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Prevalence Of Enterobius Vermicularis And Ascaris Lumbricoides Among People Under Age Fourteen Years In Al-Hilla City

Fatima Hashim Abbas [1] , Heba Saleh Shaheed[2] and Sarah Fadhil Buniya [3]

Medical Laboratories Techniques Department, Al-Mustaqbal University College ,51001Hilla, Babelon, Iraq

Abstract

The present study is designed to investigate the prevalence of Enterobius vermicularis and pin worm among children aged between 1-14 years in Al-Hilla city for the period of seven months from November 2020 to the end of May 2021 admitted to Childbirth and Children's Hospital in Al Hillah and its effect on some physical, neurological, hematological and biochemical parameters. The study mentioned a higher percentage (53%) infectious with E. vermicularis in city compere with the countryside and The present study showed that the children between one month to one year higher infections (364) with Enterobiasis than another subject less than fourteen years old as well as The data presented here showed a higher number of infection with E. vermicularis (992) compare with A. lumbricoides (225) , So the study aimed to study the prevalence of Enterobius vermicularis infections at aged less than fourteen.

Keyword: Enterobius vermicularis, pin worm and Enterobiasis.

Introduction

Enterobiasis is an intestinal nematode infection caused by Enterobius vermicularis, commonly known as pinworms. E. vermicularis infection is an important public health problem among schoolchildren, especially in tropical and subtropical countries Chen, et al 2018; Dudlová, et al,2018), with an estimate of over 1 billion infections Lohiya,, et al ; 2000). In addition, it was found that it causes many problems for the heart, including abnormalities of the heart muscle, so caution must be taken, and appropriate measures are taken to protect the heart (Dunphy, Clark, & Raja, 2017; Akkaif, Daud, et al., 2021; Akkaif, Ng, et al., 2021; Akkaif, Sha'aban, et al., 2021). Most of the infections are asymptomatic. Common

enterobiasis symptoms include itching, irritation of the perianal region, and vaginal pruritus in females (Cook, G. C. 1994 ; Burkhart and Burkhart, 2005). In severe infection cases, the symptoms include insomnia, weight loss, vomiting, abdominal pain, and appendicitis (Shoup, 2001; Hammood, et al ,2019) E. vermicularis has a simple life cycle, where it is transmitted via the finger-oral route, inhalation, or reinfection (Pezzani,2004).

E. verimcularis, the pinworm, has a simple life cycle. Contamination of eggs to the environment not only enables the transmission of infection through the finger-oral route but also by inhalation. In addition, retroinfection of the larvae through the anus is not uncommon. Among the common intestinal helminths, the prevalence of enterobiasis is generally underestimated since pinworm eggs are not usually detected by stool examination. This infection is more common in the temperate than in the tropic.(David and AP, W. ,2006). E. vermicularis is the representative contact-borne contagious helminth in the Republic of Korea. It is especially prevalent among children in crowded and unsanitary conditions (Song, et al,2003). Recently, the egg positive rate (EPR) of E. vermicularis in preschool children was reported to be 18.1% in western and southern coastal islands (Park, et al ,2005) and 7.9% in Cheongju-si (Kang, et al, 2006).

Material and methods

1.Collection of stools

The sample may be collected from stool passed into clean container, not mix with urine or before take any antibiotic or from surface of solid toilet ,the sample collected into 25 ml of wide mouth disposable container.

2.Transport of sample

Transport the sample to laboratory quickly, if delay the sample to Reach the laboratory and weather is warm use (transport medium : Buffered glycerol saline). Note: sample labeling :

1- The patient first and last name
2- The test requested
3- The time and date collection
4- The patient age and sex

3.Methods

Total numbers of Patient which have been examined **1217** samples (992 Enterobius vermicularis and 225 Ascaris lumbricoides) Take small amount from sample (Fresh liquid or

soft stool)and take this sample from 3 place (edge – End – center) ,mix the sample on slide with one drop of normal saline by stick (not use normal saline if present mucous and cover the slide by cover slide(Avoid air bubbles by drawing one edge of the cover slide and slightly down until letting it fall on slide) . make examination under microscopy (10x) (Obaid and Juma ,2017) .

