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A Comparative Study of Microbial & Parasitic, Disease in Al Muthanna Province, Iraq

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Abstract

Parasitic, bacterial, and viral diseases spread with their various clinical manifestations in Muthanna can be spread directly or indirectly and from person to person. It can affect animals when transmitted to humans. Therefore, the aim of the study was to conduct some of the epidemiological aspects of these diseases in the governorate. A descriptive study was applied to 732 patients, rabies (409), brucellosis (16), and cutaneous leishmaniasis (307) in Al-Rumaitha Hospital, Children's Hospital, Al-Hasan Hospital in Al-Samawah and Al-Qadeer Hospital. Data such as gender, age, occupation, time of illness, method of diagnosis. the highest incidence of viral diseases (56%) and parasitic diseases (42%), while the lowest incidence of bacterial diseases (2%) was recorded. According to a resident of viral and parasitic diseases was recorded in Samawah. High incidence of bacterial diseases in the Kidhair. Regarding the difference between urban and rural areas, data were recorded for the highest cases in rural areas. The study showed that the highest incidence of the disease was in January 2019, then began to decline to reach its lowest rate in October 2019. The data recorded the highest cases of males (62%) with various parasitic, bacterial, and viral diseases, while the lowest was among females (38%). OR (1.66) with CL (1.36 - 2.02). These diseases still represent a health threat that must be managed, so the county government can exercise its legal authority to manage threats to public health security by expanding the disease surveillance system.

Keywords: Epidemiology, Leishmaniasis, Rabies, Brucellosis, Infectious Diseases.

Introduction

Infection is the invasion of an organism's body tissues by disease-causing agents, their multiplication, and the reaction of host tissues to the infectious agents and the toxins they produce. Infectious disease is illness resulting from an infection. [1] An understanding of the infection process should lead to appropriate actions which help to protect patients, and healthcare workers themselves.. Knowledge of this cycle is essential in order to understand how infection can occur, Figure 1. [2] .

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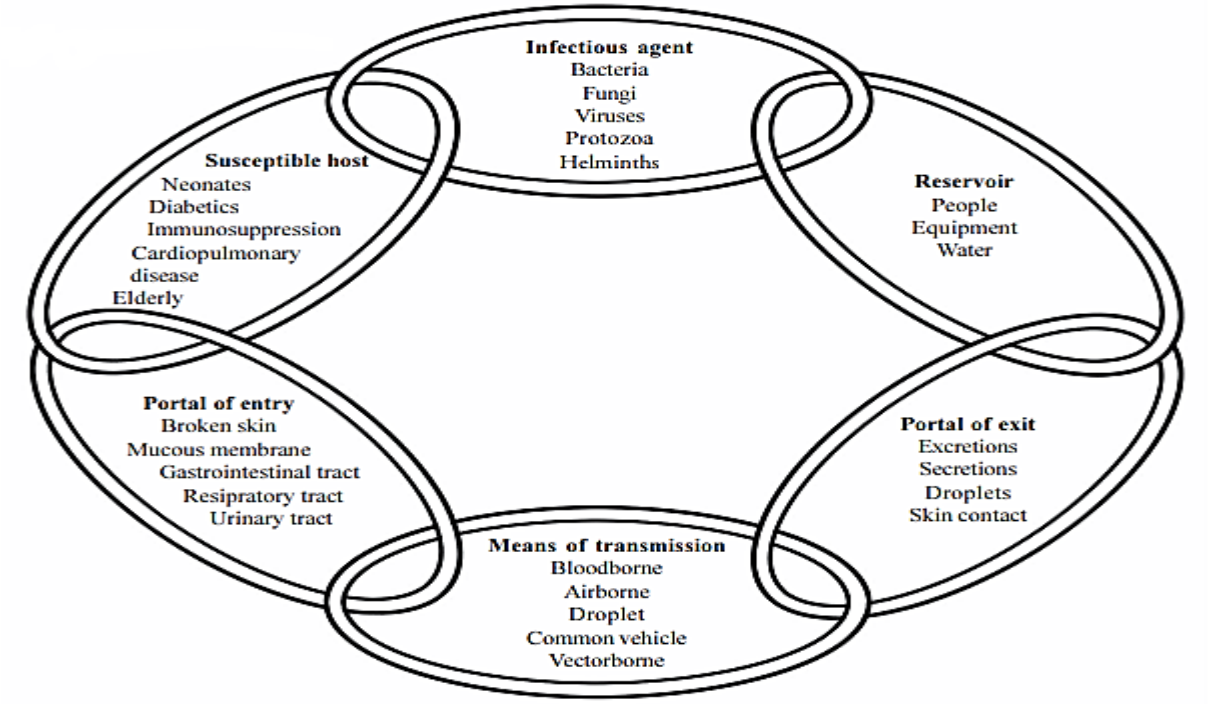

