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Anushka Sharma
M. Phil Research Scholar,
Department of Zoology
Rabindranath Tagore
University, Bhopal, India

Dr. Pragya Shrivastava
Head of Department
Department of Zoology
Rabindranath Tagore
University, Bhopal, India

Prevalence of gastrointestinal protozoan parasites among children: An epidemiological investigation

Anushka Sharma and Dr. Pragya Shrivastava

Abstract

The aim of the study was to explore the prevalence of Gastrointestinal Protozoan Parasites (PPP) among children with special reference to their source and type of drinking water. Besides, the study intended to explore the impact of gender on hemoglobin value of the respondents. 400 respondents were selected with the help of convenient sampling technique. The study was carried with the help of descriptive research design. 400 respondents were selected from Jammu Districts of Union Territory of Jammu and Kashmir. Further, all respondents were elected within the age group of 12-16 years. The results of the study reveal that that type of drinking water has significant impact on the prevalence of Gastrointestinal Protozoan Parasites (GPP) among children. Besides, it was found that source of drinking water has significant impact on the prevalence of Gastrointestinal Protozoan Parasites (GPP) among children. The impact of defecation site was reported significant on the prevalence of Gastrointestinal Protozoan Parasites (GPP). Further, it was seen that the impact of gender is significant on the level of hemoglobin value of the respondents.

Keywords: Gastrointestinal Protozoan Parasites (GPP), Gender, Source of Drinking Water, Type Drinking Water, Defecation Sites. Hemoglobin Value

Introduction

The spread of protozoa parasites has been seen frequent in people who possess a deficient immune system. Poor sanitation also facilitates the rapid increase of such infection. So far as India is concerned Intestinal parasitic infection is gaining scope day by day. Intestinal parasitic contaminations are worldwide in conveyance and especially endemic in creating nations. Therefore, epidemically speaking, intestinal parasitic diseases are worldwide in dissemination and especially endemic in nations which are still coming under developing nations list. Very high pervasiveness in developing nations is because of absence of sanitation, absence of hygiene therefore, such kind of epidemiology occurs wherever there is unhygienic environment, open defecation site, lack of health consciousness etc. Individuals of any age are influenced by this pattern of predominant parasitic diseases; notwithstanding, children are the most exceedingly terrible. Protozoan parasites are influencing around 200 million individuals. Affected individuals are 3.5 billion, and people that are sick, their number is about 450 million are sick because of these contaminations. These contaminations are observed as a severe public health problem, as they cause delayed and stunted development in children and health problems. There are large numbers of factors associated with rapid increase of gastrointestinal parasites infection in children. There is direct relationship between malnutrition and intestinal parasitism and between nutritional status and both constancy and potency of infections. Malnutrition may affect many developmental processes in children such as children development, cognitive function is also affected and thus affecting school performance of children. It causes complications such as, severe anaemia, intestinal blockage etc. The prevalence of malnutrition, lack of awareness, unhygienic environment and degraded eating habits are some of the factors which are seen in India for facilitating the occurrence of gastrointestinal parasites infection especially in children. Keeping in view, the apex institution of health, World Health Organization (WHO) stated that amoebic infection causes around 50 million people in the world to suffer each year, which results in 40100 thousand deaths yearly. Parasitic infection is more common in developing countries including India. Some parasites don't noticeably affect their host while some others become mature, reproduce or attack organ system which makes their host ill,

Corresponding Author:
Anushka Sharma
M. Phil Research Scholar,
Department of Zoology
Rabindranath Tagore
University, Bhopal, India

