STUDY OF PARASITIC INFESTATION AND ITS EFFECT ON THE HEALTH STATUS OF PRIMARY SCHOOL CHILDREN IN TANTA CITY

By

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ABSTRACT

Background: *School age children are one of the groups at high-risk for intestinal parasitic infestations. Factors like poor developments of hygienic habits, immune system and over-crowding contributes for infestation. The adverse effects of intestinal parasites among children are diverse and alarming. Intestinal parasitic infestations have detrimental effects on the survival, appetite, growth and physical fitness, school attendance and cognitive performance of school age children* ***(Alemu et al., 2011).***

Objectives: *We aimed to*

1. *Assess the prevalence of parasitic infestation and its effect on the health status of primary school children in Tanta City (5 schools from 3 areas at Tanta city)*
2. *Determine the prevalence of intestinal parasitic infestation among primary school children in some urban communities of Tanta City*
3. *Identify associated risk factors of school children for parasitic infestations in some urban communities of Tanta City.*

Design: *This is descriptive cross sectional study that was carried out on 1000 students (boys &girls) at governmental primary schools at Tanta rural areas.*

This research was continued until fulfillment of the study from April 2017 to May 2018.

Patient And Methods*: All the students were classified into two groups:*

Group1:-*Students have parasitic infestation* ***(case group).***

Group2:-*Students do not have parasitic infestation* ***(control group).***

Results: *Prevalence of parasitic infestation 31%. Single parasitic infestation in 26% and mixed infestation in 5%. The commonest Helminthic infestation was Oxyuris 8.8% followed by H. Nana 2.7%, Ascaries 2.0% and Ancylostoma 0.5%. The commonest protozol infestation was Amebae 6.5% followed by Giardia 5.5%. Mixed infestation was in form of oxyuris plus ameba in 1.4%, oxyuris plus giardia in 1.1%, oxyuris plus Ascaries in 0.3%, oxyuris plus H Nana in 0.3%, Ascaries plus ameba in 0.7%, H Nana plus ameba in 0.3%, giardia plus ameba in 0.7%. Parasitic infestation was more*

prevalent in boys 53.8% than girls 46.2%. There was significant increase of recurrent abdominal pain, dysentery, vomiting, diarrhea, perianal itching and pallor in infected students when compared to non - infected students. On comparison between free and infected children aged (6-<9 years), free children have higher level of hemoglobin than infected children while there was no significant difference between them according to BMI. On comparison between free and infected children aged (9-11 years), free children have higher level of hemoglobin than infected children and there was significant difference between them according to BMI.

Conclusion: *An intestinal parasitic infestation is an important public health problem in students between 6-12years living Gharbia Governorate with Prevalence rate (31.0%). Raising awareness about parasitic disease, its hazards and its impact on both health and socioeconomic aspects has a great effect on combating parasitic diseases. Anemia is more common in children who have parasitic infestations*

Keywords: *Parasitic Infestation, health status of primary school children.*

INTRODUCTION

Intestinal parasitosis, a major public health problem in developing countries is aggravated by hot and humid climate, poverty, malnutrition, high population density, and poor health ***(Amein N et al., 2014).***

Intestinal parasitic infection is endemic worldwide and constitutes a major public health problem. It is responsible for causing significant morbidity and mortality all over the world particularly in developing countries. Thus, it is considered as cancers of developing countries ***(Aher A and Kulkarni S, 2011).***

The World Health Organization estimate that over 270 million pre-school children and over 600 million of school children are living in areas where the parasites are intensively transmitted and are in need of treatment and preventive intervention. At least 750 million episode of diarrhea occur per year in developing countries that results in five million deaths **(Tiwar et al., 2013).**

In developing countries, giardiasis, ascariasis, amoebiasis, Ancylostomiasis and taeniasis are common intestinal parasitic infestation. **(Shrestha et al., 2012).**

Children are vulnerable group in the community, their health is vital to the future of society. School age is the segment of life span that extends from age 6- 12 years of age. School children are main target to many health problems such as malnutrition, non-infectious diseases and infectious diseases as intestinal parasitic

diseases **Hockenberry MJ and Wilson D, 2011).**

There are two main types of intestinal parasites: helminthes and protozoa. Helminthes are parasite intestinal worms. Protozoa, however have only one cell, and can multiply inside the human body, which contributes to their survival and enables serious infections to develop **(Ogbuage et al, 2009).**

