GLOBAL STATUS OF EPIDEMIOLOGY

Health status, epidemiological profile and prospects: Eastern Mediterranean region

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Accepted 5 February 2013

Background This article aims at providing an overview of the current epidemiological situation in the heterogeneous Eastern Mediterranean Region (EMR). It is one in a series of eight articles appointed by the International Epidemiological Association to improve the epidemiological situation.

Methods Several resources were used to extract morbidity, mortality and risk factors data that contribute mostly to the burden of disease and highlight health inequalities. Medline search was used to estimate epidemiological publications output by country. Indexing status of Index Medicus for the Eastern Mediterranean (IMEMR) journals in Medline/PubMed was checked. A questionnaire was designed to collect data from epidemiological associations on type of work and workforce. Authors’ knowledge and networks were used to get a perspective on the training, research and funding sources.

Results Large inequalities exist between EMR nations especially ones pertaining to social conflicts. The EMR age-standardized disability-adjusted life years rate per 1000 population is higher than the global one, with most contribution of communicable diseases in low- and middle-income countries (45%) and non-communicable diseases in high-income countries (64%). Iran and Pakistan have the highest number of publications from 1996–2012, but Kuwait has the highest rate of publications per 100 000 population. The majority of IMEMR journals are not indexed in Medline/PubMed. Masters in Public Health is the most common form of training.

Conclusions Efforts are required to ameliorate the epidemiological situation. There is a dire need for health evidence-based policy change and for field training of epidemiologists.

Keywords Eastern Mediterranean Region, epidemiology, burden of disease, health profile, morbidity, mortality

Introduction

The Eastern Mediterranean Region (EMR) represents a mosaic group of 23 nations, including Arab States lying in North Africa and West Asia. North-east African nations comprise Djibouti, Egypt, Somalia, Sudan (and most recently South Sudan), and North-west African nations include the Maghreb countries that incorporate Libya, Morocco and Tunisia. The EMR
also includes Gulf Cooperation Council (GCC) nations of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates (and Yemen, which recently applied for GCC membership) in addition to Iraq, Jordan, Lebanon, the Occupied Palestinian Territory (OPT) and Syria, which shape the Eastern Mediterranean. Other non-Arab countries included in this EMR classification are: Afghanistan, Iran and Pakistan. EMR countries are characterized by dissimilarities at many levels from the historical background, geopolitical and social context, fiscal and cultural aspects to health care provision (in terms of providers of care and resources).\(^1\) Dissimilarities in spoken languages (including Arabic in different dialects, Persian, Urdu and others) and ethnicity also exist. Furthermore, several of these nations have witnessed long years of political instability and social conflicts resulting in massive internal and external displacement of populations. Recently, new EMR nations have experienced wars and social instabilities (including the recent Arab Spring Uprising). However, possible effects of these events on the health status of its nations may not be easily assessed, due to their recent occurrence and scarcely available baseline data which would allow comparison with previous epidemiological status. The heterogeneity of the EMR nations poses a big challenge in presenting aggregate measures of a variety of indicators that reflect the epidemiological situation in the EMR.

This article on the state of epidemiology in the EMR is one of eight articles allotted by the International Epidemiological Association (IEA) for all World Health Organization (WHO)/IEA regions, to foster global efforts for furthering the discipline of epidemiology in different parts of the world. Epidemiology, as a discipline, is rather new in the EMR, dating back to the early 1950s with the first trials to combat cholera in Egypt, by health authorities and international agencies working in Egypt then. The main objective of this article is to provide an overview of the EMR epidemiological situation in order to help IEA develop health-related recommendations for the region. The second objective is to complete the body of knowledge about the EMR that could be useful for public and private institutions and the general public to identify health priority needs and in appropriately allocating resources to improve the health of these nations.