resulting into a parasitic infection. Although all infectious agents in human are considered as parasites but in convention, parasitic diseases are defined as those caused by protozoa or helminthes. Lack of adequate medical care facilities and social marginalization has increased the susceptibility of the population to other pathogenicities and morbidities associated with parasitic infection.. Parasites can live throughout the body but mostly prefer the intestinal wall. Apart from causing morbidity and mortality, intestinal parasites infection have been associated with stunted, physical weakness, open defecation sites, impure water, low educational performance of school children. Intestinal parasite has been predicted to affect some 3.5 billion people worldwide and 450 million are thought to be sick as a result of such infections, the majority is children. In some tropical areas, the prevalence hikes nearly to 100 percent. It is a main socio-economic problem in India, though a hospital based study has shown a falling trend during a decade. Intestinal parasites even in low or moderate number effect on both nutritional status and immune system of individuals leading to parasitic diseases. Indeed large number of the research studies has been conducted by the researchers on parasites. Like the studies conducted by Al-Saeed, A. T. And Issa, S.H. (2006) ^[1], Alver, O. And Tore, O. (2006) ^[2], Ayalew A, Debebe T, (2012) ^[10], Ayalew *et al.* (2011) ^[11], Escobedo, A.A.; Canete, T. & Nunez, F.A. (2008) ^[20], Escobedo, A. J. (2010) ^[21], Hegazy, A. M., Younis, N.T.; & Badr, A.M. (2014) ^[28], Jain M, Jain J, Gupta S. (2016) ^[30] and Jarallah, H.M. (2012) ^[31]. The area under study is the Jammu district of U.T Jammu and Kashmir. In context to same, the investigator explored the below mentioned research problem.

Research Problem: The statement of the research problem is as under: “Prevalence of Gastrointestinal Protozoan Parasites among Children-An Epidemiological Investigation”

Operational definition of terms and variables: The operational definitions of terms and variables are as under:

1. **Gastrointestinal protozoan parasites:** In the present study gastrointestinal protozoan parasites refers dominant set of scores obtained by respondents on stool sample tests and blood test. Besides, the investigator employed a self-developed questionnaire (2020).
2. **Source of water:** Source of drinking water in the present study refers the water availed by respondents like pond water, river water, stream water and well water.
3. **Type of water:** The present study refers the dichotomy made on the basis of boiled and unboiled water.
4. **Defecation Site:** Defecation Site in the present study refers the defecation Site availed by the respondents like open field, pit Latrines, sanitary latrines.
5. **Gender:** Gender refers the dichotomy of the respondents made on the basis of their sex.

Objectives of the study: The objectives of the present study are as under:

- **Objective-I:** To investigate the prevalence of Gastrointestinal Protozoan Parasites among Children with Special Reference to Their gender.
- **Objective-II:** To investigate the prevalence of Gastrointestinal Protozoan Parasites among Children

with Special Reference to Their Source of Drinking Water.

- **Objective-III:** To investigate the prevalence of Gastrointestinal Protozoan Parasites among Children with Special Reference to the type of Water usage.
- **Objective-IV:** To investigate the prevalence of Gastrointestinal protozoan parasitic infection in relation to defecation Site.
- **Objective-V:** To investigate the hemoglobin value among male and female students.

Hypothesis: The aim of the present study was to explore the impact Source and Type of Drinking Water on prevalence Gastrointestinal Protozoan Parasites among children. Besides, its main aim is to check the impact of defecation sites on the prevalence Gastrointestinal Protozoan Parasites (GPP) among children. In pursuance to same, it was presumed that the selected variables have significant impact on prevalence Gastrointestinal Protozoan Parasites (GPP) among children. Besides, it was speculated that there exists significant difference in hemoglobin value of male and female students.

Research limitations of the study: On the basis of partial experience of the investigator under consideration the research consider it, imperative to delimit the present study in required dimensions. Besides, keeping the time budget and diversity of the variable under consideration, the investigator delimited the present study to below mentioned dimension:

- a) The study will be delimited to only 400 children within the age gathering of 6 to 14 years.
- b) The study will be delimited to Jammu District of union territory of Jammu and Kashmir.

Methodology: Keeping the feasibility and usability of the study under consideration, the researcher found it suitable to go through descriptive survey method. Accordingly, present study was carried with the help of descriptive method. The parameters involved in methodology and procedure are as under:

- **Sample:** 400 respondents were selected with due representation of gender in school. The age groups of the respondents were 6-14 years.
- **Sampling technique:** Whole data was selected by using Convenient Sampling Technique (CST). The required data was collected from District Jammu of Union Territory of Jammu and Kashmir.