Intestinal parasitic worms are generally contracted via many routes; direct via ingesting parasite eggs or larva (e.g. Ascariasis and oxyuris) or indirect ingestion via contaminated articles, fomites and clothes and direct penetration while walking barefooted on contaminated soil e.g. Ancylos-toma duodenal **(Nkiru A. Kamalu et al.,2013).**

In developing countries, poor environmental and personal hygiene, overcrowding and climatic conditions that favor the development and survival of these parasites are some of the factors contributing to the high level of intestinal parasites transmission **(Mohammad K et al., 2012).**

Food handlers play an important role in their transmission. Ignorance is also a contributing factor to transmission especially among people living in rural areas where level of awareness is relatively low **(Cepon-Robins T et al., 2014).**

School children carry the heaviest burden of the associated morbidity due to their dirty habits of playing or handling of infested soils, eating with soiled hands, unhygienic toilet practices, drinking and eating of contaminated water and food (e.g. Ascariasis, Trichuriasis, Giardia lamblia) and sharing toys, bedding, clothing and toilet seats (e.g. oxyuris) and because of their vulnerability to nutritional deficiencies **(Nelson KA, et al., 2013).**

Apart from causing morbidity, infestation with intestinal parasites has known to cause anemia, growth retardation in children, chronic blood loss, and alteration of the normal gastro-intestinal flora by intestinal parasites has been found to be associated with diarrhea, a major cause of childhood morbidity and mortality in developing countries **(Mong k et al., 2014).**

AIM OF THE WORK

We aimed to:

1. Assess the prevalence of parasitic infestation and its

effect on the health status of primary school children in Tanta City (5 school from 3 areas).

2. Determine the prevalence of intestinal parasitic infestation among primary school children in urban communities of Tanta City.
3. Identify associated risk factors of school children for parasitic infestations in some urban communities of Tanta City.

PATIENTS AND METHODS

This is descriptive cross sectional study that was carried out on 1000 students (boys &girls) at governmental primary schools at Tanta city (5 schools from 3 different areas).

This research was continued until fulfillment of the study from April 2017 to May 2018.

Inclusion Criteria: were:

- Students age from 6-12 years.
- Free from chronic diseases.

Exclusion Criteria: were:

- Age below 6 years and above 12 years.
- Children have chronic diseases.

Financial Disclosure/Funding:

The authors received no financial support for the research, authorship, and/or publication of this article.

Ethical Consideration:

1. A written informed consent was obtained from patients or their legal guardians.
2. Informed consent was obtained from school coordination.
3. An approval by the local ethical committee was obtained before the study.
4. The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.
5. All the data of the patients and results of the study are confidential and the patients have the right to keep it.
6. The patient has the right to withdraw from the study at any time.

At the start of study, an explanation of the study was provided, as well as details of participation, to ensure the potential participant had adequate information to provide informed consent.

All included children were submitted to the following:

1. Well-designed questionnaire including:-

■ **The socio-demographic data for all students was considered regarding:**

The age, sex, residence, family pattern, number of family members, number of rooms, father education, father occupation, mother education, mother occupation, Presence of pure water supply and sewage disposal.

- Social score was calculated by total score 25 and divided to:-

➢ ***Score from 19-25 ⟶ High social standard.***

➢ ***Score from 12-18 ⟶ Middle social standard.***

➢ ***Score below 12 ⟶ Low social standard.***

(Modified from Fahmi and El-Sherbini, 1983)

This score based on education, occupation and income which are the three major variables for measuring socioeconomic status **(Farag, 2007).**

■ **Manifestations of parasitic infestations:**

- General manifestations: as (weakness, loss of weight, easily fatigability, lack of concentration).
- G.I.T Symptoms: as (abdominal pain, vomiting, loss of appetite, anorexia, diarrhea, constipation and, perianal itching, bleeding per rectum or melena).
- History of passage of worms.

2. Anthropometric measurements:

■ **Weight:**

Each enrolled child was weighed by using spring scale sensitive to 100 grams. The child was weighed with minimal clothes and no shoes.

■ **Height:**

3. Examination:

All children would be examined completely.

■ **General examination:**

- *Nutritional assessment:*

Through anthropometric measurement which include height and weight and then calculation of body mass index (BMI) would be done. BMI = (Weight (kg)/ [height (m)] 2).

