Original Article

Frequency and risk factors for intestinal parasitic infection in children under five years age at a tertiary care hospital in Karachi

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Abstract

Objective: To assess the frequency and risk factors for intestinal parasitic infection in children under five years age at a tertiary care hospital, Karachi.

Methods: A cross sectional survey of 269 children under five years was conducted at a tertiary care hospital on a pretested self-administered questionnaire. Stool smears were examined under light microscope with direct saline smear and lugol's iodine solution. Parasitic detection was confirmed by formalin ethyl acetate concentration method.

Results: Stool test positive for parasites was found in 185 (68.8%) children. Majority of children144 (53.5%) were among 4-5 years of age. Less than one third (20.4%) showed moderate malnutrition (p=0.05) while 44.6% were found to have mild anaemia (p<0.001). Giardia lamblia was the most common parasite (25.3%) identified. Only 40% of children were found to wash hands with soap after using the toilet (p<0.001). Eating mud/pica was present in 36% children (p<0.001). Less than half (48%) of the mothers said that they do not purify drinking water (p<0.001).

Conclusion: The frequency of intestinal parasitic infection was found to be high among children under five years. Major contributory factors were lack of hand washing and drinking unpurified water along with habit of eating mud/pica .This study identifies at-risk population of less than five years of age who could benefit from health education of parents (JPMA 59:216; 2009).

Introduction

Intestinal parasitic infection is a serious public health problem throughout the world particularly in developing countries.[1,2] It is a well known fact that parasitic infections are more common in paediatric age group as children area more vulnerable population.

The consequences of these parasitic infections results in malnutrition, anaemia, cognitive impairment and increased susceptibility to other infections.[2-4]

WHO has suggested that the control of parasitic infestation should be effectively incorporated into a multi-disease control approach together with T.B, Malaria and HIV/AIDS.[5]

Various risk factors are responsible for this prevalent disease, which include low socioeconomic status, poor hygienic conditions, impure drinking water, low literacy rate of parents, large size of the family and poor health status of the child.[1-4]

Studies done in different parts of the world revealed high prevalence of this common disease. An Indian study showed a frequency of 71.18% in children[6] while in another study it was 46.7%.[7] In a study done in Mexico it was found to be 57%[2] whereas in a Turkish study the prevalence was much less than India and Mexico (31.8%).[3]

Studies done in different areas of Pakistan as Abbottabad, Neelum valley and Bagh with children of different age groups showed prevalence of 81%, 18.02% and 21.75% respectively.[8-10] Whereas in Skurdu 54.91% of children suffered from this infection. Among all these areas Asacaris Lumbricoides and Giardia lambia were the most common organisms isolated.[11]

The present study was conducted to identify the frequency and risk factors for intestinal parasitic infestation in children under five year of age at a tertiary care hospital of Karachi.

Patients and Methods

A cross-sectional study among children under 5 years age in the paediatrics department of Ziauddin University Hospital, was conducted using a pretested self administered questionnaire.

All patients up to the age of five years admitted with complaints of diarrhoea with or without mucous or blood, fever, abdominal pain, abdominal distention, nausea, vomiting anal itch and anaemia during one year period were included in this study. Children more than five years age were excluded. While children under 5 years presenting with diarrhoea associated with other illnesses like hepatitis,

respiratory infection, lactose intolerance and surgical conditions like appendicitis were also excluded. Informed verbal consent was taken from their parents

Variables included in the questionnaire were age group, gender, nutritional status, duration of breast feeding, age of initiating weaning, child's habits including hand washing (with soap, with only water, do not wash), eating mud/pica , parents' education, number of children under 5 years, methods of purifying drinking water, and mother's habit of washing hands before preparing food. Haemoglobin level of the child and stool detail report (D/R) was later obtained from laboratory records.