Analysis and interpretation of the data: In connection to same, collected data was put to suitable statistical treatment by using Mean, S. D. and ‘t’ value. The detailed procedure of statistical treatment is analysed as under: The analysis and interpretation of the data is reported as under:

Table 1: Showing frequency and percentage distribution of respondents on their intensity of Prevalence Gastrointestinal protozoan parasites among male and female children (N=200 each)

Level of intensity	Male		Female	
	Frequency	Percentage	Frequency	Percentage
Severe	20	5.00	15	3.75
Moderate	20	5.00	25	6.25
Mild	10	2.5	05	1.25

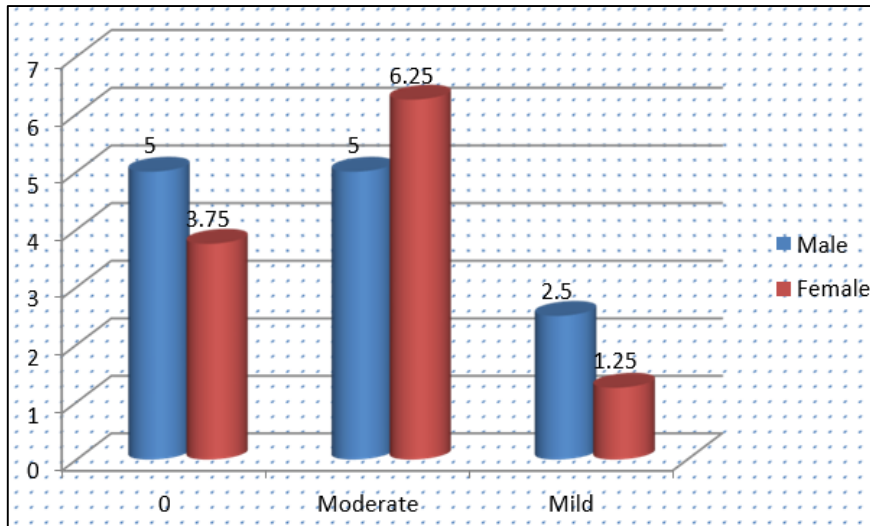


Fig 1: Showing graphical representation of respondents on their intensity of Prevalence Gastrointestinal protozoan parasites among male and female children.

Interpretation: The results reported in the table 1.1: (Please Refer Table 1, Fig. 1) gives information about the frequency and percentage distribution of respondents on their intensity of prevalence gastrointestinal protozoan parasites among male and female children. The results indicate that 5.00% (F=20) were having severe infection. Besides, results reveal among male respondents 5.00% (F=20) were having moderate infections. The results indicate that 2.5% (F=10)

were found with mild gastrointestinal protozoan parasite infection. Among female respondents 3.75% (F=20) were seen with severe gastrointestinal protozoan parasite infection. In addition to this, it was found that 6.25% (F=25) female respondents were seen with moderate gastrointestinal protozoan parasite infection. Further, it was seen that 1.25% (F=05) female respondents were seen with mild level of infection.

Table 2: Prevalence of Gastrointestinal protozoan parasitic infection in relation to Source of Drinking Water. (N=400)

Variable	Tap water		Well water		River/Pond/ Stream	
	Examined	Infected	Examined	Infected	Examined	Infected
Source of Water	300	30	70	10	30	50
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
	30.00	7.5	70.00	2.5	30.00	12.5

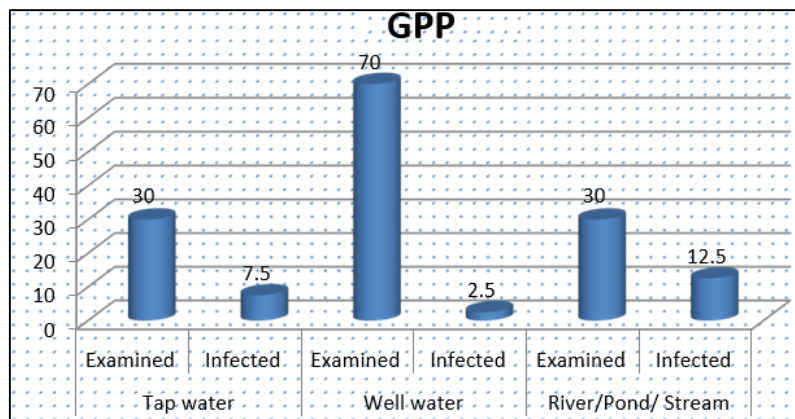


Fig 2: Showing graphical representation of prevalence of gastrointestinal protozoan parasitic infection in relation to Source of Drinking Water. (N=400)