Result

1. Enterobius vermicularis infections in comparative between male and female

Total numbers of people with Enterobiasis under fourteen years old 992 recorded in Babel Hospital for Women and Children.

The subjects divided into 548 male and 444 female (Figure 4.1).

Figure (4.1): E. vermicularis infections in comparative between male and female

2. E. vermicularis infections according to the living location

The study mentioned higher percentage (53%) infectious with E. vermicularis in city compere with countryside (Figure 4.2).

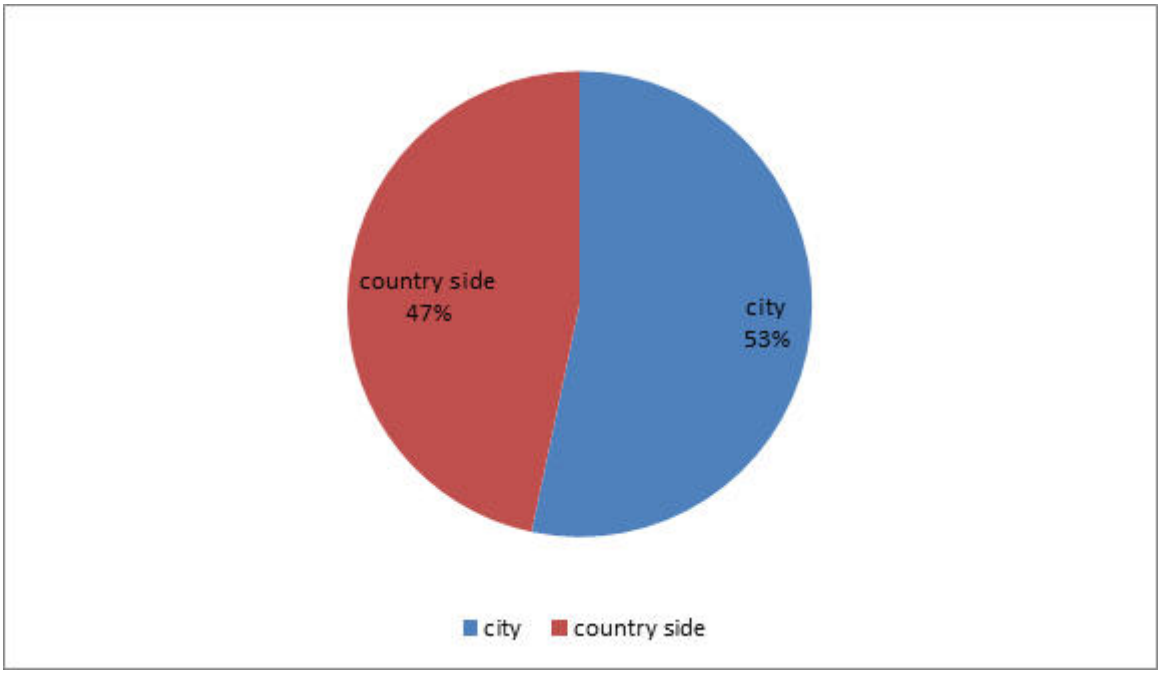

Figure (4.2): E. vermicularis infections according to the living location

3. E. vermicularis infections according to the ages

The present study showed that the children between one month to one year higher infections (364) with Enterobiasis than other subject less than fourteen years old (Figure 4.3).

