diarrhoea, vomiting, weight loss, dermatitis or proritis and chronic urticeria (Giacometi.and *et al* 2004). The infections have been reported to have serious consequences such as causing iron deficiency anaemia, growth retardation and other physical and mental health problems (Ngui *et al* 2011). If the infection left untreated, it would have other serious consequences such as hepatomegaly, splenomegaly, low immunity system, decrease level of intelligence, and esophageal varices (Working to overcome the global impact of neglected tropical diseases. First WHO report on neglected tropical diseases (WHO 2010 and USAID's Neglected Tropical Diseases Program 2014) a better understanding of the major factors, as well as how social, cultural, behavioral, and community awareness affect the epidemiology and control of intestinal parasites may help to design effective control strategies. Despite the reductions in the prevalence of IP and morbidity

have been achieved through chemotherapy, it is accepted that improvements in domestic water supplies, environmental sanitation, health education, access to health services for diagnosis and treatment must be integrated in control and elimination programmers' to assure their effectiveness (Wynd S, Melrose WD, Durrheim DN, et al 2007). This study aimed to assess the knowledge, attitude and practice on prevention and control of intestinal parasitic infection among mothers of children in Erbil, Kurdistan Region, Iraq. Therefore, this study was intended to survey the level of mother's information and practice about the reason, impact, method of transmission, and preventive techniques of intestinal parasitic infections Erbil, Kurdistan Region, Iraq.

Martials and method:

Study Participants:

Mothers of children aged 0-12 years residing in Erbil, Kurdistan Region, Iraq.

Sampling Method:

A stratified random sampling technique was used to ensure representation from different socio-economic backgrounds and residential areas within Erbil.

Data Collection Tools:

Structured questionnaire: a questionnaire had been developed covering three main sections: knowledge, attitude, and practice regarding intestinal parasitic infections and their prevention/control.

Informed consent form: consent had been obtained from participants prior to data collection.

Information pamphlets: educational materials had been provided about parasitic infections and preventive measures to participants.

Data Collection Procedure:

Trained surveyors administered the questionnaire and obtained informed consent.

Eligible participants were of community centers, healthcare facilities, and residential areas. The purpose of the study had been explained and informed consent from willing participants had been obtained.

The questionnaire had been administered through face-to-face interviews or self-administration, depending on participants' preference. The confidentiality and anonymity of participants' responses was ensured.

Data Analysis:

Quantitative analysis: The researcher tabulated responses to assess participants' knowledge, attitudes, and practices regarding intestinal parasitic infections.

Statistical software such as SPSS or Excel had been used for data analysis.

Descriptive statistics was used (mean and percentage) and inferential statistics (Chi-square test, t-test) to identify associations between variables.

Data Quality Assurance:

Pilot test of the questionnaire had been applied to assess clarity, comprehensibility, and cultural appropriateness.

Results:

The study included 100 mothers who were involved. Of the respondents, among the mothers 88 participants were Kurd in ethnicity, 12 participants were Turkmens in ethnicity. Regarding the educational status of the participant mothers, 47 mothers did not complete high school, 22 mothers completed high school, 31 mothers have college degree. The questionnaire included the educational degree in these percentages: most of them were housewifes (65 mothers) and 27 government employee, 8 private employees or working as a boss of their own business or working in the private sector.

The questionnaire included the ages of the mothers with a range from smaller than 19 to 59. Of the participant mothers, 79 were married, 11 divorced, 10 widowed. A high rate of the mothers indicated that they have a regular access to the internet daily (88 mothers) but 22 mothers did not have daily access to the internet (Table 1).