Interpretation

While glancing towards table 1.2, (Please consult Table 2, Fig. 2) gives information about the frequency and percent wise distribution of gastrointestinal protozoan parasite infection in relation to their source of water. The results reveal that those respondents who use tap water, 7.5% (F=30) were seen with gastrointestinal protozoan parasite infection. According the results reported in the same table reveals that among 70 respondents were found who avail well water in their day to day life schedule and among these respondents 10% (F=70) were seen with gastrointestinal protozoan parasite infection. The obtained results indicate

that among river/pond or stream water users 12.5% (F=30) were seen with gastrointestinal protozoan parasite infection. Thus, from the obtained results the investigator can generalize that river/pond and stream water users were found with high gastrointestinal protozoan parasite infection rate. Next to it tap water users were found with gastrointestinal protozoan parasite infection rate. Thus, type of water resources were reported to have a major impact on the level of gastrointestinal protozoan parasite infection. The results may attribute to this fact that open water sources like rivers, ponds and streams are more prone to parasitic contamination.

Table 3: Prevalence of Gastrointestinal protozoan parasitic infection in relation to Water usage. (N=400)

Variable	Boiled water			Un-boiled water		
	Examined	Infected Frequency	Infected Percentage	Examined	Infected frequency	Infected Percentage
Water Usage	40	2	0.5	360	88	22

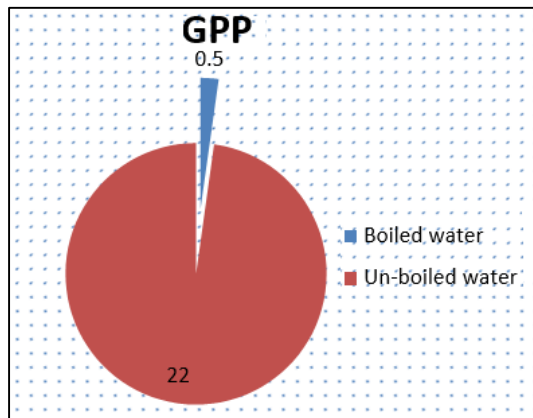


Fig 3: Showing graphical representation of gastrointestinal protozoan parasitic infection in relation to water usage

Interpretation

While glancing towards table 1.3, (Please Consult Table 3, Fig. 3) gives information about the frequency and percentile distribution of gastrointestinal protozoan parasite infection in relation to their water usage. The results reveal that among those respondents who avail boiled water, 0.5% (F=40) were seen with gastrointestinal protozoan parasite infection. While analysing those respondents who avail un-boiled water, it was found that 22% (F=88) were seen with gastrointestinal protozoan parasite infection.

Thus, from the reported results, it can be inferred that type of water usage of the respondents hold high level of impact on the level of gastrointestinal protozoan parasite infection of the respondents. As reported from the above results it is obvious that boiled water reduce the concentration of the gastrointestinal protozoan parasite infection among children.

Table 4: Showing Prevalence of Gastrointestinal protozoan parasitic infection in

Defecation Site	Open fields		Pit Latrines		Sanitary Latrines	
	Examined	Infected	Examined	Infected	Examined	Infected
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
	20	15	150	50	230	25
	15	3.75	50	12.5	25	25

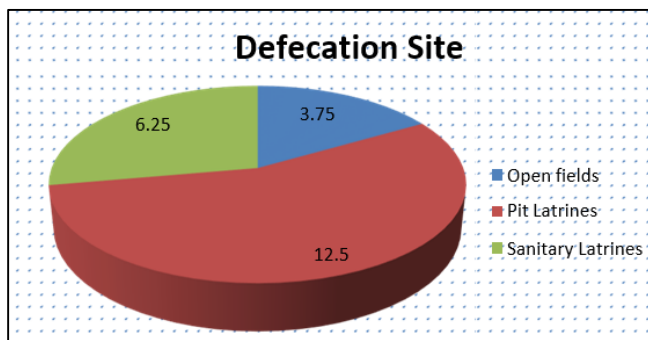


Fig 4: Showing graphical representation of Prevalence of Gastrointestinal protozoan parasitic infection in relation to Defecation Site

Interpretation

The fleeting look on the table 4 (Please Consult Fig. 4) gives information about the Prevalence of Gastrointestinal protozoan parasitic infection in relation to defecation site availed by the respondents.

The results reveal that 20 respondents were seen who avail defecating in open fields. However, among these respondents 3.75% (F=15) were found with Gastrointestinal protozoan parasitic infection.

In context to same, it was found that 150 respondents were seen who were defecating in pit latrines. However, among these respondents 12.5% (F=50) were seen with Gastrointestinal protozoan parasitic infection.

