**Epidemiological study on some endemic parasitic diseases to know the efficiency of the health system in the holy province of Karbala**

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**Article History:**
Received on: 29 Feb 2020
Revised on: 01 Apr 2020
Accepted on: 02 Apr 2020

**Keywords:**
amebiasis, giardiasis, pinworm, parasite

**ABSTRACT**
The increased incidence of the parasites is associated with various factors, including lack of community health awareness, unsafe, inadequate disposal of human waste, lack of safe drinking water, low socioeconomic status, and health system performance. To determine the prevalence of some endemic parasites such as intestinal parasites five years ago, so the study take protozoa parasite *Giardia lamblia*, *Entamoeba histolytica*, and one intestinal helminth pinworm *Enterobius vermicularis* (pinworm) and the correlation of infections with age and sex in Karbala city. This study took cases examined in hospitals and health centers of the districts and the centre of the holy city of Karbala using the database of the Ministry of Health's Transitional Diseases Centre. It was conducted between 2015 and 2019 to study the efficiency of a health system and the levels of risky infectious diseases. Between 2015 and 2019, the conducted study was on three intestinal parasitic diseases. The study showed a significant difference in the level of infection with pinworm parasites. Infection of *Enterobius vermicular* increased by 32.8% in 2019 compared to previous years. In the meanwhile, *Giardia lamblia* decreased by 4.6%, followed by *Endameba histolytica* a by 3.6%, while the incidence of tissue amoeba parasites increased in 2015, followed by pinworms 2.4% and G.lamblia 2.9%. The study showed a significant difference. The studies also recorded a significant increase in the age group. Some of them were between the ages of more than one year and up to less than 45 years. This difference may be due to variation in sample size, seasonal variation, gene amebiasis, giardiasis, pinworm, parasite ral and personal hygiene, and public health services.

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**INTRODUCTION**
Intestinal parasites cause many diseases and health issues like, Diarrhoea which may sometime be a fatal one. It becomes fatal among some children who are under five years (Verhagen et al., 2013). Hence, intestinal parasites always pose a challenge in the public health system. Sometimes, the public health system lacks food monitoring and personal inspection leading to the chances of transmission of pathogens (Tefra, 2014; Norman et al., 2015). Imported food and meat, which didn't go through any of the safety and standard checking, may cause the spread of different types of parasites. (Shah-...
doust et al., 2016) Immigration and travel ameliorate the emergence of some parasites in non-endemic countries. Parasite is a single-celled or multicellular organism that has a direct or indirect life cycle. This study is on three crucial parasites that are endemic in the region where it has been investigating the spread of these parasites in five years among both sexes, age groups during the period of study to determine the efficiency of the health system.

MATERIALS AND METHODS

This study snapped statistical information from the Communicable Diseases Centre of the province of Karbala, where the numbers have collected from reviewers for hospitals and health centres of the region, and tackled gender and the various age groups ranging from >1y – more 45y and randomly get information on the statistical analysis using a program SPSS.

RESULTS AND DISCUSSION

The ill-effects like diarrhoea, vomiting, nausea, loss of appetite, weight loss, fever, becoming anemic, etc. of the bacteria in the infected body makes the investigation an important one. The other health issues caused by the bacteria are viz., hyper-thyroidism, high eosinophils, stress, fatigue, intestinal blockage, malabsorption of gases, flatulence, and constipation (Chin et al., 2016).

The people involved in the study were patients who visited the hospital and health centres. Most of them were from the districts of Karbala City and its surroundings. The results tackled taken three intestinal parasite diseases to know the efficiency of the health system to control these diseases with the study of the impact of sex differences and age group on infection rate where data were from the Division of Communicable Diseases in the Holy Karbala Health Department and introduced statistical analysis in SPSS program. The results were the following according to the statistical analysis, A:-

1. Null hypothesis H0: There is no statistically significant relationship between diseases during the study years.

2. H1 hypothesis: There is a statistically significant relationship between diseases during the study years. The results of the analysis are as follows value (= 13133.8 x2) and the value of Sig.= 0 which is less than 0.05, so an alternative hypothesis may be accepted that there is a statistically significant relationship between diseases during the study years as in Table 1 and Figure 1. The study showed that the incidence of parasitic Enterobius vermicularis increased by 32.8% in 2019 compared to previous years. While the impact of Giardiasis decreased by 4.6%, the infection of amoebiasis also reduced by 3.6%. On the other hand there was a rising incidence of parasites Endameba histolytic. In 2015, there was
Table 1: The value and incidence of diseases studied