**Methodology**

The World Bank stratification of WHO nations into High Income Countries (HIC) and Low and Middle Income Countries (LMIC) was used to segregate the EMR (Figure 1). World Health Statistics 2011\(^2\) were mainly used to obtain descriptive epidemiological data (Life Expectancy at birth, Mortality Risk in adults aged 15–60 years and Under Five Mortality Rate). The Global Burden of Disease (GBD) 2004\(^3\) was used to assess the burden of disease in the EMR. Contributions of risk factors to Disability Adjusted Life Years (DALYs) in LMIC and HIC in the EMR were obtained from the Global Health Risks,
Mortality and Burden of Diseases Attributable to Selected Major Risks 2009.\textsuperscript{5} WHO Regional Director’s report 2010\textsuperscript{6} and the book Public Health in the Arab World\textsuperscript{7} were the two main regional resources used to extract specific local information about the member states of the region, in addition to other resources (the unpublished survey conducted by Mandil \textit{et al.} in 2008, WHO EMRO website and other published national studies). Internet searches, regional surveys, authors’ knowledge and networks were used to provide perspectives on epidemiological training, research, funding and workforce in the EMR. A Medline search was conducted to gather information on the number of papers published in the EMR (number of hits). The search strategy was done using either ‘epidemiology’ as a MeSH heading or ‘epidemiol*’ as a keyword in the title, abstract or subheading, with ‘Middle East’, ‘Arabs’ or ‘Africa, Northern’ as MeSH terms or ‘middle east*’, ‘north* Africa*’, ‘eastern Mediterranean region’ or ‘arab*’ as keywords in the title, abstract or subheading. Then the result of this search was joined by OR to the geographical locations’ MeSH with ‘Epidemiology’ as a subheading and the number of hits was reported. The same was done for each country alone using the name of the country as a MeSH or as a keyword figuring in the title, abstract or subheading. The number of papers published was looked at for recent years (2006–2012) and in previous ones (1996–2005). Rates of papers published per 100 000 population were then calculated. For the OPT, ‘Occupied Palestinian Territor*’, ‘Gaza Strip’, ‘West Bank’, ‘Palestin*’ and ‘Palestine* Camps’ were used as keywords in the title, abstract or subheading. Indexing status on Medline/PubMed or specific Index Medicus for the Eastern Mediterranean Region (IMEMR) journals were checked.

An original questionnaire was prepared to collect data on epidemiological societies’ contribution to research and health policy development in the region and their collaboration with various health institutions. It addressed presidents of the four local epidemiological societies: Iranian, Lebanese, Tunisian and Saudi Arabian societies and enquired about a few indicators related mainly to human resources (specifically the number of active members) and type of and training activities in the field of epidemiology.

Results

Descriptive epidemiology

Life expectancy and under-five mortality rate estimates were obtained from the World Health Statistics 2011\textsuperscript{2} and mortality risk estimates for adults were drawn from Rajaratnam \textit{et al.’s} study.\textsuperscript{7} For most indicators, aggregate measures are shown. Whenever possible, measures were segregated by country according to: having witnessed social conflicts, being economically poor and having a low development index. Stratification by gender was presented whenever available. Under-5 mortality rate (per 1000 population) and life expectancy for males and females, by country and by income group, are illustrated in Figure 1.

Morbidity and mortality

The estimated median life expectancy at birth for the EMR people is 72 years, slightly higher than the median global estimate of 70 years. Citizens in some GCC nations (Kuwait, Qatar and the United Arab Emirates) enjoy the highest estimated life expectancy of 78 years, followed by Tunisia (75 years). Conversely, people living in nations that have been witnessing social conflicts for a long time (such as Afghanistan, Somalia, Sudan), have the lowest estimated life expectancy ranging from 48 to 59 years. The rest of the countries have an estimated life expectancy that ranges between 63 and 74 years. Stratifying by gender reveals a median life expectancy at birth for EMR males of 70 years, slightly higher than the global median of 69 years, whereas for females the EMR and global estimates are similar (75 years).\textsuperscript{2}

The highest estimated risk of dying between 15 and 60 years of age among males in 2010 was 379 per 1000 population (Djibouti), and among females 295 per 1000 population (Afghanistan). Generally speaking, the estimated mortality risk decreased between 1970 and 2010 for most EMR nations for both genders. In some countries, the situation differed for men: in Sudan it has decreased from 1970 to 1990 and then increased till 2010, and in Pakistan it has slightly increased and then remained constant.\textsuperscript{7} This could be attributed to the presence of social conflicts in these countries.