Table1. Sociodemographic characteristics:

	Character	**%**
Maternal Age	≤19	4
	20-29	23
	30-39	22
	40-49	28
	50-59	23
Marital status	Married	79
	Divorced	11
	widowed	10
Maternal education status	Incomplete high school	47
	Complete high school	22
	College degree	31
Maternal occupation	House wife	65
	Government employee	27
	Private employee	8
	Student	0
People per household	1-3	28
	4-6	57
	7-13	15
Water for human Consumption	Municipality water	63
	Well water	33
	Bottled water	4
	Unknown	0
Toilet	Inside the house	32
	Outside the house	68
	Unknown	0
Ethnicity	Kurds	88
	Arabs	0
	Turkmens	12

	Assyrians	0
	Other	0
Native languages	Kurdish	88
	Arabic	0
	Turkoman	12
	Assyrian	0
Province	Erbil	100
	Duhok	0
	sulaymaniyah	0
Do you have internet access	Yes	88
	No	12
Do you smoke	No	95
	Cigarette	1
	Huka	4
	Electronic cigarette	0
Are your child(ren) in	Public schools	60
	Private schools	40

85 mothers did have knowledge of intestinal parasites, and 15 mothers did not have knowledge of intestinal parasite. less than half mothers did have knowledge about control and prevention role of intestinal infection, diarrhea was the most common symptom chosen by 45 mothers (Table 2).

Table 2: Maternal Knowledge About Intestinal Parasitic Infection Prevention and Control Methods in Erbil

Maternal Knowledge	Answer	%
Do you know what intestinal parasites are?	Yes	85
	No	15
When you/your child has an intestinal parasitic infection, do you go to:	Doctor or health center	86

	Pharmacy	5
	Nurse	9
Which prevention mechanisms do you know of	Hand-washing	44
	Using latrine	5
	Washing vegetables	8
	Avoid food and water contamination	5
	Hand-washing and using latrine	10
	Washing vegetables and using latrine	28
	I do not know	0
Which modes of transmission do you know of		
	Soil contact	28
	Contaminated water	10
	Contaminated food	5
	Uncooked vegetables and unclean fruits	4
	Contaminated food and contaminated water	43
	Contaminated food and soil contact	6
	Uncooked/unclean vegetables and fruits and soil contact	4
	I do not know	0
Which signs and symptoms of intestinal parasites do you know of	Diarrhea	45
	Abdominal cramps	10
	Vomiting	6
	Anorexia	2

	Diarrhea and vomiting	33
	Abdominal cramps and diarrhea	4
	I do not know	0
Which complications do you know of	Malnutrition	32
	Anemia	52
	Growth retardation	10
	Malnutrition and growth retardation	4
	Growth retardation and anemia	2
	I do not know	0

In the questionnaire, 49 mothers agree that health education can prevent parasite infection, and 44 mothers agree that the use of soap while washing hands or face can prevent intestinal parasitic infections (Table 3).

Table 3. Maternal Attitude About Intestinal Parasitic Infestation Prevention and Control Methods in Erbil

Maternal Attitude	Answer	%
Lack of hygiene is the cause of intestinal parasitic infections	Extremely agree	37
	Agree	63
	Neutral	0
	Disagree	0
	Extremely disagree	0
Intestinal parasites can be prevented and treated	Extremely agree	49

	Agree	49
	Neutral	2
	Disagree	0
	Extremely disagree	0
Health education can reduce the prevalence of intestinal parasitic infections	Extremely agree	49
	Agree	45
	Neutral	4
	Disagree	2
	Extremely disagree	0
One of the complications of intestinal parasite is growth retardation	Extremely agree	45
	Agree	48
	Neutral	6
	Disagree	1
	Extremely disagree	0
Use of soap while washing hands or face can prevent intestinal parasitic infections	Extremely agree	44
	Agree	49
	Neutral	6
	Disagree	0
	Extremely disagree	1
Raw food consumption is the cause of worm infection	Extremely agree	44
	Agree	40
	Neutral	13
	Disagree	3
	Extremely disagree	0
Food prepared outdoors is risk for intestinal parasitic infections	Extremely agree	55
	Agree	44

	Neutral	0
	Disagree	1
	Extremely disagree	0

With 94 mothers wash their children hands before any meal time, and 51 mothers have an history of a parasite treatment for their children to protect them from intestinal infection (Table 4).