Figure 1. this cycle describes the processes leading to patients acquiring infection within healthcare settings.

Rabies is an infectious viral disease that is almost always fatal following the onset of clinical symptoms. In up to 99% of cases, domestic dogs are responsible for rabies virus transmission to humans. Yet, rabies can affect both domestic and wild animals. It is spread to people through bites or scratches, usually via saliva, Rabies is present on all continents, except Antarctica, with over 95% of human deaths occurring in the Asia and Africa regions. Globally, rabies deaths are rarely reported and children between the ages of 5–14 years are frequent victims. Every year, more than 29 million people worldwide receive a post-bite vaccination. This is estimated to prevent hundreds of thousands of rabies deaths annually [3].

Brucellosis, a bacterial disease caused by organisms in the genus Brucella, is an important zoonosis and a significant cause of reproductive losses in animals. Brucellosis, also known as “undulant fever”, “Mediterranean fever” or “Malta fever” is a zoonosis and the infection is almost invariably transmitted by direct or indirect contact with infected animals or their products.Even though there has been great progress in controlling the disease in many countries, still there remain regions where the infection persists in domestic animals and, consequently, transmission to the human population frequently occurs. [4].

Leishmania species are protozoa parasites, which give rise to a number of distinct clinical syndromes. There have been more than 20 species identified, most of which cause zoonotic

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infections, but which can also cause disease in humans in endemic areas. Numerous rodent and canine species serve as reservoirs, and sandflies serve as vectors. Cutaneous leishmaniasis is classified into two different clinical syndromes: New World if it is acquired in the Americas, and Old World if it is acquired in Africa, Asia, the Middle East, or Europe [5]. This study aims to describe and summarize data from all recorded cases of rabies (viral), brucellosis (bacterial) and cutaneous leishmaniasis in Al-Muthanna province from January to December 2019, through demographic information, geographical distribution and comparison of results with the other regions in Iraq and endemic countries

Methodology

Study area and population

The governorate of Muthanna is located in southwestern Iraq, and shares internal boundaries with the governorates of Najaf, Qadissya, Thi-Qar and Basrah. The climate in Muthanna is a dry desert climate. In summer temperatures easily surpass 40°C, while rainfall is very limited and restricted to the winter months. The population is concentrated along the Euphrates River in the north of the governorate, while the southern desert districts are only sparsely populated. The governorate is divided in to five districts: Al-Samawa, Al-Khidhir, Al-Rumaitha,Al-warka and Al-Salman JAPU .

Period of study

The present study aimed to determine the epidemiological aspect of rabies (viral), brucellosis (bacterial) and cutaneous leishmaniasis (parasitic) in province during the 12 months of 2019.

Collecting of Epidemiological data

This study was carried out on 732 patients, 409 patients with rabies (viral), 307 patients with cutaneous leishmaniasis (parasitic) and 16 patients with brucellosis (bacterial). They were attended to Hospitals in four areas of Al-muthanna province. Were clinically diagnosed, other cases by Rose Bengal in the laboratory. The study was used the available surveillance database for the disease from the Department of Epidemiology and control of Transitional Diseases. Data of the current study were including Samawa, Al-Rumiatha, Al-Warka, Al Salman and Al-Khidir in Al-Muthanna provinces. This study analyzed and comparison the cases of rabies, cutaneous leishmaniasis and brucellosis in terms of place of residence, gender, age, occupation, disease season, Patient Outcome and place of residence and Type of rural or urban environment.