Weights of children were taken in minimal clothing. Weight of children up to 2 years age was assessed by Salter brecknell mechanical hanging scales while weight of children above 2 years was assessed by colonial weighing health dial Scale. Nutrition status was evaluated by Gomez's classification for classifying protein energy malnutrition in children, based on percentage of expected weight for age. According to this classification 75-89% is mild malnutrition, 60-74% is moderate malnutrition and below 60% is severe malnutrition.[12]

Blood samples were sent for Haemoglobin estimation for assessment of anaemia, which was classified into three categories according to World Health Organization (WHO) classification and is expressed as gram/dl; Mild (10-10.9gm/dl), Moderate (9-9.9gm/dl) and Severe (<9gm/dl).[13]

Mothers/Parents were explained how to collect the stool sample. For children under two years of age parents were explained to apply the diaper on the opposite side so that the faecal matter did not get absorbed and the sample was available for examination. Children above 2 years age were explained how to collect the sample in the bottle.

The collected samples were immediately sent to the laboratory for light microscopy and differential diagnosis of protozoa cyst. Stool smears were examined under light microscope with direct saline smear and lugol's iodine solution. Parasitic detection was confirmed by formalin ethyl acetate concentration method.

The data entry and analysis was done in SPSS version 10.0. Mean and standard deviation was calculated for age, weight and haemoglobin values. Chi-square test was used to find out the association between parasitic infection and risk factors. P-value <0.05 was considered significant.

Results

A total of 269 children were included in this study. There were 149 (55%) males and 120 (45%) females. Majority of the children (53.5%) were between 4-5 years age (p=0.01).Stool test positive for parasites was found in 185 children (68.8%).

Majority (36.1%) of the children were exclusively breast fed up to 4 months of age (p=0.574) and weaning was initiated after this age among 66 %(p=0.399)

Table-1: Socio-Demographic Profile of Children.

Variables	n=269(%)	p value
Age group		
0-<2 years	19 (7)	0.01
2-<3 year	31(11.5)	
3-<4year	75(28)	
4-5year	144(53.5)	
Gender		
Male	149 (55)	0.889
Female	120 (45)	
Number of children under 5 years		
One child	56(21)	0.464
Two children	116(43)	
Three children	97 (36)	
Father's Education		
None	25(9)	<0.001
Religious Education Only	26(10)	
Primary School	23(9)	
Secondary School	31(12)	
Maticulate	36(13)	
Intermediate	41(15)	
Higher Education	87(32)	
Mother's Education		
None	29(11)	<0.001
Religious Education Only	38(14)	
Primary School	20(7)	
Secondary School	25(9)	
Maticulate	35(13)	
Intermediate	31(12)	
Higher Education	91(34)	
Type of Housing		
Uncemented	68(25)	<0.001
Cemented	201(75)	

Table 1 shows Socio-demographic profile of children presenting with parasitic infections. Less than half (43%) of the families had two children under five years of age (p 0.464). Almost one third (32%) fathers and 34% of mothers were found to be highly educated (p<0.001).Most of the houses where these children were residing were cemented (p<0.001))

Table 2 shows the risk factors and organism isolated from the stool detail report. Less than half (43%) of the mothers were found to wash hands with soap before preparing food. Almost half (48%) of the mothers said that they do not purify drinking water at all by boiling or

Table -2: Risk Factors and Organisms isolated.

Variables	n=269(%)	p value
Mothers washes hands before preparing food		
With Soap	124(46)	0.003
Without Soap	91 (34)	
Do not Wash Hands	54 (20)	
Method of Purifying Drinking water		
By Boiling Water	78 (29)	<0.001
Filtering Before Use	61 (23)	
Do not Purify at all	130 (48)	
Child washes hand after using Toilet		
With Soap	107 (40)	<0.001
Without Soap	12 (4)	
Do not Wash Hands	150 (56)	
Child eating Mud/Pica		
Yes	97(36)	<0.001
No	172(64)	
Nutritional status		
Normal for age	99 (36.8)	0.058
75% to 89% of expected	79 (29.4)	
60% to 74% of expected	55 (20.4)	
< 60% and below	36 (13.4)	
Organisms Isolated		
Giardia Lamblia	68(25.3)	<0.001
Entamoeba Histolytica	52(19.3)	
Ascaris Lumbricoides	33(12.3)	
Ankylostoma Duodenale	20(7.4)	
Enterobius Vermicularis	7(2.6)	
Hymenolepis Nana	5(1.9)	
No organism found	84(31)	

filtering (p <0.001). Regarding child's habits 40% of children were found to wash hands with soap (p<0.001). Habit of eating mud/pica was present in 36% children (p=0.001). Almost one third (29.4%) of the children were

