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REVIEW ARTICLES

HYPERTENSION: A SUFFIECIENT RISK FACTOR FOR CARDIOVASCULAR DISEASES

Subhana Akber Khan

Health Services Academy, Islamabad Pakistan

ABSTRACT

Hypertension is a risk factor that can cause hypertension leading to cardiovascular diseases. A high or persistent blood pressure level of 140/90mmHg is known as hypertension which is divided into further stages. Blood pressure is the pushing force with which the heart pumps blood against the walls of arteries. High blood pressure is a serious medical condition in which the force of blood against wall of an artery is elevated than the normal which is called as hypertension. Recent guidelines of ICD-11 categorizes blood pressure into four levels. In a clinical setting, an average of blood pressure measurements is usually taken by healthcare providers. These categories are labeled as normal blood pressure, elevated blood pressure, stage 1 hypertension and stage 2 hypertension according the blood pressure measurements. Hypertension is associated with cardiovascular diseases which results in significant morbidity and mortality. Hypertension for a long-term or chronic elevation of blood pressure causes organ damage, eventually. It can be divided into primary or essential hypertension which occurs in 95% of cases whereas; secondary hypertension occurs in 5% of the cases. There are several possible and interrelated factors that are involved in development of hypertension. Intake of sodium in diet, insulin resistance, genetics, and obesity are some of the non-modifiable risk factors for hypertension. Whereas; renin-angiotensin-aldosterone system, cardiac output, peripheral resistance are also implicated in hypertension development. It is a wide known considered risk factor not only for cardiovascular diseases but for renal diseases as well. In this review article we aim to introduce disease control priorities 3rd edition based strategies to manage and control hypertension.

Keywords: Hypertension, Hypertensive patients, Healthcare, Morbidity.

INTRODUCTION

Hypertension is a clinical condition which refers to persistently raised pressure of blood in the vessels[1]. Since 1980s, there has been a reduction in the mean blood pressure (BP) level at population level. By 2010 however; still it was counted as the fourth highest risk factor for cardiovascular diseases (CVD) but then it became the highest risk factor attributable to disability adjusting life years (DALYs)[2]. Raised or persistent blood pressure level at 140/90 mmHg or higher is defined as hypertension[3]. It is a wide known considered risk factor not only for cardiovascular diseases but for renal diseases as well. Hypertension is a risk factor for most, if not all, cardiovascular diseases and renal failure[4]. In low and middle-income countries, hypertension disproportionately affects the population which signals the weakness of health system. Hypertension is considered as a silent killer, it often undergoes unrecognized and leads to the development of major cardiovascular events. In addition, it also pertains to dietary and sedentary behaviors including excessive intake of salt in food, obesity and stressful life and environmental factors[5].

Correspondence: Dr Subhana Akber, Public Health Department, Health Services Academy, Islamabad Pakistan

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According to the findings of a meta-analysis (2014), the quantifiable rise in lower-middle income countries was primarily due to aging and population growth. Approximately, 80% of global deaths due to cardiovascular deaths occur in lower-middle income countries[6] whereas; a significant decline has been experienced by high-income countries. The decline in high-income countries is mainly accredited to reduction in deaths from coronary heart diseases and stroke. Changes in population-level of risk factors, specific blood pressure control (BP) and effective anti-hypertensive treatment as well as management of hypercholesterolemia were the major attributable aspects of this success. However; with the exception of some regions of Africa, high blood pressure has been rated among five leading risk factors contributing to worldwide morbidity and mortality[7].

