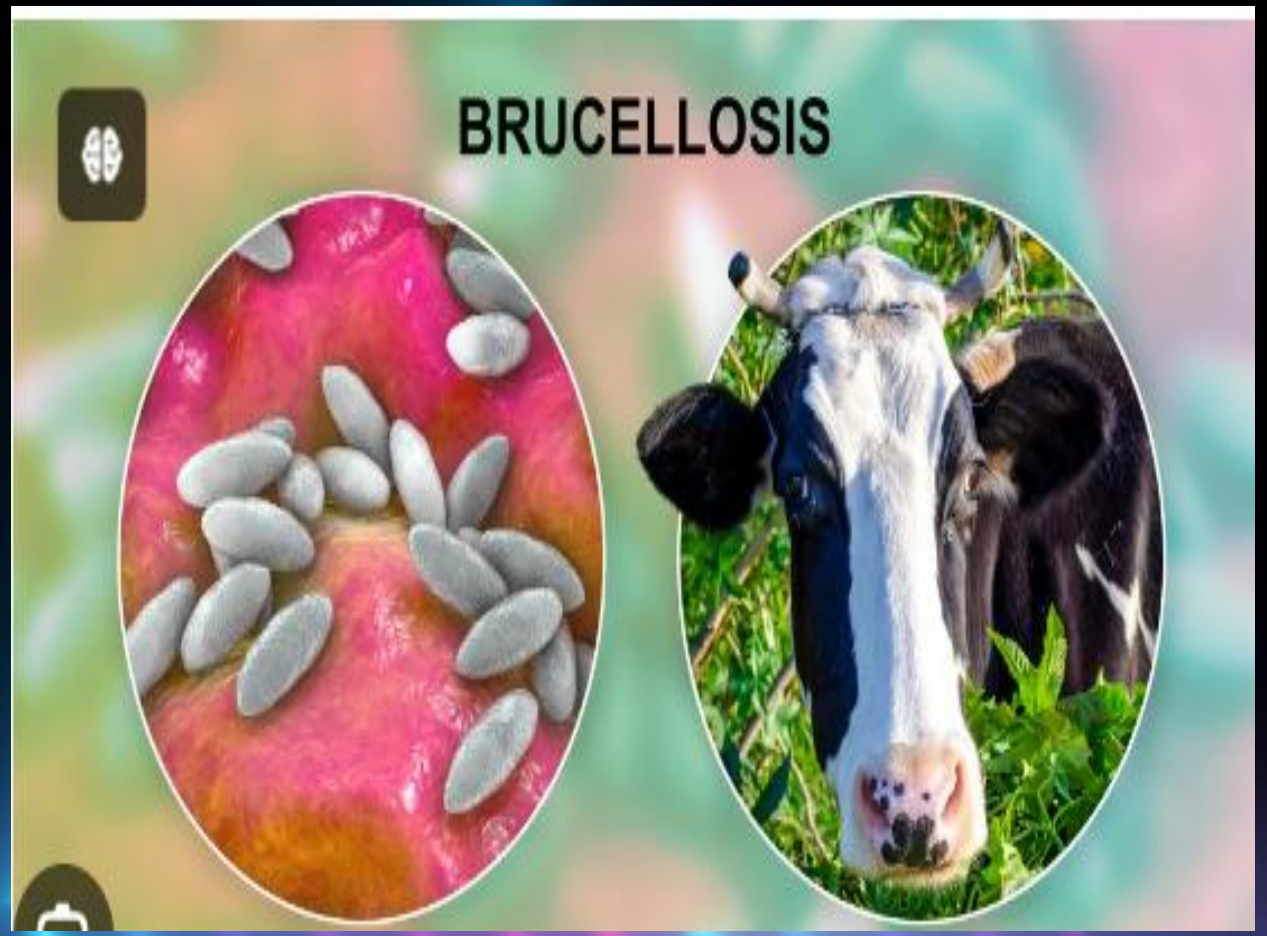
EPIDEMILOGY OF BRUCLLOSIS-2024

ASSISTANT PROF.

DR ALAA A.SALIH-FICMS-FM



- One of the major bacterial zoonoses, and in humans is also known as Undulant fever, Malta fever or Mediterranean fever.
- It is occasionally transmitted to man by direct or indirect contact with infected animals.
- It is caused by different species of the brucella group of organisms and characterized by intermittent or irregular febrile attacks, with profuse sweating, arthritis and an enlarged spleen.
- The disease may last for several days, months or occasionally years.
- Brucellosis is both a severe human disease and a disease of animals with serious economic consequences

Problem statement

- Public health problem with worldwide distribution.
- It is endemic wherever cattle, pigs, goats, and sheep are raised in large numbers.
- Important endemic areas for brucellosis exist in Mediterranean zones, Europe, Central Asia, Mexico, and South America.
- The number of cases in Eastern Mediterranean countries has increased.
- The disease is now rare in most European countries, North America and Australia.

Brucellosis Case Definitions

Facultad de Medicina
Universidad de Navarra

https://ndc.services.cdc.gov/case-definitions/brucellosis-2010/ Accessed 12 December

Brucellosis (*Brucella* spp.) 2010 Case Definition

CLINICAL DESCRIPTION

An illness characterized by acute or insidious onset of fever and one or more of the following: night sweats, arthralgia, headache, fatigue, anorexia, myalgia, weight loss, arthritis/spondylitis, meningitis, or focal organ involvement (endocarditis, orchitis/epididymitis, hepatomegaly, splenomegaly).

LABORATORY CRITERIA FOR DIAGNOSIS

Definitive

- Culture and identification of *Brucella* spp. from clinical specimens.
- Evidence of a fourfold or greater rise in *Brucella* antibody titer between acute- and convalescent-phase serum specimens obtained greater than or equal to 2 weeks apart.

Presumptive

- *Brucella* total antibody titer of greater than or equal to 160 by standard tube agglutination test (SAT) or *Brucella* microagglutination test (BMAT) in one or more serum specimens obtained after onset of symptoms
- Detection of *Brucella* DNA in a clinical specimen by PCR assay.

