

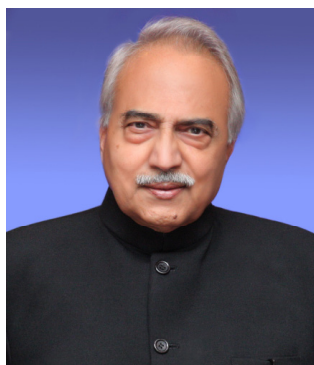
Editorial

Preventive Medicine: The Need of the Hour

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A B S T R A C T

It gives me great pleasure, to write this editorial for the *International Journal of Preventive Cardiology*. To create awareness, develop, awareness, educational, and preventive strategies, a professional society, SASAT was established at the University of Minnesota in 1993. Many international conferences have been organized worldwide and several books have been published on this topic of great public health interest.¹⁻⁵ Despite the best efforts of the professional societies, global health organizations, published guidelines and scientific statements, the cardiometabolic diseases have increased in their prevalence and incidence, to epidemic proportions worldwide.⁶⁻⁹ Nearly half of all the adults in the United States, have some type of cardiovascular disease or the other (CVD), defined as coronary artery disease, heart failure, stroke or high blood pressure, according to the American Heart Association (AHA)'s annual report, "Heart and Stroke Statistics-2019."¹⁰ AHA data shows, that more than 121 million adults had cardiovascular disease in 2016, a number which is slowly on the rise. Seminal studies of Framingham Heart Group described the risk factors for the development of heart diseases half a century ago, yet vascular diseases are the number one killer worldwide and have retained this status for over a century. An estimated 18 million people died from CVDs in 2016, representing 31% of all global deaths. Of these deaths, 85% were due to heart attack and stroke.

There are more than 2.2 billion individuals with excess weight worldwide. In the last three decades, obesity has increased two-fold and type-2 diabetes four-fold in the world. During the same period in China, diabetes has increased by 17-fold. In the USA during the same period, childhood and adolescent obesity has increased ten-fold. Hypertension, also recognized as one of the 'silent killer' is amongst the most common diseases worldwide, and a leading contributor to the acute vascular events. Metabolic risk factors that promote the development of metabolic diseases and contribute to their progress include, oxidative stress, chronic low grade inflammation, excess weight, hypertension, obesity, endothelial dysfunction (vascular dysfunction), hardening of the arteries, insulin resistance, hyperglycemia, diabetes, lipid abnormalities, subclinical atherosclerosis, and vascular diseases. Modern medicine has failed to develop strategies for the prevention of cardiometabolic diseases. Instead, it has focused on the management of modifiable risk factors for the vascular diseases. This approach indeed, has substantially reduced the premature mortality due to coronary artery disease in

the industrial nations.¹¹ However, no country has reduced, reversed, or prevented the cardiometabolic diseases at the population level.

Metabolic diseases have been described as lifestyle diseases in many articles.¹⁻⁹ Public health officials describe the infectious diseases like HIV/AIDS, viral diseases such as Spanish flu, H1N1 and recent epidemic of COVID-19 also as lifestyle or behavioral diseases. Currently, we are facing a public health crisis of the century, with COVID-19 pandemic worldwide. There is a great lesson to be learned, even at these early stages of this unprecedented pandemic. In a short span of less than 50 days, with strict Wuhan travel ban alone, the number of infected cases reduced to 200,000 (96% fewer cases) instead of expected 750,000 infected cases in China. Moral that is emerging from this unprecedented epidemic is, "if the virus cannot find you, it cannot infect you."^{12,13} Spanish Flu of 1918, infected 500 million individuals worldwide, killed over 50 million individuals. More than 80 percent of Americans would eventually be infected, and about 2.2 million would die of the disease, according to the projections of Imperial College in the United Kingdom (March 18, 2020). At the time of this writing, Coronavirus has spread to every member nation of the United Nations (180 countries). According to an authoritative monograph on this topic, what only weeks ago seemed an impossible feat, -imposing and enforcing strict quarantine measures and isolating millions of people-is now a reality in many countries. People all over the world will have to adapt and invent new lifestyles, in what is the most disrupting event since the Spanish Flu of 1918 or the World War II.¹²