Globally, 9.4 million deaths per year are accounted for increased blood pressure and due to complications of hypertension alone[7,8]. An increased blood pressure is considered as the leading risk factor of mortality[7,9], however; an estimated 18 million deaths annually are attributed to cardiovascular diseases worldwide[2,8]. Heart diseases, stroke, renal failure, premature death and disability owing to hypertension contributes to the prevailing burden of cardiovascular diseases (CVDs) and therefore pose as an issue of public health

concern[8]. The findings from Global Burden of Disease study (2015) reports the burden from Eastern Mediterranean Region (EMR) due to cardiovascular diseases (CVD) which principally included stroke and ischemic heart disease. One-third of all deaths in 2015 were ascribed to cardiovascular diseases (CVD) alone. Amongst 22 countries of the EMRO region, Pakistan was ranked first for reporting 85.1% of total deaths due to cardiovascular diseases in the country. Despite the fact that majority of deaths owing to cardiovascular diseases occurred in low and middle-income countries. However; this decline in age standardized mortality rates have been observed since last 25 years which were mainly attributed to public health and preventive interventions[10].

Disease Control Priorities (DCP 3rd Edition)

Disease Control Priorities (DCP) is a global project funded by Bill and Melinda Gates and launched in 2010 for low-resource settings. For policy and health system perspective, cost-effective health interventions help to aid budgeting of national healthcare plans and strategies[11]. Some related interventions for the management of hypertension as per Disease Control Priorities (DCP3) includes initial screening by physicians, monthly visit and training of non-physician healthcare workers. Non-physician healthcare workers can serve in task shifting and can contribute in increasing knowledge about cardiovascular risk, hypertension management and adherence to treatment particularly in low-resource settings. Effective interventions also include modification of lifestyle factors by cessation of smoking, physical exercise, dietary modifcations in which diet has low salt or is based on DASH diet[12]. Healthcare interventions mainly are pharmacological treatments along with screening and management of high blood pressure and non-pharmacological treatment includes behavioural counselling of hypertensive patients on the risk factors, dietary modifications and awareness about disease and its complications[7].

It is worth to repeatedly measure the blood pressure for the purpose of screening and diagnosis. New techniques of measuring the blood pressure such as self measurement using home or ambulatory blood pressure are bring extensively used for assessments during the treatment. It is however important to focus on blood pressure primarily to detect target organ damage, i.e. left ventricular hypertrophy (LVH) and renal effects[13]. Managing and treating hypertension can cause a significant reduction in cardiovascular associated complications among hypertensive patients. Globally, a high prevalence of hypertensive patients can be attributed to the increase in population growth and aging. However; hypertension is 40% prevalent in low and middle income countries than in high income countries which is approximately 35% of their total population. Whereas; more men tend to have raised blood pressure as compared to women in all WHO regions[14-16].

DISCUSSION

Hypertension is a substantial public health concern and among major causes of deaths all over the world. It is a disease which is been termed as a "silent killer" that tends to cause premature mortality[8,17,18]. Approximately, >7 million deaths are accounted due to increased pressure of blood which reasons 12.8% of all causes of deaths in the world[14]. According to Global Health Observatory (GHO) data, the prevalence of increased blood pressure among men and women of age 18 years and above was 24% and 20%, respectively[17]. Risk of cardiovascular events such as coronary heart disease (CHD), ischemic heart disease (IHD) and stroke results in the presence of hypertension due to positive association. In addition to macrovascular complications, it can also result in number of microvasucular complications such as renal impairment, retinopathy and peripheral vascular diseases[17].

A study was conducted in 5 countries including Pakistan to assess management of hypertension among 2185 patients in a clinical setting that focused on patient level factors. Rates of controlled hypertension were assessed as per the 2009 Reappraisal of the 2007 European Society of Cardiology/European Society of Hypertension (ESC/ESH) guidelines. Approximately, 40% of the patients had controlled hypertension as per the guidelines. However; poor rates of BP control among patients was primarily linked to non-adherence to treatment, high salt intake and lack of understanding of importance of treatment along with co-morbidity[19]. The results of study recommended promotion of guidelines and implementation of strategies to improve BP control rate. In addition, non-pharmacological interventions including lifestyle modifications and dietary changes can help to reduce progression of hypertension and onset of cardiovascular diseases[20]. There is extensive literature available eliciting role of healthcare professionals in hypertension management and control[19-21]. Other numerous studies are also available that focused on behavioural interventions using telemedicine and mhealth[22,23]. But sufficient and relevant evidence on physician's engagement with hypertensive