Case Classification

Probable

A clinically compatible illness with at least one of the following:

- Epidemiologically linked to a confirmed human or animal brucellosis case.
- Presumptive laboratory evidence, but without definitive laboratory evidence, of *Brucella* infection.

Confirmed

A clinically compatible illness with definitive laboratory evidence of *Brucella* infection

Etiological Agents

Species	Natural host	Other animal species affected	Human disease
Brucella abortus	Cattle	Wild animals, water buffalo, camels	Less severe
Brucella melitensis	Sheep and Goat & camel	Wild ruminant cattle	Severe
Brucella suis	Swine	Various wild species	Severe (except biovar 2)
Brucella canis	Dog	None	Benign

(b) RESERVOIR OF INFECTION :

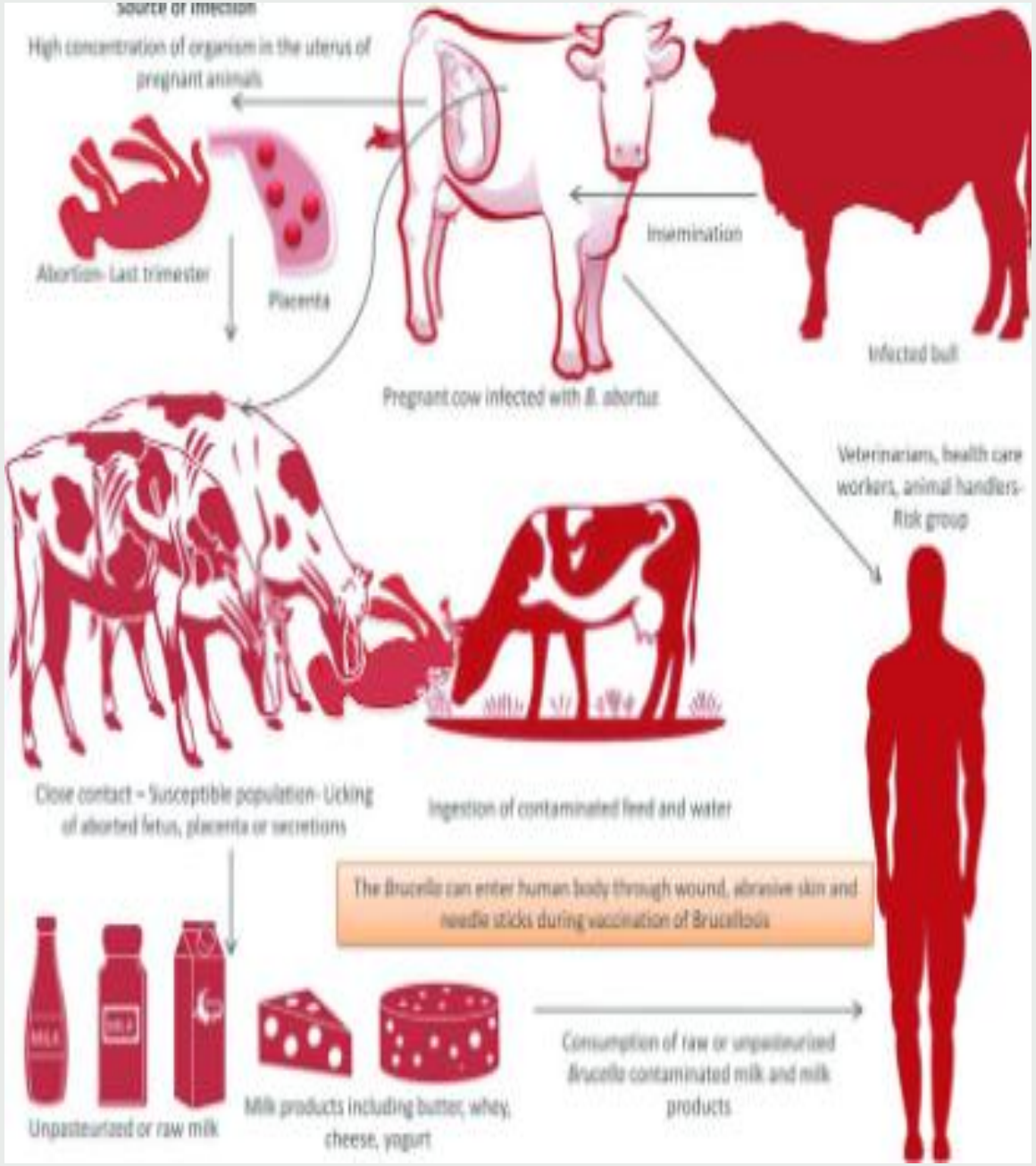
Main reservoirs of human infection are cattle, sheep, goats, swine, buffaloes, horses and dogs.

In animals the disease can cause abortion, premature expulsion of the foetus or death.

Cross infections can often occur between animal species.

The infected animals excrete Brucella in the urine, milk, placenta, uterine and vaginal discharges, particularly during a birth or abortion.

The animals may remain infected for life.



EPIDEMIOLOGY

Globally-

- More than 500 000 new human cases of brucellosis annually
- An important cause of travel-associated morbidity.
- The true incidence of human brucellosis however, is unknown for most countries including India.
- It has been estimated that the true incidence may be 25 times higher than the reported incidence due to misdiagnosis and underreporting

EPIDEMIOLOGY IN IRAQ

51,508 human brucellosis cases were reported during the 12-year study period, with some missing data for age groups. Human brucellosis persisted annually in Iraq across the study period with no specific temporal clustering of cases.

In contrast, spatial clustering was predominant in northern Iraq.

The total number of human brucellosis cases reported in Iraq from 2007 to 2018 was 51,508. The disease trend showed 2 peaks, one in 2010 and another in 2011, with 7399 and 7064 recorded cases, respectively. There was an apparent decline in reported cases from 2013 to 2018, as shown in Figure 1.