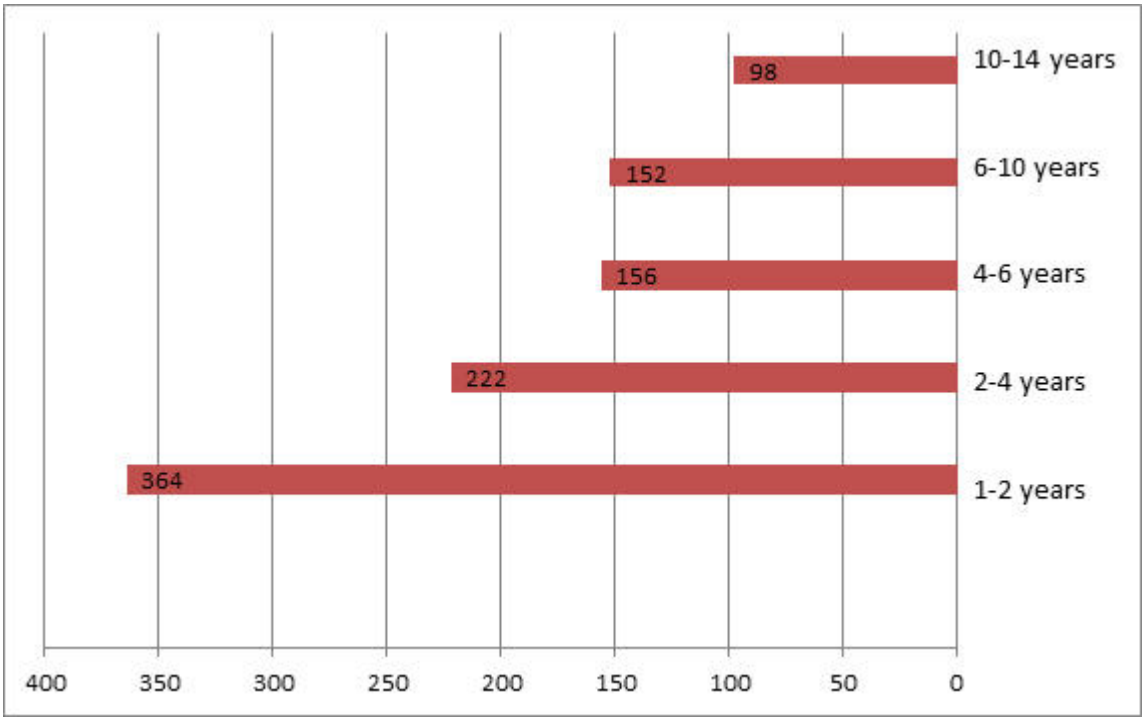

Figure (4.3): E. vermicularis infections according to the ages

4.Comparative between E. vermicularis and Ascaris lumbricoides in number of infections

The data presented here showed higher number of infection with E. vermicularis (992) compare with A. lumbricoides (225) (Figure 4.4) .

