



Impact of COVID-19 Pandemic on Integrated Management of Diabetes in India in 2020

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Abstract

Covid-19 Pandemic continues to cause huge disruption in health care services worldwide. Among the immediate health service consequences of the pandemic on diabetes, were disruption of proactive screening, diagnosis, and treatment and monitoring of blood sugars for appropriate change in treatment plans. Available evidence hint that the presence of diabetes was associated with a poor outcome in Covid 19 patients and the Covid 19 infections and disrupted services increased the diabetes complications. National data indicates that diabetes prevalence was 40% among Covid 19 hospitalized cases and deaths.

Though exact statistics is not available on the impact of Covid 19 pandemic on diabetes care, it is feared that the screening of diabetes has dropped at least 50% in NCD clinics around 70% in outreach and population-based screening since April 2020. This is attributable to: 1. Periodical lockdowns led to disruption of services both in Public and private sectors 2. Conversion of large number of urban hospitals (Public and Private) into Covid care centres (CCC) 3. Most services under the NPCDCS were either suspended or sparingly provided as the human resource was redeployed for Covid 19 duties. 4. Diabetics avoided consultation and monitoring of Blood sugar fearing the risk of Covid 19 infection.

A study in two diabetes hospitals in India indicates that the glycaemic parameters were significantly higher among patients with onset of diabetes during COVID-19 pandemic when compared to those who had onset diabetes before the pandemic. A systematic review of 32 studies estimated a median direct cost of diabetes treatment to be in the range of ₹8822/- to ₹45,792/- p.a. and the median indirect cost of diabetes was ₹1198/- p.a to ₹18,707/- p.a. This variance in the treatment cost is yet another determinant of utilization of services.

India aims to offer a collaborative, integrated and personalised approach for optimal therapy to people with diabetes or those at risk of developing the disorder. This includes screening at community level, early diagnosis and putting patients on standard treatment protocols and follow-up of each case for complications and their timely management. Clinical data indicates an increased proportion of complications among the known diabetes cases in the recent months.

In, this article I look at the impact of Covid 19 Pandemic on detection and treatment of Diabetes Mellitus in India in the FY 2020-21.

Keywords: Diabetes; NPCDCS; NCD Clinics; NCD Outreach and Population Surveys, Impact of Diabetes on Outcome of Covid19 and Impact of Pandemic on Other Health Services.

Introduction: Global Situation

Diabetes occurs when there are raised levels of glucose in the blood either because the body is unable to produce any or enough of the hormone insulin or cannot use insulin effectively. Consis-

tently high blood glucose levels can lead to serious diseases affecting the heart and blood vessels, eyes, kidneys, nerves, and teeth. In addition, people with diabetes also have a higher risk of developing infections like Covid 19 as seen in the recent Pandemic.

International Diabetes Federation (IDF) estimated 463 million people in the age group of 20-79 years to have had diabetes in 2019 worldwide and of them 77 million were in India [1,2].

Country	2019	Country	2030	Country	2045
China	116.4	China	140.5	China	147.2
India	77	India	101	India	134.2
USA	31	USA	34.4	Pakistan	37.1
Pakistan	19.4	Pakistan	26.2	USA	36
Brazil	16.8	Brazil	21.5	Brazil	26
Mexico	12.9	Mexico	17.2	Mexico	22.3
Indonesia	10.7	Indonesia	13.7	Egypt	1639
Germany	9.5	Egypt	11.9	Indonesia	16.6
Egypt	8.9	Bangladesh	11.4	Bangladesh	15
Bangladesh	8.4	Germany	10.1	Turkey	10.4

Table 1: IDF list of the top 10 countries and projects with the highest number of diabetics (millions).

Source: 1. <https://www.publicholidayguide.com/world-diabetes-day-2021>.

As seen in the table 1 the percentage of people with type 2 diabetes is increasing in all top ten countries between 2019 and 2030. The worst increases are expected in Pakistan (35%) Mexico (33%) India (31.1%) followed by China (20.7%). It is estimated that there are 374 million people pre-diabetics worldwide. Low-and middle-income countries contributed 79% of adults with diabetes living worldwide. While 20% of the people above 65 years old worldwide have diabetes and nearly half of (232 million) the people with diabetes were undiagnosed. Diabetes caused 4.2 million deaths in 2019. The situation among children and adolescents is also a matter of concern as there are more than 1.1 million children and adolescents with type 1 diabetes and more than 20 million new-borns (1 in 6 live births) are affected by diabetes during pregnancy [1].

An increase in the prevalence of gestational diabetes mellitus (GDM), is alarming as its adverse consequences include diabetes among the new-borns, and increasing diabetes and obesity, especially in offspring. Recent data show that the prevalence of GDM has increased between 10 to near 100% in several race/ethnic groups in the past 20 years. This fact has attracted the attention of obstetricians and public health professionals in the recent years. The proportion of GDM in any community reflects the magnitude of

type 2 diabetes in the overall population. Advanced maternal age, obesity, and family history of diabetes are recognised as risk factors for GDM [4]. Native Americans, Asians, Hispanics, and African American women are at higher risk for GDM than non-Hispanic white women report many studies from the U.S.A. Australian studies, indicate that GDM prevalence was higher among women of China or Indian origin than in women of Europe or Northern Africa origin [4].

Situation in India

India is a high burden Diabetes country. The prevalence of diabetes in the Indian population is 8.9%, as against 11.8% in a Government of India survey¹². IDF estimated that there were 77 million diabetics in India in early 2020 [1], Juvenile Diabetes (diabetes among 0 - 14 years) also called as Type 1 Diabetes Mellitus (T1DM) is increasing worldwide and India is home for more than a million T1DM cases second only to the United States As per the World Health Organization [3]. There were 9.9 million deaths in India in 2017, with a death rate of 717.79 deaths/100,000 people, according to the 2018 Global Burden of Disease (GBD), published by the University of Washington and of them 254,500 (2.57%) deaths were due to diabetes [3]. Urban population have a higher diabetic than the rural population in India. The survey conducted during 2015-2019 by Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi showed that the prevalence of known diabetes cases was 8.0% and new diabetes cases was 3.8%.