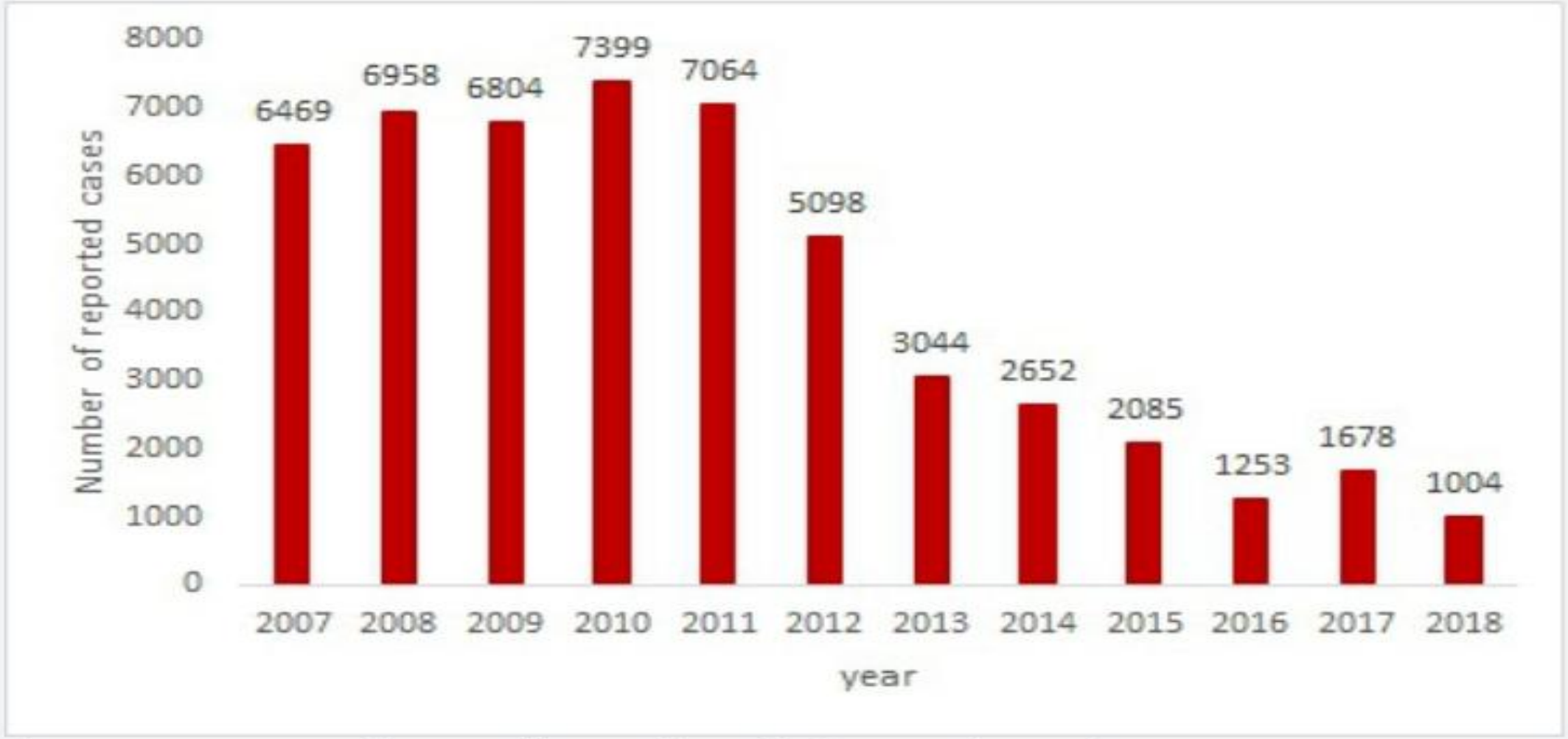


Figure 1. Frequency of reported human brucellosis cases in Iraq from 2007 to 2018.