- *Pulse, temperature, respiratory rate and heart rate.*
- *Abnormal faces, pallor, cyanosis and jaundice.*

- *Assessment of each student for physical signs of malnutrition was being done.*

■ **Abdominal examination:**

Through inspection, palpation, percussion and auscultation.

4. Investigations:

■ **Stool examination:**

Each student was given specimen container and instructed to put a small quantity of their fresh feces into it. Stool samples were taken for cases complaining from recurrent abdominal pain, anorexia, mucous or blood in the stool. All samples examined by:

- *Macroscopic examination:*

Stool examined for presence of frank blood, mucus, color, consistency and visible worms.

- *Microscopic examination.*

■ **Complete blood picture:**

Determination of hemoglobin level was performed by the cyan-met-hemoglobin method using a spectrophotometer as recommended by WHO **(Beaton &Bengoa, 1976).**

All the students were classified into two groups:

Group 1: Students have parasitic infestation (case group).

Group 2: Students do not have parasitic infestation (control group).

STATISTICAL ANALYSIS:

Data were collected, coded, revised and entered to the statistical package for social science (SPSS) version 20. Qualitative data were presented as number and percentages while quantitative data were presented as mean, standard deviation and range. The comparison between two groups with quantitative and parametric data was done by using independent t-test. The comparison between more than two groups with quantitative and parametric data was done by using one way analysis of variance (ANOVA) test. Spearman correlation coefficient were used to assess the relation between two parameters in the same group. P value below 0.05 was considered significant.

RESULTS

Table (1): ***Socio-demographic status among studied children***

Socio-demographic		**Value**
Age /year (mean ±SD)		8.97±1.72
Sex:		
-	Male	508 (50.8%)
-	Female	492 (49.2%)
Social standard:		
	Low	557 (55.7%)
-	Medium	392 (39.2%)
-	High	52 (5.2%)
Mother Education:		
-	University education	78 (7.8%)
-	Secondary education	155 (15.5%)
-	Preparatory education	413 (41.3%)
-	Primary education	287 (28.7%)
-	Illiterate	67 (6.7%)
Father Education:		
-	University education	167 (16.7)
-	Secondary education	200 (20%)
-	Preparatory education	320 (32%)
-	Primary education	210 (21%)
-	Illiterate	103 (10.3%)
Waste disposal:		
-	Sewage Disposal	226(37.7%)
-	Well with chamber disposal	374(62.3%)

Table (1): showing that nearly equal male & female distribution with low social economic **(55.7%)**, Parents education mostly Preparatory education, mother (**41.3%)** & father **(32%)**, and cases mostly dispose their wastes through well with chamber disposal**(62.3%).**

Table (2): ***Prevalence of intestinal parasites among studied children:***

	No	**%**
Infected	310	31.0
Non-infected	690	69.0
Total	1000	100.0

Table (2): showing that the prevalence of infestation regardless its type was 31%, while 69% were non- infected.

Table (3): ***Type of infestation in studied cases:***

	No	***%***
Non-infected	690	69.0
Helminthes	146	14.6
Protozoa	127	12.7
Mixed helminthes and protozoa	37	3.7
Total	1000	100.0

Table (3): showing that helminthes infestation alone was reported in 146 cases out of 1000 cases (14.6%), while protozol infestation alone reported in 127 cases (12.7%) and finally mixed helminthes and protozol infestation was reported in 37 cases (3.7%).

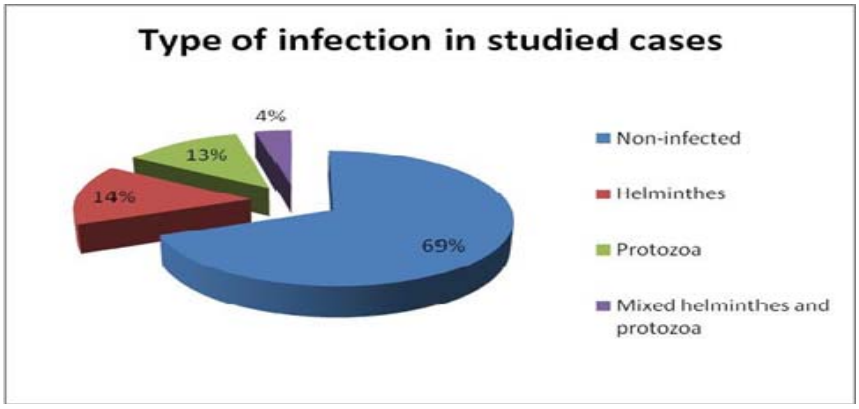

Figure (1): Type of infestation in studied cases

Table (4): ***Frequency of different intestinal parasites among studied children*:**