patients on a multi-component hypertension treatment and patients' involvement into their self care and management of hypertension is though limited particularly in context of Pakistan[4]. The findings of a meta-analysis (2018) stated that the pooled prevalence of hypertension among Pakistanis was found to be 26.34% with higher prevalence among urban population (26.61%) than among the rural dwellers which was 21.03%[18].

*Global Health Estimates 2016: Deaths by Cause, Age, Sex, by Country and by Region, 2000 2016. Geneva, World Health Organization, 2018; effective date on 5th April, 2018.

As indicated in table-I, the probability of dying at the age of 70 years gradually decreased from 2010 to 2016 as compared between WHO global regions versus East Mediterranean Region including Pakistan[24]. This necessitates implementation of effective public health interventions that has been found effective in low and middle income countries including Pakistan such as population-based intervention on hypertensive patients[25]. In this context, Disease Control Priorities, 3rd Edition is a project that is reviewed by policymakers and technical experts. It serves to provide evidence on economical and cost effective strategies in LMICs to address the burden of priorities diseases[26]. In addition, table-II shows global mortality from cardiovascular

Table-I: Comparison of probability (%) of dying between age 30-70 years from any of cardiovascular disease, cancer, diabetes or chronic respiratory disease from 2010-2016.

Year	WHO Global*	Eastern Mediterranean Region
2016	18.3	22.0
2015	18.5	22.3
2010	19.4	23.5

Table-II: Comparative analysis of global mortality due to cardiovascular events between high and low-middle income countries.

Cause of Death	High Income Countries (%)		Low-Middle Income Countries (%)	
	2016	2000	2016	2000
Ischaemic Stroke	16.8	22.2	16.3	11.2
Haemorrhagic Stroke	7.2	10.3	8.4	7.0
Hypertensive Heart Diseases	1.4	1.0	1.3	1.0
Kidney Diseases	2.2	1.6	2.3	1.5

events such as ischemic stroke, heamorrhagic stroke, hypertensive heart diseases and kidney diseases among both sexes of high income and low-middle income countries from 2000 to 2016[27]. Although deaths from hemorrhagic stroke, hypertensive heart diseases and kidney diseases were reported higher in low-middle income countries during 2000 whereas; only hypertensive heart diseases and kidney diseases were also reported higher among high income countries during 2016. But the global burden of deaths from ischaemic stroke was significantly reduced in both high and low-middle income countries from 2000 to 2016.

Worldwide, hypertension is one of the most important cardiovascular risk factor[8], which prevails due to increased longetivity as well as in the presence of contributing factors such as obesity, diabetes, salt intake, smoking, associated clinical conditions and other environmental risk factors. According to World Health Organization (WHO 2016), effective implementation of all of WHO "best buys" can help to save more than 169,000 lives[28]. This includes recommended interventions such as drug therapy, treating acute myocardial infarction (MI), acute ischemic stroke and managing diabetes[29]. Whereas, preventive efforts include regular check-ups, better diet (such as DASH diet), smoke cessation and physical activity as shown in figure[21,30,31].

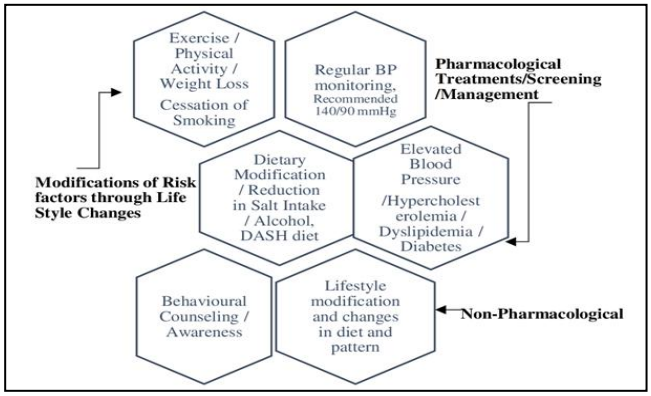

Figure: Interventions for the primary prevention of cardiovascular diseases in disease control priorities 3rd edition (adapted) 7.