Besides the calculated results indicate that 230 respondents were seen who avail sanitary latrines, but 6.25% (F= 25) were reported with Gastrointestinal protozoan parasitic infection.

Thus, from the gained results it can be inferred that open field defecation and pit latrines defecation were seen more prone to gastrointestinal protozoan parasitic infection as

compared to sanitary latrines.

Table 5: Showing mean significance difference between male and female respondents on their Hemoglobin (Hb) value (N=200 each)

Variable	Male		Female		't' value
	Mean	SD	Mean	SD	
Hb Value	11.90	1.23	10.72	1.05	10.28@@@

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- Hb= hemoglobin value
- @@@= significant at 0.01 level of confidence

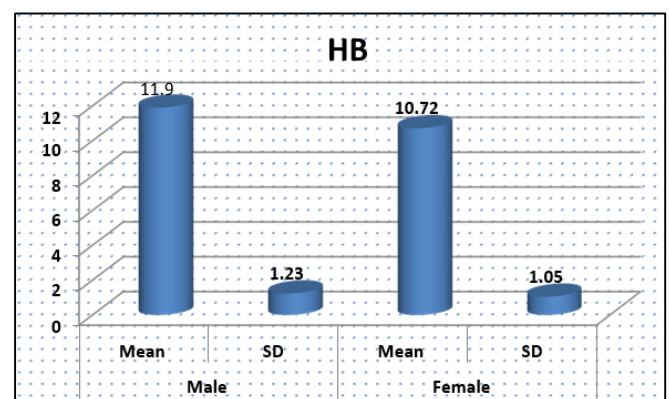


Fig 5: Showing graphical representation of male and female respondents on their Hemoglobin (Hb) value.

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- Hb= Hemoglobin value

Interpretation

While pondering on the table 1.4 (Please consults table 5, Fig. 5) gives information about the mean significant difference between boy and girl children on their level of

hemoglobin value (Hb). The results reveal that the mean score of male respondents was reported higher (M=11.90) while as the mean score of female students was reported lower (M=10.72). When the both groups were comparatively analyzed, the 't' value came out to be 10.28, which is significant at 0.01 level of confidence. Therefore, from the calculated results it can be said that male respondents had high level of hemoglobin value as compared to female respondents. Thus, from the obtained results it can be inferred that gender has significant impact on the level of hemoglobin value of the respondents.

Support to findings

Indeed, it was found that type of drinking water has significant impact on the prevalence of Gastrointestinal Protozoan Parasites (GPP) among children. Besides, it was found that source of drinking water has significant impact on the prevalence of Gastrointestinal Protozoan Parasites (GPP) among children. The results are supported by host of the researchers like; Ganiyu, A., O.; Surj, Y., A. & Shu, R, K. (2012), Ghai, O.P., Kalra, S.L., Jaswal, V.N. (1969), Ghimire and Mishra (200), Giannattasio, A, Guarino, A & Lo Vecchio, A. (2016), Al-Saeed, A. T. And Issa, S.H. (2006) ^[1], Alver, O. And Tore, O. (2006) ^[2], Ayalew A, Debebe T, (2012) ^[10], Ayalew. (2011) ^[11], Escobedo, A.A.; Canete, T. & Nunez, F.A *et al.* (2008) ^[20], Escobedo, A. J. (2010) ^[21], Hegazy, A. M., Younis, N.T.; & Badr, A.M. (2014) ^[28], Jain M, Jain J, Gupta S. (2016) ^[30] and Jarallah, H.M. (2012) ^[31].

Conclusion

The aim of the present study was to explore the impact of Source and Type of Drinking Water on the prevalence Gastrointestinal Protozoan Parasites among children. Besides, it aims the impact of defecation sites on prevalence Gastrointestinal Protozoan Parasites (GPP) among children. In pursuance to same, it was found that type of drinking water has significant impact on the prevalence of Gastrointestinal Protozoan Parasites (GPP) among children. Besides, it was found that source of drinking water has significant impact on the prevalence of Gastrointestinal Protozoan Parasites (GPP) among children. Further, it was found that the impact of defecation site has significant impact on the prevalence of Gastrointestinal Protozoan Parasites (GPP) among children. In addition to this, it was seen that the impact of gender is significant on the level of hemoglobin value of the respondents.

Conflict of Interest

Keeping the entire research process under consideration, no any conflict of interest has been declared by the investigator.

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