

## A SURVEY OF *Enterobius vermicularis* AMONG CHILDREN IN THE 2<sup>ND</sup> DISTRICT OF THE PROVINCE OF ALBAY

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### Abstract

*Enterobius vermicularis* (pinworm) is the causative agent of Enterobiasis that is common in children. The study was conducted from June to September 2012 to determine the overall prevalence of *E. vermicularis* among children in the 2<sup>nd</sup> District of Albay. A total of six hundred thirty two (632) children ages 3-10 years old were examined from five (5) different municipalities using Cellulose Tape Perianal Swabbing. The result of the study showed that the overall prevalence rate of *E. vermicularis* in the 2<sup>nd</sup> District of Albay was 33.1% or two hundred nine (209) out of six hundred thirty two (632). The ratio obtained from the study was 49.40 which mean that in every three (3) children that were examined one (1) of them was found to be positive. Chi square test revealed that all the possible risk factors under socio demographic characteristics ( $P = 0.0000$ ), knowledge of parents regarding pinworm ( $P = 0.0000$ ) and their hygiene practices ( $P = 0.0000$ ) were significantly related with pinworm infestation. Based on the result of the study, the infection greatly depends on the socio demographic characteristics of the family, the knowledge of parents regarding pinworm and lastly their hygiene practices.

*Keywords: cellulose tape perianal swabbing, children, E. vermicularis, Legazpi City, prevalence*

### Introduction

According to the World Health Organization (WHO), the estimated number of individuals who are infected with intestinal parasites reaches about 3.5 million last 2010 and most of them are children. Also, the number of individuals who are ill due to infection of intestinal parasites reaches about 450 million people around the world. The most common intestinal parasites that thrive to humans are *Ascaris lumbricoides*, *Trichuris trichuria*, *Enterobius vermicularis* and hookworm.

*E. vermicularis* is the causative agent of Enterobiasis which is an infection due to the inhalation or ingestion of embryonated eggs of pinworm and it is accompanied by the intense itching sensation in the perianal region which brings to the infected individual discomfort during night time. Kucik *et. al.*, 2004 estimated that the number of individuals infected with *E. vermicularis* is about 400 million world wide. The most common mode of transmission is through fecal-oral route or transmission of infected eggs through inanimate objects or fomites.

The study was designed to determine the overall prevalence rate of *E. vermicularis* among children ages 3-10 years old in the 2<sup>nd</sup> District of Albay Province. Moreover, the study

also aimed to determine the prevalence according to socio demographic characteristics, knowledge of parents regarding pinworm and hygiene practices and correlate Enterobiasis to the possible risk factors.

## Methodology

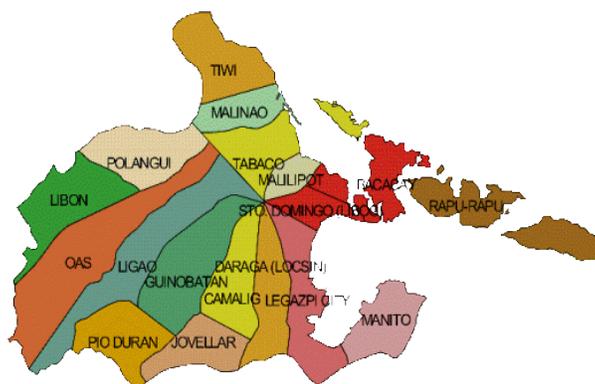


Figure 1. Provincial Map of Albay

Source: ([http://go-package.com/albay/images/albay\\_map.gif](http://go-package.com/albay/images/albay_map.gif))

The study was conducted in five (5) municipalities in the 2<sup>nd</sup> district of the province of Albay namely Camalig, Daraga, Legazpi, Manito and Rapu-Rapu (Figure 1). The study was conducted last June to September 2012. A total of six hundred thirty two (632) children ages 3-10 years old regardless of their gender were swabbed using Cellulose Tape Perianal Swabbing method. The children were swabbed once. Questionnaires were given to the parents of the children to obtain information regarding their socio demographic characteristics, knowledge about pinworm and their hygiene practices.