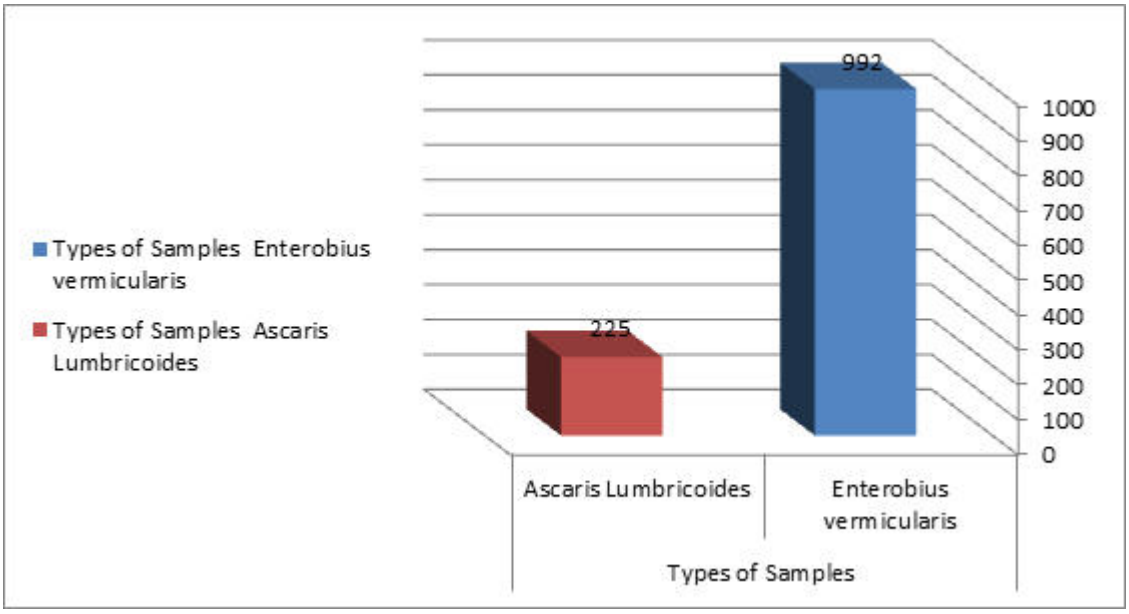

Figure (4.4): Comparative between E. vermicularis and A. lumbricoides in number of infections

Discussion

1. Enterobius vermicularis infections in comparative between male and female

In the current study, recording higher infection of E.vermicularis in male in comparative with female, the reason for this high rate of infection of parasites in male is probably due to their weak immune system which accounts for this high prevalence in this sex group indicating that female are internally more stronger to resists the infection as compared to males. However geographical reason can be the cause of male dominance but the statistical significance for the observed difference cannot be stated. However it is not surprising when one finds that both the genders occupy the same habitat. that Was agree with (Acuna-Soto et al.,2000; Khan and Jahan, 2017).

This study was in disagreement with data from previous studies conducted in the country Doğan et al (2008). That recorded the overall prevalence of intestinal parasitic infection rate was 3.6%, of these patients, 52.5% were female and 47.5% The prevalence rates of infection in study were 29% and 27% in female and male, respectively. There was no significant correlation between gender and infection rates (Mahni et al.,2016). Similarly, the results of

some other studies showed that gender is not a factor subscribe to the differences in possibility of intestinal parasitic infections male (Rezaeian and Saraei,1992 ; Rezaiian and Hooshyar, 1996) . analysis showed that the male gender and illiteracy of fathers and/or mothers were the socio-demographic factors significantly associated with higher infection rates (Doğan et al .,2008). This result is in agreement with Maulood et al. (1995) which carried a survey in Diyala to study the prevalence of intestinal parasite in this region and they found among 6645 children examined the infection rate for enterobiasis was higher in male than female. Ganem (1996) , carried a study on 750 children in Kirkuk city, he found that the infection rate in male 54.27% was greater than female 45.73%.

2. E. vermicularis infections according to the living location

The greater percentage were (53%) of peoples with Enterobiasis in city while lowest percentage (47 %) of peoples with Enterobiasis in countryside . The variance in the infection rate between living locations may be related to the overcrowding index and lack to hygiene ,levels of peoples education , bad sanitary elimination, and in the areas where infection rates were rise. This findings were agreed with Gündüz et al., (2005) revealed The difference in the infection rate between one region to another may be related to the crowding index and educational levels of peoples, poor sanitary disposal, and poor hygiene in the areas where infection rates were high. The World Health Organization estimates that approximately 1.5 billion people are infected with soil-transmitted helminths worldwide (Jourdan et al.,2018) . In Thailand, helminth infection remains a significant health problem in rural communities of some regions. A national survey in 2009 found the prevalence of helminthiasis in the Thai population was 18.1%, with persistent high prevalence of opisthorchiasis and hookworm infection in the northeastern and southern regions of Thailand, respectively (Wongsaroj,2015). These variations in prevalence may be due to differences in climatic conditions, environmental sanitation, economic and educational status of study subjects, and previous control efforts. The highest rate of infection was recorded among rural school children (33.4%), compared to children from urban areas (29.6%) (Hama and Rahemo, 2014).