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Results and Discussion

Distribution of Cases

Distribution of cases shown in (Figure 2), the figure reveals the highest percentage of infections with viral diseases (56%), parasitic diseases (42 %), while the lower infections were recorded with bacterial diseases (2%). These findings are consistent with many researchers who stated that incidence of viral human rabies in Iraq exceeds that of its neighboring countries substantially. In 2009, the estimated incidence of viral human rabies in Iraq was 0.89 per million persons while it was 0.025 in Turkey and 0.02 in Iran [6]. This is of particular concern because the increase in reported cases coincided directly with periods of intense conflict from 2003 onwards and a threefold increase in reported cases during the ten-year period from 2001-2010 [7], in the Eastern Mediterranean Region (EMR), Parasitic diseases, especially cutaneous and visceral leishmaniasis, were reported from 14 of the 22 countries in the region, namely Afghanistan, Egypt, Iran (Islamic Republic of), Iraq, Jordan, Libyan Arab Jamahiriya, Morocco, Pakistan, Saudi Arabia, Somalia, Tunisia and the Republic. Syrian Arab Republic, Sudan and Yemen [8]

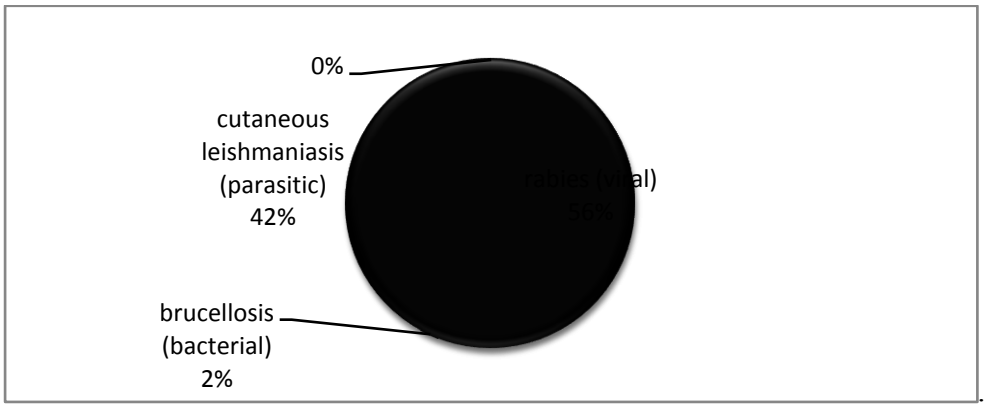

Figure 2. Rates of diseases in Al Muthanna province

Our confirmed results are that most of the diseases in the province have been transmitted to humans by animal bites (Fig.3.2), and this is consistent with what has been mentioned about zoonotic diseases having potentially dangerous impacts on human health and the economy. The past 30 years have seen an increase in infectious diseases in humans, and more than 70% of these are zoonotic diseases [9]. These results are consistent with the many researchers who have stated that peskiest viral diseases, especially emerging viral diseases, have tended to spread more rapidly and on a larger scale over the past decade, as they invaded entire countries and continents. It is estimated that the majority and some estimates indicate that 75% of these diseases originate from animals [10].

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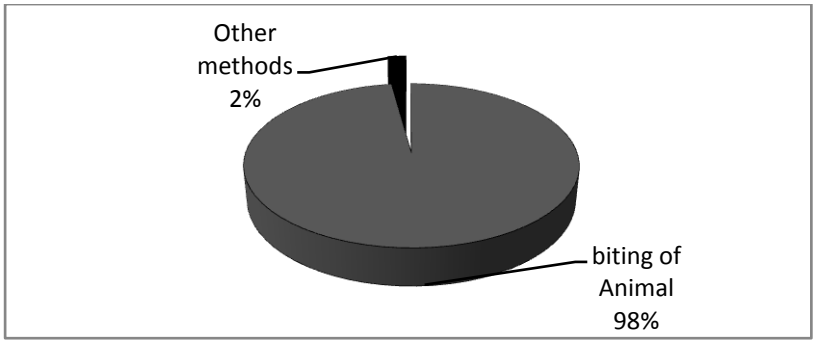