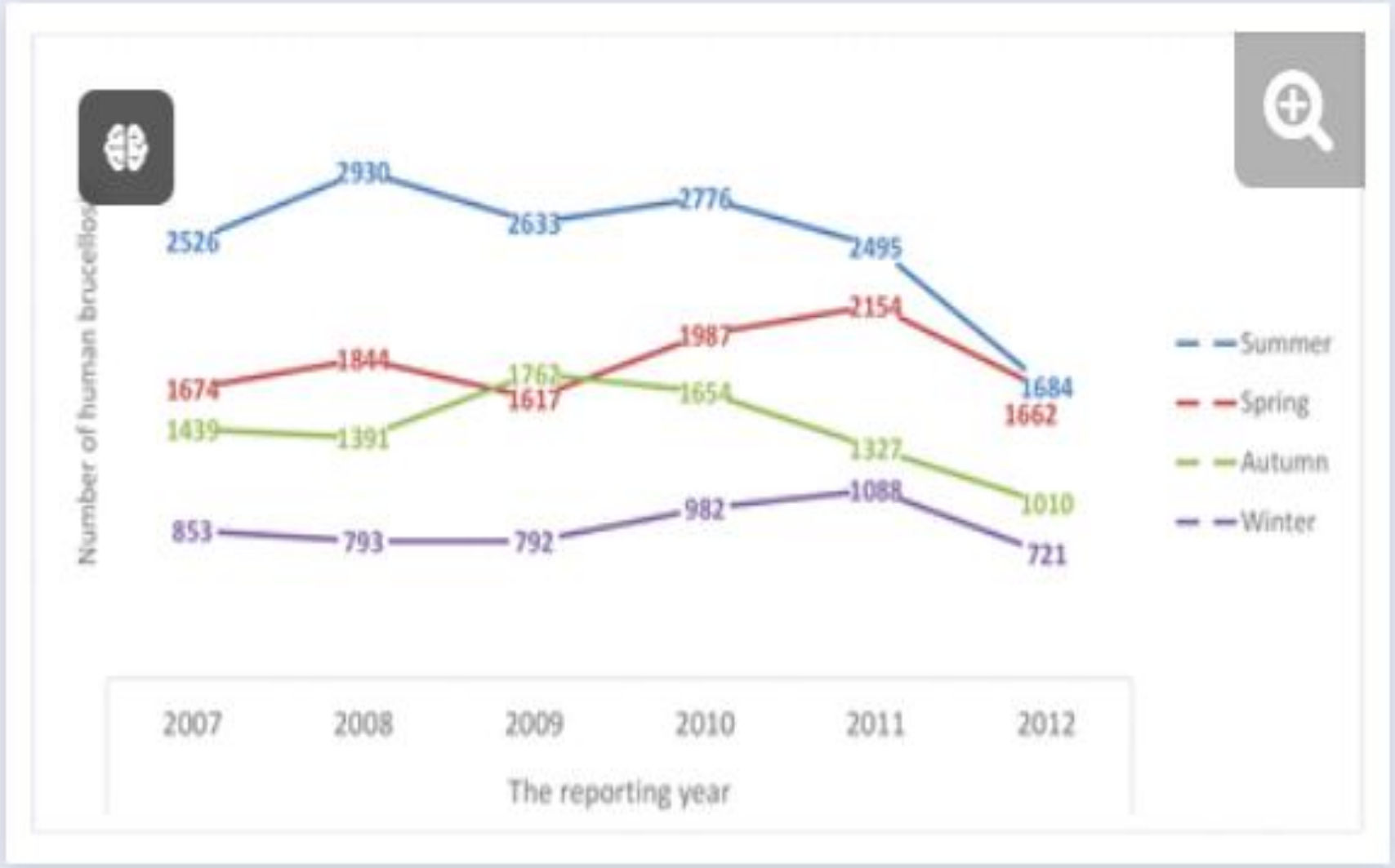


Figure 4.

Seasonal distribution of Brucellosis cases in Iraq during 2007-2012.

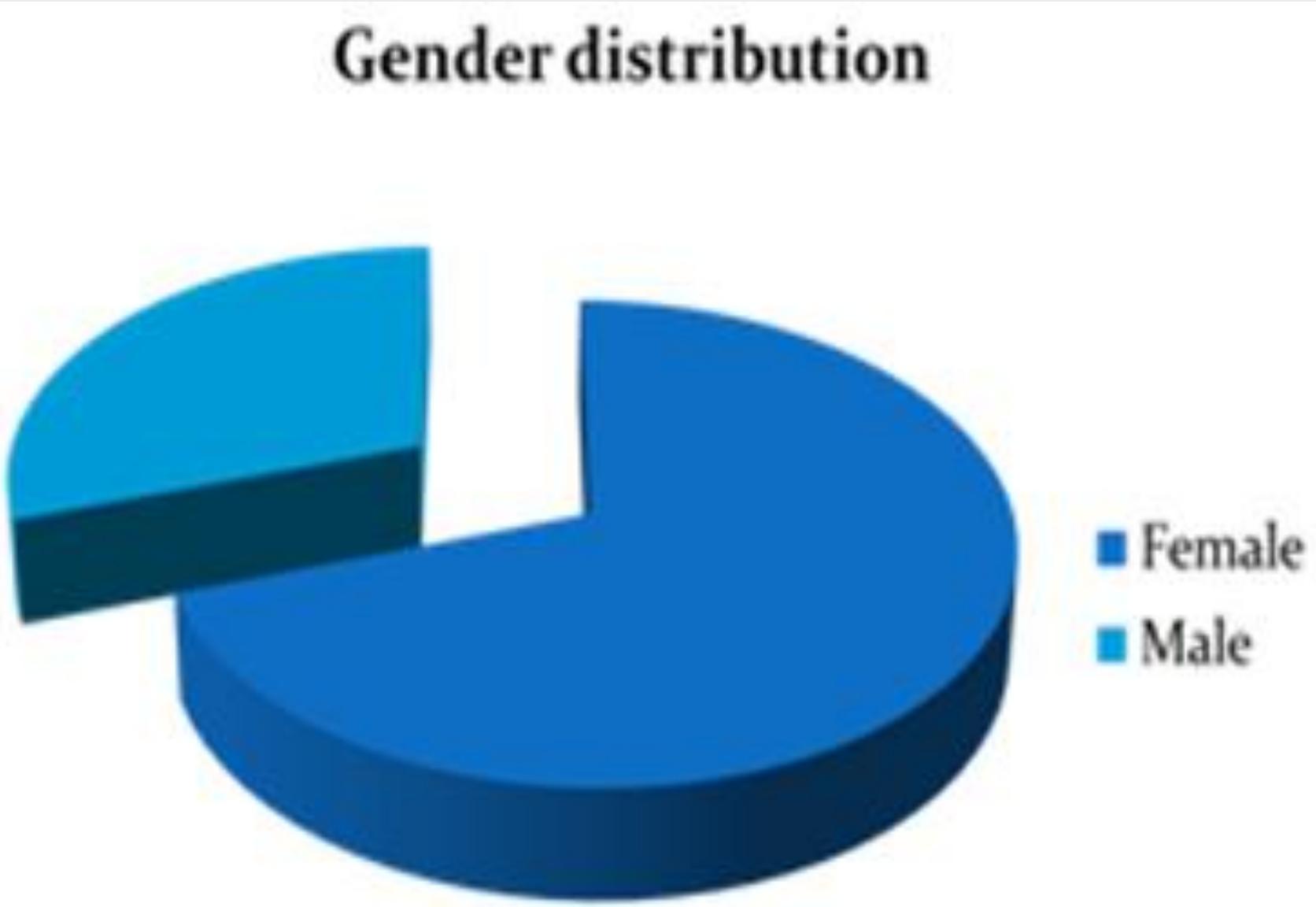


Fig. 1 : Gender distribution of brucellosis infection in Iraq during 2017.