3. E. vermicularis infections according to the ages

The higher number of peoples with E.vermicularis infection were between age 1month to 2 years old . Current results were correlated with Kim et al.,(2003) were established in the Republic of Korea that the E. vermicularis is a common human intestinal parasite among pre-school and primary school children. Furthermore , The study disagree with Kadir,(2011) were

found The rate of infection was higher (29.5 %) in school aged children, than preschool children (21.51 %). The high rate of infection in school aged children than smaller aged children may be related to that school children are more likely to be in close contact with each other and are exposed to unsatisfactory sanitary environment. Intestinal parasitic infection is most common among school-age children and tends to cause high-intensity infection in this age group. Also, helminthes infection leading to nutritional deficiency and impaired physical development is likely to have negative consequences for cognitive function and learning ability (Ulukanligil and Seyrek,2003). E. vermicularis infection was found to be prevalent in all ages from 3 to 10 years, and boys were more highly infected than girls. Children in this age group contact each other more frequently in kindergartens and primary schools than children of other ages, and are also exposed to unsatisfactory sanitary environments (Chai et al.,2004).

4.Comparative between E. vermicularis and Ascaris lumbricoides in number of infections

In agreement with the previous research (Haswell et al.,1987) E. vermicularis more prevelance than Ascaris lumbricoides The distribution and abundance of E. vermicularis in a fishing community in South Tndia, the prevalence of Enterobius infection was consistently high in all age groups of both males and females.

The results were no correlated with Sayyari et al.,(2005) were found in 19.3% of the study population [19.7% male, 19.1% female]. A. lumbricoides [1.5%], and E. vermicularis [0.5%] were the most common infections. The infection rate was highest in the 2-14 years age group [25.5%] and in rural residents [23.7%]. The worldwide infection by E. vermicularis is about 200 million and it is the commonest helminthic infection in the United States (40 million). In contrast to soil transmitted helminthiasis, enterobiasis is prevalent in both developed and developing countries Hotez et al.,2006; Chan ,1985).

The finding are not consistent with Abah and Arene, (2015) how noted A. lumbricoides infections among primary school children in Rivers State, Nigeria (51.78%), while E. vermicularis (0.01%). The prevalence of the infection was generally higher in males (57.60%) than females (42.40%). The parasites frequently encountered are A. lumbricoides, Trichuris trichiura, Strongyloides stercoralis, and hookworm (Agi, ., 1995). Ezenwaka et al.,(2011) reported 18.5% prevalence among children in Ogbaru Local Government Area of Anambra State with A. lumbricoides 9.5%, hookworm 7.5%, T. trichiura 1.5%, E. vermicularis 1%, and Taenia species 1% while Abah and Arene (2015) reported 47% prevalence among school children in Umuukwu, Aram, in Anambra State in

their work, the unartificial impact of intestinal helminthiasis among the school children in the area.

Reference

1. Abah, A. E., and Arene, F. O. I. (2015). Status of intestinal parasitic infections among primary school children in Rivers State, Nigeria. Journal of parasitology research, 2015.
2. Acuna-Soto, R., Maguire, J. H., and Wirth, D. F. (2000). Gender distribution in asymptomatic and invasive amebiasis. The American journal of gastroenterology, 95(5), 1277-1283.
3. Agi, P. I. (1995). Pattern of infection of intestinal parasites in Sagbama community of the Niger Delta, Nigeria. West African journal of medicine, 14(1), 39-42.
4. Akkaif, M. A., Daud, N. A. A., Sha'aban, A., Ng, M. L., Abdul Kader, M. A. S., Noor, D. A. M., & Ibrahim, B. (2021). The Role of Genetic Polymorphism and Other Factors on Clopidogrel Resistance (CR) in an Asian Population with Coronary Heart Disease (CHD). Molecules, 26(7), 1987.
5. Akkaif, M. A., Ng, M. L., Kader, M. A. S. A., Daud, N. A. A., Sha'aban, A., & Ibrahim, B. (2021). A review of the effects of ticagrelor on adenosine concentration and its clinical significance. Pharmacological Reports, 1-14.
6. Akkaif, M. A., Sha'aban, A., Daud, N. A. A., Yunusa, I., Ng, M. L., SK Abdul Kader, M. A., . . . Ibrahim, B. (2021). Coronary Heart Disease (CHD) in Elderly Patients: Which Drug to Choose, Ticagrelor and Clopidogrel? A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Journal of Cardiovascular Development and Disease, 8(10), 123.
7. Al-Daoody, A. A. K., and Al-Bazzaz, E. N. H. (2020). Impact of Enterobius vermicularis infection on biochemical parameters in the blood of children in Erbil Province, Iraq. BMC infectious diseases, 20, 1-6.
8. Ash, L. R., and Orihel, T. C. (1990). Atlas of human parasitology (pp. 103-111). Chicago: ASCP Press.
9. Benelli, G., Pavela, R., Canale, A., and Mehlhorn, H. (2016). Tick repellents and acaricides of botanical origin: a green roadmap to control tick-borne diseases?. Parasitology Research, 115(7), 2545-2560.
10. Brown, H. W., and Belding, D. L. (1964). Basic clinical parasitology (pp. 71-87). New York: Appleton-Century-Crofts.