Figure 3. Modes of infection in Al-Muthanna province in 2019

Geographical distribution

Figure (3.3) shows the geographical distribution of diseases in the governorate. The figure reveals the high incidence of viral diseases in Samawah (52.8%), Al Qadeer (22.2%) and Rumaitha (19.3%), while the lowest infections were recorded in Warka (5.6%). The incidence of parasitic diseases increased in Samawah (58.6%), Al Qadeer (17.2%) and Rumaytha (15.3%), while the lowest cases were recorded in Warka (8.7%). The incidence of bacterial diseases increased in Kedir (43.7%), Rumaitha (37.5%) and Samawah (12.5%), while the lowest cases were recorded in Warka (6.2%). The current results are consistent with previous studies. Factors in their infection vary, including geographical location, average mortality, season of the year, type and depth of bottom, immune status, and animals. And plants in or around the environment, host food, forage, host age, host and parasite behavior, parasite seasonal maturity cycle, and host age [11]. Vector-borne and zoonotic diseases contributed to the lowest number of accidents to the total burden of infectious disease. [12]

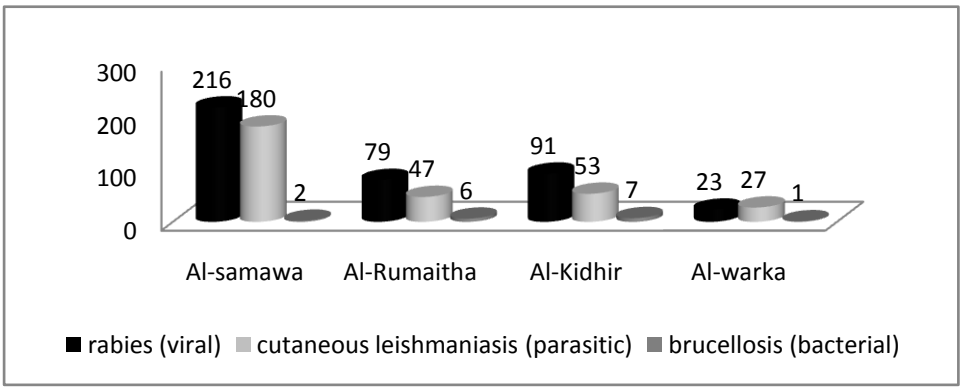

Figure 4. Incidence of the diseases by socioeconomic status in 4 strict surveyed for one year.

With regard to the geographical distribution of infection, it was evident from (Figure 3.4) that the percentage of viral, parasitic and bacterial diseases that were selected in this study was very high in Samawah (54%) and Al Khader. (21%) and Rumaitha (18%), and the lowest incidence of these three diseases was in Warka (7%). There are many factors that play important roles in the presence and distribution of these diseases, including the use of mud to build some homes in villages. Moreover, people who work long hours in the open air are more susceptible to insect bites, large migration, and urbanization that occurs during the study period [13].

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Comparison of infectious diseases Between Rural and Urban Areas

Regarding the difference between urban and rural areas, the highest incidence data were recorded in rural areas (57%), while the lowest were in urban areas (43%). People can become infected with these diseases by touching animals, saliva, blood, urine, feces, or other body fluids; Animal bites and scratches. Or contact contaminated objects in areas where animals live and roam, such as habitats, supplies and animal feed. People can also contract animal diseases by drinking water or eating food contaminated with animals, such as raw fruits and vegetables that come into contact with animal feces. Scientists estimate that more than 6 out of 10 infectious diseases known to humans are zoonotic [14]. As in non-urban settings. Likewise, temperature was identified as a risk factor in urban areas [19]. In addition to population density may work synergistically to increase the risk of transmission and proximity to intensive cultivation or vegetation, and increased humidity fluctuation [22]. Figure (5) shows the distribution of diseases in the province. The higher percentage of diseases in rural areas (51.8 %) for viral infections, and (66.4 %) for the parasitic infections, while the bacterial infections were equal in urban and rural areas .These large differences were consistent with the results reported in Iraq; that parasitic diseases were closely related to illiteracy and farmers as a profession, which is usually more common in rural residents (67.4%) [15], also the high numbers of cases in rural areas relative to the population means rural areas should be a priority for public awareness and viral rabies control [6]. According to the 6th national population census in china, over 0.67 billion people live in rural areas and account for 50.32% of the entire population. Rural residents differ from urban residents in terms of socioeconomic status, which can lead to heightened infectious diseases risks [16]. In Iraq, cases of infection with Brucella melitensis were estimated from 52.3 cases per 100,000 people / year in a rural area to 268.8 cases per 100,000 people / year in a semi-rural area. These wide differences in the infection cases of Brucella are clear between the different governorates in Iraq, highlighting the need to deepen our understanding of the risk factors for disease transmission in humans and animals [17].

