Available online at www.ijrp.org

IJRP.ORG
International Journal of Research Publications

International Journal of Research Publications

"ISOLATION AND IDENTIFICATION OF PARASITIC ORGANISMS FROM SELECTED WATER SAMPLES IN ICC PHILS. FOUNDATION INC. IN FLORIDABLANCA PAMPANGA"

Miguel Paolo Yesu S. Quintos, Emerlyn Florre S. Masagca, Rachelle M. Relano
Bachelor of Science in Medical Technology Students
Saint Jude College PHINMA, Manila, Philippines

ABSTRACT

Water – related parasitic diseases is severe problem that causes pain, disability and death around the world. Mostly people got infected by ingesting contaminated water. Increased water borne parasitic disease outbreaks were due to poor sanitation and water supply especially in the community of rural areas. Hence, researchers conducted quasi-experimental study in ICC Phils. Foundation Inc. in Floridablanca, Pampanga aimed to identify if their water from different sources is free from parasites and protozoans that may cause diseases and if residents were practicing purification process before consumption. Different water samples were collected upon the resident's consents and survey was conducted if they practice water purification process. Microscopic analysis of water samples was conducted in SJC-PHINMA laboratory, and there were no parasites isolated and identified in different water samples upon the verification of RMT's. Conclusions were made based on the gathered data; the residents were not practicing any water purification process before consuming their water.

Keywords: parasitic organisms; water borne parasitic disease; contaminated water; water purification.

I. INTRODUCTION

Water-related parasitic diseases are common throughout the world mostly 3rd world countries (Omarova, Tussupova, Berndtsson, Kalishev, & Sharapatova, 2018). Water-related parasitic infection may occur when ingested with contaminated waters. Hygiene, sanitation and water are 3 significant elements that need to be focused to prevent the spread of parasitic diseases. Around the world contaminated water is a severe problem than can cause pain, disability and death. People are infected when they ingest contaminated water with fecal matter, come in contact with said waters with open wounds. People are also contaminated during water recreational activities (swimming, hot tubs, river, ocean, lakes). Individuals who are immunocompromised are in greater risks compared to those who have a normal immune system (CDC 2016). According to UNDP (2006), almost 2 million children die each year globally because they don't have access to clean and safe water and poor sanitation. According to DOH (2017), there was a total of 6,701 diarrhea cases reported nationwide from first term of the year. Even though awareness in ones' hygiene is the campaign of the department of health in fighting protozoan diseases, many are still having parasitic infection. And as the years pass by, the outbreaks of waterborne parasitic disease were increased due to poor maintained community sanitation and water supply systems. In small facilities parasitic identification is not frequently performed due to lack of equipment. Researches are now widely conducted to identify the presence of parasites in different water samples internationally, but there were few numbers of researches being conducted locally. Hence, the purpose of this study is to isolate and identify the parasites present in different water samples. Also, to identify the method of consumption and if the residents were practicing filtering or purification process before consumption. Generally, this study is aims to isolate and identify parasites from selected water samples in ICC Phils. Foundation Inc. in Floridablanca Pampanga. Specifically, this study aims to answer the following questions:

1. What is the physical characteristic of obtained water samples in terms of?
   a. Physical appearance/ Transparency
   b. pH
   c. Sources
2. Is there any presence of parasites in the water samples obtained in terms of?
   a. Presence of ova
   b. Presence of protozoans
   c. Presence of other contaminants
3. In what aspects do samples of water obtained being utilized in terms of:
   a. Hygienic practices

b. Drinking purposes
c. Household use

II. METHODOLOGY

Research Design

The study utilized the quasi-experimental method which is suited to this study in establishing the analysis parasites in selected water samples. The quasi-experimental design involves selecting groups without any random pre-selection process and after this selection, the experiment proceeds in a very similar way to another experiment (Shuttleworth, 2008).

Location of the Study

The different water samples for the study will be gathered inside ICC Phils. Foundation Inc. in Floridablanca, Pampanga and the household around its vicinity. The gathered samples will be examined in the laboratory facility of St. Jude College PHINMA and results will be verified by registered Medical Technologists or Parasitologist.

Samples of the Study

The specimen used for the study are the gathered water samples from different sources namely: tap water from unfiltered faucet, deep well water, and spring water.

Population of the Study

The selected population of this study are the residents of ICC Phils. Foundation Inc. in Floridablanca, Pampanga and the household around its vicinity.