The collected samples were brought to Bicol University College of Science Building 3 at Microbiology/Parasitology Laboratory for microscopic examination. The slides were viewed under a compound light microscope using low power objective (LPO) and high power objective (HPO).

The association of the possible risk factors such as the socio demographic characteristics, knowledge about pinworm and hygiene practices was analyzed using Chi-square test of independence.

## Results and Discussion

A total of six hundred thirty two (632) children were examined in this study. Of these, two hundred nine (209) or 33.1% were found to be positive and four hundred twenty three (423) or 66.9% of them were negative. Similar results were observed in the present study and in the study of Baldo *et. al.*, 2004 (33.1%) (40/121). However, in the study conducted by Totanes *et. al.*, 2009 in Batangas and Cavite they found that 36.3% (98/270) of children residing in that area were found to be positive with pinworms.

Table 1. Prevalence of *E. vermicularis* infestation among children on five (5) municipalities of the 2<sup>nd</sup> district of Albay.

Municipality/City	Number of samples found to be Positive (%)	Number of examined children
Camalig	32 (33.3)	96
Daraga	60 (35.7)	168
Legazpi	74 (32.6)	227
Manito	22 (51.2)	43
Rapu-Rapu	21 (21.4)	98

The examination for the presence of *E. vermicularis* eggs revealed that the municipality/city which has the highest number of children found to be positive with pinworm was Manito (22/43) (51.2%) followed by Daraga (60/168) (35.7%), Camalig (32/96) (33.3%), Legazpi (74/227) (32.6) and the least number of children found to be positive with pinworm was Rapu-Rapu (21/98) (21.4%) as shown in Table 1. The municipality of the children where they reside was found to be significantly related to pinworm infestation ( $P=0.0000$ ). Mohammad and Mohammad, 2012 stated that the location was statistically significant to pinworm infestation. On the other hand, Totanes *et. al.*, 2009 mentioned in their study that the location did not have any significant relationship to pinworm infestation among children.

In terms of gender of the children, the positive rate of pinworm infestation was found higher in female children (107/304) (35.2%) than in male (102/328) (31.1%). In addition, Totanes *et. al.*, 2009 observed that positive cases of pinworm infestation were higher in females than in males. Pinworm infestation was greatly observed on children ages 3-10 years old (116/335) (34.6%) than on those children ages 6-10 years old (93/297) (31.3%). A high rate of pinworm infestation was observed on those children having their fathers who only attained elementary education (64/178) (35.9%), followed by those children whose fathers attained secondary education (101/295) (34.2%) and lastly those fathers who attained tertiary education (43/157) (27.3%). Also, those children whose mothers attained elementary education (48/117) (41.0%) showed a greater number of positive cases on pinworm infestation than those who attained secondary education (113/345) (32.7%) and those who attained tertiary education (48/169) (28.4%). Wang *et. al.*, 2009 had the same findings with the present study having both parents who

only attained elementary education showed that their children was more susceptible to pinworm infestation. Fathers who were permanently employed showed that the pinworm infestation was more prevalent on their children (8/20) (40.0%) than those fathers who were unemployed (95/279) (34.0%) and who were not permanently employed (105/337) (31.7%). In case of the mother's employment status, those children whose mothers were unemployed (37/107) (34.5%) showed that more positive cases was observed than those children whose mothers were permanently employed (143/421) (33.9%) and mothers who were not permanently employed (29/104) (27.8%). This finding was also similar to the study of Nithikathkul *et. al.*, 2001. Families having a monthly income of greater that 20,000 has the highest number of children that were found to be positive with pinworm eggs (5/8) (62.5%) which was followed by those children including on those families whose monthly income was less than 10,000 (193/584) (33.0%) and lastly children whose a member of a family having a monthly income of greater than 10,000 but less than 20,000 (11/40) (27.5%). As to the number of children in a family, pinworm infestation was more prevalent on those families having six (6) or more children (64/154) (41.5%) followed by those families having five (5) children (22/63) (34.9%), families with three (3) children (47/135) (34.8%), families with four (4) children (33/106) (31.1%), families with one (1) child (13/52) (25.0%) and pinworm infestation was less prevalent on those families having two (2) children (30/122) (24.5%). Moreover, positive cases of pinworm infestation were high on those children who live in houses made up of local materials (75/204) (36.7%) which is followed by those children living in houses made up concrete materials (40/122) (31.4%) and those children who live in a partially concrete houses (94/301) (31.2%). In the case of the type of floor, children who live in houses having a land or soil flooring (20/48) (41.6%) was found to have more positive cases than those children who live in houses whose flooring was made up of cement (168/495) (33.9%) and wood (21/88) (23.8%).