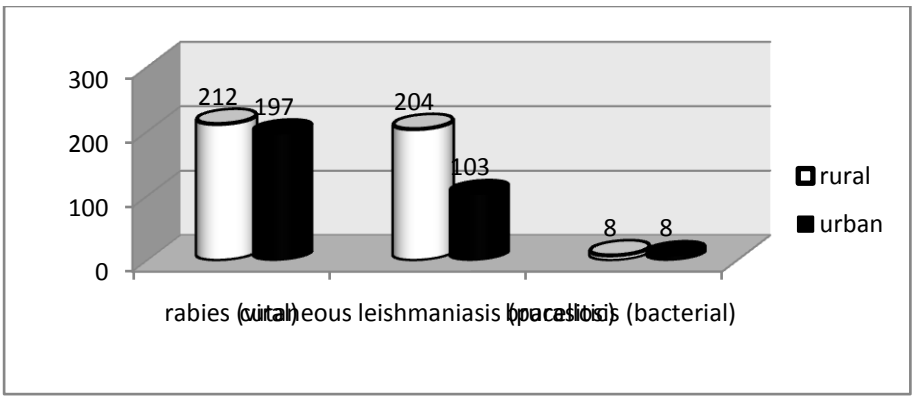

Figure 5. Comparison of infectious diseases Between Rural and Urban Areas.

3.4. Monthly distribution of diseases

The study showed that the highest incidence of disease in January 2019, which is 148 cases (20%), then began to decline to reach the lowest rate in October 2019 (30 cases) by about 4% (Figure 7) and a high significant at P value = 0.01 < 0.05 of infection in 3 month (jan,fab,mar) in compare with

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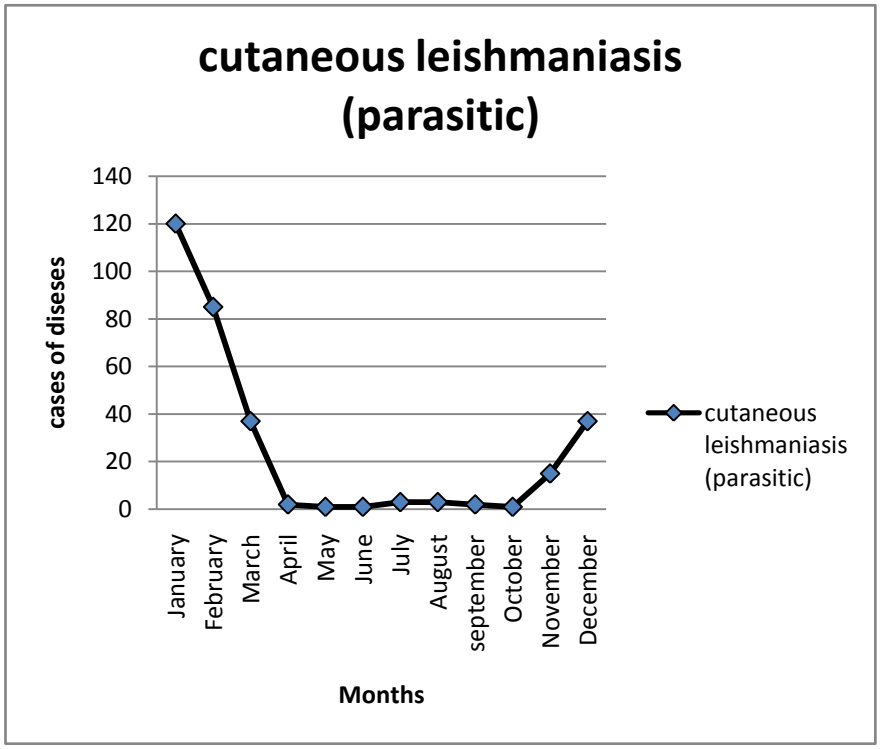
other months of years .the varition of seasonal patterns are one of the main pathways for the subtle but highly potential impacts of climate change on disease dynamics. [18]