The median estimated under-5 mortality rate in the EMR varies considerably among EMR states, but overall is similar to the global one (21/1000 population in 2009). The lowest rates (7–17/1000) are reported from GCC nations (Bahrain, Oman, Qatar and UAE), Lebanon and the OPT. EMR countries in social conflict report the highest rates, including Afghanistan (199/1000), Djibouti (93/1000), Pakistan (87/1000), Somalia (180/1000) and Sudan (108/1000).\textsuperscript{2,5}

Considering gender, the median under-five mortality rate for EMR males (24/1000) is the same as the global rate. Similarly, the median rate for EMR females (19/1000) is equivalent to the global rate.\textsuperscript{2} So far, an overall 30% decrease in under-five mortality rate has been reported in the EMR from 1990 to 2009 (with 6% annual decline from 1990 till 2010).\textsuperscript{5,8} Three EMR states (Egypt, Lebanon and Oman) have achieved the Fourth Millennium Development Goal — MDG-4—(i.e. 2/3 decrease in under-five mortality from 1990 till 2015), and six more (Iran, Morocco, Qatar, Syria, Tunisia and UAE) are on their way (with 56–59% reduction). Nevertheless, EMR states which experienced wars, political instability or internal displacement, such as Afghanistan, Yemen, Somalia and Sudan, are not likely to achieve MDG4 by 2015.\textsuperscript{5,9}
Burden of disease
Time trends and current status of disease burden in the EMR, as measured by DALYs per 100,000 population, were reviewed to understand the impact over time of broad health-related outcomes, such as communicable diseases, non-communicable diseases and injuries (last update of the GBD 2004, WHO Regional Director’s Report for the EMR of 2010, Public Health in the Arab World, 2012).

As shown in Figure 2, the overall disease burden in the EMR (273/100,000) is reported to be higher than the global one (237/100,000). We notice that EMR-HIC report higher proportions of communicable, maternal, perinatal and nutritional disorders as compared with HIC in other WHO regions (18% of all diseases), whereas EMR-LMIC report the second highest burden of disease, in different broad categories, after Africa, compared with other LMIC.

Morbidity burden
Based on preliminary results of the 2010 GBD and current discussions among epidemiology professionals, the EMR is witnessing a shift in the 2010 burden of disease from communicable diseases such as respiratory infections and diarrhoeal diseases, representing highest proportion of DALYs in 1990 and 2004 in EMR nations, to non-communicable diseases, such as cardio-vascular diseases (CVD) and neuropsychiatric disorders. In fact, neuropsychiatric disorders contribute to just above 10% of the overall morbidity burden in the EMR. In addition, community-based studies at the national level estimated the prevalence of mental disorders in adults to range from 8.2% in the UAE to 21% in Iran.

Overall in the EMR, based on 2004 estimates, CVD account for 9.2% of total DALYs, among which ischaemic heart disease was reported to be predominant (47%), followed by cerebrovascular disease (20%), hypertensive diseases (7.1%), rheumatic heart disease (4.5%) and inflammatory heart disease (4%). In EMR-HIC, CVD account for 12.5% of total DALYs whereas in LMIC, they account for 9.1% of total DALYs.

The prevalence of diabetes in the EMR is 9.3% and it ranges from 7% to 26% among adults aged 15 to 65 years (7% in Morocco, 10.4% in Iraq, 20.5% in Syria, 26% in Bahrain, respectively) as cited in Public Health in the Arab World. This prevalence is the second highest among all WHO regions.

A review by Mehio-Sibai et al. reported hypertension rates to be quite high among adults aged 25 years and above in the EMR, especially among older adults. The proportion of hypertension ranges between 19.3% in Iraq and 42.1% in Bahrain (a wide range of high prevalence in EMR nations).