11. Burkhart, C. N., and Burkhart, C. G. (2005). Assessment of frequency, transmission, and genitourinary complications of enterobiasis (pinworms). International journal of dermatology, 44(10), 837-840.

12. Bynum, W. F., and Porter, R. (Eds.). (2013). Companion encyclopedia of the history of medicine. Routledge.

13. Caldwell, J. P. (1982). Pinworms (enterobius vermicularis). Canadian Family Physician, 28, 306.

14. Chai, J. Y., Park, J. H., Han, E. T., Shin, E. H., Kim, J. L., Guk, S. M., and Rim, H. J. (2004). Prevalence of Heterophyes nocens and Pygydiopsis summa infections among residents of the western and southern coastal islands of the Republic of Korea. The American journal of tropical medicine and hygiene, 71(5), 617-622.

15. Chan, C. T. (1985). Enterobiasis among schoolchildren in Macao. The Southeast Asian journal of tropical medicine and public health, 16(4), 549-553.

16. Chen, K. Y., Yen, C. M., Hwang, K. P., and Wang, L. C. (2018). Enterobius vermicularis infection and its risk factors among pre-school children in Taipei, Taiwan. Journal of Microbiology, Immunology and Infection, 51(4), 559-564.

17. Cook, G. C. (1994). Enterobius vermicularis infection. Gut, 35(9), 1159.

18. Cook, G. C., and Zumla, A. (2008). Manson's tropical diseases. Elsevier Health Sciences.

19. Dalton, J. P., Skelly, P., and Halton, D. W. (2004). Role of the tegument and gut in nutrient uptake by parasitic platyhelminths. Canadian Journal of Zoology, 82(2), 211-232.

20. David, T. J., and AP, W. (2006). Markell and Voge's medical parasitology. Saunders Elsevier.

21. Değerli, S., Malatyali, E., Ozçelik, S., and Celiksöz, A. (2009). Enterobiosis in Sivas, Turkey from past to present, effects on primary school children and potential risk factors. Turkiye Parazitol Derg, 33, 95-100.

22. Doğan, N., Demirüstü, C., and Aybey, A. (2008). The prevalence of intestinal parasites according to the distribution of the patients' gender and parasite species for five years at the Osmangazi University Medical Faculty. Turkiye parazitolojii dergisi, 32(2), 120-125.

23. Dudlová, A., Juriš, P., Jarčuška, P., Vasilková, Z., Vargová, V., Sumková, M., and Krčméry, V. (2018). The incidence of pinworm (Enterobius vermicularis) in pre-school and school aged children in the eastern Slovakia. Helminthologia, 55(4), 275.

24. Dunphy, L., Clark, Z., & Raja, M. H. (2017). Enterobius vermicularis (pinworm) infestation in a child presenting with symptoms of acute appendicitis: a wriggly tale! Case Reports, 2017, bcr-2017-220473.

25. Ezenwaka, C. O., Nsofor, C. J., and Nzeakor, S. O. (2011). Prevalence of intestinal Helminths among primary school children in Ogbaru local government area, Anambra state, Nigeria. Nigerian Journal of Parasitology.