A



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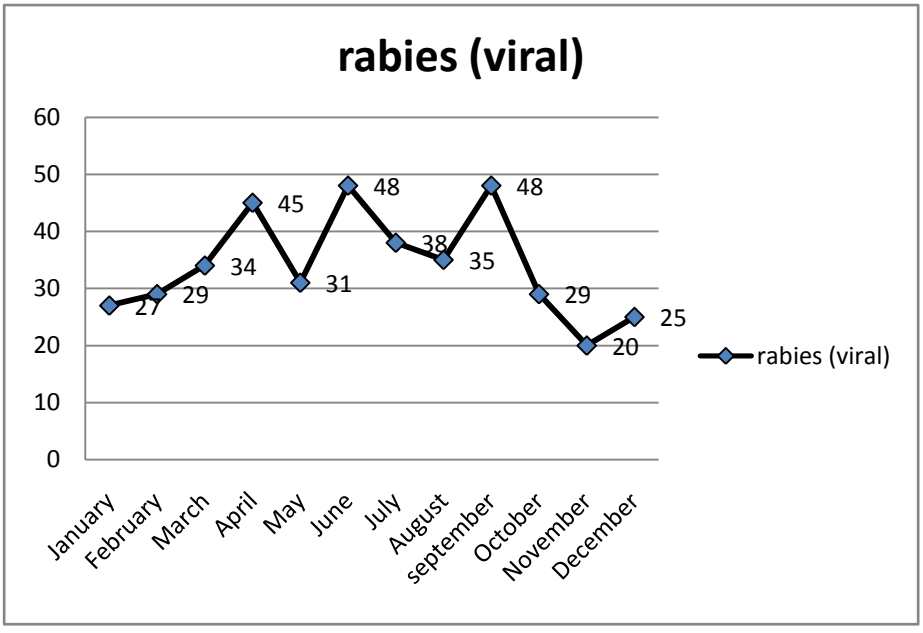

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C

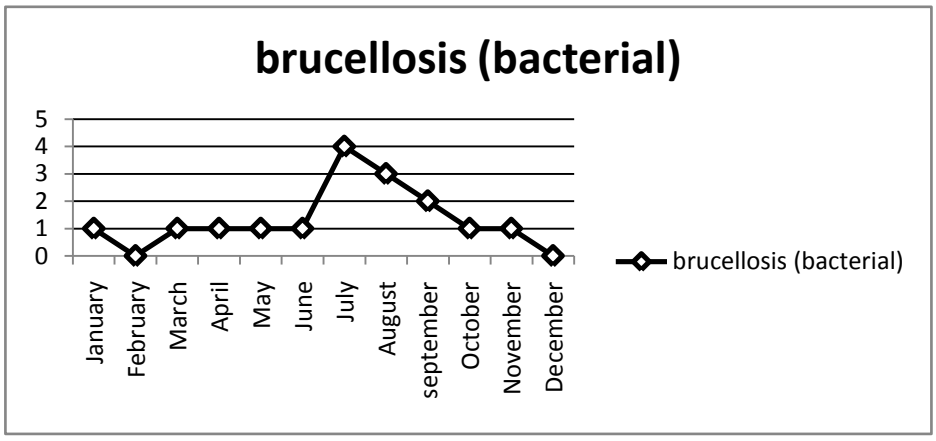

Figure 6. Monthly distribution According to the diseases (A-cutaneous leishmaniosis, B-Rabies, C-Brucellosis)

The study shows in figure (7 A) that the lowest rate of infection in the month of April-October 2019, and then began to rise to reach the highest rate of infection in the months of December-January 2019 and then cases decreased in February. These results were similar to those mentioned by [23], The Monthly distribution of CL in winter was more than in summer months. Monthly distribution of cases where the highest cases were recorded during winter and autumn due to the growth and spread of disease vectors and decreased in summer. These results are consistent with other previous studies in Iraq, where cases peaked during December and January [24]. while rabies disease in figure (7B) showed seasonal patterns with a strong peak in February, June, October, and a minor peak in December. There was no significant distribution of rabid dogs, in contrast, there seems to be an acyclic pattern of distribution of the outbreaks of rabies cases that seemed to cluster around April and September, corresponding to breeding seasons for dogs in Nigeria [25]. Brucellosis was common during the months of summer. This may be due to the exposure to the disease was high because the deliveries of animals occur in the spring so the increase in milk production following it and contamination of milk is more marked [26].