Data Gathering and Procedures

The researchers started on data gathering by creating written consent forms to be given out to the community and have it approved by the adviser. Upon the approval of the forms, the researchers gave out the consent forms to different houses in order to ask their permission in conducting the study. After the needed samples are collected, the researchers will conduct the procedure in the laboratory facilities in the school in order to identify the parasites present. Afterwards, the researchers would proceed to analyze the final data received from the laboratory.

Procedures

1. Water samples were collected from various prospective waters sources like tap water, spring water and deep well connected either directly and indirectly with the lands and houses. For each sample 2 water samples from different locations were collected in sterile plastic bottle and each sample was 700 mL.
2. The water samples were transported to the Saint Jude College PHINMA and were left to stay undisturbed for 24 hours at room temperature, after 24 hours the samples were place inside the refrigerator.
3. Samples were centrifuged at 3,000 RPM for 5 minutes and all supernatant was placed in a sterile amber bottle.
4. Supernatant of each samples were heat fixed in slide, 3 slides for each different stain per water sources were prepared.
5. Samples were stained with Lugol's iodine, H & E stain, and Giemsa stain and examined microscopically, for parasite cysts, trophozoites and helminth eggs.
6. The result of the quantitative analysis of the water samples was verified by registered Medical Technologist or Parasitologist. And the data that was gathered by the researchers from the survey were analyzed and conclusions were made.

III. RESULTS AND DISCUSSION

Results of this study from the given questionnaires and from the quantitative testing of the water samples that were stained and through microscopic analysis was interpreted.

Table 1. Shows the different appearances and pH and sources of different water samples after 24 hours of standing in room temperature.

SAMPLE	TRANSPARENCY /PHYSICAL APPEARANCE	PH	SOURCES
Household 1 Sample 1	Clear	7	Spring

Household 1 Sample 2	Clear	7	Deep well
Household 1 Sample 3	Clear	7	Tap water
Household 2 Sample 2	Turbid	7	Deep well
Household 3 Sample 2	Turbid	7	Deep well
Household 4 Sample 2	Turbid	7	Deep well

All the samples from household 1 has a transparent appearance and a pH of 7 a neutral pH level, these water sources came from spring, deep well and tap water sources. Households 2,3,4 all have a turbid appearance after 24 hours, and has a pH of 7 neutral pH level, these water samples come from deep well sources.

Table 2. Shows any presence of parasites in the water samples obtained from different sources.

SAMPLE	PRESENCE OF OVA	PRESENCE OF PROTOZOANS	PRESENCE OF OTHER CONTAMINANTS
Household 1 Sample 1	None	None	Artifacts
Household 1 Sample 2	None	None	Artifacts
Household 1 Sample 3	None	None	Artifacts
Household 2 Sample 2	None	None	Artifacts
Household 3 Sample 2	None	None	Artifacts
Household 4 Sample 2	None	None	Artifacts

There was no presence of parasites in all water samples obtained from all households but there is presence of other contaminants.

Table 3. Shows the actual number of parasites identified from the different water sample obtained.

SAMPLE	TAP WATER	SPRING WATER	DEEP WELL
Household 1 Sample 1	None	None	None
Household 1 Sample 2	None	None	None
Household 1 Sample 3	None	None	None
Household 2 Sample 2	None	None	None
Household 3 Sample 2	None	None	None
Household 4	None	None	None

Sample 2

There was no presence of parasites in all the different water samples obtained from all households.

Table 4. Shows the different water samples obtained being utilized in terms of hygienic practices, household uses, and drinking water.

SAMPLE	HYGIENIC PRACTICES	DRINKING WATER	HOUSEHOLD USE
Household 1 Sample 1	Yes	Yes	Yes
Household 1 Sample 2	Yes	No	Yes
Household 1 Sample 3	Yes	No	Yes
Household 2 Sample 2	Yes	No	Yes
Household 3 Sample 2	Yes	Yes	Yes
Household 4 Sample 2	Yes	Yes	Yes

Household 1 sample 1 is spring water and according from the survey this type of water sample is being utilized in hygienic practices, consumption and household use. Water sample 2 is from the deep well is and being utilized in hygienic practices and household use but not for consumption. Water sample 3 is tap water is being utilized in hygienic practices and household use but not for consumption. Household 2 sample 2 is deep well water utilized in hygienic practices and household use but not for consumption. Household 3 and 4 sample 2 is deep well water and according from the survey this type of water sample is being utilized in hygienic practices, consumption and household use.

Table 5. Shows the different stains that were used in identifying the parasites and protozoans.

