SHORT REPORT

Albendazole and mebendazole in the treatment of ancylostomiasis in school children between the ages of 6-15 in Swat, Pakistan

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Abstract

A cross-sectional study was conducted from March to September, 2018 on the efficacies of albendazole and mebendazole against ancylostomiasis in school children of district Swat, Pakistan.

Faecal samples were collected from primary school children and preserved in 10% formalin. The samples were then sent to the Laboratory of Parasitology, in the University of Malakand for microscopic analysis. On the basis of drug availability, the *Ancylostoma dueodenale* infected students were divided into two groups. Group A was treated with Albendazole 400-450mg while group B was orally treated with Mebendazole 350-400mg. Eggs per gram were calculated before and after the treatment.

From the total sample of 296, 192 (64.8%) children were found infected with *Ancylostoma duodenale*. Of the total number of infected children, this study found 87.8% (n=137/156)of them with light intensity of infection, 10.8%(n=17/156) with moderate and 1.2% (n=2/156) with heavy intensity of infection. Albendazole showed a high rate 75% of efficacy than mebendazole 71% ($p<0.05$).

The present study concluded that albendazole and mebendazole are drugs of choice for the treatment of Ancylostomiasis.

Keywords: Parasite infection, Children's health, Albendazole, Mebendazole, Ancylostomiasis, *Ancylostoma duodenale*

DOI: https://doi.org/10.47391/JPMA.1055

Introduction

Ancylostomiasisis a common soil-transmitted helminths infection in humans, caused by two species of hookworm i.e. *Ancylostoma duodenale* and Necatoramericanus. Hookworm infection is acquired through skin exposure to infective larval in faecally-contaminated soil.[1]

According to World Health Organisation, two billion individuals are infected with STHs,[2] about 3,000 to 65,000 deaths a year are caused by *A. duodenale* around the world.[2] Hookworm infection is the leading cause of anaemia, loss of iron and protein in the intestinal tract. Kapadia et al,[3] suggested that a mono infection of *A. duodenale* can use almost 150 µL of blood/per day from the host.

Most of the people included in the study area are dependent upon agriculture for their livelihood and used night soil as manure. They lived in muddy houses, their personal hygiene was low, they used faecally contaminated water, most are connected with farm animals and awareness on health was negligible; such conditions provide a suitable environment for the development of *Ancylostoma duodenale*.

Over the last several decades there has been a growing awareness about treatment through chemotherapy of STHs parasites in infected patients. Albendazole and mebendazole are the recommended treatment in patients all over the world[2] while the WHO's[2] recommended drugs against STH are albendazole, mebendazole, zentel, Benzimedazole as well as levamisole.

Methodology

For this study two rounds of faecal samples were collected from each student. Permission was taken from head of the school as well as parents prior to sample collection. On the first day, all students present were provided an empty faecal bottle that had an agreement form and was labelled with a distinctive ID number. After collection these faecal samples were sent for microscopic analysis. Those students who were found positive for ancylostomiasis were asked to meet their physician along with their parents. After 3 days of treatment another container with a letter and a unique number was provided to each infected student for their second stool sample. Each student was asked to write the name of the drug they had taken on the provided consent paper.

Data were analysed by using Graph paid version 5. Mean and standard deviation was calculated. P value of < than 0.05 was taken as statistically significant.

The efficacy of drugs =Number of eggs before treatment – Number of eggs after treatment×100.

Results

Total number of children included in the study was 325.The percentage of students who refused to give faecal samples

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Table-1: Egg reduction rate (%) for *A.dueodenale*, in the infected cohort (n =156) with drugs used.

Groups	Drugs	n	*A.duodenale*			
			EPG before treatment	EPG after treatment	EPG becoming negative	Egg negative rate (%)
A	Albendazole	83	3405	852	2553	75%
B	Mebendazole	73	2994	869	2125	71%

EPG; Egg Per Gram; *A.duodenale; Ancylostoma duodenale.*

Table-2: Comparison the range and intensity of A.dueodenale recommended by WHO with present study.