Even though the SARS-CoV-2 continues to spread from the major US cities to smaller cities, it is already evident, that there is disproportional death in the minority community. African Americans seem to be dying from COVID-19 (SARS Cov-2) at a greater rate than the general population. In some states as high as 72% of the deaths are reported to be in the minority communities. This observed racial disparity, seems to be the result of pre-existing comorbidities such as hypertension, diabetes and vascular diseases (cardiometabolic diseases). Since the theme of this editorial is about preventive medicine, especially as it relates to cardiology, we will discuss these issues from prevention perspective. The models explored for the prevention of COVID-19 use different approaches; mitigation, containment and suppression. Most advanced country in the world, the United States (US) of America, is now the country with most known coronavirus cases in the world. Just in the State of New York alone, there are more coronavirus infected individuals, than any other country in the world. The original models proposed, envisaged that only 50% of the population will follow the "shelter in place" instructions, issued by various administrations.

However, according to recent reports, over 95% of the US population is staying home, except for "essential activities." COVID-19 has virtually brought the entire world down to its knees, has shut down all community activities, and created an unexpected global economic loss and unemployment. Good news is that emerging preliminary results show, that mitigation (self-quarantine or enforced quarantine) has proved to be a very significant contributor for the fewer cases of infection as well as deaths. The major preventive measure in this case seems to be behavioral, social distancing and good hygiene practices.

Now, that we have briefly discussed a scenario, which was unprecedented, global public health crisis, let us discuss the differences in the preventive approach between the infectious diseases and Non-Communicable Diseases (NCDs). As mentioned earlier, metabolic diseases such as hypertension, excess weight, obesity, type-2 diabetes, and vascular diseases have increased in the prevalence and incidence to epidemic proportions. Just four of these conditions (CVD, stroke, hypertension, and diabetes) present in 122 million adults, account for 810,000 deaths each year. Coronary artery disease is the number one cause of death in America. Nearly 80% of the deaths in high-income countries occur among those over age sixty, compared to 42 percent in low-and middle-income counties. In developing countries, the increase in CVD burden is largely due to an increase in the prevalence of risk factors and a relative lack of access to appropriate interventions. Between 1990 and 2020, CVD has increased 120 percent in women and 137 percent for men in developing countries. The million-dollar question remains the same, for both communicable and noncommunicable diseases. Why, in this age of technologically advanced medicine, do we have seemingly impossible and incredibly fatal pandemics of diseases? According to some experts, the answer is that we have invested our resources, in addressing the consequences of these diseases, rather than prevention or treating the causes. In other words, the focus of modern medicine, is on management of modifiable risk factors than prevention of these risk factors from developing in the first place.

According to experts, at least 70% and as much as 90% of the cardiometabolic risks are directly attributed to modifiable behaviors, like unhealthy diet, sedentary habits, smoking, and use of excess alcohol. In view of this observation, it is believed that addressing just the three behaviors, -poor diet, sedentary activity and smoking, and maintaining normal weight would prevent 70% of stroke, 80% of heart disease and 90% of diabetes. Making comprehensive behavioral changes can effectively treat, and in some cases fully reverse cardiometabolic diseases. Do we have any clinical data to support such claims? INTERHEART studies done in 52 countries across the world, showed that interventions

aimed at behavioral risk factors, lowering blood pressure, lowering blood lipids, normalizing blood glucose levels (managing modifiable risks for CVD), could significantly prevent premature death worldwide.¹⁴ Prof. Khera and Associates from Harvard, concluded, "Across four studies 55,685 participants, genetic and lifestyle factors were independently associated with susceptibility to coronary artery disease. Among participants at high genetic risk, a favorable lifestyle was associated with nearly 50% lower relative risk of coronary artery disease than was unfavorable lifestyle."¹⁵

