Diseases Associated with Non-Communicable Chronic Conditions are Medical Illnesses

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Received: 3 August, 2022, Manuscript No. HEOR-22-75571; **Editor Assigned:** 5 August, 2022, PreQC No. HEOR-22-75571 (PQ); **Reviewed:** 22 August, 2022, QC No. HEOR-22-75571 (Q); **Revised:** 25 August, 2022, Manuscript No. HEOR-22-75571 (R); **Published:** 29 August, 2022, doi:10.37532/heor.22.8.8.3-4.

Abstract

The rising economic cost of medical illnesses is a reflection of the increased prevalence of Non-Communicable Chronic Diseases (NCDs). In health economics research, observational studies are used to identify relationships between NCDs or related risk factors and economic variables such as health insurance, income inequality, job accessibility, education, and annual income. The conclusions drawn from such interactions are restricted to associations, which are frequently influenced by confounding variables and reverse causation, rather than proving causality. An effective technique for examining the causal relationships between modifiable risk variables and health economics metrics is the Mendelian randomization (MR) approach. The use of MR in the economic evaluation of health issues has begun, and the results so far have been encouraging.

Introduction

The growth of Non-Communicable Chronic Diseases (NCDs) has been linked to an epidemiological transition that has turned the focus away from communicable diseases that are lethal. In order to improve the general wellbeing of human populations, the Sustainable Development Goals (SDG, 2015) of the United Nations have identified NCDs as one of their key health-related priorities. Chronic diseases like cancer, diabetes, chronic respiratory disorders, and cardiovascular disease (CVDs) are examples of NCDs.

According to the Global Burden of Disease (GBD), the percentage of fatalities linked to NCDs increased from 57.6% in 1990 to 71.3% in 2015. India spends only 4.5% of its GDP on health and is ranked 143 on the SDG index, which measures the age-standardized mortality rate from NCDs (such as cancer, diabetes, and cardiovascular disease). Low (i.e., 46 points below the median score of 50; scale used: 0 to 100) scores were assigned to chronic respiratory disease in populations aged 30 years-70 years, per 100,000 population, and chronic lung disease. India and Pakistan among the South Asian nations had received the majority of Development Assistance for Health (DAH), which is a financial (or in-kind) resource transferred to Low and Middle-Income Countries (LMICs) by development organisations like UNICEF, WHO, etc., primarily for maintaining or improving health.

India was rated second in the burden of NCDs in 2015 compared to the average DAH allotted for 2012–2014 and over 60% of deaths there are caused by NCDs. Between 2012 and 2030, Intrillion and trillion, respectively, will be caused by CVDs and mental health issues. Patients with CVD in India pay more out-of-pocket for healthcare and are more likely to borrow money or sell household possessions. The increased burden of NCDs and related risk factors is the cause of the rising economic costs. For instance, drinking alcohol is known to increase the chance of developing a number of different malignancies and cardiovascular diseases, such as hypertension and stroke.

61% of cardiovascular fatalities are caused by lifestyle-based risk factors like inactivity, alcoholism, smoking, and high body mass index, among others.The impact of socioeconomic patterning in health inequalities associated to NCDs and their risk factors is a topic of interest for health economics. a study on the effects of NCD multi-morbidity on healthcare Utilization and Out-of-Pocket Expenditure (OOPE) data revealed that the majority of OOPE is spent on medications. The availability of enormous resources that contain a variety of data on biological and economic elements has led to a progressive expansion of the field of health economics study. It is enabling health economists to assess a range of economic considerations in relation to NCD risk factors. When analysing exposure-outcome relationships in observational studies, epidemiologists typically adjust the statistical models for confounding in order to equalise the distribution of confounders among the analytical sub-groups. It is challenging to verify if statistical correction has effectively eliminated the impact of confounders in reported correlations. RCTs testing such alleged connections are strong causal evidence between exposure and outcomes, as opposed to conventional observational research, is important in preventing RCT failures. This paper's goal is to review the Mendelian Randomization (MR) approach's application to the research of NCDs' health economic aspects.

Advantages of MR

- The ability to move the focus of the evidence from pure observation to causality is extremely helpful in laying the groundwork for RCTs.
- The direction of causation of the link between exposure and outcome can also be determined using MR.
- The random distribution of confounders between exposed and unexposed populations, which also eliminates selection bias, is made possible through the use of genetic variations as a proxy for exposure. Additionally, genetic data can be accurately generated without error at a reasonable cost that will likely go down much further in the future.
- The methodology for doing MR analysis is well established as a result of the ongoing research activities, and it has the ability to develop further in the future.
- Even for researchers without an expertise in genetics, the identification of genetic instruments from existing datasets is useful and manageable.

Limitations of MR

- The validity of the underlying assumptions in a modelling-driven MR strategy has a significant impact on the conclusions drawn by MR.
- Finding a genetic proxy for our interest's exposure is a requirement for the implementation of MR.
- Due to the tiny impact sizes of genetic variations, large sample sizes are needed for MR analysis, which is challenging to achieve in low and middle-income countries.
- The genetic tools used in MR are chosen from genome-wide association studies without a hypothesis, which lack a thorough knowledge of the mechanisms behind connections between genetic variants and traits or diseases.

Conclusion

The open innovation in medical and pharmaceutical research started to appear in the literature in the middle of the 2000s, and the majority of the research was conducted in North America and Europe, with Asia lagging behind. This was discovered by studying 384 published research articles in the existing academic literature. In addition to receiving more social media attention, publications with writers connected to biotechnology or pharmaceutical businesses had a higher mean citation count than articles without industry ties.

The publications under review proposed several public-private collaborations that addressed sharing of intellectual property, providing financial and professional help, and opening up channels to facilitate simpler communication. It was discovered that the pharmaceutical/ pharmacology industry is a thriving one that supports open innovation and has important medical implications. But taking into account the long history of open innovation in the information sector.

Consequently, it is reasonable to anticipate that firms working at the intersection of information technology and medicine will use open innovation tactics more frequently in the future (e.g., in the area of digital health technologies). To take advantage of the huge opportunities that open innovation presents, all concerned parties must be flexible and enthusiastic about new forms of collaboration, while never losing sight of the need to create goods and solutions that will improve human health.

Cite this article: Squire, V. Diseases Associated with Non-Communicable Chronic Conditions are Medical Illnesses. Health Econ Outcome Res: Open Access. 2022, 08 (08), 03-04.