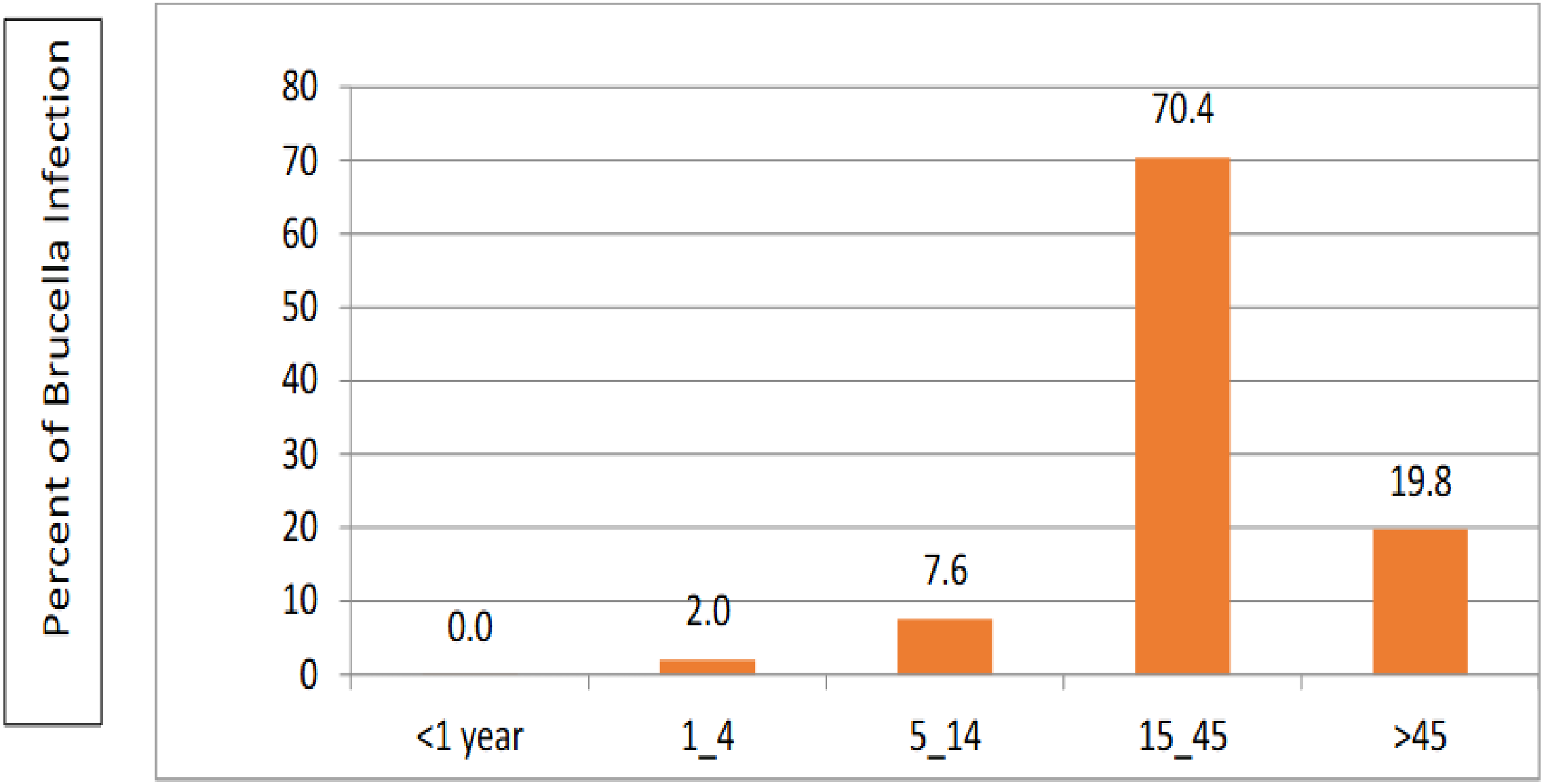


Fig-1: Distribution of the Age-groups with Brucella Patients

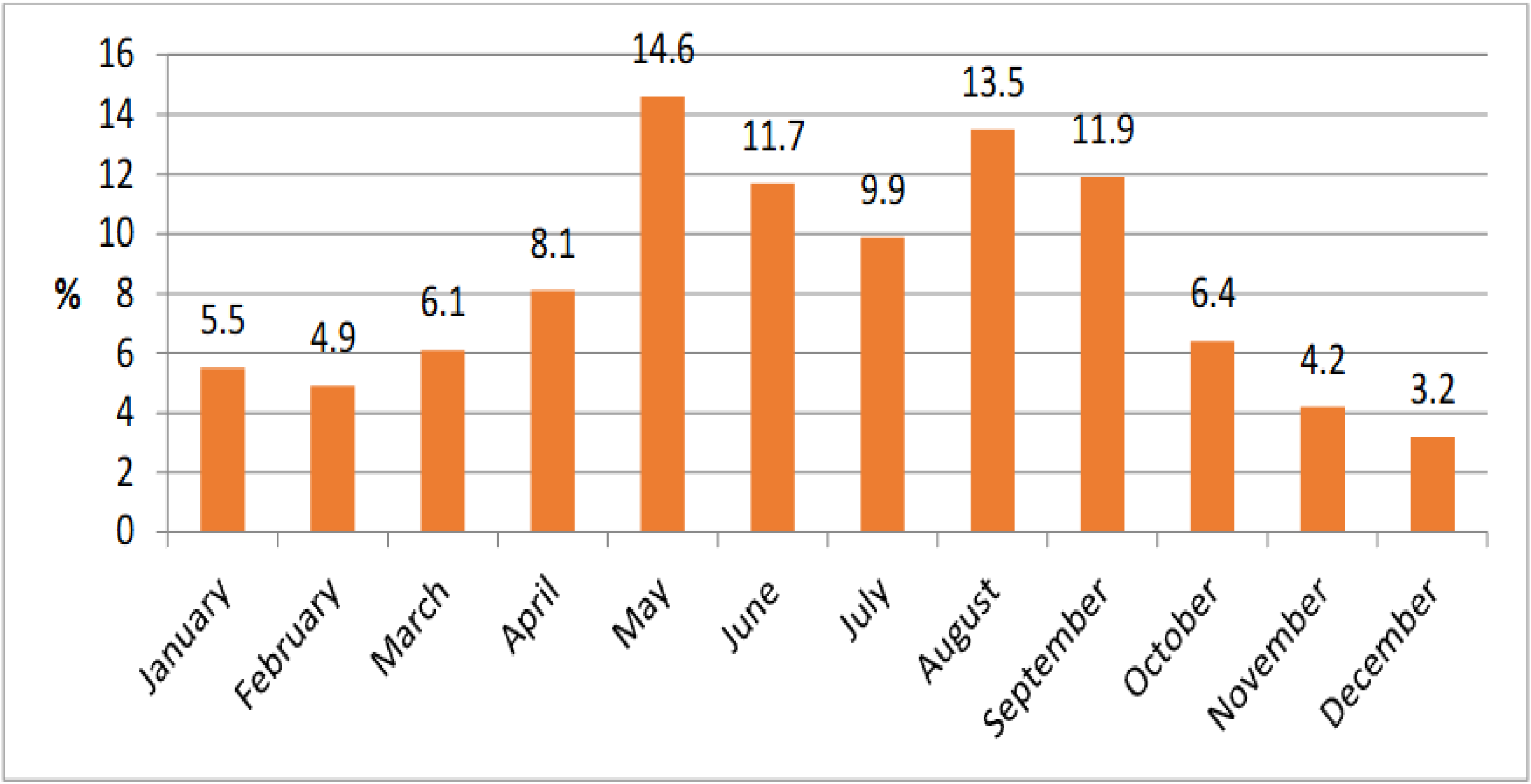


Fig-2: The Distribution of Number of Cases According to Month's Variation

Fig-3 demonstrated the number of patients with brucellosis in eighteen Iraq's provinces in year (2015). The most cases