CONCLUSION

Disease control priorities provide a basis for necessary implementation of cost-effective strategies to manage and control hypertension particularly in low resource settings.Implementation of multi-component intervention needs financing and necessary infrastructure in the health systems at all levels so as to enable effective delivery in an equitable manner.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. WHO | Hypertension. WHO [Internet] 2017. Available from: https://www.who.int/topics/hypertension/en/. [Assessed at 2018 Dec 30]
2. Murray CJL, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990–2010: a systematic analysis for the global burden of disease study 2010. Lancet 2018; 380(9859): 2197–23.
3. WHO EMRO | High blood pressure: a public health problem | World Health Day 2013 | World Health Days [Internet]. Available from: http://www.emro.who.int/media/world-health-day/public-health-problem-factsheet-2013.html [Assessed at: Jan 8, 2019]
4. Tazeen Jafar. AKU Launches Largest Study on Hypertension in Pakistan | The Aga Khan University News [Internet]. Available from: https://clinicaltrials.gov/ct2/show/record/NCT00327574. [Assessed at: 2019 Jul 28].
5. Batool A, Gilani P, Javed T. Risk factors, pathophysiology and management of hypertension. Int J Pharma Sci Sci Res [Internet]. 2018; 4(5): 49–61.
6. Yusuf S, Rangarajan S, Teo K, Islam S, Li W, Liu L, et al. Cardiovascular Risk and Events in 17 Low-, Middle-, and High-Income Countries. N Engl J Med 2014; 371(9): 818–27.
7. Jeemon P, Gupta R, Onen C, Adler A, Gaziano TA, Prabhakaran D, et al. Management of hypertension and dyslipidemia for primary prevention of cardiovascular disease [Internet].. Available from: http://dcp-3.org/sites/default/ files/chapters/DCP3 CVRD_Ch 22.pdf [Assessed at: 2018 Dec 31]
8. WHO|A global brief on hypertension. WHO [Internet]. 2013 Available from: https://www.who.int/_diseases/publications/global_brief_hypertension/en/. [Assessed at: 2018 Dec 31];
9. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012; 380(9859): 2224–60.
10. Burden of cardiovascular diseases in the Eastern Mediterranean Region, 1990-2015: findings from the Global Burden of Disease 2015 study. Int J Public Health 2018; 63(Suppl-1): 137–49.
11. Horton S, Gelband H, Jamison D, Levin C, Nugent R, Watkins D. Ranking 93 health interventions for low- and middle-income countries by cost-effectiveness. 2017 [Internet] Available from: https://doi.org/10.1371/journal.pone.0182951. [Assessed at: 2019 Feb 12];
12. Salehi-Abargouei A, Maghsoudi Z, Shirani F, Azadbakht L. Effects of Dietary Approaches to Stop Hypertension (DASH)-style diet on fatal or nonfatal cardiovascular diseases - incidence: a systematic review and meta-analysis on observational prospective studies. Nutrition 2013; 29(4): 611–18.
13. Kjeldsen SE, Aksnes TA, Fagard RH, Mancia G. Hypertension. In: The ESC Textbook of Cardiovascular Medicine [Internet]. Oxford Uni Press 2009; 1(1): p.437–63.
14. WHO | Raised blood pressure. WHO 2015 [Internet]. Available from:https://www.who.int/gho/ncd/risk_factors/blood_pressure_prevalence_text/en/. [Assessed at: 2019 Jan 11];
15. Singh S, Shankar R, Singh GP. Prevalence and associated risk factors of hypertension: a cross-sectional study in urban Varanasi. Int J Hypertens 2017; 2017(1): 5491838-42.