	No (310)	***%***
Oxyuris	*89*	*8.9*
Ascaris	*22*	*2.2*
H. nana	*28*	*2.8*
Ancylstoma	*7*	*0.7*
Oxyuris + Ameba	*11*	*1.1*
Oxyuris + Giardia	*9*	*0.9*
Oxyuris +Ascaris	*3*	*0.3*
Oxyuris +H nana	*2*	*0.2*
Ascaris+ Ameba	*5*	*0.5*
H nana+ Ameba	*2*	*0.2*
Giardia+ Ameba	*5*	*0.5*
Giardia	*59*	*5.9*
Ameba	*68*	*6.8*

Table (4): showing that as regard frequency of different parasitic infestation. the most common intestinal parasites infestation were Oxyuris, Ameba and Giardia with percentage of 8.9%, 6.8%, 5.9% respectively.

Table (5): Age, Anthropometric measurements &Hb among the infected and non-infected groups:

	Infected (n=310)		Non Infected (n=690)		Statistics	
	Mean	±SD	Mean	±SD	**t test**	**P value**
Age in years	8.998	1.73	8.96	1.71	0.252	0.801 NS
Weight in kg	26.81	4.43	26.94	4.21	0.351	0.726 NS
Height in cm	125.88	8.94	125.81	8.81	0.096	0.924 NS
BMI	16.79	0.76	16.91	0.61	2.04	0.042 S
Hb	10.63	0.8013	11.32	0.682	4.32	0.001 S

P value is significant when <0.05. *Hb: hemoglobin. *BMI: Body Mass Index

Table (5): showing that the BMI &Hb were significantly decreased in infected group than non -infected group (P Value 0.042 & 0.001 respectively) but there was no significant difference in age, weight and height between both groups.

Table (6): Effect of Amoeba, Giardia and Oxyuris on infected school children according to hemoglobin and BMI.

variables	parasites	N	Mean ± SD	P value
Hb	*Amoeba*	68	10.944 ± 0.7324	0.067
	Giardia	59	10.5000 ± 0.5477	
	Oxyuris	89	10.4381 ±0 .8393	
	Total	181	10.6981 ±0 .7870	
BMI	*Amoeba*	68	15.6618±1.57071	0.585
	Giardia	59	15.6445±0.96764	
	Oxyuris	89	15.2277±1.47180	
	Total	181	15.4911±1.47006	

P value is significant when <0.05. *Hb: hemoglobin. *BMI: Body Mass Index.

Table (6): showing that there was no significant difference between effect of amoeba, giardia and oxyuris on infected children regarding to, Hb and BMI (P=0.067 and 0,585) respectively.

DISCUSSION

The incidence of intestinal parasites is known to be high, generally affecting human health and causing great public health concern. This is more common especially in developing or underdeveloped countries, in which actions to control entero-parasites are made more difficult by the financial cost of technical measures and due to the lack of educational projects that provide the population with information **(Nematian et al., 2004).**

Intestinal parasitic infestations regarded as serious public health problem, as they cause iron deficiency anemia, growth retardation in children and other physical and mental health problems **(Ulukanligil & Seyrek, 2004)**.

Epidemiological research carried out in different countries has shown that the social and economic situation of the individuals is an important cause in the prevalence of intestinal parasites. In addition, poor sanitary and environmental conditions are known to be relevant in the propagations of these infectious agents **(Pinar Pkyay et al., 2004).**

School age children are one of the groups at high-risk for intestinal parasitic infections. Factors like poor developments of hygienic habits, immune system and over-crowding contributes for infection. The adverse effects of intestinal parasites among children are diverse and alarming. Intestinal parasitic infections have detrimental effects on the survival, appetite, growth and physical fatnesses, school attendance and cognitive performance of school age children **(Alemu et al., 2011).**

In our study the prevalence of intestinal parasites in children between 6-12 years living in Gharbia Governorate was 31%. This was similar to (**Ibrahium et al., 2011)** who reported that the prevalence of parasitic infection among Egyptian school children in El-Minia governorate village in Upper Egypt was 29.3%. Also similar to (**Zeinab A., et al., 2012)** who reported that the prevalence of parasitic infection among Egyptian school children in Qalyoubia governorate was 25.8%. However, our result was less than that reported in Lower Egypt by (**El-Gammal et al., 1995)** and **(El-Masry et al., 2007)** who reported that the prevalence of parasitic infections among Egyptian school children in Sohag governorate villages were 60.2% and 88.5%, respectively.