of brucellosis recorded were from Al-Sulaymaniyah which represent796 case (43.6%), followed by Erbil and Nineveh 240, 174 case (13.2% and 9.5%) respectively. While the cases from Anbar was 0% because of the war situation at this year so no data obtained.

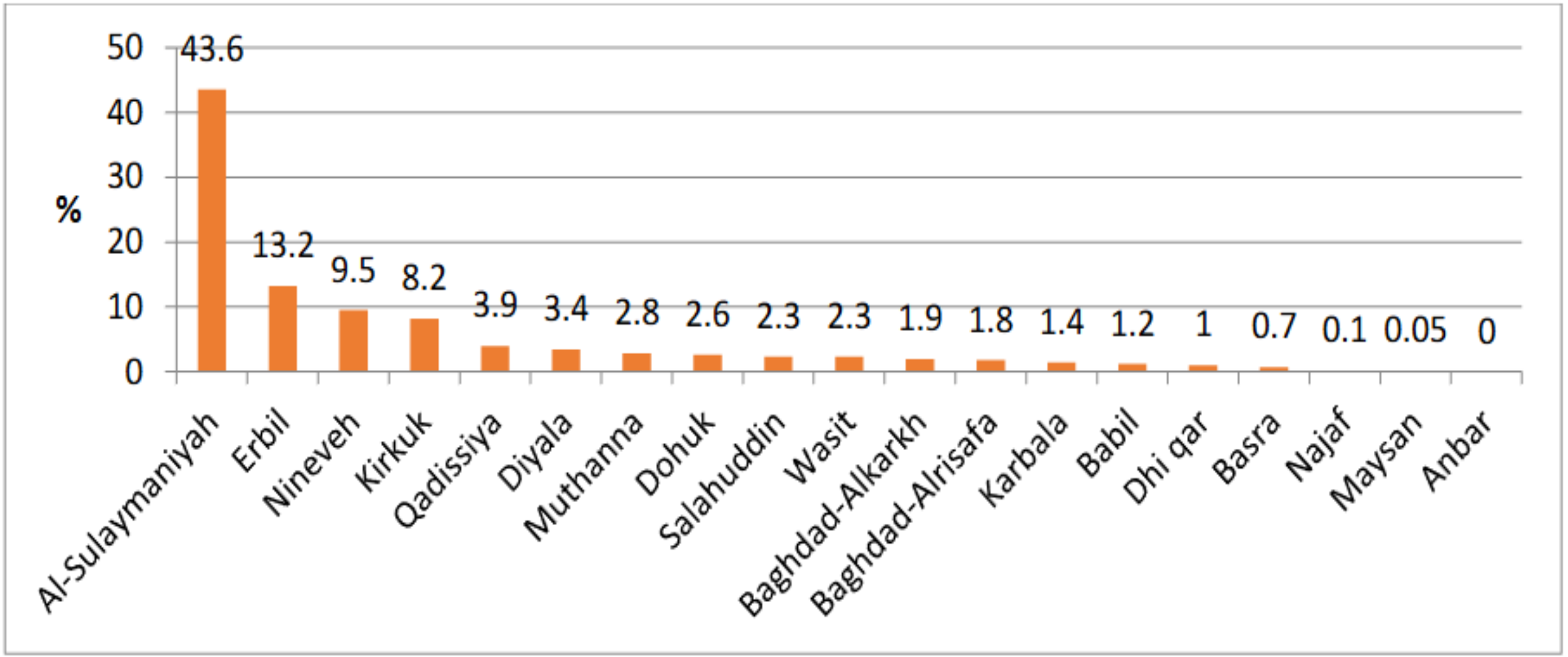
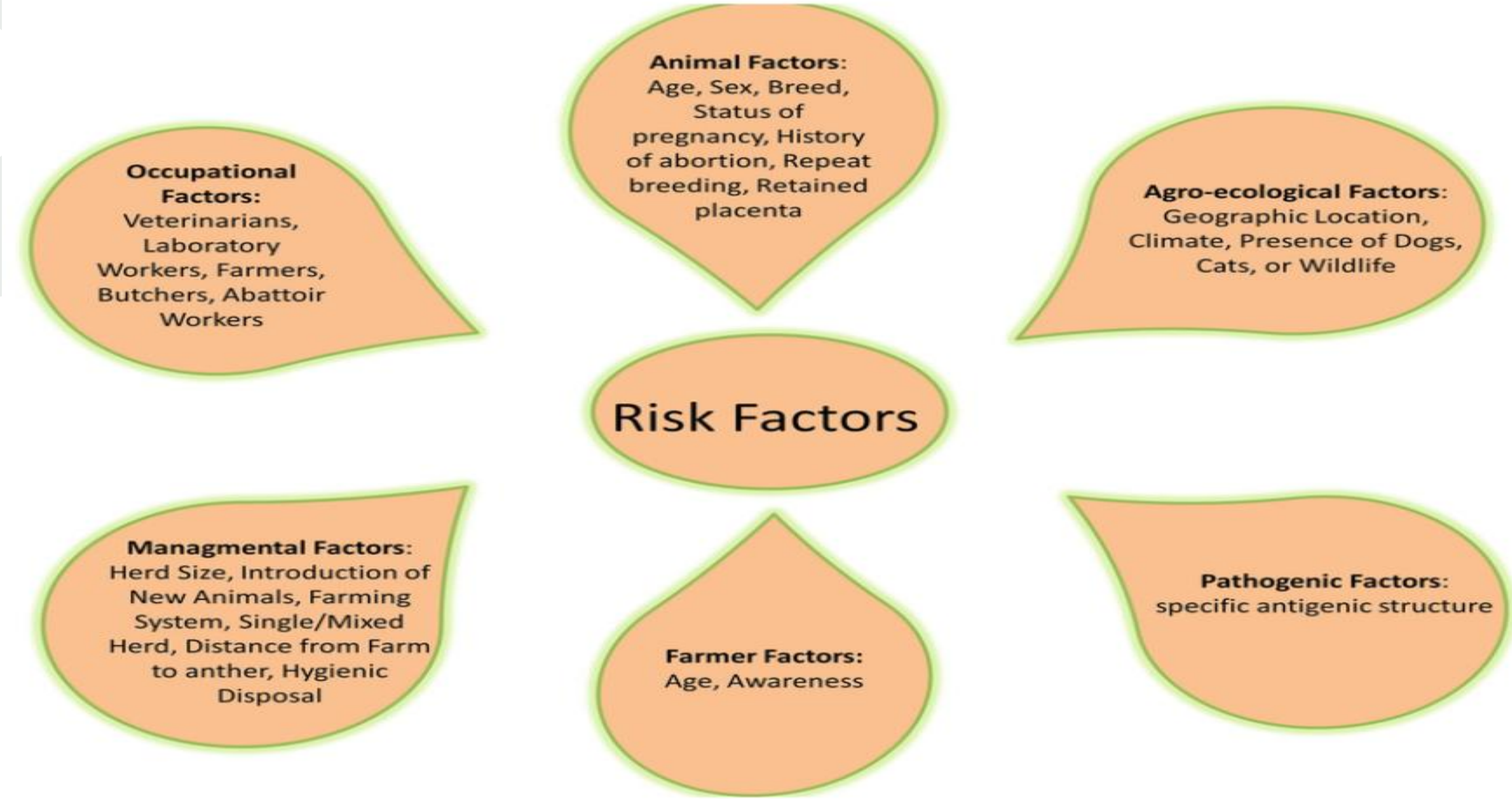