Comparison of infectious diseases Between male and female

Over the past years, considerable attention has been paid to gender differences in the frequency, causes, symptoms, treatment response and outcomes of neurological diseases [27]. The recent data record the highest cases in males (62%) exposed to various parasitic, bacterial and, viral diseases, while the lowest was among females (38%) (Figure 8). The results in this research are identical to

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many research, where experimental studies have documented hormonal effects on the immune response in animals as well as in humans. [28]
It became clear from the chart (Figure 9) that the proportion of males in viral infections (286 (62%) cases and females 132 (38%) cases, and these data were identical with the data obtained in China, where China is a high-risk environment. As for rabies, the cases of human rabies are second only to India, globally. Males in rural areas were more susceptible than urban residents. More efforts should be boosted especially in high point areas [29]. In Iraq, there is a severe bias towards males with regard to rabies infections, as eight cases were reported in males for every case in females [30]. Parasites induce host defenses including cell infiltration, resulting in protective or ineffective inflammation. These responses are often affected by host genotype and sex [31].
The comparing infectious diseases between males and females, it became clear from the chart (Figure 3.10) that the proportion of males in parasitic infections (169) cases and females (138) cases, and these data were identical with the data obtained in Iraq, that clear and reliable bias toward males exists in some tropical diseases, such as leishmaniasis, CL is a major health problem in Iraq [31]. In contrast to the previous diseases, from the figure (9) that the percentage of females is higher in bacterial infections (9) cases and males (7) cases, and these data were identical with the data obtained in Mosul [32] Erbil [33] and duhok [34] in Iraq.

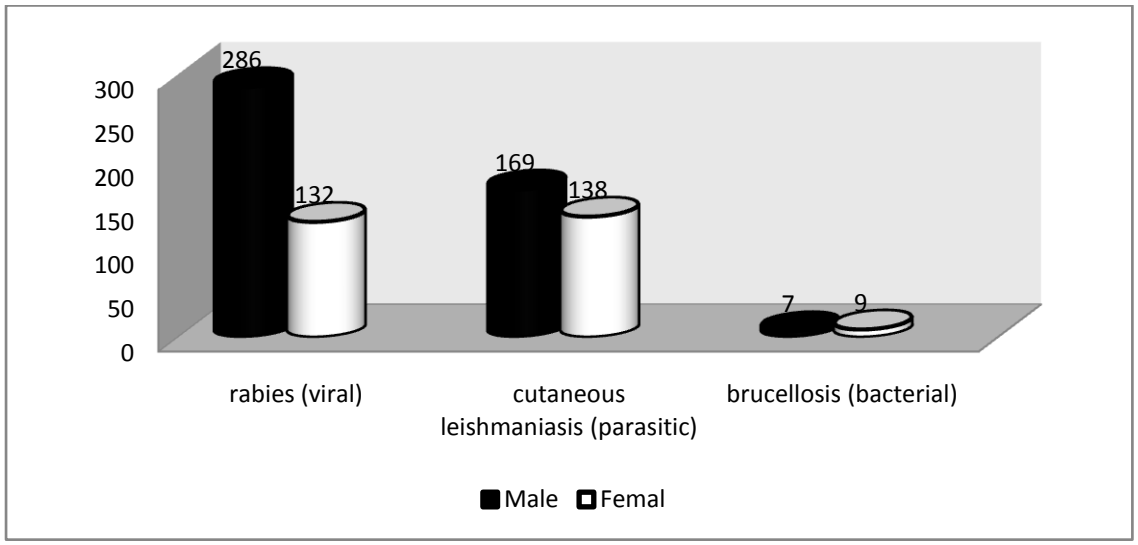

Figure .7 Distribution of infectious diseases (Rabies , cutaneous leidshmanaisis , brucellosis) according gender

Conclusions

This population study showed that the current level of awareness of parasitic and viral diseases among the rural population in Muthanna is still very low. Prevention programs should target these

individuals and provide them with more acceptable modes of advertising. This study may also be useful in planning policies to prevent and control these diseases.

Conflict of Interests

The authors declare that no competing interest exists.

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Authors' contribution

Nuha designed the study, analysis the data, and drafted the manuscript. Ali was involved in collection of data and also contributed in manuscript preparation.

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