SAMPLE	LUGOL'S STAIN	H&E STAIN	GIEMSA STAIN
Household 1 Sample 1	None	None	None
Household 1 Sample 2	None	None	None
Household 1 Sample 3	None	None	None
Household 2 Sample 2	None	None	None
Household 3 Sample 2	None	None	None
Household 4 Sample 2	None	None	None

Lugol's stain is used for the identification of intestinal protozoa and helminths ova and larvae, from all the water samples no parasites were seen. H&E stain is used for detecting and quantifying parasitic organisms, this stain also produced no parasites in all water samples. Giemsa stain is used to stain parasites blue and red, this also resulted in no parasites seen in all water samples.

IV. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis of data gathered and results of microscopic examination of different waters samples the researchers found that samples from household 1 appeared transparent and has a pH of 7 which is neutral, after 24 hours of standing at room temperature while samples from household 2 - 4 appeared turbid and has a pH of 7 after 24 hours of standing at room temperature. No parasites were isolated and identified in each different water samples in 4 different households from spring water, tap water and deep well. The water is free from parasitic organisms and was

utilized for consumption, household usage, hygienic practices and the residents were not practicing water purification process. To further improve this study the future researchers are encourage to conduct bacterial analysis of water, for water contaminants, crystals and artifacts.

V. REFERENCES

Chan, J. (2001) The efficacy of the different treatment methods on water potability. Baguio Colleges Foundation. Retrieved February 25, 2019, from National Library, Philippines.

Davis, J. (1998) The local water utilities administration: An assessment for policy reforms. Silliman University Dumaguete City. Retrieved Feb 25, 2019, from National Library, Philippines.

Lozano, C. (1995) Potential re-use of the effluent treated wastewater at the Baguio sewage. University of Baguio. Retrieved Feb 25, 2019, from National Library, Philippines.

Philippine Department of Health, Revised Guidelines in the Management and Prevention of Schistosomiasis, 2006.

Sougata Ghosh MD, (2013) Paniker's Textbook of Medical Parasitology 7th edition DCH ISBN 978-93-5090-534-0

Bakir, B. (2003) Investigation of waterborne parasites in drinking water of ankara turkey. Retrieved December 04, 2018, from https://www.researchgate.net/publication/228854628_Investigation_of_waterborne_parasites_in_drinking_water_sources_of_Ankara_Turkey

Bannick, C. (2018) Development and testing of a fractionated filtration for sampling of microplastics in water. Retrieved December 04, 2018, from https://www.sciencedirect.com/science/article/abs/pii/S004313541830842X?via%3Dihub

Basualdo, J. (2000) Screening of the municipal water system of La Plata, Argentina, for human intestinal parasites. Retrieved December 04, 2018, from https://www.sciencedirect.com/science/article/pii/S1438463904700255?via%3Dihub

B. L. Blas, M. I. Rosales, I. L. Lipayon, K. Yasuraoka, H. Matsuda, and M. Hayashi, “The schistosomiasis problem in the Philippines: a review,” Parasitology International, vol. 53, no. 2, pp. 127–134, 2004. Retrieved August 11, 2019 from https://www.ncbi.nlm.nih.gov/pubmed/15081944?dopt

Noor Nihad Baqer,* Amel Hamzah Hammood, Khalid Falih Hassan, and Elaff Saffa Al-deen Hassan. Detection of water-borne parasites in drinking water of Baghdad, Iraq Retrieved august 11, 2019 from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6085744/

Jasper, C. (2012) Water and Sanitation in Schools: A Systematic Review of the Health and Educational Outcomes. Retrieved December 04, 2018, from file:///C:/Users/Asus/Zotero/storage/6CBULGX9/Jasper%20et%20al%20-%202012%20%20Water%20and%20Sanitation%20in%20Schools%20A%20Systematic%20Revi.pdf

Lalle, M. (2018) Treatment-refractory giardiasis: challenges and solutions. Retrieved December 04, 2018, from file:///C:/Users/Asus/Zotero/storage/AWAFDVDS/Lalle%20and%20Hanevik%20-%202018%20-%20Treatment refractory%20giardiasis%20challenges%20and%20so.pdf

L. D. Wang, H. G. Chen, J. G. Guo et al., “A strategy to control transmission of Schistosoma japonicum in China,” New England Journal of Medicine, vol. 360, no. 2, pp. 121–128, 2009. Retrieved august 11, 2019 from https://www.nejm.org/doi/full/10.1056/nejmoa0800135

