

Non-Communicable Diseases: Challenges and Impact of COVID-19 Pandemic

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Abstract

Non-communicable diseases (NCDs) are the major cause of mortality and morbidity worldwide. In India, more than 2/3rd of the total deaths are reported due to NCDs in the World Health Organisation (WHO) South-East Asia Region. Since after the outbreak of COVID-19, as per WHO, 122 countries reported disruptions in NCD health services. NCDs remain undiagnosed due to lack of knowledge and inadequate access to health care. Role of primary care and family physicians can help in early detection and protection against NCD; patient education plays a crucial role in raising awareness of NCDs and their effect on wellbeing. Undertreatment of NCD has become a serious public health issue. Many factors like expenditure for service structure, lack of skilled health workers, periodic review and follow-ups, limited access to essential medicines lead to undertreatment of NCDs. For successful management of NCDs, a multi-disciplinary approach is required that involves adequate knowledge of the disease, adherence to the treatment regimen, follow-ups. People living with NCDs are impacted by COVID-19 pandemic like a disruption in health care services, mental health disorder, reduced physical activities. Many strategies like telemedicine, triaging, the novel supply chain for NCD medicines, and redirection of patients with NCDs to alternate health care facilities are direly needed to be deployed to overcome disruptions in LMICs.

Keywords: Non-communicable diseases, COVID-19, NCDs, underdiagnosis, undertreatment

Introduction

Non-communicable diseases (NCDs) designated as chronic diseases, such as cancer, cardiovascular diseases, chronic respiratory diseases and metabolic disorder (diabetes), are the major cause of mortality and morbidity worldwide.^[1] This invisible epidemic hinders the economic development of many countries. The burden is growing with a constant increase in the number of people, families and communities. World Health Organization (WHO) reports the death of 15 million people every year in low- and middle-income countries (LMICs) due to NCDs. Common, modifiable risk factors underlie the major NCDs, including tobacco, harmful use of alcohol, unhealthy diet, insufficient physical activity, overweight/obesity,

raised blood pressure (BP), increased plasma glucose levels and high cholesterol.^[1]

In India, more than 2/3rd of the total deaths are reported due to NCDs in WHO's South-East Asia Region (SEAR).^[2] According to SEAR's 2011 report NCD status, the three major risk factors include: raised BP, elevated plasma glucose and tobacco use and these factors are responsible for the majority of deaths in this region annually. The study reported the prevalence of raised BP, increased plasma glucose in India is about 35% and 11% respectively. The popularity of smoked tobacco products is marginally lower in India with about 15% in comparison with other SEAR countries, whereas, the prevalence of smokeless tobacco (SLT) products is higher in India (25.9%) compared to Thailand (1.3%),

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Sri Lanka (15.8%), Nepal (18.6%) and Bhutan (19.4%).^[3]

NCDs require long-term therapy and uninterrupted health care services. The pandemic of coronavirus disease 2019 (COVID-19) tapped globally, and first occurred in China, Wuhan (the epicentre) in December 2019 and now has affected 216 countries worldwide.^[4-6] Since after the outbreak of COVID-19, there has been a direct impact on people living with NCDs, as per WHO, 122 countries reported disruptions in NCD health services. A direct relationship was reported in transmission phase of COVID-19 pandemic and disruption in NCD health services.^[7]

Underdiagnosis and Undertreatment of Non-Communicable Diseases: Before Onset of COVID-19 Pandemic

The prevalence of non-communicable diseases in India is escalating. NCDs usually occur in people 55 years of age or older in many developed countries, but they appear a decade earlier in India (45 years of age).^[8,9] The problems of multiple chronic conditions are exacerbating this issue and the fact that many remain undiagnosed due to lack of knowledge and inadequate access to health care.

