Macrothink Institute™

Business and Economic Research
ISSN 2162-4860
2021, Vol. 11, No. 3

Take the Initiative, Stop Being Passive to NCDs: A PCA-Weighted Composite Indicator towards Prevalence of NCDs in Malaysia

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Received: May 16, 2021 Accepted: June 12, 2021 Published: June 17, 2021

doi:10.5296/ber.v11i3.18647 URL: https://doi.org/10.5296/ber.v11i3.18647

Abstract

In today's highly dynamic socio-economic environment, the high degree of non-communicable diseases (NCDs) poses both direct and indirect health problems for nations. This study constructed a composite Non-Communicable Diseases Risk Indicator (NCDRI) that comprises leading characteristics to predict the movement of NCDs' prevalence, which serves as an early signaling tool for policymakers and public health sectors. A weighting scheme for both non-weighted and principal component analysis (PCA)-weighted was applied from the PCA loading factor. The findings verified that the constructed PCA-weighted approach had a remarkable lead time, which also produced better lead times and was consistent in predicting the direction of change in the fluctuations caused by NCDs' prevalence. An appropriate regime for policymaking and implementation is required, followed by periodic monitoring and rapid action, to reduce the deadly diseases.

The findings of this study demonstrate that the cost indicator marked the most significant risk factor to indicate the prevalence of NCDs; therefore, policymakers should converge on this indicator so that cost-effective interventions can result in more valuable outcomes.

Keywords: Non-communicable diseases, Risks, Composite indicator, PCA-weighted

1. Introduction

Non-communicable diseases (NCDs) are defined as chronic diseases that tend to have a long diagnosis and are the result of a combination of genetic, physiological, environmental, and behavioral factors. These diseases occur among all ages, genders, regions, and countries. Contrary to popular opinion, the data indicate that almost half of the disease burden that strikes the world's low- and middle-income countries hardest consists of NCDs (WHO, 2017). Malaysia's Ministry of Health (MOH) and the World Health Organization (WHO) have reported that, due to absenteeism, presenteeism in the workplace, and the premature death of the working age population, Malaysia's gross domestic product (GDP) has experienced annual losses of upwards of RM8.91 billion, which is equivalent to about 0.65 percent of Malaysia's GDP. More specifically, the MOH and WHO also reported that NCDs placed a significant health burden on countries resulting from disability and loss of healthy life years, called the burden of disease costs. This "indefinable" cost is estimated to be around RM100.79 billion yearly, which is equivalent to 7.35 percent of Malaysia's GDP. This situation shows that NCDs hamper the social and economic development of the country.

In addition, limited research has been conducted in developing countries due to inadequate resources for gathering the information and validating the collective information. The lack of data sources in supporting the research on NCDs is a major issue. Effective solutions and policies are always associated with reliable information, data, and steadfast evidence. Cost-effective interventions can result in higher and more valuable outcomes for public health. Despite more awareness campaigns being conducted, the rate of NCDs has not be reduced. Health awareness programs are becoming a well-established practice around the world, yet people remain a key vulnerability, and the data do not match the outcomes of these awareness programs. People acquire the relevant healthcare knowledge but maintain their same unhealthy lifestyles and practices. Hence, action is required to target the use of composite indicators in NCD surveillance in Malaysia.

To understand the facts, this study reviewed the indicator construction process. The most prominent example of this type of work was carried out by Burns and Mitchell (1946), whose early emphasis on the consistent pattern of movement among different variables over the movement cycle led to the creation of composite leading, coincident, and lagging indexes. By adopting and adapting Burns and Mitchell's (1946) work, the indicator construction process becomes a very effective method when used in indicator analysis. Furthermore, a weighting scheme, adopted from principal component analysis (PCA), is applied to the constructed Non-Communicable Diseases Risk Indicator (NCDRI), and the directional accuracy is tested to examine if the indicator holds a forecasting ability.