The present study showed that the prevalence of pinworm infestation was found to be higher on those children whose parents do not have the knowledge regarding pinworm (169/492) (34.3%) than those children whose parents who have the knowledge about pinworm (40/140) (28.5%). In terms of the previous occurrence of pinworm, positive cases was higher on those children who had a previous occurrence of pinworm (55/165) (33.3%) than those children who do not experienced previous occurrence of pinworm (154/467) (32.9%). Moreover, children who took an antihelminthic medicine for the last six (6) months has less positive cases of pinworm infestation (83/281) (29.5%) than those children who do not took an antihelminthic medicine for the last six (6) months (126/351) (35.8%)

In terms of hygiene practices, less positive cases of pinworm infestation was observed on those children who has the habit of thumb sucking (134/417) (32.1%) than those who do not have this habit (75/215) (34.8%). Moreover, children who do not regularly trim their nails (7/18) (38.8%) have more number of positive cases than those who regularly trim their nails (202/614) (32.8%). However, in terms of hand washing before and after eating children who do hand washing before and after eating (201/605) (33.2%) showed that more positive cases were observed than those who do not perform hand washing before and after eating (8/27) (29.6%). Furthermore, pinworm infestation was greatly observed on those children who perform hand washing after using toilet facilities (207/617) (33.5%) than those who do not perform hand washing (2/15) (13.3%). Children who took a bath outright waking up (124/352) (35.2%) has more number of positive cases than those who do not took a bath outright waking up (85/280)

(30.3%). However, pinworm infestation was greatly observed on those children who do not take a bath daily (11/24) (45.8%) than those children who take a bath daily (198/608) (32.5%). The present study showed that those children who do not scratch their butt (150/448) (33.4%) have the more number of individuals to be positive with pinworm than those who scratch their butt (59/184) (32.0%). Positive cases were higher on those children who play on the ground (154/462) (33.3%) than those children who do not play on the ground (55/170) (32.3%). The number of positive cases of pinworm infestation on children that has the habit of going outside their house barefoot (114/309) (36.8%) was greater than those who do not do this habit (95/323) (29.4%). As the sharing of bedroom with other family members, children who sleep together with other family members (164/497) (32.9%) has lesser positive cases of pinworm infestation than those children who do not sleep together with other family members (45/135) (33.3%). In addition, children that belong to those families who do not regularly clean their house (4/10) (40.0%) showed greater positive cases of pinworm infestation than those who regularly clean their house (205/622) (32.5%). Furthermore, the prevalence of pinworm infestation was observed higher on those children whose family that do not have the habit of cleaning and fixing their beddings (10/26) (38.4%) than those children whose family has the habit of cleaning and fixing their beddings (199/606) (32.8%). In terms of changing of beddings, the prevalence was increasing as the duration of time keeps longer. Children belong to those families who change their beddings monthly (14/36) (38.9%) showed that the pinworm infestation was greater than those families who change their beddings weekly (194/594) (32.6%).

Chi-square test revealed that the factors under socio-demographic characteristics ( $P=0.0000$ ) like gender, age, educational attainment of the parents, parent's work status, their monthly family income, number of children in the family, type of house and even the type of floor were found to all significantly related to pinworm infection. Moreover, knowledge of parents about pinworm ( $P=0.0000$ ), previous occurrence of pinworm infection and even taking of antihelminthic medicine were all significantly related to pinworm infection. Hygiene practices ( $P=0.0000$ ) were found to be significantly related to pinworm infection.

Pinworm infestation among children in the 2<sup>nd</sup> District of Albay greatly depends on the socio demographic characteristics, knowledge of parents regarding pinworm and even hygiene practices. Therefore, an intervention strategy like regular deworming, health education on personal hygiene to the children and parents and sanitary measures should be implemented strictly.

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