Type 2 diabetes mellitus (T2DM) epitomizes the management challenge in non-communicable diseases. For better management and care of diabetes, timely diagnosis and adequate treatment are the key aspects. In India, T2DM remains undiagnosed for a long time causing more than half of the diabetic population being undetected.^[10]

A cross-sectional (Screening India's Twin Epidemic [SITE]) study conducted in 10 states in India, enrolled 15,662 patients. The results reported 7.2% (793 of 11,028) patients whose disease status was unknown at the time of enrollment were diagnosed with diabetes, and 18.4% (2,031 of 11,028) patients were classified as prediabetic.^[11]

The prevalence of complications associated with diabetes is also mounting. Chennai Urban Rural Epidemiology Study (CURES) reported an overall prevalence of 17.6% diabetic retinopathy, 2.2% overt nephropathy and 26.9% microalbuminuria.^[10] Due to the under or late diagnosis of diabetes, the complications also remain underdiagnosed. In a multi-country study in Asia, Diab-Care Asia, 2269 patients were enrolled, 50% of patients had poor HbA1c control, and 54% had late severe complications.^[12] In another pan-India study, 5516 patients were enrolled out of which

17.6%, 5.6% and 4.2% of patients went for an eye examination, kidney function tests and lipid tests. Of the patients who went for examination, 27.4% and 26.5% of those had elevated blood pressure and diminished vision at the time of diagnosis.^[13] Similarly, in a study among urban diabetics in Delhi (N=819) reported 63.2% and 74.5% of patients with uncontrolled hypertension and abnormal lipid profile, respectively. Only 13%, 16.2%, 32.1% and 3.1% of patients had undergone HbA1c test, eye examination, serum cholesterol test, and foot examination, respectively.^[14] Delay in diagnosis leads to associated complications.

As discussed above, the lack of knowledge is a crucial factor that leads to underdiagnosis of NCD. In a population-based survey in Chennai, 23% of self-reported diabetic patients knew that diabetes could lead to foot problems, while only 5.8% knew that it could cause a heart attack.^[15]

Another NCD that remains underdiagnosed is hypertension, the results from SITE study reported 22.2% (2,408 of 10,858) patients whose disease status was unknown at the time of enrollment were diagnosed with hypertension whereas 60.1% (6,521 of 10,858) were prehypertensive.^[11] Awareness of hypertension also lacks in the general public, from the results of Screening and Early Evaluation of Kidney Disease (SEEK) study, 46% of patients were unaware of their hypertensive status at the time of enrollment.^[16]

Chronic obstructive pulmonary disease (COPD), another leading cause of morbidity and mortality worldwide remains underdiagnosed, yet another NCD. A population-based study in China (N=20,245 adults) reported 8.2% of patients had persistent airflow obstruction. Only 35% of patients with post-bronchodilator airflow obstruction (FEV1/FVC < 0.70) had a physician diagnosis of COPD, and the remaining 65% of subjects with chronic airflow obstruction in China remain undiagnosed.^[17]

The role of primary care and family physicians in developing acceptability of NCD in patients is important and can help in early detection and protection against NCD and associated complications. Moreover, patient education plays a crucial role in raising awareness of NCDs and their effect on wellbeing, related risk factors and implementing healthier lifestyles for their prevention.

NCDs if remain undertreated become a serious public health issue. Management of chronic diseases is a complex process as it requires long-term therapy.

Few factors that have impeded the treatment of chronic diseases include expenditure for service structure, lack of skilled health workers, irregular review and follow-ups, weak health system infrastructure, and limited access to essential medicines.^[18,19]