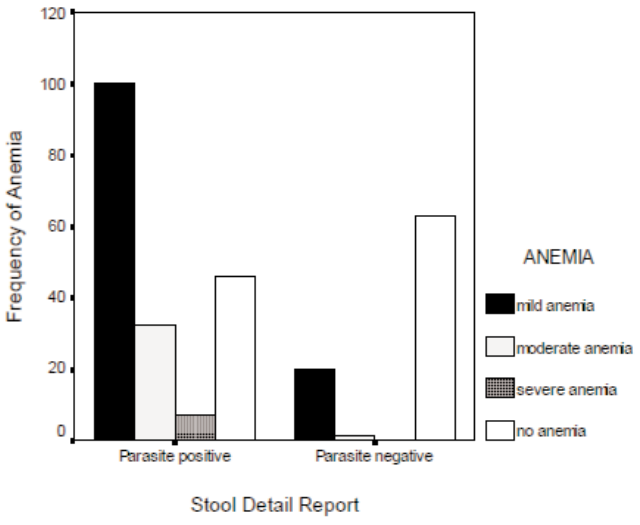

Figure: Association of Parasitic infection with Anaemia.

mildly malnourished while 20.4% showed moderate malnutrition (p=0.05). Most common organism found was Giardia Lamblia (25.3%) followed by Entamoeba Histolytica (19.3%).

The figure shows frequency of anaemia and its association with stool D/R results.

Discussion

This study showed a higher prevalence of parasitic infection (68.8%) in children under 5 years of age while a similar study done in Karachi revealed a lesser percentage (32.2%).[14] Most frequent age group associated with parasitic infection in this study was 4-5 years while the study done on children in Quetta showed an age group of 9-12 years to be most common.[15]

Breast milk provides not only the safest and best food source for children but strengthens the child's immune system and confers protection against infections.[16] Less then half of the children in this study were exclusively breast fed for four to eight months. No significant association was found between breast feeding and parasitic infection which is comparable to studies done in central Africa and Bangladesh.[17,18] Though a study done in Egypt showed less incidence of giardiasis in children exclusively breast fed for six months (p<0.05).[19]

It is a known fact that there is a strong relationship between a child's health and the parent's education, specifically the mother. An unusual finding of this study was that although a significant number of the parents were highly educated but still prevalence of parasitic infection was high among their children. This may be due to some ignorance regarding health and hygiene habits among parents. While a study done in Mexican children revealed low maternal education levels to be highly associated with parasitic infection (p<0.001).[2] Another study in Turkey did not show any significant association between intestinal parasites (p=0.035)[3] and maternal education.

In this study most of the houses were found to be cemented (75%) which is a higher figure than in a study done by Quihui L.[2] Less than half of the mothers washed their hands with soap while 20% did not wash their hands. This is comparable to a Turkish study.[3]

Purifying water before drinking is essential to prevent parasitic infestations. Almost half of the children in this study did not use boiled or filtered water for drinking which is similar to the results obtained from a comparative study done by Osten (p<0.001).[4]

Hand washing with soap removes potentially pathogenic organisms. It was found in this study that majority of infected children did not wash their hands

regularly with soap. Similar results were obtained in study among Turkish school children ($p<0.001$).[4] Eating mud /pica were found to be the major cause of parasitic infections in this study. Similar results were obtained in a study among children in northern areas of Pakistan.[20]

Nutrition is an essential determinant of well-being. Less then half of the children in this study had normal nutritional status while almost similar number of children were mildly malnourished presenting a significant association between parasitic infection and malnutrition which is consistent with an Ethiopian study.[21]

Giardia lamblia was the most common parasite isolated in this study with almost one third of children harbouring it. Almost similar results were obtained in two local studies done in Abbotabad and Hayatabad.[8,22,23] It was also found in this study that anaemia was prevalent in most of the children harbouring a parasite which is consistent with a Palestenian study.[24]

The frequency of intestinal parasitic infection was found to be high among children under five years age. Despite better education status of parents there is lack of hygienic environment for children as they were not provided with safe drinking water and did not have the habit of hand washing. We have identified an at-risk population who could benefit from health education of parents specifically the mothers, promotion of good health and provisions of safe drinking water.

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