Table 4. Maternal Practices Regarding Intestinal Parasitic Infection Prevention and Control Mechanisms in Erbil

Maternal Practices	Answer	%
Does your child have any stool examination history?	Yes	38
	No	62
Do you wash your child hands before any meal time?	Yes	94
	No	6
Do you wash your child hands after any meal time?	Yes	94
	No	6
Do you cut your child nails?	Yes	98
	No	2
Did you give drugs to your child for prevention of intestinal parasite?	Yes	51
	No	49
Do you use chemically treated /tap water to prevent intestinal parasitic infection?	Yes	100
	No	0
Do you wash your child hands after defecation?	Yes	94
	No	6
Has your child ever been diagnosed with intestinal parasitic infection?	Yes	78
	No	22
Do you use soap to clean utensils?	Yes	100

	No	0
Did you wash before cooking meals?	Yes	100
	No	0
Do you wash fruits and raw vegetables thoroughly before eating?	Yes	100
	No	0

Discussion:

Intestinal parasitic infection acquired in any age, but young children are more susceptible disproportionally (Albonico, M., Allen, H., Chitsulo, L., *et al.* 2008). Though, intestinal parasitic infection is a global problem, it is more devastating in developing countries (WHO 2013) particularly in developing countries, and (DPPC. 2002). This may contribute for poor hygienic practice, and low level of maternal practice to prevent IP infection. In addition, assessing the knowledge, attitude, and practice of individuals regarding the risk factors, mode of transmission, and intermediate host in the community have a great importance for identifying, designing and implementing effective community-based interventions (Sady, H., Al-Mekhlafi, H. M., Atroosh, W. M., *et al.* 2015) and (Alemayehu, B., & Tomass, Z. 2015). In this study, the reported level of good maternal knowledge, positive attitude, and good maternal practice in preventing and controlling intestinal parasitic infection on their children, knowledge was lower than a study that was done in Tigray, Ethiopia in which 94.4% of respondents had good knowledge about intestinal parasitoids prevention (Gebreyohanns, A., Legese, M. H., Wolde, M., et al. 2018). This discrepancy might be because of different study population. In our study only mothers who had under five years old children were considered but the referred paper included both males and females irrespective of presence of under five children. The finding of this paper was not the same of a study done in Senbete and Bete towns, north Shoa, Ehiopia that reported 60.3% of respondents were knowledgably (Lewetegn, M. (2015). This variance might be due to the use of different

operational definitions on knowledge. Our study used the median value to categorize as knowledge and none knowledgeable but the compared study consider a total score cut of points. In this study, on each knowledge questionnaire, respondents considered soil contact, and many mothers indicated contaminated food as a mode of IP transmission. This is not the same of a study conducted in Egypt that reported 41.8% of mothers mentioned contaminated food, and 41.7% state soil as a mode of transmission (Curtale, F., Pezzotti, P., Latif, A., et al. (1998). In general, the mothers showed high levels regarding intestinal parasitic infection prevention and control mechanisms in Erbil.

Conclusion:

the prevalence of intestinal parasitic infections, particularly among children in Erbil, Kurdistan Region, Iraq, underscores the importance of implementing effective control measures, emphasizing personal hygiene, environmental sanitation, and the need for improved diagnostic methods to enhance detection accuracy and treatment efficacy. These findings emphasize the necessity of public health interventions to reduce the burden of intestinal parasitic infections in the region, especially among vulnerable populations like children.

Reference:

Albonico, M., Allen, H., Chitsulo, L., et al. (2008). Controlling soil-transmitted helminthiasis in pre-school-age children through preventive chemotherapy. PLoS Neglected Tropical Diseases, 2(3), e126.

Alemayehu, B., & Tomass, Z. (2015). Schistosoma mansoni infection prevalence and associated risk factors among schoolchildren in Demba Girara, Damot Woide District of Wolaita Zone, Southern Ethiopia. Asian Pacific Journal of Tropical Medicine, 8(6), 457–463. doi:10.1016/j.apjtm.2015.05.009. PMID: 26194830.

Amhara region Disaster Prevention and Preparedness Commission (DPPC). (2000). Strengthening Emergency Response Abilities/SERA Project.

Awasthi, S., Bundy, D.A.P., Savioli, L. (2003). Helminthic infections. BMJ, 19, pp. 885–888.

Ayed, L. B., & Sabbahi, S. (2017). Entamoeba histolytica. In J. B. Rose & B. Jimenez-Cisneros (Eds.), Global water pathogen project. Michigan University, E. Lansing, MI, UNESCO.