India being a developing country, a large proportion of the population earns less than the minimum wages prescribed by the government. Hence, affordability is a critical issue for the general population for the treatment of any chronic disease requiring life-long therapy. In Asian countries like Tajikistan, meager wages make many medicines unaffordable, despite their low prices.^[18,20] The National List of Essential Medicines identifies glibenclamide, metformin, and insulin (soluble and lente) as anti-diabetic drugs that need to be available universally.^[21] In a study to assess the availability and affordability of essential medicines for diabetes, participants aged 35–70 years (n=156625) were enrolled from 22 countries. The results reported 0.7% of households in high-income countries (Sweden, Canada, United Arab Emirates, and Saudi Arabia) and 26.9% of households in low-income countries (Bangladesh, Pakistan, Tanzania, and India) could not afford metformin. Whereas 2.8% of households in high-income countries, and 63.0% of households in low-income countries could not afford insulin.^[22] The availability of glibenclamide in public health facilities, for example, varied from 100 per cent in Karnataka to 3.8 per cent in West Bengal.^[18] Considering, hypertension another NCD, analysis from Prospective Urban Rural Epidemiological (PURE) study for availability and affordability of blood pressure-lowering medicines in 20 countries. The study reported 31% in low-income countries like India (1069 of 3479 families), 9% in middle-income countries (5602 of 65 471 families), and less than 1% in high-income countries were unable to afford two blood pressure-lowering medicines.^[23]

Lack of skilled health workers adds to the surge in undertreatment of chronic diseases. In India, only seven physicians and 17.1 nursing/midwife personnel are available per 10,000 population.^[19] There has been a study that reports that general practitioners (GPs) have insufficient knowledge about prophylaxis for chronic disease, and patients and/or GPs are focusing on treating acute episodes rather than long-term control of the chronic disease.^[24]

Existence of gap in the infrastructure of health facilities in developing countries also accounts for undertreatment. Taking India into consideration, only 20.72% of primary health centres (PHCs) are said to be

functioning as per IPHS norms.^[25] Due to limited operational health care centres, there is a decline in follow-ups of patients leading to unsatisfactory treatment of chronic conditions. The availability of essential medicines to treat chronic diseases at the primary care level is a crucial prerequisite. The accessibility of essential medicines was found to be very low in the public sector; however, in private sectors, the generics were available with high prices in all the Indian states.^[18] The results from the Prospective Urban Rural Epidemiology (PURE) study for availability and affordability of essential medicines for diabetes, metformin was available in 88 (100%) of 88 pharmacies. In contrast, insulin was available in 67 (76.1%) of 88 pharmacies in India.^[22] In another Prospective Urban Rural Epidemiology (PURE) study for availability and affordability of blood pressure-lowering medicines, 76% of communities in India (68 of 90) had four drug classes available.^[23]

Since there is an increase in the incidence of chronic diseases in developing Asian countries, there is a need to address the problem by increasing the number of skilled health workers, education and awareness for doctors and the general public, treatment guidelines, improving access to essential medicines, coordination in multisectoral policy interventions, and resource allocation in activities related to chronic disease prevention and control.

Status of Compliance in Patients with Non-Communicable Diseases: Before Onset of COVID-19 Pandemic

For successful management of non-communicable diseases, a multi-disciplinary approach is required that involves adequate knowledge of the disease, adherence to the treatment regimen, follow-ups.^[26] A lack of compliance with any of the critical factor in the management of the chronic disease will lead to poor health outcomes and high health care cost.^[27] In developing countries like China, Gambia and Seychelles, the adherence rate is 43%, 27%, and 26%, respectively to anti-hypertensive medication regimen.^[28-31]

Adherence to treatment is a determining factor of the effectiveness of treatment. Good compliance improves the effectiveness of interventions aimed at promoting healthy lifestyles, such as diet modification, increased physical activity, and non-smoking. Adherence to treatment depends on five factors: 1) social/economic factors 2) therapy-related factors 3) patient-related factors 4) condition-related factors and