Deaths due to non-communicable diseases are expected to rise in the region and surpass 2.6 million cases in 2015 and 3.8 million in 2030, if effective community-based interventions do not take place.

Figure 2 Burden of disease, by WHO Region, GBD 2004 data. Source: Blakely et al.
Mortality burden
CVD account for the biggest proportion of deaths (27% of all deaths) with: 13.4% due to ischaemic heart disease, 5.9% due to cerebrovascular disease and 2.4% due to hypertensive disease. Almost 50% of deaths are attributed to CVD and cerebrovascular diseases, as reported from studies conducted in the OPT between 1999 and 2003. Cancer was the second non-communicable disease to contribute to the EMR mortality burden, according to 2004 estimates. Breast and lung cancers were the top causes of deaths due to cancer. By 2020, and compared with other WHO regions, the EMR is expected to witness the highest increase of cancer-related deaths. Even though diabetes is approximated to being the seventh leading cause of disability and the sixth leading cause of death in the EMR in 2010, its effect is diluted by the fact that people who have diabetes mostly die from CVD.

Injuries in the EMR
Injuries are among the leading causes of morbidity and mortality in young age groups in the EMR. GCC states and Egypt report the highest rates among EMR nations. Males are reported to be more affected by injuries than females. Road traffic accidents contribute most to EMR injury morbidity and mortality burdens (32.2 deaths per 100 000 population). Consequently the EMR region has the highest death rate due to road traffic accidents, among other WHO regions. The age-adjusted death rate in the EMR attributed to road traffic accidents was reported to contribute to the EMR mortality burden, according to 2004 estimates. Breast and lung cancers were the top causes of deaths due to cancer. By 2020, and compared with other WHO regions, the EMR is expected to witness the highest increase of cancer-related deaths. Even though diabetes is approximated to being the seventh leading cause of disability and the sixth leading cause of death in the EMR in 2010, its effect is diluted by the fact that people who have diabetes mostly die from CVD.

Risk factors
The top 10 risk factors reported to contribute most to the morbidity burden (% DALYs) in EMR-LMIC are: underweight (8.6%), unsafe water, sanitation and hygiene (5.3%), suboptimal breastfeeding (5.2%), indoor smoke from solid fuels (3.1%), high blood pressure (3.0%), high blood glucose (2.6%), overweight and obesity (2.1%), vitamin A deficiency (2.1%), tobacco use (2.0%) and physical inactivity (1.8%). This reflects the fact that EMR-LMIC still suffer greatly from risk factors associated with communicable diseases. Yet, the burden of disease in EMR-HIC is mostly related to risk factors that are associated with non-communicable diseases. More precisely, the 10 risk factors that contribute the most to the burden of disease (% DALYS) in EMR-HIC are: overweight and obesity (7.3%), high blood glucose (5.9%), high blood pressure (4.3%), physical inactivity (3.3%), high cholesterol level (2.4%), lead exposure (2.1%), suboptimal breastfeeding (2.0%), unsafe water, sanitation and hygiene (1.9%), underweight (1.5%) and risk factors for injuries. Among risk factors associated with non-communicable diseases in the EMR, some (such as tobacco use, physical inactivity, imbalanced nutrition, hypertension, obesity) are observed to show an increasing trend over time in the region. Although tobacco use is the 17th leading risk factor in HIC and the 9th in LMIC (0.7% and 2.0% of total DALYs, respectively) from a uniform list which includes risk factors for both communicable and non-communicable diseases, its prevalence seems to be underestimated, as it does not take into consideration alternative forms of tobacco use, such as water-pipe, nor under-reporting of smoking among females. Moreover, data are only available from about half of the EMR countries. Among Arab countries, Jordan and Tunisia have the highest age-standardized tobacco consumption rates (36% and 26%, respectively) whereas Oman has the lowest (11%). Generally speaking, EMR is witnessing an escalating epidemic of tobacco use with increasing rates of cigarette consumption and emergence of water-pipe smoking. Tobacco use among adult males is reported to be much higher than among adult females. It is also noted that water-pipe smoking has become very prevalent in the region, especially among young females. A systematic review by Akl et al found that the prevalence of current water-pipe smoking among schoolchildren is high in GCC nations (9–16%) and Lebanon (25%). Among university students, it was reported to be less prevalent in GCC nations (6%) and Syria (15%) than in Lebanon (28%) and Pakistan (33%). Adult water-pipe smoking in the EMR is the highest in Lebanon (15%), followed by Syria (9–12%), GCC countries (4–12%) and Pakistan (6%). Smoking water-pipes in groups is common in Egypt (11–15%) and Lebanon (5%). Around 5% of pregnant women in Lebanon reported smoking a water-pipe during their pregnancy. This might be explained by the fact that water-pipe smoking seems to be generally more culturally acceptable than cigarette use in some countries of the EMR, in particular among women. Overseas control, obesity and physical inactivity are reported to be quite prevalent in the region. Unlike tobacco use, the estimated prevalence of physical inactivity, obesity and overweight is higher in females than males. The WHO STEPS study in some EMR countries, as cited by Alwan et al., showed that
Sudan has the highest proportion of people who are not sufficiently physically active (above 90% of females and 70% of males), with lowest rate in Tunisia (20% of females and 10% of males). The prevalence of overweight people was found to be more than 60% in Bahrain, Jordan, Qatar and the UAE and over 70% in Egypt and Kuwait. The estimated regional rate of obesity is almost 25%. According to the study conducted by Mehio Sibai et al., obesity rates are the highest in GCC nations, especially Saudi Arabia (almost 44%).