L. R. Leonardo, P. Rivera, O. Saniel et al., “Prevalence survey of schistosomiasis in Mindanao and the Visayas, the Philippines,” Parasitology International, vol. 57, no. 3, pp. 246–251, 2008. Retrieved august 11, 2019 from https://scholar.google.com/scholar_lookup?title=Prevalence+survey+of+schistosomiasis+in+Mindanao+and+the+Visayas%2C+the+Philippines&author=L.+R.+Leonardo&author=P.+Rivera&author=O.+Saniel+et+al.&publication_year=2008

Omarova,A. (2017) Protozoan Parasites in Drinking Water: A System Approach for Improved Water, Sanitation and Hygiene in Developing Countries. Retrieved December 04, 2018, from file:///C:/Users/Asus/Zotero/storage/K79YVS5N/Omarova%20et%20al.%20-%202018%20%20Protozoan%20Parasites%20in%20Drinking%20Water%20A%20 System%20Ap.pdf

Ott,W. (2014) Access to Drinking Water and Stakeholder Action - Drinking Water Governance in Cameroon from a Political-Ecological Perspective. Retrieved January 12, 2019, from https://www.geo.fu-berlin.de/en/v/iwm-network/vorgestellt/Master-thesis-Ott1.pdf

Richard, R. (2016) Monitoring of Waterborne Parasites in Two Drinking Water Treatment Plants: A Study in Sarawak, Malaysia. Retrieved December 11, 2018, from file:///C:/Users/Asus/Zotero/storage/4KN55STM/Richard%20et%20al.%20-%202016%20%20Monitoring%20of%20Waterborne%20Parasites%20in%20Two%20Drinking.pdf

Richard A. McPherson MD & Matthew R. Pincus MD, PHD Henry's Clinical Diagnosis & Management by Laboratory Methods 22nd edition by ISSBN 978-1-4377-0974-2

Sharifuzzaman,Md. (2015) Isolation and Identification of Cryptosporidium from water samples in Bangladesh. Retrieved March 12, 2019, from http://ijnss.org/wp-content/uploads/2015/01/IJNSS-V2I1-18-pp-118124.pdf

“Schistosomiasis: national objectives for health,” DOH. Retrieved August 11, 2019 http://www.doh.gov.ph/noh/3-1-7pdf.

Tezera, B. (2011) Water supply and Sanitation Development Impacts of Poor Accessibility of Potable Water Supply and Basic Sanitation in Rural Ethiopia: A case study of Soddo District. Retrieved January 12, 2019, from https://brage.bibsys.no/xmlui/handle/11250/135213

file:///C:/Users/Asus/Zotero/storage/K79YVS5N/Omarova%20et%20al.%20-%202018%20%20Protozoan%20Parasites%20in%20Drinking%20Water%20A%20 System%20Ap.pdf

Ott,W. (2014) Access to Drinking Water and Stakeholder Action - Drinking Water Governance in Cameroon from a Political-Ecological Perspective. Retrieved January 12, 2019, from https://www.geo.fu-berlin.de/en/v/iwm-network/vorgestellt/Master-thesis-Ott1.pdf

Richard, R. (2016) Monitoring of Waterborne Parasites in Two Drinking Water Treatment Plants: A Study in Sarawak, Malaysia. Retrieved December 11, 2018, from file:///C:/Users/Asus/Zotero/storage/4KN55STM/Richard%20et%20al.%20-%202016%20%20Monitoring%20of%20Waterborne%20Parasites%20in%20Two%20Drinking.pdf

Richard A. McPherson MD & Matthew R. Pincus MD, PHD Henry's Clinical Diagnosis & Management by Laboratory Methods 22nd edition by ISSBN 978-1-4377-0974-2

Sharifuzzaman,Md. (2015) Isolation and Identification of Cryptosporidium from water samples in Bangladesh. Retrieved March 12, 2019, from http://ijnss.org/wp-content/uploads/2015/01/IJNSS-V2I1-18-pp-118124.pdf

“Schistosomiasis: national objectives for health,” DOH. Retrieved August 11, 2019 http://www.doh.gov.ph/noh/3-1-7pdf.

Tezera, B. (2011) Water supply and Sanitation Development Impacts of Poor Accessibility of Potable Water Supply and Basic Sanitation in Rural Ethiopia: A case study of Soddo District. Retrieved January 12, 2019, from https://brage.bibsys.no/xmlui/handle/11250/135213