5) health-system factors.^[27] In a cross-sectional study to assess the adherence to oral medication among patients with type-2 diabetes mellitus in Asian countries, the study enrolled 382 patients of Chinese, Indian, and Malaysian ethnicity. The study reported patients of younger age and Chinese ethnicity were less adherent to their medications, whereas older, married, and widowed patients were more adherent because of family or domestic help assistance.^[32] In another cross-sectional study in rural Puducherry, South India, 260 patients with chronic diseases (hypertension, diabetes mellitus, bronchial asthma) were enrolled. The study results reported one-third of the population were non-adherent to medications. Females, patients with no formal education, unemployed patients, were found to be the determinants of non-adherence.^[33] A community-based cross-sectional study in north India enrolled 400 self-reported diabetic patients. One-hundred twelve patients (28%) were found non-adherent to diabetic drugs with reasons like forgetting to take the drug, feeling of bitterness, non-availability of drugs, fear of side-effects, and financial constraints.^[34] Few other studies also reported poor adherence to medication among people with hypertension.^[35,36] Other factors like lack of time for self-care, financial dependence, alcoholism were observed to affect treatment adherence.^[37]

Socio-economic factors like poverty, illiteracy, low level of education, unemployment, unstable living conditions, long-distance from the treatment centre, high cost of transport, high cost of medication, culture and lay beliefs about illness and treatment, and family dysfunction have a significant effect on adherence to treatment. Disease condition-related factors like severity of symptoms, level of disability (physical, psychological, social and vocational), rate of progression and severity of the disease, and the availability of effective treatments are a few determinants of adherence. Patient-related factors like inadequate knowledge and skill in managing disease symptoms and treatment, lack of acceptance of monitoring; low treatment expectations; low attendance at follow-up, or counselling contribute to affect adherence.^[27]

The loss to follow-up remained the most common factor in the management of chronic diseases. Literature review documented patients reasons like no clinical sign or symptoms of the disease, long waiting time at clinics, medical services not available at close-proximity, and expensive health care for loss to follow-up.^[38]

A constant effort is being made to improve the pro-

vision of information to patients and drive sustainable good adherence for long-term therapies. Improvement in health care systems is aimed to provide better adherence to treatment, follow-ups.

Impact of COVID-19 Pandemic on Health Services of Non-Communicable Diseases

COVID-19 pandemic has impacted people living with NCDs in many ways like increased morbidity and mortality, disruption in health care services, mental health disorders, reduced physical activities, reduction in funding by government bodies.

Morbidity and Mortality

People living with NCDs like diabetes mellitus (DM), hypertension, cerebrovascular disease, coronary artery disease (CAD), and COPD are susceptible to COVID-19 infection. In India, 86%, while in China, 72.2% of COVID-19 patients had comorbid conditions.^[39]

In a systematic review and meta-analysis by Awadhesh Kumar Singh et al. 22.9%, 11.5%, 9.7% of patients with COVID-19 reported hypertension, diabetes, and CVD, respectively. Whereas, less than 4% of patients had comorbid conditions like chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), cerebrovascular disease, and cancer.^[40]

NCDs like hypertension, diabetes, CAD, COPD and their associated conditions are correlated to a higher risk of death in COVID-19 patients.^[39]

Disruption in Health Care Services

There has been a disruption in health care services for people with NCDs like postponement in routine chronic care (including palliative care), difficulties in accessing medication and treatment when supplies are disrupted, appointments are postponed, or where health workers are diverted to the COVID-19 response.^[41]

According to results reported in rapid assessment of service delivery for NCDs during the COVID-19 pandemic, conducted by the World Health Organization (WHO), there was an increase in disruptions of NCD services with more severity in the transmission phase of COVID-19 pandemic. During phase 2 (sporadic cases), 39%, 33%, and 22% of countries disrupted services to treat hypertension management, diabetes and complications and cardiovascular emergencies, respectively. However, during phase 4 (community transmission) 66%, 64%, and 46% of countries disrupted services to treat hypertension management, diabetes and complications and cardiovascular emergencies, respectively.^[7]