Having discussed the importance of behavioral change for preventing infectious as well as noninfectious diseases, it is worth reminding readers, as to how difficult behavior change is and the need for support to accomplish this change. There are some novel approaches to get the population involved in behavioral change and motivating them. In every country, overwhelming majority of individuals have access to the ubiquitous smartphone. In view of this fact, there is great opportunity to develop software for implementing prevention strategies and action plans. A classic novel example of such a use of digital information gathering for population-based information is, the All of Us Research Program by Scripps Research Translational Institute, California, to track the activity data using Fitbit. Participants can now link their Fitbit accounts to the program to share additional data for research (<https://participant.joinallofus.org>). "Collection of real-world, real-time data through emerging technologies, will become a fundamental part of the program," Eric Dishman, director of the All of Us Research program says. Currently efforts are in progress in global public health platforms, to gather data (using mobile apps and activity trackers) on the incidence and prevalence of infectious diseases as well as noncommunicable diseases. It is not far-fetched to imagine the deployment of digital health consultation for not only surveillance, but also for creating awareness, implementing preventive strategies, and therapeutics.

References

1. Rao GHR: (Editor): Handbook of Platelet Physiology and Pharmacology, Kluwer Academic Publishers, Boston, 1999. ISBN # 0-7923-8538-1.
2. Rao GHR: (Editor): Coronary Artery Disease in South Asians: Epidemiology, Risk Factors, Prevention. Jaypee Medical Publishers, New Delhi, India, 2001, ISBN #81-7179-811-X.
3. Rao GHR: (Editor): Coronary Artery Disease: Risk Factors, Pathophysiology and Prevention. Jaypee Medical Publishers, New Delhi, India. 2005, ISBN # 81-8061-450-6.
4. Rao GHR: (Editor): Handbook on Coronary Artery Disease, McMillan Medical Communications (Springer Healthcare), New Delhi, India. 2016.
5. Rao GHR: Manual of Blood Platelet Physiology and Pharmacology, JP Medical Publishers, New Delhi, India. 2018.
6. Rao GHR: Prevention or reversal of Cardiometabolic Diseases. *J Clin & Preventive Cardiology* 2018; 7(1): 22-28.
7. Rao GHR: Predictive and Preventive Healthcare: Integration of Emerging Technologies. Point of View. *J Clin Res in Diab & Endocrinol* 2018; 1(1): 1-8.
8. Rao GHR: Cardiometabolic Diseases: A global perspective. *J of Cardiol Cardiovasc Ther* 2018; 12(2): JOCCT. MSID. 55834.
9. Rao GHR: Global Syndemic of Metabolic Diseases. *Editorial J Diab & Clin Res* 2018; 1(1): 2-4.
10. Benjamin EJ, Muntner P, Alonso S et al: Heart Disease and Stroke Statistics-2019 Update: A Report of the American Heart Association *Circ*. 2019; 139: e56-e528.
11. Di Cesare M, Bennett JE, Best N et al: The contributions of risk trends to cardiometabolic mortality decline in 26 industrialized countries. *Int J Epid* 2013; 42(3): 838-848.
12. Bernd Sebastian Kamps Christian Hoffman: COVID-REFERENCE: <https://covidreference.com>.
13. Tian H, Liu Y et al. An investigation of transmission control measures for the first 50 days of the COVID-19 epidemic in China *Science* 2020. <https://doi.org/10.1126/science.abb6105>.
14. Yusuf S, Hawken S, Ounpuu S et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case-control study. *Lancet* 2004; 364(9438): 937-952.
15. Khera AV, Emdin CA, Drake I et al. Genetic risk, adherence to a healthy lifestyle, and coronary artery disease. *N Engl J Med* 2016; 375: 2349-2358.