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Letter to Editor

Non-Laboratory-Based Screening of Cardiovascular Disease Risk–Possibilities and Challenges

Komal Shah[1,*], Vishal Karmani[1], Shubhangini Pandey[1], Kalyan Barua[2]

Sir,

Non-Communicable Diseases (NCDs) are now attributing to 71% of the total global deaths and hence in 2011, United Nations set a target to reduce premature NCD death by 25% by 2025.[1] Among all the major NCDs, Cardiovascular Diseases (CVD) especially ischemic heart disease and stroke are the chief contributors of death and disability.[2] Globally 19.1 million deaths are reported in the year 2020 only due to CVD. It is now imparting a dual burden of disease due to steadily escalating cases and disease occurring at relatively early age especially in developing countries. This results in significant clinical and cost implications imparting huge burden on health system. Cardiovascular disease management cost which was around 863 US$ is expected to rise at around 1044 US$ by 2030.[3] So, in order to achieve the NCD targets for 2025, it is imperative to design robust strategies for prevention and control of CVDs and its risk factors.

With early identification and robust primary health care systems, developed nations are witnessing reduction in CVD incidences, however developing countries still share 50% of total mortality and 80% of the disease burden. These countries have additional challenge of resource limitation along with larger proportion of the population to be catered and hence they require cost-effective and contextual solutions for the disease. Most effective strategy for managing CVD is prevention and early identification of warning signs. This includes both primordial and primary preventive checkups of the population in very early age (from 30 years) through affordable solutions.

Prognosis of CVD is often driven by multiple risk factors that ranges from demographic (age, sex), life style (dietary habits, physical activity, smoking and alcohol consumption), anthropometric (Body Mass Index-BMI, blood pressure, waist circumference) and hereditary (family history of premature CVD) and blood sugar lipid levels (total cholesterol and high-density lipoprotein cholesterol). The individual risk assessment using various models such as WHO, FRS, ASCVD, QRISK, JBS, SCORE and others have yielded significant reduction in the CVD incidence in developed countries and is endorsed by many guidelines for primary prevention.[4] Prevention of disease by early screening using charts, promoting cardiovascular health, ideal body mass index and increased use of cardioprotective drugs (statin and aspirin) brought about a decline of 60% in 10-year death rate due to CVD in USA by 1980 making it a cost-effective approach for high-income countries.[5] Albeit as risk assessment charts using these factors depends on invasive laboratory tests, this might impart again a cost burden on population residing in resource limited setting. In majority of the Low-Middle Income Countries (LMICs) this might result in out-of-pocket expenditure where as in case of health system it might limit the coverage of health services.

In past few decades various attempts are made to develop non-laboratory tools and validate the same for various ethnic populations.[6] Framingham risk score and World Health Organization/International Society of Hypertension (WHO/ISH) risk prediction charts are widely adapted non-laboratory-based tools for risk assessment in heterogenous population.[6] These charts essentially use BMI in exchange of lipids and hence eliminate the need for blood tests. Similar to laboratory charts, non-laboratory charts can also calculate individual risk and categorize them into low (<5% - green), moderate (5-<20% - yellow-orange) or high-risk categories (20-≥30% - red-dark red). According to the risk categories the individual can be further guided for management of the risk factors.

Non-laboratory-based tools can have various advantages over laboratory tools as following:

1. Cost effective preventive programmes can be implemented using non-laboratory-based tools. Studies conducted using mathematical modelling exercises and few primary studies conducted on African, American and Uzbekistan have shown that there is a good agreement between laboratory and non-laboratory-based tools and found non-laboratory-based management strategy cost-effective in nature.[4] This can contribute significantly in reducing preventive program's budget implication and can be adapted as multistage screening strategy.
2. Increased reach of health services and improving coverage of primary prevention programmes. Non-laboratory-based tools can be easily adapted by frontline health care

Komal Shah[1,*], Vishal Karmani[1], Shubhangini Pandey[1], Kalyan Barua[2]

[1]Indian Institute of Public Health Gandhinagar, Gandhinagar, Gujarat, INDIA.
[2]The Hans Foundation, Gurgaon, Haryana, INDIA.

***Correspondence**

Dr. Komal Shah
Associate Professor, Indian Institute of Public Health Gandhinagar (IIPHG), Gujarat, INDIA.
Email: kshah@iiphg.org

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workers and hence can support active – door to door screenings of the eligible population. Countries like India have adapted screening of all the individuals above the age of 30 years for all the major NCDs under NCD prevention. Initiative like this can be hugely benefitted from integration of non-laboratory-based tools. As no laboratory-based screening is required with this, limiting factors such as need for laboratory near to the population, phlebotomist and specific skills can be easily addressed and the screening can be brought at the doorsteps of the population.

3. Various models such as Framingham and WHO have provided guidelines for statin recommendation based on this screening tool. It can help identifying population who will be benefitted from primary prevention drug molecules such as statins and aspirin.
4. Similar to laboratory models, non-laboratory models also have issue of calibration and validation. Various countries have already initiated the re-calibration of these models on their population for appropriate adaptation of the model. In resource-poor settings, non-laboratory-based risk assessment could serve as a useful proxy for these more intensive, expensive risk screening approaches.

CONCLUSION

Non-laboratory tool based screening of CVD can be a cost effective intervention for resource limited settings. However contextual validation of the tool should be undertaken before integration of the tools in primary health care system.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

ABBREVIATIONS

NCD: Non-Communicable Diseases; **CVD:** Cardiovascular Diseases; **BMI:** Body Mass Index; **LMICs:** Low-Middle Income Countries; **WHO:** World Health Organization; **ISH:** International Society of Hypertension.

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