In the present work, age ranged from 6 to 12 years with a mean of 8.97±1.72 years. This agrees with (**Karim R., et al., 2013)** reported

that, the mean age was 7.45±0.87 years. Also agree with (**Quihui et al., 2006)** reported that, the school children had an average age of 8.2 (1.4) years. And disagree with (**Okyay et al., 2004)** reported that, the mean age was 10.34 ± 2.27, 10.17 ± 2.30 for girls and 10.51 ± 2.23 for boys, and both age are higher than that reported in the present work. This may be due to different inclusion criteria, and different sample size, besides different socio-demographic characteristics between both countries (Egypt and Turkey).

As regards the sex distribution, our findings revealed that males were more susceptible to infection (53.8%) than females (46.2%). This finding is in agreement with **(Al-Hindi et al., 2005)** who reported a significantly higher prevalence of infection among males (48%) as compared to (27.8%) in females. Also in agreement with **(Amuta et al., 2009),** who reported that infection was more in male children (53.33%) than females (46.66%). Also (**Ulukanligil et al., 2004**), showed more affection of boys 57.2% than girls (42.7%).

The difference of Prevalence between males and females could be attributed to the activity of males than females.

But this result is not in agreement with **(Nimri & Meqdam, 2004)** who suggested that the low immunity of females may account for higher prevalence.

As regards the distribution of intestinal parasites in studied children regarding to sex, we found that females were more affected with Entamoeba, Ascaries and oxuris (25.6%, 7.0%, and 34.9%) respectively than males (17.0%, 6.0%, and 23.0%); while males were more affected with giardia, H. nana, anclystoma and mixed infection (21.0%, 9.0%, 3.0% and 21.%) respectively than females (14.0%, 8.1%, 0.0% and 10.5%) with no significant statistical difference. This result is in agreement with (**Olu Wafemi, 2003)** who reported that infection with E. histolytica was higher in female than male. Also agree with (**Amira A., et al., 2012)** who reported that infection with Ascaries was higher in female than male. As regards the distribution of intestinal parasites in studied children regarding to age, we found that Ancylostoma occurred in older ages and Oxyuris occurred in younger ages. This agrees with (**Zainab A., 2012)** who reported that Ancylostoma occurred in older ages and Oxyuris occurred in younger ages. And disagree with **(Amuta et al., 2009)** who reported that no significant difference in infection rate between age groups as helminthes infection recorded among all age groups**.**

As regards the socio economic status, in our study the majority of infected children has low and moderate socio economic status (59.7% & 36.6%). These were in accordance with (**El-Gammal et al., 1995)** who reported that 43.0% of their students were belonging to low socioeconomic standard in Lower Egypt. Also in agree with (**Amira A., et al., 2012)** who reported that the majority of infected children has low and moderate socioeconomic status (22.2%, 75.8%).

The effect of socio economic status on risk of infectious diseases in general, and parasitic infections in particular, is complex in nature and could be attributed to several other factors such as lack of access to clean water, poor hygienic environment, lack of access to education due to financial constraints and overcrowded condition **(Houweling et al., 2003).**

As regards residence, we found that the majority of infected children were living in rural areas (66.1%) than urban areas (33.9%) with significant statistical difference (P value 0.04). This result is in agreement with **(Fernandez et al, 2002)** who reported that the highest prevalence of intestinal parasitic infections 91% in preschool and school children was reported in rural settings in and around Chennai, South India. Also in agreement with **(Hany I., et al., 2006**) who reported that the prevalence of parasitic infections among rural children was found significantly higher than that of urban children (89% and 58%) respectively.