WHO	Present study		
Intensity	Range	EPG	n (%)
Light (1-1999)	10 – 1320	335.7	137 (87.8)
Moderate (2000-3999)	2000 – 2172	2051	17 (10.8)
High (4000 –above)	4000 – 4028	4014	2 (1.2

WHO; World Health Organization

in the first round of collection was 29/325 (8.9%).The overall prevalence of hookworm in the studied population was 192/296 (64.8%) whereas the number of non-infected students was 104/296 (35.1%).The total number of children lost to the study by the end of the second round of sample collection was 36/296 (18.7 %) as from albendazole group total assigned students was 104 (66.6%) and loss was 10(9.10%) and from mebendazole group total students was 88 (56.4%) and loss was 8 (9.09%) (Figure /Flow chart)

The efficacy of the drugs prescribed was noted via the counting of eggs in per gram of stool before and after treatment. Albendazole achieved a high ERR 75% whereas mebendazole resulted in 71% negative egg rate. No adverse effect was observed except in (n=3) cases in which Albendazole caused vomiting and diarrhoea (Table-1).

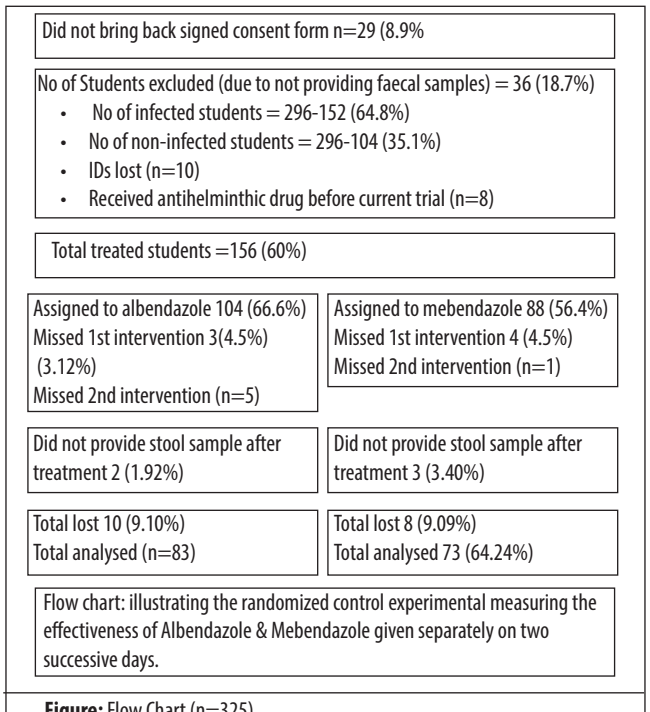

Figure: Flow Chart (n=325).

This experiment revealed light infection in 137/156 (87.8%) children; moderate infection in 17/156 (10.8%) and high infection in 2/156 (1.2%) compared to WHO recommended values for *A.dueodenale* (Table-2).

Discussion

Geohelminths infestation is a global health problem for inhabitants of third world countries including Pakistan. Poor hygiene, impure water, overpopulation, improper disposal of faecal matter, contacts with soil in non-cemented houses, and immigration of public to capitals are key factors in the spreading of STHs. In Pakistan, soil transmitted helminthiasis are present in more than 29% of all school students.[4]

WHO[2] recommends preventive chemotherapy once a year where the prevalence of geohelminths in the community is over 20%, and twice a year where it is over 50%. Present research reveals that treatment with albendazole has a high efficacy against *A.dueodenale* infestation which was 75% egg reduction rate (ERR) while mebendazole shows a 71% egg reduction rate

In the last four decades different studies have been published on the efficacies of albendazole and mebendazole that have ranged from 25.8% to 87.9% ERR.

Studies of non-comparable efficacies have been conducted and published throughout the world with respect to ERR: 56%from South Africa;[5] 25.8%, 61% and 53% from Ghana;[6] as high as 69% and 63% and low as 41.33 and 35.23% from Attock, Pakistan.[7]

There are comparable efficacies conducted throughout the world with respect to ERR such as75%, 70% and 85% from northern India;[8] 72%, 75% and 78% fromNigeria[9] and from Pakistan 82.9% and 76.9%[10] have been noted.

Limitations

Only school children between the ages 6-15 were enrolled for the study and data was collected only from those who agreed to participate.

Conclusion

Albendazole was found to be the more effective drug showing a 75% efficacy against ancylostomiasis.

Recommendation

Community hygiene should be developed to reduce the incidence of infection and tests must be conducted from time to time in the population.

Disclaimer: This manuscript was a part of MS/Mphil thesis degree of the 1st Author.

Conflict of Interest: None

Funding Sources: The study was conducted with the facilities provided under the project SRGP #21-61 granted by HEC, Islamabad, Pakistan

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