The top 21 risk factors contributing to DALYs in the EMR-LMIC and EMR-HIC as compared with the world are shown in Figure 3.

### Journals and publications in the EMR

#### Peer-reviewed epidemiological publications

Following the rigorous Medline search methodology described in the Methods section, the number of Medline-indexed journal epidemiological papers in the EMR has increased 2.4-fold from 10,053 during the period 1996–2005 to 24,142 during the period 2006–2012 (to 2 November 2012 only).

When we segregate by country and group nations according to HIC and LMIC, we find that the number of Medline hits for epidemiological papers in all LMICs in the EMR has doubled, from 530.9 per year during 1996–2005 to 1288.3 per year during 2006–2012 (to 2 November 2012 only), with Iran and Pakistan contributing greatly to this increase. In HICs in the EMR, the number of epidemiological Medline hits has increased from 174.7 per year in 1996–2005 to 230.1 per year in 2006–2012 (to 2 November 2012 only).

The EMR country that appears the most as a MeSH or as a key work in the title, abstract or subheading in epidemiological papers in 1996–2012 is Iran (3661 papers), followed by Pakistan (2747), then Saudi Arabia (2069) and Egypt (1629). However, presented as a rate per 100,000 population, Kuwait has the highest rate of publications per 100,000 population in 1996–2012 (20.76), followed by Lebanon (13.82) and Tunisia (13.24). Excluding South Sudan, Syria has the lowest rate of publications per 100,000 population (0.88) (Table 1).

### Journals in IMEMR

The Index Medicus for the Eastern Mediterranean Region (IMEMR) database was created by WHO to improve access to the latest publications about and from the EMR, since health and biomedical sources about this region are not always integrated within top bibliographical databases. The IMEMR contains a total of 523 journals, among which 331 have an active IMEMR indexing status.