In rural communities in Egypt, human feces are often used as agricultural fertilizer, and there is no central sewage disposal system or home a septic tanks and even if potable water is used for drinking and cooking in some villages, water from Nile is commonly used for washing, bathing and recreation and these sociocultural habits are difficult to be changed. Also warm climate, humid atmosphere, muddy nature of soil and consumption of large quantities of raw vegetables without washing, were all factors which helps in transmission of parasitic infections. On the international level (**Egger et al., 1990)** in Thailand reported a high prevalence rate of parasitic infection among rural children. This could be explained by the similarity of the sanitary and hygienic condition in both Egypt and Thailand.

As regards the mother education, we found that the majority of infected children have mothers who were either illiterate or educated less than secondary education with highly significant statistical difference (P. Value 0.001). This result is in agreement with **(Santos**

& Merlini, 2010) who reported that greater frequency of intestinal parasites occurred among children whose parents had low level of education. Also this result is in agree with **(Amira A., et al., 2012)** who reported that the majority of infected children have mothers who were either illiterate or educated less than secondary education with highly significant statistical difference.

Regarding to individual parasites, Enterobious vermicularis, it had a prevalence rate (8.8%) in our study. This result in agreement with (**Amira A., et al., 2012)** who reported that prevalence rate of Enterobious vermicularis was (12%). Also in agreement with **(Glickman, 2005)** who reported that Enterobious vermicularis is the most prevalent parasite, infects up to one third of children worldwide because children frequently spread the infection. Enterobious vermicularis is most prevalent in day-care centers and schools. On the other hand a lower prevalence rate of Enterobious vermicularis reported by (**Kotb et al., 1993)** as 0.3%.

Ascaries lumbricoides and Ancylostoma duodenal were reported in this study with prevalence rates of 2% and 0.5% respectively. This result is in agreement with (**Karim R., et al., 2013)** who reported that prevalence rate was 6% and 0.5% respectively. Other studies conducted in rural communities showed much higher prevalence of both infections. (**Nagaty et al., 1961)** reported prevalence of 17% and 26% for Ascaries and Ancylostoma infections. Factors that favor the spread of ascariasis infection in some areas include damp soil needed for development of eggs and larvae e.g. near canals. Other factors include hygienic practice, promiscuous defecation and contact with soil and mud during agricultural work.

H. nana was reported in our study with prevalence rate of 2.7%. This result is in agreement with (**Elnaggar et al., 1978)** and **(Kotb et al., 1993)** who recorded 3.9% and 5% respectively. And disagree with **(Hany I., et al., 2006)** who reported that H. nana affect 8.4% of children.

Regarding E. Histolytica and G. Lambia the prevalence rates in our study were 6.5% and 5.5% respectively. This result is in agreement with **(Karim R., et al., 2013)** recorded prevalence rates of 9% and 8.5% for E. histolytica and Giardia lambia respectively. And disagree with **(Ali et al., 1984)** reported a prevalence rates of 17% and 22% for E. histolytica and Giardia infections respectively. Also disagree with **(Hany I., et al., 2006)** who reported that prevalence rate of

12.9% and 15% for E. histolytica and Giardia lambia respectively.

As regards mixed infections, the prevalence rate in our study was 5%, all of them had double infections. This result is in agreement with (**Okyay et al., 2004)** who reported that 6.4% of students were infected with more than one parasite, in Turkey **(Daryani et al., 2012)** reported that, the observed multiple or mixed infections could be explained by poor hygiene and the fact that many species of protozoa have the same mode of transmission.

As regards Anthropometric measurements, it revealed that there was significant affection of BMI between infected and non- infected groups and there was no significant affection of weight and height between infected and non- infected groups. This result is in agree with **(Amuta et al., 2009)** who detected high significant difference in BMI between infected and non- infected children. And disagree with **(Oninla et al., 2010)** who found significant affection of height for age among the infected cases. In some other studies as those made in Nigeria **(Egwunyenga and Ataikiru, 2005),** Ethiopia **(Tadesse, 2005)** Yemen **(Raja'a and Mubarak, 2006)** and in Alexandria, Egypt **(ElSahn et al., 2004)** there was no statistically positive association between parasitic infection and nutritional status.

As regards the relation of intestinal parasites regarding to clinical symptoms and signs at time of examination, it revealed that the majority of infected children were suffering of abdominal pain, dysentery, vomiting, perianal itching, diarrhea and pallor in infected children (69.9%, 9.1%, 3.2%, 33.9%, 12.9% and 48.4%) respectively with highly significant statistical difference. This agree with (**Amira A., et al., 2012)** who reported that majority of infected children were suffering of abdominal pain, perianal itching, diarrhea and pallor. Also agree with (**Hurst, 2008)** who reported that the physical conditions of infected children showed pallor, abdominal pain and loss of appetite. These physical conditions may be indicative of the presence and effects of the parasitic infections.

