

ESTIMATING THE BURDEN OF INTESTINAL HELMINTHS AMONG PREGNANT WOMEN IN KHYBER PAKHTUNKHWA.

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ABSTRACT

Background: Soil transmitted intestinal helminthiasis is a global public health issue. Annually, about 44% pregnancies are affected by this, world wide leading to neonatal pre maturity, peri natal mortality, low Birth Weight (LBW) and maternal anemia. The objective of this study is to establish the burden of soil transmitted helminths among pregnant women in Khyber Pakhtunkhwa (KP) and plan control strategies accordingly; both at the provincial and district levels.

Methods: This Cross-sectional study was conducted over a period of five months on a study sample of 1545 pregnant women selected randomly through multi stage sampling from the four defined zones of Khyber Pakhtun Khwa. Stool sample of each participant was analysed through wet smear direct microscopy method. Data was analysed through SPSS and Microsoft Excell. Frequencies and percentages along with 95% Confidence Intervals were calculated for categorical data. Participants consent and approval of the ethical review committee were sought.

Results: 293 (18.96%, 95% CI: 17.01% to 20.91%) of the total stool samples were positive for soil transmitted helminths. Roundworm or *Ascaris lumbricoides* contributed 135 (8.73%, 95% CI: 7.32% to 10.14%), and among positive stool samples, it was found to be in the highest proportion. Zone -D contributed the highest proportion among positive samples, as 45.73%.

Keywords: Pregnancy, Helminthiasis, Malnutrition, Iron Deficiency Anemia.

INTRODUCTION

Out of two billion people infected every year by intestinal parasites, about three million experience severe morbidity¹. In the list of these infections, Intestinal Helminthiasis particularly soil transmitted, is recognized as a priority public health issue^{2,3}. It is estimated that about 44 million pregnancies are affected world wide annually by soil transmitted intestinal helminths⁴.

Helminthiasis during pregnancy is an important cause of neonatal pre maturity, peri natal mortality, low Birth Weight (LBW) and maternal anemia in most of the tropical countries, including Pakistan^{5,6}. According to a study, Helminth infestations in Asian women attending an antenatal clinic in England, Bangladesh contributed 45% carriage rate followed by Pakistan (7.3%) and India (3%)⁷.

In case of soil transmitted helminths, the infection is caused by ingestion of eggs from contaminated soil (Round worms and Whip worms) or penetration of the skin by larvae in the soil (Hook worms)⁸. Soil-transmitted helminths impair the nutritional status during pregnancy

in multiple ways. The worm feeds on host tissues, including blood, which leads to loss of iron⁹

and protein, and also increase malabsorption of nutrients. Some soil-transmitted helminths also cause loss of appetite and therefore a reduction of nutritional intake and physical fitness. *Trichuris trichura* can cause diarrhea and dysentery.

The objective of this study is to establish the burden of soil transmitted helminths among pregnant women in Khyber Pakhtunkhwa (KP).

Khyber Pakhtunkhwa lacks published data on the prevalence of helminthiasis among pregnant Women. Studies have shown that there exists lots of adverse outcomes due to helminthiasis in pregnancy^{10,11} and chances of increase susceptibility to other infections especially malaria and HIV¹². Keeping these facts in view, this study was conducted to provide a basis for the need of effective control strategies and case management options at Provincial and district levels.

MATERIAL & METHODS

This cross-sectional study coupled with a similar study on school children, was conducted from October 2012 to February 2013, on 1545 pregnant women who attended forty health facilities (Basic Health Units and Rural Health Centers) in eight districts of Four-Defined Zones of Khyber Pakhtunkhwa (Table:01), selected through multistage random sampling. First, two districts were randomly selected from each of the four zones, then from each district, ten health facilities (BHU and RHC) were selected randomly from a list obtained from

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the EDO(H) office of each district. Pregnant women who visited a specific health facility on a particular day for Ante Natal Care, were approached and purpose of study explained to them. Those pregnant women who were not willing to participate or visited health facility for reasons other than ante natal or pregnancy related care were excluded from the study. After this, every pregnant lady fulfilling the criteria of study population were given a stool collection set including stool collecting spatula, container and zip-lock plastic bags.

A team of 04 technicians was trained for two weeks at the Pathology laboratory of Hayatabad Medical Complex Peshawar. Permission of the Director General Health, KP was obtained and study plan was explained to the respective Executive District Officer Health and concerned Medical Officer in charge.

Stool sample analysis was done through direct wet smear microscopy. A drop of normal saline was placed on a clean slide and a small amount of stool sample was thoroughly mixed with it. A cover slip was placed over it and observed under the microscope using low power objective lens. A team of parasitologists randomly visited the study sites and examined at least 10% of the slides already reported by the technicians.

Data on stool samples was analyzed using SPSS and MS Excell soft wares. Frequencies and Percentages along with 95% Confidence Intervals (CI) were calculated.