The indexing status in Medline of IMEMR’s journals was reviewed, including subjects of: communicable diseases (8), community medicine (6), diabetes
null
Prevention) expertise. So far, more than 250 epidemiologists have graduated from the functional FETPs held in the EMR.21

Research institutions and funding for research
A recent WHO-funded study22 carried out on 106 EMR health research institutions (65% reporting from four nations only, i.e. Egypt, Lebanon, Pakistan and Iran) showed that more than half of the surveyed institutions are academic-based (58%), most of which (80%) have an educational programme. About 60% have both undergraduate and postgraduate programmes, whereas around one-third have postgraduate programmes only and one-tenth have only undergraduate programmes. Birth and maternity health and non-communicable diseases were found to be the predominant topics of research (59% of surveyed institutions), followed by communicable diseases research (45%). Most research institutions reported having bioethics review committees (80%). About one-third of them mentioned having specific research area labs (32% biotechnical labs, 17% tropical labs, 15% clinical labs, 8% public health labs and 19% other labs). The majority of surveyed EMR health research institutions share their research results with their institutions by producing printed reports (85%) and sending mass e-mails (37%) but much less through organizing meetings or publishing in scientific journals (13% and 12%, respectively). Outside their institutions, researchers share the results of their research mostly with scientific communities (91%), health professionals (81%) and decision-makers (64%). Unfortunately only very few share the results with the general public (4%). Public funding was reported to be the main source of funding for these institutions (80%), followed by WHO funds (35%), private donations (31%), other UN agencies (30%), other international agencies (22%), pharmaceutical companies (19%) and international aid programmes (17%). Around 10% of funding was mentioned to be financed by institutions’ revenues (12%) and the smallest portion came from vaccine manufacturers (3%).

Some of the major research funding initiatives in the EMR which positively influence epidemiological research in the region (arranged in alphabetical order of nations) include: Academy for Scientific Research and Technology (Egypt); Kuwait Foundation for Scientific Development and Kuwait Society for the Advancement of Arab Children—KSAAC (Kuwait); Karim Khan Foundation (Lebanon); Qatar Foundation and Qatar National Research Fund—QNRF (Qatar); King Abdul-Aziz City for Science and Technology—KACST, Arab Gulf Programme for Development—AGFUND and Islamic Bank for Development (Saudi Arabia); in addition to Shaikh Hamdan bin Rashid Al-Maktoum Foundation (UAE). It is to be noted that this is not an exhaustive list of funding agencies in the EMR.

Regional and global institutions, networks, organizations and active societies
Regional communicable disease surveillance is coordinated by WHO across the EMR mainly through two WHO units, namely Emerging and Other Diseases and AIDS, Malaria and TB.23 The WHO’s STEPwise approach to chronic disease risk factors surveillance (STEPS) has helped in collecting information about non-communicable diseases risk factors at country level which allows comparison between EMR states.24

In order to establish an integrated and comprehensive approach to non-communicable disease prevention and control efforts, the WHO/EMRO office supported the establishment of the Eastern Mediterranean Approach to Non-Communicable Diseases Network (EMAN). The network’s objectives are to connect Eastern Mediterranean countries through community-based programmes, to raise awareness about main risk factors (namely smoking, hypertension, diabetes, obesity and physical inactivity) that are prevalent in the region, to facilitate capacity building for the implementation of standardized NCD risk factors surveillance and also at primary health care level to advance chronic conditions care.25

As related to epidemiology, the EMR has two forums: the Eastern Mediterranean Regional Academic Institutions Network for Public Health (EMRAIN) that assembles regional academic institutions (of public health) to advance public health through building institutional capacity, empowering the health personnel, knowledge sharing and using evidence-based priorities and policies; and the Middle East and North Africa-Health Policy Forum (MENA-HPF) which aspires to instituting evidence-based policy in the region through cooperation, research, capacity building and knowledge exchange.26

The International Epidemiological Association (IEA) has been quite active in the EMR, especially over the past two decades. Several IEA regional meetings have been held in its members’ states. These include: Egypt (1995); Lebanon (1997, 2010); Tunisia (1998); Bahrain (2000); Iran (2003); and Saudi Arabia (2007). Moreover, at least four national epidemiological associations have been active in the EMR and are linked to IEA activities (i.e. Lebanese, Tunisian, Saudi and Iranian associations). Other epidemiology-related societies exist in the EMR, but under titles of public health, community medicine, preventive medicine etc. All such associations help further the discipline of epidemiology in the EMR; network professionals working in the field of epidemiology; facilitate exchange of research information and expertise through holding meetings/workshops/conferences; and the production/dissemination of scientific bulletins and journals. It should be noted that each above-mentioned IEA regional meeting produced an abstract book in addition to an important publication, the Compendium of Tobacco Publications.27

