Global Burden of Disease Study 2010: A Real Advance in Global Descriptive Epidemiology: Perspective For Developing Countries

The Global Burden of Disease Study 2010 (GBD 2010) is to date the largest epidemiologic study on major illnesses and injuries. The study includes several millions of observations on risk factors, causes of death, mortality, injury and disease incidence and prevalence during a 5 year period with more than 400 contributing scientists across the globe. The study has developed novel metrics that quantify not only the disease but also "health", and so makes it possible to compare health status in different countries in different regions of the world at different times. GBD metrics measure both disease occurrences and death events. They further quantify years lived with disability (YLD) and years of life lost (YLL) as a result of premature death. By adding these two metrics, GBD reports disability adjusted life year (DALYs) as an indicator of quality of life. The GBD study enables scientists to investigate the impact of risk factors on health for both patients and community at large and highlights the importance of various risk factors leading to disability and death. The innovative ensemble of quantitative methods used in GBD 2010 allowed "imputing" data for places and times where data were not obtainable. One feature of the sophisticated methodology of GBD study was to manage inconsistencies in data and outliers.[1–5]

Christopher Murray and his colleagues from the Institute for Health Metrics and Evaluation, Seattle, WA, USA (IHME) with collaboration from a collection of noble research departments across the world should be praised for their remarkable accomplishments in advancing our knowledge of global descriptive epidemiology.[1–5] This landmark study, aiming to promote global and country-level assessment of disease burden, helps policy makers in making decisions to improve the health of nations.

In this issue of AIM, Naghavi, Shahraz and Forouzanfar, along with their co-authors, have tried to use the data from GBD 2010 to estimate causes of death and morbidity with epidemiologic transition toward chronic diseases in Iran and its comparison with 20 countries in the region.[6–8] They have tried to estimate the burden of 67 risk factors and 291 diseases for three time points (1990, 2005, and 2010) during the last 20 years. The obvious finding is a shift away from premature death to years lived with disability and from infectious and communicable etiologies to chronic non-communicable diseases (NCDs).[6–8]

Despite post revolution conflicts, an 8-year war, tight economic sanctions by Western countries, and multiple earthquakes over the last three decades, life expectancy increased by 22 years for women and 21 years for men. In 2010, a total of 351,814 deaths occurred in Iran (223,768 deaths in men). NCDs accounted for 76.4% of the total death toll, with 14.4% and 9.2% of the total pertaining to injuries and 'communicable, maternal, neonatal, and nutritional diseases', respectively.[6–8] Using GBD results for time trend and cross-country comparisons as a local assessment of health performance guides policymakers to plan for population health improvement.[1–5]

In addition to cardiovascular disease and cancers (the main current etiologies for death and disability in Iran), the escalating burden of mental and behavioral disorders, musculoskeletal diseases, and diabetes are new challenges for the health system. The fatality rate of 14% for road injuries and the top rank of road injury YLL among all other causes in 2010 are alarming.[6–8]

The first and most important message of this study for Iranian stakeholders is to reconfigure the current primary care system to be responsive to the new burden estimates. This entails a fast and cost-effective move toward a system that focuses on preventing NCDs and [road] injuries. The alternative no-action scenario is secondary and tertiary prevention of these conditions that will impose enormous financial costs on the system and, indirectly, on the population.[9–10] The primary health care system in Iran, similar to several other health systems in low- and middle-income countries, is not well prepared for confronting the challenges caused by the epidemics of NCDs because of its typical policy direction toward preventing maternal-child conditions and infectious diseases.[9] Prevention, early diagnosis and care of NCDs need a different and well prepared health infrastructure to avert huge co-morbidities which contribute greatly to rising health care costs and compromise of economic productivity. NCDs remain asymptomatic long before they manifest clinically. Unfortunately, our clinical experience supported by evidence indicates that symptoms of NCDs show up in a relatively younger population in Iran. The policy message is that nationwide, low-cost, early, and sustainable interventions are needed to mitigate NCDs' increasing burden.[10–11] This goal has already been established after the UN General Assembly resolution on the prevention and control of NCDs in 2010 and was followed by the WHO's 65th World Health Assembly in May 2012. The goal was set at 25% reduction in premature mortality from NCDs by 2025.[12]

It is notable that GBD 2010 has several limitations,[13] in particular when the data for a developing country like Iran is being analyzed and reported. The study used a multi-cause estimation model; so it uses different sources of data such as demographics data, cancer registries, verbal autopsy, and hospital and vital registry information. The aim of using multiple sources of data

was to adjust for overestimation or underestimation of individual causes due to under-ascertainment and over-reporting. Because these types of adjustments have not been customized for each country, they may sometimes bias the results. An example of this weakness can be seen in reporting the increasing rate of liver cancer during the last 20 years in Iran.[6] This trend in liver cancer in Iran is inconsistent with the result of well documented cancer registry data published recently from Iran.[14–16] The reason for this inconsistency is the fact that in GBD2010, the authors mainly relied on national data coming from a pool of vital death statistics available from the death registry and hospital discharge data. We suspect that these two sources are not as high quality as their counterparts in developed nations.[17–18] Therefore, the GBD results at disease level should be used with caution. For instance, while the category of GI cancers can be reliably estimated by GBD, specific cancers may be relatively off the true estimates. A study addressing the quality of data source from Iran, China, Mexico, Thailand and Sri Lanka has revealed enormous misclassification of causes of death in hospitals.[17]

Regional or local well designed surveillance methods, I believe, are reliable sources for country level burden estimates. Also, certain indicators such as relative risks of disease outcomes (RRs), disability weights, disease severities, case-fatality rates, pattern of distribution of sequelae, and the concept of quality of life have been used uniformly across all countries. These indicators can differ, both qualitatively and quantitatively, across countries at different times but they have been treated equally in the GBD study. The GBD needs to update these indicators through more vigorous review of all published high quality data or extensive field trials, especially in middle- and low-income countries. An updated GBD 2013 report is a good opportunity to utilize reliable locally produced data and local expert consultation. This will require a more extensive estimates provided by country experts along with discussing the work together for quality estimates at any aggregate level. At the same time, the GBD study provides an incentive for our country's researchers and health administrators to generate nationally representative data on conditions that require less intensive modeling to yield robust burden estimates. GBD has a unique template to follow. However, customizing its algorithm to generate burden of disease estimates is a wise approach to take. This will require mutual knowledge and skill exchange between GBD core experts and Iranian GBD experts.

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