26. Fan, C. K., Chuang, T. W., Huang, Y. C., Yin, A. W., Chou, C. M., Hsu, Y. T., and Tu, C. Y. (2019). Enterobius vermicularis infection: prevalence and risk factors among preschool children in kindergarten in the capital area, Republic of the Marshall Islands. BMC infectious diseases, 19(1), 1-7.

27. Fry, G. F., and Moore, J. G. (1969). Enterobius vermicularis: 10,000-year-old human infection. Science, 166(3913), 1620-1620.

28. Ganem A.H. (1996) Enterobius vermicularis, its impact on children aging 1-5 years in Kirkuk city. DP, College of Medicine, Tikrit Univ., P17-21.

29. Garcia, Lynne S. Diagnostic medical parasitology. American Society for Microbiology Press, 2006.

30. Garcia, Lynne Shore (2009). Practical guide to diagnostic parasitology. American Society for Microbiology. pp. 246–247. ISBN 978-1-55581-154-9. Retrieved 5 December 2009.

31. Gündüz, T., Demirel, M. M., İnceboz, T., Tosun, S., and Yereli, K. (2005). Prevalence of intestinal parasitosis in children with gastrointestinal symptoms associated with socio-economic conditions in Manisa region. Türkiye Parazitol Derg, 29(4), 264-267.

32. Gutierrez, Y. (2000). Diagnostic pathology of parasitic infections with clinical correlations. Oxford University Press, USA.

33. Hama, A. A., and Rahemo, Z. I. (2014). Intestinal parasitosis in relation to haemoglobin concentration among primary schoolchildren in erbil province kurdistan-iraq. International science journal, 1(1), 96-99.

34. Hammood, Z. D., Salih, A. M., Mohammed, S. H., Kakamad, F. H., Omar, D. A., Hassan, M. N., ... and Usf, D. C. (2019). Enterobius vermicularis causing acute appendicitis, a case report with literature review. International journal of surgery case reports, 63, 153-156.

35. Haswell-Elkins, M. R., Elkins, D. B., Manjula, K., Michael, E., and Anderson, R. M. (1987). The distribution and abundance of Enterobius vermicularis in a South Indian fishing community. Parasitology, 95(2), 339-354.

36. Hopkins, D. R. (1992). Homing in on helminths. The American journal of tropical medicine and hygiene, 46(6), 626-634.

37. Hotez, P. J., Bethony, J., Bottazzi, M. E., Brooker, S., Diemert, D., and Loukas, A. (2006). New technologies for the control of human hookworm infection. Trends in parasitology, 22(7), 327-331.

38. Hung, Y. P., Huang, I. H., Lin, H. J., Tsai, B. Y., Liu, H. C., Liu, H. C., and Ko, W. C. (2016). Predominance of Clostridium difficile ribotypes 017 and 078 among toxigenic clinical isolates in southern Taiwan. PloS one, 11(11), e0166159.

39. Järnerot, G. (1994). New salicylates as maintenance treatment in ulcerative colitis. Gut, 35(9), 1155.

40. John, D. T., and Petri, W. A. (2013). Markell and Voge's Medical Parasitology-E-Book. Elsevier Health Sciences.

41. Jourdan, P. M., Lamberton, P. H., Fenwick, A., and Addiss, D. G. (2018). Soil-transmitted helminth infections. The Lancet, 391(10117), 252-265.

42. Kadir, M. A. A. (2011). Prevalence of enterobiasis (Enterobius vermicularis) and its impact on children in Kalar Town/Sulaimania-Iraq. The Medical Journal of Tikrit University, 2(172).

43. Kang, S., Jeon, H. K., Eom, K. S., and Park, J. K. (2006). Egg positive rate of Enterobius vermicularis among preschool children in Cheongju, Chungcheongbuk-do, Korea. The Korean journal of parasitology, 44(3), 247.

44. Khan, N. T., and Jahan, N. (2017). Prevalence of E. histolytica associated dysentery in children in Satellite Town, Quetta. Epidemiology (Sunnyvale), 7(290), 2161-1165.