The Lebanese Epidemiological Association (LEA) was founded in 1994, whereas the Iranian
Epidemiological Association (IrEA) was founded in 2000. Both associations contribute to a large extent to furthering the discipline of epidemiology and are highly involved in generating epidemiological research/publications/evidence for decision-making in their respective countries. Whereas the IrEA collaborates to a large extent with the national ministry of health and with other health care delivery institutions (e.g. military, religious, private sector, charitable) in Iran, the LEA’s cooperation with these institutions is to a lesser degree. Both associations work on epidemiological research and health promotion activities, in partnership with non-governmental organizations or civil society organizations working in the field of public health, or more precisely epidemiology, in their country. The IrEA strongly influences health policymaking in Iran through producing relevant evidence. However, it has not been approached systematically and consistently by the ministry of public health.

The International Clinical Epidemiology Network (INCLLEN) aims at improving the health of people especially in developing countries by conducting interdisciplinary research, training health care research leaders and networking. It is active in the EMR through two of its seven branches. Some EMR nations are part of regional INCLLEN bodies. For example, INCLLEN-Africa (Afri-Clin) comprises eight African universities and one health institute among which is the Suez Canal University, Ismailia, Egypt. Similarly, the Aga Khan University in Pakistan is part of INCLLEN-Asia (which includes 17 Asian universities). 28

Workforce

If we try to estimate the epidemiological workforce capacity by looking at the rate of IEA members per 100,000 population in the EMR and compare it with rates in other WHO regions, we will find that the epidemiological workforce capacity in the EMR (0.17) is higher than the African (0.06) and South-East Asian (0.04) regions and slightly higher than the Western Pacific region (0.13). However, it is much less than the capacity of epidemiological workforce in both the Americas (0.32) and Europe (0.31). 10

It is to be noted that IEA membership is never a true indicator of the overall epidemiology workforce, as only small proportions of those working in the field of epidemiology are actually IEA members, as evidenced by participants in our regional/global meetings, where we notice that members only represent fractions of those working in the field. Moreover, not all IEA members are epidemiologists by training. The current number of active members enrolled in the Iranian Epidemiological Association (IrEA) is 263 (as of 1 May 2012), out of whom 152 are epidemiologists by training (i.e. hold an academic degree in epidemiology). The key members of the IrEA have had significant roles in national health programmes. They also have high-ranking positions in other disciplines related to research, education, management and budgeting. The LEA on the other hand, has 50 active members, just above half of whom (26) hold a degree in epidemiology.

Discussion

This paper provides an overview of the current epidemiological situation in the EMR. Because of the heterogeneity of EMR nations, aggregate measures cannot tell the story of the region. When basic health indicators are presented by country, they reveal a wide disparity in health status, very obvious especially when countries are divided according to whether they are witnessing wars and civil unrest or not and are in the LMIC classification.

Whereas trends and differences are a true reflection of the reality, the absolute values of some indicators can be misleading and therefore should be interpreted with caution. Some data are old and might not reflect the current situation such as the Global Burden of Disease data 1 and others are not age-standardized, such as information on prevalence of water-pipe smoking taken from a systematic review by Maziak et al. 17 Even when information is taken from a single reliable source, such as the World Health Statistics, there is still doubt about the origin of the data. The source of the information could be potentially flawed. For instance, disability weights used to assess the burden of disease are not always designed to suit the incidence or prevalence of the source of disability, neither available nor appropriate. This is particularly true when assessing injuries, since one type of injury might lead to different forms of disability and the latter might change in severity and duration. 29 However, the authors have no means to verify these sources which are mostly ad hoc surveys for the countries.

