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Impact of Environmental Factors on Non - Communicable Diseases in India

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Abstract- The present papers discuss about the impact of environmental factors on non - communicable diseases in India. This paper is qualitative in nature. Secondary data have been used to study the influence of environment on non - communicable diseases including cardiovascular diseases, cancers, chronic, respiratory, diseases and diabetes. The paper also reveals the risk factors of non - communicable diseases such as Behavioural risk factor and Metabolic risk factors. This paper also explores the socio-economic and environmental impacts on non - communicable diseases in society. This paper also discloses the preventive measures of Noncommunicable diseases.

Keywords- Environmental Factors; Non-Communicable Diseases (NCDs); India; Air Pollution; Climate Change; Environmental Exposure; Cardiovascular Diseases; Respiratory Diseases; Diabetes; Cancer; Heat Stress; Water Pollution; Occupational Exposure; Urbanization; Environmental Health; Public Health; Risk Factors; Health Inequalities; Sustainable Development; Preventive Healthcare.

I. Introduction

Non-communicable diseases (NCDs), also known as chronic diseases, tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors.The main types of NCDs are cardiovascular diseases (such as heart attacks and stroke), cancers, chronic respiratory diseases (such as chronic obstructive pulmonary disease and asthma) and diabetes. NCDs disproportionately affect people in low- and middle-income countries, where nearly three quarters of global NCD deaths (32 million) occur.

Impact of Environment on Non - Communicable Disease at Global Level

- Noncommunicable diseases (NCDs) killed at least 43 million people in 2021, equivalent to 75% of non-pandemic-related deaths globally.
- In 2021, 18 million people died from an NCD before age 70 years; 82% of these premature deaths occur in low- and middle-income countries.
- Of all NCD deaths, 73% are in low- and middle-income countries.
- Cardiovascular diseases account for most NCD deaths, or at least 19 million deaths in 2021, followed by cancers (10 million), chronic respiratory diseases (4 million), and diabetes (over 2 million including kidney disease deaths caused by diabetes).
- These four groups of diseases account for 80% of all premature NCD deaths.
- Tobacco use, physical inactivity, the harmful use of alcohol, unhealthy diets and air pollution all increase the risk of dying from an NCD.

People at risk

People of all age groups, regions and countries are affected by NCDs. These conditions are often associated with older age groups, but about 18 million NCD deaths occur

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before the age of 70 years. NCDs cause more deaths in this age group than all other causes of death combined. Of these premature deaths, 82% are estimated to occur in low- and middle-income countries. Children, adults and the elderly are all vulnerable to the risk factors contributing to NCDs, whether from unhealthy diets, physical inactivity, exposure to tobacco smoke, or the harmful use of alcohol or air pollution.
Unhealthy diets and a lack of physical activity may show up in people as raised blood pressure, increased blood glucose, elevated blood lipids and obesity. These are called metabolic risk factors and can lead to cardiovascular disease, the leading NCD in terms of premature deaths.

II. Risk factors

Behavioural risk factors
Behavioural risk factors increase the risk of NCDS, including:

- tobacco use (including the effects of exposure to second-hand smoke);
- unhealthy diets, including excess salt, sugar, and fats;
- harmful use of alcohol; and
- insufficient physical activity.

The social, commercial, and physical environment are key drivers of these behaviours.

III. Metabolic risk factors

Behavioural risk factors contribute to four key metabolic changes that increase the risk of NCDs:

- raised blood pressure (including hypertension);
- overweight/obesity;
- high blood glucose levels (including diabetes); and
- abnormal blood lipids (including high cholesterol).

In terms of attributable deaths, the leading metabolic risk factor globally is elevated blood pressure (to which 25% of global NCD deaths are attributed) (1), followed by raised blood glucose and overweight and obesity.

Environmental risk factors
Several environmental risk factors contribute to NCDs. Air pollution – indoor and outdoor – is the largest of these, accounting for 6.7 million deaths globally, of which about 5.6 million are due to NCDs, including stroke, ischaemic heart disease, chronic obstructive pulmonary disease, and lung cancer.

Socioeconomic impact
NCDs threaten progress towards the 2030 Agenda for Sustainable Development, which includes a target of reducing the probability of death from any of the four main NCDs between ages 30 and 70 years by one third by 2030.

Poverty is closely linked with NCDs. The rapid rise in NCDs is predicted to impede poverty reduction initiatives in low-income countries, particularly by increasing household costs associated with health care. Vulnerable and socially disadvantaged

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people get sicker and die sooner than people of higher socio-economic positions, especially because they may have limited access to health services. To reduce these inequities, governments must invest in health systems that respond to users' expectations and needs.

IV. Prevention and Control

An important way to control NCDs is to focus on reducing the risk factors associated with these diseases. Low-cost solutions exist for governments and other stakeholders to reduce the common modifiable risk factors. Monitoring progress and trends of NCDs and their risk is important for guiding policy and priorities.

To lessen the impact of NCDs on individuals and society, a comprehensive approach is needed requiring all sectors, including health, finance, transport, education, agriculture, planning and others, to collaborate to reduce the risks associated with NCDs, and to promote interventions to prevent and control them.