In our study, on studying the effect of parasitic infections on anthropometric parameters and hemoglobin level in different age groups there was significant relationships between parasitic infections and some anthropometric parameters and hemoglobin level in some age groups, however it is insignificant with same parameters in other age groups. In other words, parasitic infections had no

significant effect on BMI in children at age group (6-9) years; this may be due to the fact that these children are still under supervision of their parents with minimal hazards of being infected.

While it has significant effect on hemoglobin at same age group which can be explained by relative anemic state due to high requirements of iron for rapid rate of growth this may be aggravated by parasitic infections. However, at age group (9-12) years, it has significant effect on both BMI and hemoglobin.

This can be related to the fact that children at this age group start to play outside the house and go to fields with their parents with high risk of being infected. In general speaking, free children had higher BMI and hemoglobin level than infected children. This may be due to the fact that iron deficiency impairs growth. Although they rarely cause death, parasitic infections, such as the soil-transmitted helminthes worms, have received research attention for their capacity to subtly impact nutrition, growth, cognitive development, and life-long health of humans **(Crompton and Nesheim, 2002).**

CONCLUSION

1. Intestinal parasitic infection is an important public health problem in students between 6-12years living Gharbia Governorate with Prevalence rate (31.0%).
2. Rural residence, lower mother education, poverty were significant associations.
3. Both sexes were affected with males more than females.
4. The most common type of parasitic infection was Oxyuris and the least one was Ancylostoma.
5. Raising awareness about parasitic disease, its hazards and its impact on both health and socioeconomic aspects has a great effect on combating parasitic diseases.
6. Parasitic infected children are more prone to anthropometric retardation.
7. Anemia is more common in children who have parasitic infestations.

RECOMMENDATIONS

Based on the practical work and results obtained from the present study, we put forward the following recommendations:

1. Anemia, being a preventable and treatable community health problem, needs continuous and widespread medical care at the primary health care level.

2. Parasitological diagnostic considerations should be given to this entity of patients with iron deficiency anemia particularly if they are living in an endemic parasitic country.
3. Screening for intestinal parasitic infections and appropriate treatment even they were asymptomatic, could be an important part of the program for anemia control in developing countries.
4. Fortification of food with iron to reduce the magnitude of the problem in Egypt.
5. Improve sanitation of environment to reduce contamination of water and soil.
6. Health education of children and mothers about modes of transmission and methods of prevention of parasitic infections.
7. Regular follow up is needed to ensure the efficiency of management and to diagnosis new infection.

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دراسة الإصابة الطفيلية وتأثيرها على الحالة الصحية لأطفال المرحلة الابتدائية بمدينة طنطا

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الهدف: الهدف من هذه الدراسة هو تحديد مدى انتشار الطفيليات المعوية وتحديد عوامل الخطر المرتبطة بالعدوى بين تلاميذ المدارس في المرحلة الابتدائية فى هذه المنطقة الجغرافية. هذه النتائج سوف تسهل وتساعد على تقييم مستوى توطن الطفيليات المعوية المختلفة، وتحديد ما إذا كانت هناك حاجة إلى تدابير واسع النطاق أو محدودة لمكافحة هذه الطفيليات.

المنهجية: تضمنت هذه الدراسة المقطعية 1000 طالب وطالبة من المدارس الابتدائية بمدينة طنطا – محافظة الغربية وتتراوح أعمارهم بين 6 - 12 سنة وتم اخذ عينة عشوائية عنقودية من المدارس.
- تم تصنيف جميع المرضى إلى مجموعتين :-
أ- الطلاب لديهم إصابة طفيلية وعددهم310طالب وطالبة (مجموعة الحالة).
ب- الطلاب ليس لديهم إصابة طفيلية وعددهم 690 طالب وطالبة (مجموعة المراقبة).
- تم الحصول على موافقة كتابية لكل حالة قيد الدراسة وتمت الموافقة على إجراء الدراسة بواسطة لجنة الأخلاقيات بكلية الطب، جامعة الأزهر.