HICs are not necessarily doing better than LMICs in terms of burden of disease and risk factors. In truth, this may be a result of lumping countries together. Quite a few LMICs are doing well. For instance, the estimated under-5 mortality rate in Lebanon that is lower than the rate in Saudi Arabia (21 per 1000 population), classified as one of the HICs. Life expectancy for males and females is better in Lebanon and Tunisia than in Saudi Arabia (males: 71 and 73 in Lebanon and Tunisia, respectively; females: 77 in Lebanon and Tunisia versus 75 in Saudi Arabia). 2

Conclusions

The EMR is rich in terms of culture and religion, yet complex in its nature and different health determinants. Hence, any trial to address its health and epidemiology profile will always fall short of encompassing all necessary details, especially with scarcity of reliable and valid data from a region plagued by social conflicts in at least one-third of its nations.
We would like to mention that quantitative comparisons of health indicators and related conclusions have to be taken with caution, as these were generally based on resources referred to, multiple studies done in the same country over time or comparing countries in the EMR using the same methodologies. Thus, we should call for better capacity-building in epidemiology, encourage building/sustaining surveillance systems not only for communicable diseases, but also for non-communicable diseases and related risk factors, and ensure that the health policy-makers respect/utilize evidence generated from such systems. Until all this happens, we take our results and related conclusions with some caution and care.

Future challenges

Unfortunately, health systems in many countries of the EMR have not adapted a comprehensive concept of public health / epidemiology and remain centred on the disease-focused biomedical model. Community involvement and empowerment are still not accepted and implemented enough. Resources and employment positions are mainly reserved for physicians and nurses. As a result, graduates of independent public health programmes struggle to incorporate a wider perspective of health in the existing curative-oriented context.

Graduate programmes offering specialized training in epidemiology are scarce, in comparison with different preventive medicine programmes, whether in the public or private sectors in the EMR. Moreover, there is a big gap between health researchers / epidemiologists in academic and research institutions on one hand and decision- and policy-makers on the other, especially when it comes to using research-produced evidence for sound cost-effective health policy-making.

There is also dire need for establishment of national epidemiology societies and FETPs in more nations in the EMR. The former will help network professionals working in the field of epidemiology and encourage experience exchange. The latter will assist in producing professionals well trained in solving community-based health problems, thus assisting sound decision-making, prevention and control of health problems, especially communicable diseases as well as non-communicable diseases of public health importance.

More emphasis needs to be placed on the major morbidity mortality problem of injuries in the EMR, especially in GCC states and Egypt. This only begins with political commitment and the establishment/enforcement of injury control programmes, and includes a long process of establishment of relevant action plans, surveillance systems and health awareness campaigns for the public for control of injuries, among other needed measures.

In the area of vaccine-preventable diseases, the EMR has witnessed improvements and obstacles. However, Millennium Development Goal 4, relating to decrease of under-five mortality, and Millennium Development Goal 5, concerning reduction of maternal mortality, are not expected to be achieved in many EMR nations. This is due to prevalent social conflicts in many states and variable political commitment and universal access to quality primary health care services. It is also due to scarce efficient health information systems that are hindering assessment of improvement towards reaching these goals and evidence-based decision-making.

Not only do chronic/non-communicable diseases constitute more than 60% of the burden of disease in the region and greatly affect quality of life; they also greatly affect the economy of individuals, families and the community at large. Although these diseases are preventable to a large extent, cost-effective interventions and prevention programmes to raise public awareness are scarce. Preventive activities that focus on healthy lifestyles—such as anti-smoking campaigns, encouraging frequent physical activity and balanced diet—and promote frequent health check-ups remain minor, compared with curative measures.

Changes in the EMR are needed to re-conceptualize health beyond disease. In order to obtain a comprehensive public health approach, national health reforms should take place. National and regional multi-disciplinary networks should be established to assess the current public health situation and put in place research plans to implement evidence-based changes. Assistance in achieving preventive measures within a broader public health image could be drawn from the global guidelines and regional strategic plans.

Funding

This study has been supported by the International Epidemiological Association (IEA).

Conflict of interest: None declared.

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