Major reasons contributing to the NCD health service disruption included: 1) Decrease in inpatient volume due to cancellation of elective care; 2) Closure of population-level screening programmes; 3) Government or public transport lockdowns hindering access to the health facilities; 4) NCD related clinical staff deployed to provide COVID-19 relief; 5) Closure of outpatient disease-specific consultation clinics; 6) Closure of outpatient NCD services as per government directive; 7) Unavailability/Stock out of essential medicines, medical diagnostics, health products.^[7]

In a developing country like India, a large number of people with NCDs remain undiagnosed or cannot access treatment to control their conditions, even under normal circumstances while during a pandemic situation government must ensure access to treatment, avoid disruption of health services. Many countries are using strategies like telemedicine (~50% of LMICs), triaging (more than 50% of LMICs), novel supply chain and/or dispensing approaches for NCD medicines, and redirection of patients with NCDs to alternate health care facilities to overcome disruptions.^[7] Telemedicine has gained significance because of delivery of health-care services through medical data transmission via information and communication technologies (ICT).^[42] The application of telemedicine involves a) real-time interactive mode (for e.g.: videoconferencing); b) store-and-forward mode (information, including digital images, video, audio, and data, is captured, stored, and sent electronically to a specialist or clinician at another facility for interpretation and feedback); c) remote monitoring; and d) communication via telephone.^[43] With increase in prevalence of NCD, and eventually increase in follow-up consultations, telemedicine is a wider use application. It also reduces the number of hospital visits, travel time and associated stress, and cost for both patients and healthcare payers.^[42]

Mental Health Disorders

The mental health of people living with NCDs is impacted due to the stress of avoiding infection by following recommendations like physical distancing in the public area, self-isolation, quarantine measures which further led to increase in loneliness and reduced social interaction. The steps taken by people living with NCDs can exaggerate the problem and can cause anxiety and depression in older people. Patients with existing mental health issues suffer more during the pandemic situation due to quarantine periods.^[44]

In a systematic review, 16–28% and 8% of people in India reported anxiety and depression, and stress re-

spectively, due to psychological reactions to COVID-19 pandemic and is related to a disturbance in sleep pattern.^[45] Another systematic umbrella review reports mental health problems among patients who have undergone quarantine and isolation.^[46]

Reduced Physical Activities

Reduced physical activity is a major risk factor for developing NCDs like hypertension, obesity, and CAD. Physical inactivity existed due to sedentary work-life but exacerbated during pandemic related lockdowns, travel restrictions which further can increase the associated risk of NCDs.^[47] The lockdown imposed in many countries, including India, lead to the closure of gyms, swimming pools, and clubs and inevitably reduced physical activity. Physical activity control symptoms, and risk factors associated with NCDs like hypertension, elevated glucose levels, cardiorespiratory functions.^[44]

Reduction in Funding by Government Bodies

In many LMICs research projects on NCDs have been halted or postponed due to COVID-19 outbreak. According to WHO, 17% per cent of countries have allocated additional funding from the government budget to include the provision of NCD services in their national COVID-19 plan.^[41]

Despite the dreadful impact of COVID-19 pandemic on people living with NCDs, the lockdowns imposed by Government of India (GoI) lead to clear skies and clean air and turned out to be a blessing in disguise for the millions affected due to air pollution in India. A study reports a correlation between air pollution and COVID-19 deaths, and also reported the number of fatalities was maximum from regions with high pollution levels.^[48]

In light of COVID-19, tackling NCDs must be understood as fundamental to health security. Pandemic preparedness - today and in the future - depends on Universal Health Coverage, healthy populations, and a resilient, qualified, well-resourced health workforce. COVID-19 and NCDs can impact the global and national economy, health being an essential factor for the development of the economy; therefore, it is essential to strengthening health services industry to avoid disruption in existing models of delivering health services. Improvement in providing health services include patient engagement platforms (informational/educational messages, reminder messages for doctor/expert consultation), telemedicine, novel supply chain for NCD medicines; such programmes will prepare countries to combat the impact of the pandemic on health

services for NCDs.

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