

Infectious diseases in Iran: a bird's eye view

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Abstract

Thanks to improved health standards in Iran over the past three decades, we have witnessed a shift in the causes of death in Iran from infectious causes to non-communicable diseases—mainly cardiovascular disorders, cancers, and road traffic injuries. The incidence and prevalence of many infectious diseases, such as many parasitic infections, have fallen significantly; there have been no reported cases of dracunculiasis in Iran since the mid-1970s. Great strides have also been made towards the elimination of schistosomiasis in Iran. However, we still have some problems with cutaneous leishmaniasis, hepatitis C, human immunodeficiency virus, tuberculosis, infections among immunocompromised hosts, hospital-acquired infections, and antibiotic-resistant bacterial strains. We need to emphasize improvements in sanitation, good clinical practice, and education about the rational administration of antibiotics.

Keywords: Bacterial infections, communicable diseases, drug resistance, epidemiology, incidence, infection control, microbial, parasitic diseases, prevalence, viral diseases

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Introduction

Infectious diseases constitute a major healthcare burden for many developing countries. Despite all of the efforts made to control infectious diseases, it is estimated that, by the year 2025, they will still kill almost 5 000 000 children under 5 years of age, mostly in developing countries [1].

Iran, a country with an area of 1 648 000 km² in the Middle East, with its various climates, suffers from a wide array of infectious diseases. Previously, the diseases were responsible for most deaths in Iran [2]; however, thanks to improved health standards and the establishment of national surveillance systems over the past two decades, we have witnessed a shift in the causes of death in Iran from infectious causes to non-communicable diseases—mainly cardiovascular disorders, cancers, and road traffic injuries [2,3]. Herein, we wish

to present a bird's eye view of common and important infectious diseases in Iran.

Viral Infections

Viral hepatitis

Viral hepatitis is more common in Iran than in western countries. Hepatitis A and B viruses are the most common causes of acute hepatitis in children and adults, respectively. The prevalence of hepatitis A in Iran, as in many countries in the region, is very high, and although the age of exposure to the virus has been increasing in Iran, owing to improved sanitary measures, children and young adults remain the primary targets, so that most children in Iran contract the disease and have immunity by the age of 10 years. In most parts of

Iran, >90% of people aged ≥ 33 years are seropositive for anti-hepatitis A virus antibody [4–8].

Hepatitis B virus is the most common cause of acute hepatitis in adults. We have witnessed a dramatic decline in the prevalence of hepatitis B in Iran during the last decade; the country is now classified as a region with 'intermediate prevalence' for the disease [9]. Increased popular awareness of hepatitis B risk factors and the establishment of a national hepatitis B vaccination programme in 1993, which includes vaccination of all neonates and vaccination of high-risk groups, could be the reasons for this change. The overall prevalence of hepatitis B surface antigen in Iran is 2.1%. Prevalence rates of >3% are reported in north-eastern Iran; the rate decreases to <2% in the central and western regions [10]. It was shown that genotype D was the only type found in all hepatitis B surface antigen-positive patients [11,12]. The vaccination programme has significantly decreased the carrier rate among young children. As a consequence, the average age of infected people has increased [9].

In Iran, predictors of hepatitis B included family history of the infection, history of receiving blood transfusion, hospitalization, unsafe sex, male gender, and living in urban areas [9]. History of surgery and imprisonment were other major risk factors for infection [5,13]. Certain jobs [14–16] and ethnicities [17] carry a higher risk of acquisition of the infection. Approximately 1.5 million people in Iran are living with the infection; it is estimated that 15–40% of these people are at risk of developing cirrhosis and hepatocellular carcinoma, if left untreated [10,18]. Hepatitis B virus is therefore a true healthcare burden for Iran.

The overall prevalence of hepatitis C in Iran is <1% [5,19], but the rate is much higher among multiply transfused patients [20], including those with β -thalassaemia major [21–23] or coagulopathy [24], and patients with end-stage renal disease undergoing chronic haemodialysis [25,26]. Hepatitis C virus is the aetiology of <10% of cases of chronic hepatitis or liver cirrhosis. The pooled estimate of the prevalence of hepatitis C in haemodialysis patients in Iran is 16%, with a minimum of 3% in Isfahan province (central Iran) to a maximum of 28% in Golestan province (north-eastern Iran) [25]. The prevalence of the infection is also high among intravenous drug users [19,27], but the rate has decreased with the expansion of services for them, such as needle and syringe programmes [28].

Hepatitis C virus infection is common in kidney transplant recipients. It is a major cause of chronic liver disease following renal transplantation, and is associated with higher morbidity and mortality rates in patients on chronic haemodialysis [29]; it is also a major threat to allograft survival in renal transplant recipients [26]. Although not common in the general population, the infection imposes a great burden on

Iran, because of its serious complications and the associated treatments.

Human immunodeficiency virus (HIV) infection

The prevalence of HIV infection in the 15–49-year-old age group increased from almost 0.02% in 1990 to 0.2% in 2004, after which the rate reached a plateau. There are almost 92 000 people living with HIV. Annually, 6000–6500 people die of AIDS [30]. The main cause of death in patients with HIV is tuberculosis [31]. Although patients have free access to antiretroviral therapy, their adherence to highly active antiretroviral therapy, one of the most commonly used drug regimens in Iran, does not exceed 70% [32]. One of the important routes of transmission in Iran is sharing of syringes by intravenous drug users. As HIV and hepatitis C virus are transmitted in the same way, co-infection with these two viruses is not uncommon. In a recent study from Shiraz, southern Iran, 78% of 1338 studied HIV-infected patients were also infected with hepatitis C virus, which increases the likelihood of AIDS-related deaths by more than two-fold [33]. Another report also showed high rates of co-infection with hepatitis B or C virus in HIV-infected patients in Iran [34]. The co-infection rates were significantly higher in intravenous drug users.

Crimean–Congo haemorrhagic fever (CCHF)

Considering the descriptions of a haemorrhagic syndrome associated with ticks in the book *Zakhyre Kharazmshahi* (The-saurus of the Shah of Khwarazm) compiled by the Iranian scholar Jorjani, CCHF may have been reported in Iran as early as AD 1110 [35]. However, the first evidence of the disease in the country was presented by Chumakov *et al.*, in 1970, when 45% of sheep sent from a Tehran abattoir to Moscow tested positive for CCHF antigen [35]. The first confirmed human cases of CCHF in Iran were reported in 1974 and 1975 [36]. However, it was not until the 1999 outbreak that CCHF was recognized as an important public health problem in Iran. Between January 2000 and September 2010, 738 cases of CCHF and 108 deaths from the disease were reported in Iran [36,37]. During this period, the disease was reported from 23 provinces of Iran; the highest incidence rates, in descending order, were in Sistan-va-Baluchestan (south-eastern Iran), Isfahan (central Iran), Fars (southern Iran), Khorasan (north-eastern Iran), and Tehran (northern Iran). The virus isolated from Iranian patients had the same phylogenetic characteristic as that isolated from Pakistan (CCHF Matin strain) [38]. The maximum reported incidence of CCHF was in 2002 [39]. However, as CCHF presents with non-specific influenza-like symptoms, its diagnosis can be difficult. The disease is usually transmitted by ticks, but person-to-person transmission through close

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