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High Blood Pressure: The Leading Global Burden of Disease Risk Factor and the Need for Worldwide Prevention Programs

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Keywords

Hypertension; Blood pressure; Cardiovascular disease; Global Burden of Disease Study; Risk factor; Prevention; Treatment; Epidemiology

Introduction

It has been long recognized that hypertension is an important risk factor for cardiovascular disease and mortality.(1) Traditionally, a high burden of hypertension and its adverse consequences has been mistakenly thought to be an affliction of only economically developed countries.(2) However, studies over the past two decades have reported the majority of people in many economically developing countries have blood pressure above the levels considered optimal with a high prevalence of hypertension present.(3–5) Although a high prevalence of hypertension in all world regions has been previously reported, a recent publication from the Global Burden of Disease (GBD) Study has placed a renewed focus on the heavy toll high blood pressure is having in all regions of the world.(6,7)

What is the global burden of disease?

The Global Burden of Disease was initiated in 1992 as a collaborative effort between the World Bank and the World Health Organization (WHO). The purpose of this study was to address three primary goals; (1) provide information on non-fatal health outcomes for debates on international health policy, (2) develop unbiased epidemiological assessments for major disorders, and (3) quantify the burden of disease with a measure that could be used for cost-effectiveness analysis.(8) The WHO first reported the GBD for 1990 using disability-adjusted life years (DALY), which is a time-based measure that combines years of life lost due to morbidity and premature mortality.(9) The first GBD report found that the top 5 leading causes of death world-wide were ischemic heart disease, cerebrovascular accidents, lower respiratory infections, diarrheal disease, perinatal disorders.(8)

Since the first report in 1990, there have been subsequent waves of the GBD study. Comparative Risk Factor Assessment (CRA) was introduced into the GBD study in 2000 to provide a systematic approach for evaluating the changes in population health that result from modifying the distribution of exposure to a risk factor or a group of risk factors.(10) An update of these estimates took place in 2004 and reported that approximately 45% of the adult disease burden in low- and middle-income countries globally is now attributable to

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non-communicable disease.(11) The GBD 2010, which was published in December 2012, is a collaborative effort involving a much larger community of experts and researchers worldwide and was led by the Institute for Health Metrics and Evaluation located at the University of Washington. Compared to prior GBD studies, the scope of the 2010 GBD study is expanded and includes 281 diseases and injuries, 67 risk factors, and estimates for 21 regions. This expansion was aimed at improving estimates of the global and regional burden of disease and injuries and the risk factors that cause them. The GBD 2010 study used a new method for calculating DALYs, which maximizes comparability across time and between conditions. This report provided an opportunity to re-assess the burden of diseases and injuries for 1990, 2005, and 2010.

What did it report?

The GBD 2010 had a number of important findings with respect to high blood pressure around the world. In 2010, high blood pressure ranked as the leading single risk factor for GBD.(12) Additionally, high blood pressure was one of the 5 leading risk factors for GBD in all regions with the exception of Oceania, Eastern sub-Saharan Africa, and Western sub-Saharan Africa.(12) In these regions, high blood pressure was ranked as the number 6 risk factor attributable to burden of disease, as assessed by DALYs.(12)

Looking back at findings from the 1990 GBD study, the GBD 2010 study identified a shift from communicable diseases in childhood to non-communicable disease in adulthood.(12) This was most notable in regions such as sub-Saharan Africa and South Asia, where a substantial proportion of the world's population resides and where high blood pressure has had an especially large effect on disease burden.(12) High blood pressure went from being the 4th leading risk factor in 1990 for GBD, as quantified by DALYs, to the number 1 risk factor in 2010.

Are these findings surprising?

Although this shift to non-communicable disease burden reported by the GBD 2010 study is important, these findings are not entirely surprising. A study by Kearney et al. published in 2005 reported 26.4% of the world's adult population had hypertension in 2000.(6) This study also suggested that the burden of hypertension in economically developing countries was just as dire as in economically developed countries, with two-thirds of adults with hypertension residing in economically developing regions.(6)

Also relevant to the GBD 2010 report, a recent study by Danaei et al., examined secular trends in the age-adjusted mean systolic blood pressure (SBP) around the world. Overall, the mean age-adjusted SBP declined from 130.5 mm Hg in 1980 to 128.1 mm Hg in 2008.(7) The age-adjusted SBP was highest in low-income and middle-income countries.(7) Between 1980 and 2008, mean age-adjusted SBP declined in economically developed regions such as Australia, North America, and Western Europe and increased in economically developing regions such as Oceania, East Africa, South and South East Asia.(7) The age-adjusted prevalence of uncontrolled hypertension decreased from 33% to 29% among men and from 29% to 25% among women. In contrast mean SBP increased in several regions including Oceania, east Africa, and south and southeast Asia. Additionally, due to the growth and aging of the population around the world, the number of people with uncontrolled hypertension was reported to have increased between 1980 and 2008.(7) Given its high burden and the aging of the population, hypertension remains an issue of global concern.

Due to economic development around the globe and aging of the population, chronic diseases are expected to become more prevalent over the coming decades.(2) The prevalence of obesity is increasing, possibly due to a more readily available westernized diet. Another

factor in this equation is the increase in individuals now living a sedentary lifestyle. These factors may have contributed to the increased burden of hypertension in some world regions. It is well known that lifestyle factors play a crucial role in the development of hypertension and future steps need to be taken to provide interventions that improve lifestyle factors in economically developed and developing countries.

Beyond programs aimed at the prevention of hypertension, treatment of hypertension remains a challenge in many parts of the world. Perkovic et al. reviewed several potential barriers to the implementation of programs for the treatment and control of hypertension in economically developing countries.(13) Despite the availability of affordable drugs, treatment is not always available to those who need it. Although hydrochlorothiazide is available for less than one penny per day, price mark up of antihypertensive treatment is a potential barrier.(13) Another barrier is the lack of having a health care system to identify those at risk for hypertension and cardiovascular disease and provide continuous follow-up where blood pressure can be monitored and treatment delivered.(13) Finally, Perkovic noted prioritization of funding for non-communicable diseases by global agencies in many countries including WHO and World Bank; a focus that comes at the expense of the prevention and treatment of chronic diseases.(13) These groups heavily influence the allocation of funds in economically developing countries and regions to communicable diseases. The approach needed to further address the burden of hypertension and its adverse outcomes will continue to take the combined efforts of these organizations and the local health care systems.

Conclusion

In summary, the GBD 2010 report provides a stark reminder to the challenges facing the hypertension community over the coming years. Hypertension is prevalent in both economically developed and developing countries and regions. Furthermore, high blood pressure, above the level considered optimal for cardiovascular disease prevention but below the threshold for defining hypertension is quite common. High blood pressure is having a substantial impact on the burden of cardiovascular disease worldwide. A combined effort of international agencies along with a focus on the burden of non-communicable diseases in economically developing countries and regions is necessary to stem the heavy toll blood pressure is having on disability. Without a concerted effort addressing the prevention, diagnosis, treatment and control of hypertension, the pandemic of cardiovascular disease around the world will likely continue to grow.

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