النتائج:- وقد أسفرت نتائج الدراسة عن الآتى-:
1- بالنسبة للتوزيع العمرى وجدنا ان التلاميذ المصابين يتراوح أعمارهم من سن 6 سنوات حتى 12 سنة بمتوسط قدره (2,27 ± 8,72 سنة) مع عدم وجود فارق إحصائى بين الذكور والإناث.
2- بالنسبة للتوزيع الجنسى وجدنا أن التلاميذ المصابين كانوا ذكورا (53,8٪) وإناثا (46,2٪).
3- أما بالنسبة للمستوى الاجتماعى للتلاميذ .كان المستوى منخفض (55,7٪)؛ ومتوسط (39,3٪)، ومرتفع (5,2٪).
4- أما بالنسبة للمستوى التعليمى للام وجدنا أن أميات (6,7٪)، وذات تعليم ابتدائى (28,7٪)، وذات تعليم إعدادى (41,3٪)، وذات تعليم ثانوى (15,5٪)، وذات تعليم جامعى (7,8٪).
5- وقد تحقق إمدادات المياه النقية في 182 تلميذ (98,7٪) وليس موجودا في 18 تلميذ (1,3٪).
6- كان التخلص من مياه الصرف عن طريق مراحيض منزليه في (62,3٪) من التلاميذ، وصرف صحى فى (37,7٪) من التلاميذ.
7- وكان معدل انتشار العدوى بغض النظر عن نوعه (31,0٪) مع عدم وجود اختلاف كبير بين الذكور والإناث.
8- وجدنا أن عدوى واحدة في 26% من التلاميذ ، و متعددى الإصابة 5٪ من التلاميذ.
9- وجد أن معدل الإصابة بطفيليات متعددة كان (37) تلميذ.

10- أما بالنسبة لمعدل الاصابة بالطفيليات المعوية فى أطفال الدراسة وجدنا انه من بين 1000 طفل فى هذه الدراسة (8,9٪) مصابين بالدودة الدبوسية (2,2%٪) مصابين بالإسكارس و(2,8٪) مصابين بالهيمونلبيس نانا و (0,7٪) مصابين بالانكلستوما و (5,9٪) مصابين بالجيارديا و(6,8٪) مصابين بالانتاميبا و(5٪) متعددى الإصابة.

11- لم يكن هناك فارق إحصائى بين التلاميذ المصابين و غير المصابين في السن ونوع الجنس.

12- من ناحية أخرى، كان هناك فارق إحصائى بين التلاميذ المصابين وغير المصابين من حيث الحالة الاجتماعية ومستوى التعليم بين الأمهات.

13- وكان هناك فارق إحصائى بين التلاميذ المصابين وغير المصابين من حيث مؤشر كتلة الجسم.

14- وكان هناك فارق إحصائى كبير بين التلاميذ المصابين وغير المصابين من حيث آلام متكررة في البطن ، والتعنية ، والإسهال ، والترجيع ، والحكة حول الشرج وشحوب باللون.

الاستنتاجات:

1- تعتبر الطفيليات المعوية مشكلة صحية عامة فى التلاميذ من سن 6 الى12سنوات فى مدينة طنطا محافظة الغربية بمعدل انتشار(31,0٪) .

2- كانت الإقامة في المناطق الريفية، وانخفاض تعليم الأم، والفقر من أهم وسائل العدوى بالطفيليات المعوية.

3- تأثر كلا الجنسين مع عدم وجود فارق إحصائى بينهم.

4- وكانت الإصابة بالدودة الدبوسية هى النوع الأكثر شيوعا بين عدوى الطفيليات المعوية والإصابة بالانكلستوما هى الأقل شيوعا.

التوصيات:-

1- لابد من زيادة الاهتمام بتشخيص وعلاج الأطفال المصابين والحاملين للعدوى بالطفيليات المعوية.

2- استخدام وسائل الإعلام (التليفزيون - الراديو- المجلات) فى توعية الأسرة عن طرق النظافة الشخصية وتأثير العوامل البيئية فى انتشار هذه الأمراض مثل عدد الحجرات ودورات المياه ومصادر المياه فى المنازل .

3- تحسين وسائل الصرف الصحى ومصادر المياه.

4- الحد من نسبة الأمية فى الأمهات عن طريق برامج خاصة واستخدام وسائل متعددة الاتجاهات.

5- الحث على عمل برامج مسل كلى للديدان برامج صحية تحث على زيادة الوعى الصحى والنظافة.