Casapía, M., Joseph, S.A., Núñez, C., et al. (2006). Parasite risk factors for stunting in grade 5 students in a community of extreme poverty in Peru. International Journal of Parasitology, 36, pp. 741–747.

Curtale, F., Pezzotti, P., Latif, A., et al. (1998). Knowledge, perceptions and behaviour of mothers toward intestinal helminths in Upper Egypt: Implications for control. Health Policy and Planning, 13(4), 423–432.

Gebreyohanns, A., Legese, M. H., Wolde, M., et al. (2018). Prevalence of intestinal parasites versus knowledge, attitude and practices with special emphasis on Schistosoma mansoni among individuals who have river water contact in Addiremets town, Western Tigray, Ethiopia. PLoS ONE, 13(9), e0204259. doi:10.1371/journal.pone.0204259

Giacometti, A., Ghiselli, R., & Cinomi, O. (2004). Emerging protozoan pathogens. Journal of Antimicrobial Chemotherapy, 54(3), pp. 654-660.

Kidane, E., Mekonnen, S., Kebede, A., et al. (2014) Prevalence of intestinal parasitic infections and their associations with anthropometric measurements of

school children in selected primary schools, Wukro town, eastern Tigray, Ethiopia. International Journal of Current Microbiology and Applied Sciences, 2, pp. 11–29.

Kvalsvig, J.D., Cooppan, R.M., Connolly, K.J. (1991). The effects of parasite infections on cognitive processes in children. Annals of Tropical Medicine & Parasitology, 85, pp. 551–568. doi:10.1080/00034983.1991.11812608

Lewetegn, M. (2015). Prevalence of Intestinal Parasites among Preschool Children and Maternal Knowledge, Attitude and Practice on Prevention and Control of Intestinal Parasites in Senbete and Bete Towns, North Shoa, Ethiopia. Addis Ababa University, Master's thesis.

Maru, D.S. (2017). Prevalence of Intestinal Parasitic Infections and Associated Risk factors among School children in Adigrat town, Northern Ethiopia. International Journal of Emerging Trends in Science and Technology, 04(01), pp. 4943–4948.

Ngui, R., Ishak, S., Chuen, C.S., Mahmud, R., & Lim, Y.A. (2011). Prevalence and Risk Factors of Intestinal Parasitism in Rural and Remote West Malaysia. PLoS Neglected Tropical Diseases, 5(3).

Nyantekyi, L.A., Legesse, M., Belay, M., et al. (2010) Intestinal parasitic infections among under-five children and maternal awareness about the infections in Shesha Kekele, Wondo Genet, Southern Ethiopia. Ethiopian Journal of Health Development, 24, pp. 185–190.

Rozendale, J.R. (1997). Vector Control Methods for use by Individuals and Communities. Geneva: WHO, pp. 337-356.

Sady, H., Al-Mekhlafi, H. M., Atroosh, W. M., et al. (2015). Knowledge, attitude, and practices towards schistosomiasis among rural population in Yemen. Parasites & Vectors, 8(1), 1.

USAID's Neglected Tropical Diseases Program. (2014). Soil transmitted helminthiasis. Available at: https://www.neglecteddiseases.gov/target_diseases/soil_transmitted_helminthiasis/

World Health Organization. (2002). Prevention and control of Schistosomiasis and soil transmitted helminthiasis. Report of WHO expert committee. Geneva.

World Health Organization. (2002). Prevention and control of Schistosomiasis and soil transmitted helminthiasis: Report of WHO expert committee. Geneva.

World Health Organization. (2010). Prevention and control of schistosomiasis and soil-transmitted helminthiasis. Geneva: WHO. Available at: http://whqlibdoc.who.int/publications/2010/9789241564090_eng.pdf.

World Health Organization. (2013). Soil-transmitted helminthiases: number of children treated in 2013. Weekly Epidemiological Record, 10(90), pp. 89-96.

World Health Organization. (2015). Weekly epidemiological record. Soil-transmitted helminthiases: number of children treated in 2013. (10), 90, pp. 89-96.