RESULTS

Out of 1545 stool samples examined, 293 (18.96% , 95% CI: 17.01% to 20.91%) were positive for intestinal helminths. Roundworm or *Ascaris lumbricoides* contributed 135 (8.73% ,95% CI: 7.32% to 10.14%), followed by Hookworm or *Ankylostoma duodenale* as 61 (3.95% , 95% CI: 2.98% to 4.92%), *Hymenolepis nana* as 44 (2.85% ,95% CI: 2.02% to 3.68%), Tapeworm as 27 (1.75% ,95% CI: 1.1% to 2.4%), Whipworm or *Trichuris trichiura* as 26 (1.68% ,95% CI: 1.04% to 2.32%) among all stool samples.

DISCUSSION

Nearly one fifth of the samples were positive for helminthes (Fig-01),and among those, major portion was contributed by Zone-D, followed by Zone-A, Zone-C and the lowest proportion by Zone-B (Fig-02). In positive samples, Roundworms were in the highest proportion followed by Hookworms, H-Nana and tapeworms while Whipworms were the least. Most of the Roundworms were found in Zone-A followed by Zone-D,Zone-B while the least in Zone-C (Fig-03). Hookworms; that can aggravate pregnancy related anemia,was found in highest frequency in Zone-D, followed by Zon-A ,Zone-B and the least in Zone-C. The number of stool samples collected from Zone-B and Zone-C were small as compared to Zone -A and Zone-D, where security situation remained

Table: 01 Division of Khyber Pakhtunkhwa into Four Zones.

Zone	Definition	Districts Selected
A	Low lying, warm & humid	Peshawar & Swabi
B	Wet & cool highlands	Lower Dir & Bunir
C	High altitude mountainous areas with a cold winter	Upper Dir & Swat
D	Low lying dry & hot areas	Karak & D.I Khan

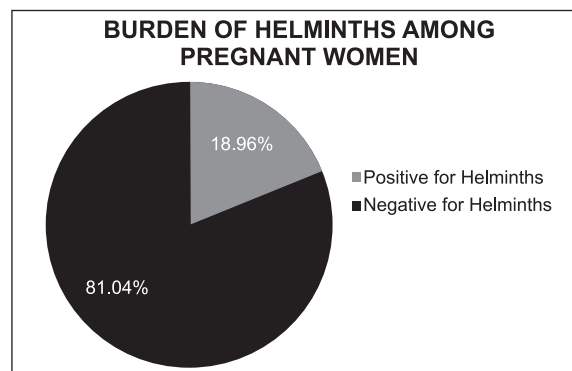


Figure: 01

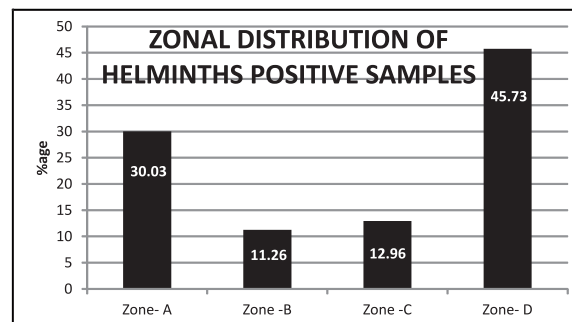


Figure:02

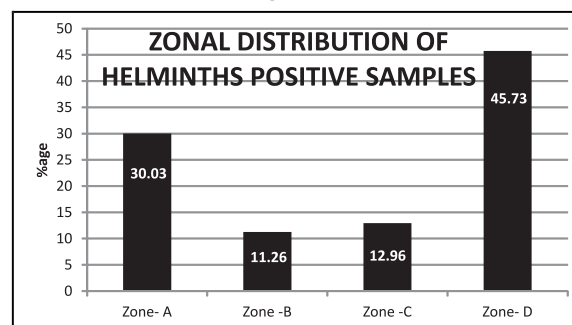


Figure: 03

volatile.

Intestinal helminthiasis is associated with blood loss and decreased supply of nutrients for erythropoi-

esis, resulting in iron deficiency anaemia. Over 50% of the pregnant women in low- and middle-income countries suffer from iron deficiency anaemia. Though iron deficiency anaemia is multifactorial, hook worm infestation is a major contributory cause in women of reproductive age in endemic areas. Anthelmintics are highly efficacious in treating hook worm but evidence of their beneficial effect and safety, when given during pregnancy, has not been established⁴.

Control strategy for soil-transmitted helminths could be through the periodic deworming according to standard protocols, of all at-risk individuals living in endemic areas, irrespective of previous diagnosis. This action could ensure community wide control of soil transmitted helminths¹³.

Health promotion activities like health education, behavior change communication, environmental sanitation, and nutritional intervention could be made parts of control program. Pregnancy without helminthes infestation should be preferred over pregnancy with infestation and latter deworming.

CONCLUSION

Helminthiasis during pregnancy is recognized as a major public health issue that impairs nutritional status in multiple ways. Hookworms; though present in second highest proportion, can further pregnancy related iron deficiency anemia leading to complications, both maternal and neonatal. It is yet to be established whether there is any beneficial effect and drug safety associated with the use of anthelmintics during pregnancy. It is therefore prudent to formulate pre-pregnancy deworming strategies.

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