16. Everett B, Zajacova A. Gender differences in hypertension and hypertension awareness among young adults. Biodemography Soc Biol 2015; 61(1): 1-5.
17. WHO | Raised blood pressure. WHO 2016 [Internet]. Available from: https://www.who.int/gho/ncd/risk_factors/blood_pressure_text/en/. [Assessed at: 2019 Jan 11];
18. Shah N, Shah Q, Shah AJ. The burden and high prevalence of hypertension in Pakistani adolescents: a meta-analysis of the published studies. Available from: https://doi.org/10.1186/13690-018-0265-5. [Assessed at: 2019 Jan 11];
19. Ragot S, Beneteau M, Guillou-Bonnici F, Herpin D. Prevalence and management of hypertensive patients in clinical practice: Cross-sectional registry in five countries outside the European Union. Blood Press 2016; 25(2): 104–16.
20. Mahmood S, Shah KU, Khan TM, Nawaz S, Rashid H, Baqar SWA, et al. Non-pharmacological management of hypertension: in the light of current research. Irish J Med Sci 2019; 188(2): 437–52.
21. Bazzano LA, Green T, Harrison TN, Reynolds K. Dietary approaches to prevent hypertension. Curr Hypertens Rep 2013; 15(6): 694–702.
22. Brokmann JC, Rossaint R, Müller M, Fitzner C, Villa L, Beckers SK, et al. Blood pressure management and guideline adherence in hypertensive emergencies and urgencies: A comparison between telemedically supported and conventional out-of-hospital care. J Clin Hypertens 2017; 19(7): 704–12.
23. Siddiqui M, Islam MY ul, Mufti BAI, Khan N, Farooq MS, Muhammad MG, et al. Assessing acceptability of hypertensive /diabetic patients towards mobile health based behavioral interventions in Pakistan: A pilot study. Int J Med Inform 2015; 84(11): 950–55.
24. GHO | By category | Risk of premature death from the four target NCDs - Data by WHO Region. WHO [Internet]. Available from: http://apps.who.int/gho/data/view.main.2485REG?lang=en. [Assessed at: 2019 Jan 11];
25. Afshin A, Micha R, Webb M, Capewell S, Whitsel L, Rubinstein A, et al. Effectiveness of dietary policies to reduce non communicable diseases [Internet]. Available from: http://dcp-3.org/sites/default/files/chapters /DCP3 CVRD_Ch 6.pdf [Assessed at: 2019 Jan 11].
26. About the Project | DCP3 [Internet]. Available from: http://dcp-3.org/about-project. [Assessed at: 2019 Jul 28].
27. GHO | By category | Risk of premature death from the four target NCDs - Data by MDG Region. WHO [Internet]. Available from: http://apps.who.int/gho/data/view.main.2485MDG?lang =en [Assessed at: 2019 Jan 11];
28. Pakistan Risk of Prematre Death to NCDs. [Internet] Available from: https://www.who.int/nmh/countries/2018/pak_en.pdf?ua=1. [Assessed at: 2019 Jan 12];
29. Best Buys. Tackling NCDs 2009 [Internet]. Available from: http://apps.who.int/iris/bitstream/handle/10665/259232/WHO-NMH-NVI-17.9-eng.pdf?sequence=1. [Assessed at: 2019 Jan 12].
30. World Health Organization. Men's health checklist [Internet]. Available from: https://www.who.int/news-room/feature-stories/detail/men's-health-checklist. [Assessed at: 2019 Jan 12].
31. DASH Eating Plan | National Heart, Lung, and Blood Institute (NHLBI) [Internet]. Available from: https://www.nhlbi.nih.gov/health-topics/dash-eating-plan. [Assessed at: 2018 Dec 30].