Investing in better management of NCDs is critical. Management of NCDs includes detecting, screening and treating these diseases, and providing access to palliative care for people in need. High impact essential NCD interventions can be delivered through a primary health care approach to strengthen early detection and timely treatment. Evidence shows such interventions are excellent economic investments because, if provided early to patients, they can reduce the need for more expensive treatment. Countries with inadequate health care coverage are unlikely to provide universal access to essential NCD interventions. NCD management interventions are essential for achieving the SDG target on NCDs.

WHO response
The 2030 Agenda for Sustainable Development recognizes NCDs as a major challenge for sustainable development. As part of the Agenda, heads of state and government committed to develop ambitious national responses, by 2030, to reduce by one third premature mortality from NCDs through prevention and treatment (SDG target 3.4). WHO plays a key leadership role in the coordination and promotion of the global fight against NCDs and the achievement of the Sustainable Development Goals target 3.4.
In 2019, the World Health Assembly extended the WHO Global action plan for the prevention and control of NCDs 2013–2020 to 2030 and called for the development of an Implementation Roadmap 2023 to 2030 to accelerate progress on preventing and controlling NCDs. The Roadmap supports actions to achieve a set of nine global targets with the greatest impact towards prevention and management of NCDs.

Impact of Environment on Non-Communicable Disease at National Level
In India, the current population is 1,438,069,596 as of 2023 with a projected increase of 17% to 1,679,589,259 by 2050 (WHO). Non-communicable diseases (NCDs) account for over 60% of all deaths in India and pose a major threat to achieving United Nations Sustainable Development Goal 3 (SDG 3) to reduce premature mortality by one-third by 2030.

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Non communicable diseases in India

Conditions like cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes cause nearly 65% of total annual deaths. India stands to lose trillions of dollars in economic output (estimated at over $3.55 trillion through 2030) due to healthcare expenses and lost workforce productivity. NCD management drives high out-of-pocket medical spending, pushing vulnerable and low-income households into poverty.

Source: Secondary data

Major NCDs Affected

- Chronic Respiratory Diseases (CRDs): Asthma and COPD are closely tied to persistent exposure to airborne pollutants and smoke.
- Cardiovascular Diseases: Toxic air particles trigger systemic inflammation, raising rates of ischemic heart disease and stroke.
- Metabolic Disorders: Sedentary urban designs combined with localized food market shifts contribute heavily to rising obesity and type-2 diabetes.
- Environmental Factors
- Air Pollution: High levels of indoor and outdoor air pollution (including PM2.5 exposure) rank among India's top triggers for chronic respiratory diseases and cardiovascular conditions.
- Urbanization and Built Environment: Rapid growth has reduced green spaces, increased traffic congestion, and promoted sedentary indoor work environments.
- Climate Change: Extreme heat waves and changing weather patterns exacerbate underlying cardiovascular and respiratory vulnerabilities.
- Indoor Exposures: Biomass fuel usage for cooking in rural and semi-urban households creates toxic indoor air, raising the risk of chronic obstructive pulmonary disease (COPD).

Welfare schemes and programs for non-communicable disease in India

India runs national programs and welfare initiatives to prevent, screen, and treat non-communicable diseases (NCDs) like diabetes, high blood pressure, and cancer.

- National Programme for Prevention and Control of Non-Communicable Diseases (NP-NCD): Formerly known as NPCDCS, this core program under the National Health Mission focuses on early diagnosis, management, and public awareness of cancer, diabetes, cardiovascular diseases, and stroke.
- Ayushman Bharat - Health and Wellness Centres: These centers provide free population-based screening for common NCDs targeting adults aged 30 and older using frontline health workers like ASHAs and ANMs.
- Pradhan Mantri National Dialysis Programme: This scheme offers free or subsidized dialysis services for patients suffering from chronic kidney failure at district hospitals.
- National Tobacco Control Programme (NTCP): This initiative works to reduce tobacco use, which is a primary risk factor for cancer and heart disease.
- National Programme for Health Care of the Elderly (NPHCE): This program delivers dedicated preventive and curative care for age-related chronic illnesses.
- Ayushman Bharat PM-JAY: Provides health insurance coverage of up to ₹5 lakh per family per year for secondary and tertiary care hospitalization, including major NCD treatments like cancer care and cardiac surgeries.

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- State-Level Initiatives: Many states implement expanded localized screening models, such as Tamil Nadu's NCD Intervention Programme, which integrates grassroots testing across government health facilities.

V. Conclusion

Non-communicable diseases (NCDs) are chronic health conditions—such as heart disease, diabetes, cancer, and lung ailments—that are not passed from person to person, and they now account for 63% to 65% of all deaths in India. To reduce the Non-communicable diseases, India has implemented many welfare programs and schemes in health care services at national level and state level. Those programs also supporting health care system in preventing disease, prolonging life, and promoting physical and mental health through organized community efforts. national programs and welfare initiatives in India promotes the quality of life of people in various groups like children, adolescence, adult and old age people. Reduction of Non-communicable diseases reduce mortality rate, morbidity rate and improve life span of individuals in India.

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