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Review Article

Epidemiology of multidrug-resistant, extensively drug resistant, and totally drug resistant tuberculosis in Middle East countries

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ABSTRACT

The 2015 represent the deadline for the global tuberculosis (TB) targets set through the Millennium Development Goals (MDG). From 2016 and onward, new goals were set to end the global TB epidemic via implementing new campaign entitled “the End TB Strategy”. The major hurdle to end TB epidemic in several parts of the world is the emergence and spread of drug resistant *Mycobacterium tuberculosis* (MTB) strains. The better understanding of the actual global burden of drug resistant tuberculosis would feed into better implementing the End TB Strategy. In this article we summarize the current knowledge on the patterns of drug resistance tuberculosis cases in the Middle East countries. These countries are served by the Eastern Mediterranean Regional Office (EMRO), one out of six regional offices of World Health Organization. Middle East countries are characterized by geographic vicinity and population's interaction. However, they are dissimilar in several aspects such as economy and health infrastructures. Regarding economy, countries in this region are ranging from wealthy to very poor. Prevalence of tuberculosis and patterns drug resistance tuberculosis cases are also following variable trends within countries of this region. In almost all Middle East countries, there is under-reporting of drug-resistance tuberculosis cases. There are shortages in the infrastructures and facilities for detecting the pattern of drug-resistance tuberculosis. For instance, six out of 14 countries have neither in-country capacity nor a linkage with a partner laboratory for second-line drug susceptibility testing and only 4 countries have registered site performing Xpert MTB/RIF.

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The Middle East and its position within World Health Organization regional offices

The Middle East is a term first used at the beginning of the last century [1]. It has a loose geographic definition, but with wealthy political usages [2]. Geographically, the Middle East is a region extending from the western side of the Indian subcontinent to the Eastern Mediterranean and from the Arabian Peninsula in the South to Turkey in the North. There are 16 countries forming the Middle East, namely Egypt, Iran, Iraq, Turkey, Saudi Arabia, Yemen, Syria, United Arab Emirates (UAE), Jordan, Palestine, Lebanon, Oman, Kuwait, Qatar, Bahrain, and Israel [3]. According to the World Health Organization (WHO) database, almost 400 million people, approximately 5% of the world's population, live in the Middle East: Egypt (90 million), Iran (78 million), Turkey (78 million), Iraq (35 million) and Saudi Arabia (31 million) being the most populated countries [4]. Six countries are in the Gulf Cooperation Council (GCC); Saudi Arabia, Qatar, Bahrain, Kuwait, Oman, and UAE [5]. Saudi Arabia is the biggest country among the GCC, followed by UAE (9.1 million), Oman (4.2 million), Kuwait (3.8 million), Qatar (2.2 million), and the smallest is Bahrain with population of 1.4 million [4].

Historically, several civilizations and religions have been embraced in the Middle East and formed a framework for human interactions [6]. Some of the human interactions could have medical consequences, such as: waves of human migration and settlements; inter-marriage between civilizations; numerous wars and political instabilities; as well as trading and industry [3,7,8]. Since the beginning of 2011, uprisings and dramatic political changes have swept the Middle East, with major events occurring in Egypt, Syria, and some of the Gulf states and Yemen [2]. The effect of these events on the health systems needs to be addressed. Tuberculosis (TB) has been a familiar disease in the Middle East since ancient times [9]. A consistent external source of TB transmission is the substantial numbers of people migrating to the Middle East for economic or religious reasons [10]. Many of those immigrants or travelers are coming to the Middle East from countries that are endemic for multidrug-resistant (MDR) TB, such as South-East Asia, the Indian subcontinent, the former Soviet Union, and East Africa [11].

Within the United Nations system, the directing and coordinating authority for public health in Middle East countries is the WHO Eastern Mediterranean Regional Office (EMRO), which is one of six regional offices. EMRO serves additional countries (has 21 member states and Palestine; West Bank and Gaza Strip; see: www.emro.who.int). Most of the available data on the burden of MDR TB within EMRO countries are based on WHO estimates, as no population-based representative surveys have been conducted yet in most of the countries. In most of the cases, data other than annual WHO reports are obtained from small studies that are designed to collect information from cases handled in referral hospitals, which makes these studies unreliable sources of data. In contrast, WHO estimates are based on modeling systems, and most of these contain discrepancies between the estimates and detection rates for each country [12,13].

TB profile of the Middle East

The methods used to estimate TB incidence in Middle East countries are variable. In countries such as Iran, Syria, Jordan, and Palestine, case notification data are combined with expert opinion about case detection gaps (under-reporting and underdiagnosis). In Turkey, Saudi Arabia, Qatar, Kuwait, and Oman, notifications are adjusted by a standard amount or measure of under-reporting from inventory studies (surveys conducted to quantify the level of under-reporting of detected TB cases, to account for case detection gaps). In Egypt, Iraq, and Yemen, recent capture-recapture studies were conducted (capture-recapture is a type of modeling designed to permit quantification of the level of under-reporting of diagnosis of cases) [14].

In 2014, a total of 58,252 TB cases were notified in the Middle East, and 96% of the cases were detected in seven countries (Iran, Iraq, Turkey, Egypt, Syria, Saudi Arabia, and Yemen). The biggest contributor to the TB burden in this region was Turkey, which comprised 22% of cases. Five countries reported a TB burden <25/100,000 population compared to one country in 1990 [13], whereas two countries (Iraq and Yemen) reported a burden >50/100,000. Within the countries of the GCC in 2014, the total numbers of notified TB cases

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