







Prevention and Treatment of Cardiovascular Disease in Ethiopia: a cost-effectiveness analysis

Summary

Cardiovascular disease (CVD) is a leading cause of mortality globally and disproportionately affects low- and middle-income countries (LMICs). According to local studies, CVD is rising in urban areas across Ethiopia. This is linked to risk factors such as smoking, high cholesterol and high blood pressure.^{1,2} Over the last 50 years, CVD has been a major cause of hospital admission in populations aged 60 and above and a leading cause of intensive care admission.³ In Addis Ababa, around 25% of deaths were attributed to CVD.⁴ February 2019

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Background

Despite the increasing burden of CVD, in 2014, only 12% of patients with a history of established CVD were found to be on statin.⁵ To address the rise in non-communicable diseases (NCDs), Ethiopia launched the National Strategic Action Plan (NSAP) for the prevention and control of NCDs, where CVD is among the four targeted NCDs.⁶ Since spending in NCDs is relatively low, conducting a cost-effectiveness analysis on selected CVD interventions can help to ensure that existing limited public funds are used most efficiently to address the rising NCD burden.⁷

A Closer Look at the Evidence

A recent cost-effectiveness study led by Tolla et al, assessed the cost-effectiveness of a variety of CVD interventions in Ethiopia covering five groups of interventions including primary prevention, acute treatment, and secondary prevention for ischemic heart disease and stroke.⁷

Disease Control Priorities-Ethiopia (DCP-E)

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Methodology

The authors analyzed the cost-effectiveness of interventions against a non-intervention (null) scenario. A total of 15 single and 16 integrated CVD interventions were analyzed. Efficacy estimates were taken from randomized controlled trials and further adjusted by target coverage (e.g. 20%) and patient adherence.

Modelling

A WHO-CHOICE model was adapted to the demographics of Ethiopia.^{8,9} The health benefits from primary prevention interventions were modeled through their impact on risk factors, while acute treatment and secondary prevention interventions were modeled through their impact on all-cause or cause-specific mortality. The health benefits were reported in disability-adjusted life years (DALYs) averted.

An ingredients-based approach was used to estimate intervention costs. Unit costs for laboratory tests and imaging were adjusted based on pricing from two public hospitals in Addis Ababa; and a few additional adjustments were conducted to align pricing with the local context.

Per group of interventions, incremental costeffectiveness ratios (ICERs) were first calculated by dividing the incremental cost of each intervention by its incremental health benefits compared with a 'null' scenario. Subsequently, an incremental analysis was performed starting from the intervention with the lowest effectiveness in each group of interventions.

Results

Overall, combination drug treatment with aspirin, anti-hypertensives and statin to individuals with an absolute risk (>35% risk treshhold) of developing a CVD event was found to be the most cost-effective, with an ICER < US\$100 per DALY averted. The absolute-risk based approach estimates individuals' risk of developing a CVD event over 10 years based on the level of systolic blood pressure, total serum cholesterol, smoking status, age, and sex. When compared with single risk-factor based approaches addressing high blood pressure or high cholesterol solely, the absolute risk-based approach was more cost-effective. Notably, initiating treatment at a higher CVD risk threshold would generate better efficiency gains compared to lower risk thresholds regardless of the approach chosen.

The analysis illustrates that primary prevention of CVD would be a more efficient strategy for maximizing population-level health benefits compared with acute treatment and secondary prevention. For primary CVD prevention, the absolute risk-based approach would be more costeffective than the single risk-factor approaches.

Next Steps

The rise of NCDs and CVD in Ethiopia requires immediate action. The most cost-effective intervention that the authors identified combination drug treatment based on the absolute risk based approach—could be scaled up within the primary care level in Ethiopia, and be included within the ongoing revision of Ethiopia's Essential Health Services Package.

Bibliography

- Mendis S, Puska P, Norrving B. Global atlas on cardiovascular disease prevention and control. Geneva: World Health Organization; 2011.
- Steyn K, et al. Risk factors associated with myocardial infarction in Africa the INTERHEART Africa Study. Circulation. 2005;112(23):3554–61.
- Misganaw A, et al. Epidemiology of major noncommunicable diseases in Ethiopia: a systematic review. J Health Popul Nutr. 2014;32(1):1.
- Misganaw A, Haile Mariam D, Araya T. The double mortality burden among adults in Addis Ababa, Ethiopia, 2006-2009. Prev. Chronic Dis. 2012; 9: E84.
- 5. Ethiopian Public Health Institute. Ethiopia STEPS report on risk-factors non-communicable disease (NCDs) and prevalence of selected NCDs. 2016.
- Federal Ministry of Health Ethiopia. Prevention and control of non-communicable disease: National Strategic Action Plan2014-2016. Federal Ministry of Health Ethiopia. Health Sector Transformation Plan 2015/16-2019/20.
- Tolla et al. Prevention and treatment of cardiovascular disease in Ethiopia: a costeffectiveness analysis. Cost Effectiveness and Resource Allocation 2016; 14(10).
- World Health Organization. Cost effectiveness and strategic planning (WHO-CHOICE). <u>http://www.who.int/choice/interventions/en</u> <u>/</u>.
- United Nations, P.D., Population estimates and projections section. World Population Prospects: The 2012 revision.
 2012. <u>http://www.esa.un.org/unpd/wpp/Excel-Data/population.htm</u>.