| Years | Diseases / Total percentage % and count | Total |
|-------|----------------------------------------|-------|
|       | Amoebiasis | Enterobiasis | Giardia |       |
| 2015  | Count 2354 | 880          | 1069    | 4303  |
|       | Total 6.5% | 2.4%         | 2.9%    | 11.8% |
| 2016  | Count 1761 | 495          | 828     | 3084  |
|       | Total 4.8% | 1.4%         | 2.3%    | 8.5%  |
| 2017  | Count 1565 | 173          | 737     | 2475  |
|       | Total 4.3% | 0.5%         | 2.0%    | 6.8%  |
| 2018  | Count 1879 | 9211         | 548     | 11638 |
|       | Total 5.2% | 25.3%        | 1.5%    | 31.9% |
| 2019  | Count 1324 | 11962        | 1675    | 14961 |
|       | Total 3.6% | 32.8%        | 4.6%    | 41.0% |
| Total | Count 8883 | 22721        | 4857    | 36461 |
|       | Total 24.4%| 62.3%        | 13.3%   | 100.0%|

Table 2: The percentages of the injured and the age groups for the years of study

| Years | Gender | Total |
|-------|--------|-------|
|       | Male   | Female |       |
| 2015  | Count 2139 | 2164 | 4303 |
|       | Total 5.9% | 5.9% | 11.8% |
| 2016  | Count 1536 | 1548 | 3084 |
|       | Total 4.2% | 4.2% | 8.5%  |
| 2017  | Count 1225 | 1250 | 2475 |
|       | Total 3.4% | 3.4% | 6.8%  |
| 2018  | Count 5418 | 6220 | 11638|
|       | Total 14.9% | 17.1% | 31.9% |
| 2019  | Count 7005 | 7956 | 14961|
|       | Total 19.2% | 21.8% | 41.0% |
| Total | Count 17323 | 19138 | 36461|
|       | Total 47.5% | 52.5% | 100.0%|

Table 3: The percentages of sex and age groups for years of study

| Age    | Gender | Total |
|--------|--------|-------|
|        | Male   | Female |       |
| 1 Y    | Count 291 | 303 | 594  |
|        | Total  0.8% | 0.8% | 1.6% |
| From 1 to 4 Y | Count 5739 | 6528 | 12267|
|        | Total  15.7% | 17.9% | 33.6%|
| From 5 to 14 Y | Count 6351 | 6522 | 12873|
|        | Total  17.4% | 17.9% | 35.3%|
| From 15 to 45 Y | Count 3396 | 4243 | 7639 |
|        | Total  9.3% | 11.6% | 21.0%|
| More 45 Y | Count 1546 | 1542 | 3088 |
|        | Total  4.2% | 4.2% | 8.5%  |
| Total  | Count 17323 | 19138 | 36461|
|        | Total  47.5% | 52.5% | 100.0%|
a low incidence of pinworms (2.4) was followed by giardiasis (2.9)%, show Table 1 and Figure 1.

3. From the chart's observation, it is concluded that pinworm disease began to increase significantly from 2018. It was the least in 2017. The results of different studies stated that the amoebic tissue parasite prevalence was higher, and also the parasitoid *Giardia lambia*. The study was conducted among the children of Thi-Qar Governorate, where the highest rate of tissue amoeba parasite was recorded, reaching 90%, followed by the parasite of *Giardia lambia*, where it was 7.5% and 0.1% also between (Al-Hassani et al., 2014) in 2014 study. The amoeboid amoebiasis was 66.8%, while the *Giardia* parasite was 36.8%. All these statistics carried out in Karbala city differed from the study conducted in Brazil (Rop et al., 2016). While studies agree with Natta C research, including (Abu-Madi et al., 2011) analysis, it confirmed that the highest prevalence of intestinal parasites in western Ethiopia was the *Giardia* parasite at 13.3%. The amoeba and pathological anatomy, registered 7.8%, (Shield et al., 2015) showing an increased prevalence of parasite. And also the risk of its direct oral transmission to humans.

The Australian analysis revealed the highest proportion of whip parasites, which was 86%. The most critical percentage in Iran, which was 26.9% (Kiani et al., 2016) Perhaps the difference in the incidence of intestinal parasites is due to the different geographical locations, climatic conditions and time zone (Nath et al., 2015). Or, it could be a result of the population or personal hygiene, and sanitation systems in the areas studied, or the difference may arise from Diagnostic methods: sensitivity and accuracy of the examiner, size, and several samples examined (Ali, 2015). Concerning the convergence in the recorded ratios, it could be due to the way it spreads widely; or, it could be the ways it transmits directly to humans and also its resistance they show towards chlorine sterilization. The simple lifestyle and congenial climatic conditions may also play a role in the spread of the parasite.