45. Kim, B. J., Lee, B. Y., Chung, H. K., Lee, Y. S., Lee, K. H., Chung, H. J., and Ock, M. S. (2003). Egg positive rate of Enterobius vermicularis of primary school children in Geoje island. The Korean Journal of Parasitology, 41(1), 75. Wongsaroj, T. (2015). National survey of helminthiasis in Thailand. Asian biomed, 8(6).

46. Lohiya, G. S., Tan-Figueroa, L., Crinella, F. M., and Lohiya, S. (2000). Epidemiology and control of enterobiasis in a developmental center. Western Journal of Medicine, 172(5), 305.

47. Mahni, M. B., Rezaeian, M., Eshrat Beigom, K. I. A., Raeisi, A., Khanaliha, K., Tarighi, F., and Kamranrashani, B. (2016). Prevalence of intestinal parasitic infections in Jiroft, Kerman Province, Iran. Iranian journal of parasitology, 11(2), 232.

48. Markell, E. K., and Voge, M. (1976). Medical parasitology.

49. Maulood, N. A., Hilal, M. A., and Amir, A. Y. (1995). Prevalence of intestinal parasites among people of Diyala province. Ibn Haitham J science, 9(2), 1-18.

50. Obaid, H. M., and Juma, S. A. (2017). TORCH screening test in pregnant women of Kirkuk city. Al-Mustansiriyah Journal of Science, 27(5), 17-25.

51. Paniker, C. J., and Ghosh, S. (2017). Paniker's textbook of medical parasitology. JP Medical Ltd.

52. Parija, S. C. (2008). Textbook of medical parasitology, Protozoology and Helminthology.Trop Pediatr; 2000; 46 (5): 282-7.

53. Park, J. H., Han, E. T., Kim, W. H., Shin, E. H., Guk, S. M., Kim, J. L., and Chai, J. Y. (2005). A survey of Enterobius vermicularis infection among children on western and southern coastal islands of the Republic of Korea. The Korean Journal of Parasitology, 43(4), 129.

54. Pawlowski, Z. S. (1990). Enterobiasis. Tropical and Geographical Medicine., (Ed. 2), 404-407.

55. Pezzani, B. C., Minvielle, M. C., de Luca, M. M., Córdoba, M. A., Apezteguía, M. C., and Basualdo, J. A. (2004). Enterobius vermicularis infection among population of General Mansilla, Argentina. World Journal of Gastroenterology: WJG, 10(17), 2535.

56. Piekarski, G. (2012). Medical parasitology. Springer Science and Business Media.

57. Reyan, K. J., and Ray, C. G. (2004). Sherris, Medical Microbiology: An Introduction to Infectious Disease.

58. Rezaeian, M., and Saraei, M. (1992). A survey of the prevalence of human parasites in rural areas of Lahijan. Iran J Public Health, 4(1), 29-35.

59. Rezaiian, M., and Hooshyar, H. (1996). The prevalence of intestinal parasitic infection in rural areas of Tonekabon, Iran. Iranian Journal of Public Health, 47-58.

60. Satoskar, A. R. (2009). Medical parasitology. CRC Press.

61. Sayyari, A. A., Imanzadeh, F., Bagheri Yazdi, S. A., Karami, H., and Yaghoobi, M. (2005). Prevalence of intestinal parasitic infections in the Islamic Republic of Iran. EMHJ-Eastern Mediterranean Health Journal, 11 (3), 377-383, 2005.

62. Shoup, B. (2001). Diagnosis and management of pinworm infection. Primary Care Update for OB/GYNS, 8(6), 240-243.

63. Song, H. J., Cho, C. H., Kim, J. S., Choi, M. H., and Hong, S. T. (2003). Prevalence and risk factors for enterobiasis among preschool children in a metropolitan city in Korea. Parasitology research, 91(1), 46-50.

64. Ulukanligil, M., and Seyrek, A. (2003). Demographic and parasitic infection status of schoolchildren and sanitary conditions of schools in Sanliurfa, Turkey. BMC public health, 3(1), 1-7.