Fig-3: Brucellosis among Patients in Different Iraq's Provinces in 2015

Host factors

Human brucellosis is predominantly a disease of adult males. (In Iraq females more than males)

Farmers, shepherds, butchers, veterinarians and laboratory workers are particularly at special risk because of occupational exposure.



The risk and predisposing factors of brucellosis.

Environmental factors

- Brucellosis is most prevalent under conditions of advanced domestication of animals in the absence of correspondingly advanced standards of hygiene.
- Overcrowding of herds, high rainfall, lack of exposure to sunlight, unhygienic practices in milk and meat production.
- The infection can travel long distances in milk and dust.
- The environment of a cowshed may be heavily infected.
- The organism can survive for weeks, or months in favourable conditions of water, urine, faeces, damp soil and manure

Mode of transmission

Transmission is usually from infected animals to man.

The routes of spread are :

(a) *Contact infection:* Most commonly, infection occurs by direct contact with infected tissues, blood, urine, vaginal discharge, aborted fetuses and especially the placenta.

Infection takes place through abraded skin, mucosa or conjunctiva (mucocutaneous route).

This type of spread is largely occupational and occurs in persons involved in handling livestock and slaughterhouse workers.

(b) Food-borne infection: **Infection may take place indirectly by the ingestion of raw milk or dairy products (cheese) from infected animals.**

Fresh raw vegetables can also carry infection if grown on soil containing manure from infected farms. Water contaminated with the excreta of infected animals may also serve as a source of infection.

(c) Air-borne infection: **The environment of a cow shed may be heavily infected.**

Few people living in such an environment can escape inhalation of infected dust or aerosols.

Brucellae may be inhaled in aerosol form in slaughterhouses and laboratories, so these infections are notified as occupational.

Can brucellosis be spread from person to person?

- **Human-to-human transmission is rare.**
  - ✓Bone marrow transplantation from infected donors
  - ✓Blood transfusion
  - ✓Sexual intercourse
  - ✓Neonatal infection; trans-placentally or during delivery
  - ✓ Or probably through breast milk.

Incubation period

Highly variable.

Usually, 1-3 weeks but may be as long as 6 months or more.

Pattern of disease

Brucella infection in man can vary from an acute febrile disease to a chronic low-grade ill-defined disease, lasting for several days, months, or occasionally years.

The acute phase is characterized by a sudden or insidious onset of illness with

(i) swinging pyrexia (up to 40-41 C), rigors and sweating.

(ii) arthralgia/arthritis (usually monoarticular) involving larger joints such as hip, knee, shoulder and ankle.

(iii) low back pain.

(iv) headache, insomnia.

(v) small firm splenomegaly and hepatomegaly.