Second

1. Null hypothesis H0: No statistically significant relationship between sex during the study years.

2. H1 hypothesis: There is a statistically significant relationship between sex during the study years.

The results of the analysis were as follows: value (= 25.9 x2) and the value of Sig. = 0, which is less than 0.05, so we accept the alternative hypothesis that there is a statistically significant relationship between sex during the years of study, as in Table 2 and Figure 2.

Table 2 and Figure 2 showed there was a difference between the sexes. The infection rate of females was more - male 52.5% and females 47.5%. The earlier studies carried out in 2015-2017 didn't show any significant difference between males and females. It began in 2018, where the incidence of females was 17% and males 14.9% and increased in 2019 to 21.8% for females and 19. 2% for males.

The results differ from each other. The current study agrees with the study (Lobo et al., 2014) in the city of Agostinho Neto in Africa and also with the study (Fuhrimann et al., 2016a) in Kampala and Imam et al. (2015) records in Saudi Arabia. What was mentioned by (Fuhrimann et al., 2016b) at Hanoi in Vietnam, the results differed with (Derso et al., 2016). The results indicated that males had a higher incidence of intestinal parasites than females, reaching 15.7% and 20.5% (respectively). Other studies suggested that the rate of parasitic intestinal infection was higher among males than females. (Shahdoust et al., 2016) Among auditors to the health centre in Tonekabon in Fiy recorded a male and female infection rate of 27.9% and 26.1%, respectively. Tonekabon in Fiy mentioned, among the children of Cameroon, 12.2% of males and 9.6% of females had an infection (Kwenti et al., 2016). A plausible explanation for the difference in the male to female ratio could be the different places of work, activities, surroundings, and children who stay out of the house for long hours. These children may transmit among themselves.

In Iran, the incidence of whipworms was higher. The human bladder was higher than Huang st: The difference may be due to the difference in geographical locations, climatic conditions and time, in addition to the presence of the host carrier (Nath et al., 2015) or the result of different population density or personal hygiene and sanitation systems in the studied areas. Or, maybe a difference due to the methods used in the diagnosis, sensitivity, and accuracy of the examiner, sample size, and number (Ali, 2015).

The study also took the hypothesis of a difference between sex and age group where the incidence was in the age group of 1-4, and from 5-14 followed by the age group 15-45 six and these results.

Third

1. Null hypothesis H0: There is no

2. Null hypothesis H0: There is no statistically significant relationship between sex and age groups.

3. H1 hypothesis: There is a statistically significant relationship between sex and age groups.
The results of the analysis were as follows: value ($= 56.97 x 2$) and the value of Sig. $= 0$, which is less than 0.05, so we accept the alternative hypothesis that there is a statistically significant relationship between sex and age groups, as in Table 3 and Figure 3.

The results showed that there is a relationship between the sexes with the age group between the ages of 1 to 4 and 15 to 45, where these groups showed that more females than males are infected due to the fact that the percentage of females examined more than males because the proportion of society is more as well as furniture resistance less than males and that Due to the hormonal differences for both sexes it is known that the hormone estrogen is an effect on the immune system and in particular the proportion of blood cells of the egg supported that Table 2 and Figure 2 as supported . The results showed that there is a relationship between the sexes and ages group between so the ages of 1 to 4 and 15 to 45, where these groups showed that more females than males are infected due to the fact that the percentage of females examined more than males because the proportion of society is more as well as furniture resistance less than males and that Due to the hormonal differences for both sexes it is known that the hormone estrogen is an effect on the immune system and in particular the proportion of blood cells , Table 2 and Figure 2 appears resulted it agree with and explained , (Hadi, 2011; Hailegebriel, 2017) that the age group 6-10 years is the most infected with intestinal parasites followed by 16-20 years . As supported by a study conducted in the district of Shatrah (Punsawad et al., 2017; Diongue et al., 2011; Tasawar et al., 2010)

CONCLUSION

The results of study not agree with they found age group 21-30 years found the lowest infection rate and also differed with where the age group 31-60 years was the highest infection rate in Senegal and explained that the difference is due to environmental conditions or the number of studied and the way of eating different food. Or push the fingers to mouth by the kids to taste Or due to the fact that children spend most of their time outside the home and their needs and they are in this age group do not know the importance of personal hygiene and the quality of healthy food and found it and eating food from street vendors.The age group most affected by infection is between the age of 1 years to 14 years for all diseases of the study where there was a significant difference between the age groups studied The most affected age group confirmed that.

Funding Support
None.
Conflict of Interest
None.

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