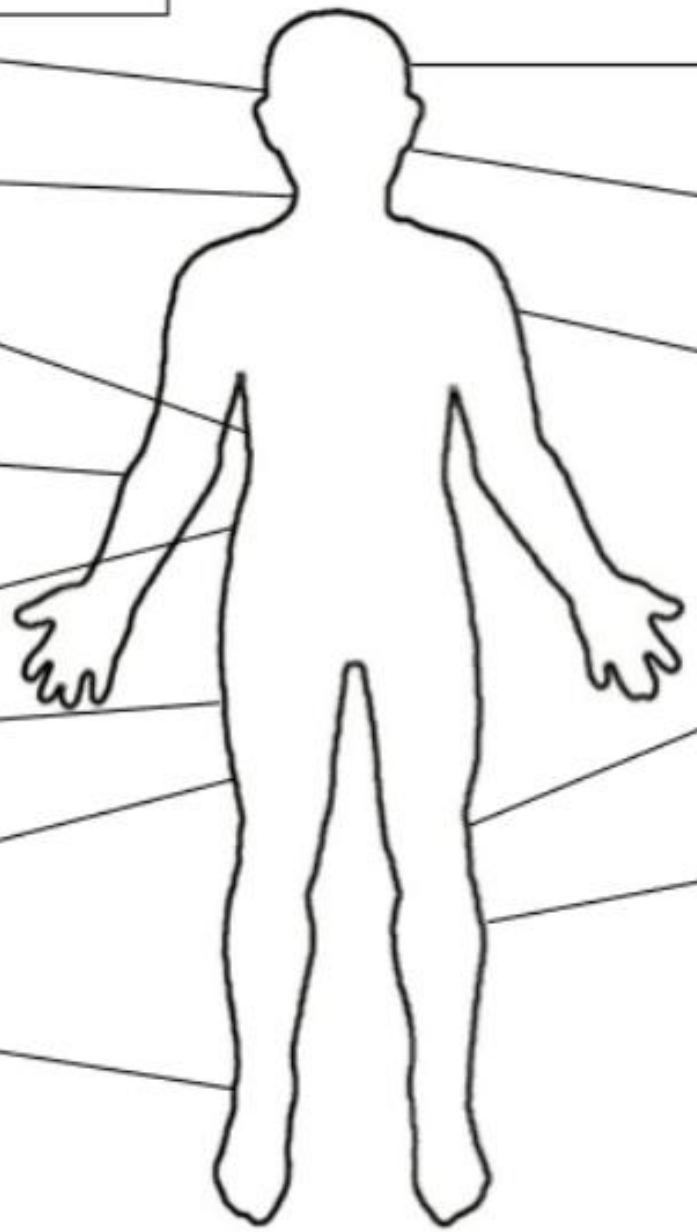
(vi) leucopenia with relative lymphocytosis

Clinical features:

- Dry cough
- Headache
- Fever
- Lymphadenopathy
- Night sweats
- Hepatosplenomegaly
- Weight loss
- Malaise & myalgia
- Arthralgia

Complications:

- Orchitis
- Meningoencephalitis
- Endocarditis
- Osteomyelitis
- Arthritis



Key points for the diagnosis of brucellosis in humans

- ✓ In acute brucellosis, isolation of *Brucella* from blood or other tissues definitive.
- ✓ Culture is often negative, especially in long-standing disease.
- ✓ Serology is the most generally useful diagnostic approach.
- ✓ The RBT, tube agglutination and ELISA procedures are recommende
- ✓ Methods which differentiate IgM and IgG can distinguish active and past infection.
- ✓ False positive serological reactions may occur.
- ✓ Skin test reactions indicate past exposure not active infection.

The most striking aspect of the clinical picture is the severity of the illness and the absence of clinical signs. (PUO)

The acute phase subsides within 2-3 weeks.

If the patient is treated with tetracycline, the symptoms may disappear quickly, but the infection, being intracellular, may persist giving rise to subacute or relapsing disease.

Symptoms recur for prolonged periods in a few patients (up to 20 percent).

Control of brucellosis

IN THE ANIMALS

A-Test and slaughter : **Case finding is done by mass surveys. Skin tests are available. The complement fixation test is also recommended. Those animals infected with brucellosis are slaughtered, with full compensation paid to farmers. This is the only satisfactory solution aimed at eradication of the disease.**

B-Vaccination: **Vaccine of *B. abortus* strain 19 is commonly used for young animals.**

A compulsory vaccination programme for all heifers in a given community on a yearly basis can considerably reduce the rate of infection.

Systematic vaccination for a period of 7 to 10 years may result in the elimination of the disease. Control of the infection caused by *B. melitensis* in goats and sheep has to be based mainly on vaccination .

C- Hygienic measures: **These comprise provision of a clean sanitary environment for animals, sanitary disposal of urine and faeces, veterinary care of animals and health education of all those who are occupationally involved.**

IN THE HUMANS

(a)Early diagnosis and treatment:

In uncomplicated cases the antibiotic of choice is doxycycline =tetracycline.

In patients with skeletal or other complications,intramuscular streptomycin 1 g daily in addition to tetracycline usually achieves a cure.

(b) Pasteurization of milk: **This is a useful preventive measure which will render milk and milk products safe for consumption. Boiling of milk is effective when pasteurization is not possible.**

Treatment

- ✓ The essential element in the treatment of all forms of human brucellosis is the administration of **effective antibiotics for an adequate length of time.**

Category	Treatment
Adults and children eight years of age and older:	**Doxycycline + Streptomycin/ Rifampicin**
For children <8yrs of age-	**Cotrimoxazole+Streptomycin /gentamicin** **Cotrimoxazole + rifampicin**
For pregnant females	**Cotrimoxazole/Rifampicin**

(c) Protective measures :

The aim is to prevent direct contact with infected animals.

Persons at risk such as farmers, shepherds, milkmen, abattoir workers should observe high standards of personal hygiene.

They should exercise care in handling and disposal of placenta, discharges, and foetuses from an aborted animal.

They should wear protective clothing when handling carcasses.

Exposed areas of the skin should be washed and soiled clothing renewed.

(d) Vaccination :

A human live vaccine of *B. abortus strain* 19-BA is available.

Vaccines based on live attenuated *Brucella* strains, such as *B. abortus* strain 19BA or 104M, have been used in some countries to protect high-risk populations but have displayed only short-term efficacy and high reactogenicity

REFERRENCES

Park,s Text Book Of Preventive And Social Medicine 23rd Edition

Control of Communicable Diseases Manual, 21st Edition