Neuropathy is the most common complication (41.4%); followed by Foot ulcers (32.7%), eye complications (Cataract and retinopathy-19.7%), cardiovascular (6.8%) and nephropathy (6.2%), with the number of diabetic complications increasing with mean duration of disease and mean levels of Blood sugars as monitored by Hb1Ac [15]. Clinical data indicates an increased proportion of complications like diabetic retinopathy, hyper-mature cataracts and Cerebral strokes following Covid 19 infections among the known diabetes cases in the recent months. The proportion of depression was around 20% of diabetics as compared to 15.1% in general population, that too has worsened due to Covid infections spread [16].

In a study of 357 pregnant women of 21 and 28 weeks of gestational age from January to March 2016, showed that GDM was recognized in 20.4% pregnant women with capillary testing compared

to 11.5% with venous blood testing using a glucometer. GDM was much higher among literates, homemakers, Hindus, among people living in nuclear family, belonging to socio-economical middle class, residing in urban area, primigravidae, and obese women. The public health strategy lesson from this study suggested that glucometer testing can be used to screen pregnant women at an early gestational age (21 weeks), at the community level by health-care workers [5]. Many studies in India have proved that the risk factors for GDM are a family history of diabetes, obesity, advancing maternal age, reduced physical activity, desk jobs, sedentary lifestyle, unhealthy eating habits, smoking and alcohol consumption, history of PCOD and hypertension. This rising incidence of gestational diabetes mellitus (GDM) is a cause for concern among obstetricians. Studies in different parts of India gathered evidence of an increasing prevalence of diabetes in urban both rural populations, mainly because of the urbanization of lifestyle parameters. Recent studies have shown a rapid conversion of impaired glucose tolerance to frank diabetes cases in the southern states of India. In southern states the prevalence of diabetes among adults has reached around 20% and 10% in urban populations and rural populations, respectively. In another cross-sectional study analysed the fourth National Family Health Survey, conducted in India between January 2015 and December 2016. A national representative sample comprised of 699 686 women in the ages 15 to 49 years of age, of whom 32 428 (4.6%) were pregnant. Data was analysed between July and December 2019 and between July and August 2020. The weighted age-adjusted prevalence of gestational diabetes was 1.3% (95% CI, 1.1%-1.5%). The prevalence of gestational diabetes increased with age, from 1.0% (95% CI, 0.5%-1.5%) at age 15 to 19 years to 2.4% (95% CI, 1.0%-3.8%) at age 35 years or older. The age-adjusted prevalence of gestational diabetes was higher among women with a body mass index (BMI) of 27.5 or greater (1.8%; 95% CI, 1.0%-2.5%) compared with women with a BMI of less than 18.5 (0.8%; 95% CI, 0.5%-1.1%). It was significantly higher among women in the highest wealth quartile (1.7%; 95% CI, 1.1%-2.5%) compared with those in the lowest quartile of economic status (0.9%; 95% CI, 0.7%-1.2%), and women in the southern states like Kerala: 4.5%; 95% CI, 2.4%-6.7%; Telangana: (5.4%; 95% CI, 0.0%-11.0%) when compared with the northeast (e.g., Assam: 0.23%; 95% CI, 0.0%-0.48%; Mizoram: 0.16%; 95% CI, 0.0%-0.49%) [6]. All these studies indicate the need and urgency of screening pregnant women for GDM, which was compromised across the country in the last one year due to disruption of routine antenatal care service [6].

Previous studies have shown consistent association of diabetes with pancreatic cancer and indicate a twofold higher risk of developing pancreatic cancer among diabetes patients. Most of the recent studies, indicate that nearly 80% of pancreatic patients pres-

ent with either new-onset type 2 diabetes, or an impaired glucose tolerance at the time of diagnosis. Identification of high-risk people and ability to detect pancreatic cancer at an earlier stage would improve pancreatic cancer patient outcomes. Research has shown that long standing uncontrolled diabetes could be either a risk factor for pancreatic cancer or a symptom of pancreatic cancer. New research studies suggest that the onset of type 2 diabetes in people over 50 may be an indication of pancreatic cancer [7].

A systematic review of 32 studies estimated a median direct cost of diabetes to be in the range of ₹18,890/- p.a. for the north zone, ₹10,585/- p.a. for the south zone, ₹45,792/- p.a. for the north-east zone and ₹8822/- p.a. for the west zone. Similarly, the median indirect cost of diabetes was ₹18,146/- p.a. for the north zone, ₹1198/- p.a. for the south zone, ₹18,707/- p.a. for the north-east and ₹3949/- p.a. for the west zone.

In India, the glycaemic outcome in treated patients is far from ideal due to disparity in the availability and affordability of diabetes care I rural and urban areas and so also due low awareness of the disease and its consequences. Lower age at onset of the diabetes, delay in diagnosis and sub-optimal personalized glycaemic monitoring and evidence-based treatment and control are making way for the occurrence of cardio-vascular and cerebral complications. Most advanced treatments and therapies are available for type 2 diabetes, in urban India. The overall new developments in diabetes management in urban India that include the once-weekly GLP-1, use of technology for self-management and blood glucose monitoring are the precursors of the current diabetes management in the country.

Alarmed by the increasing diabetes prevalence figures from multiple small studies across the country, Government of India started National Diabetes Control Programme (NDCP) on pilot basis in 1987 in some districts of Tamil Nadu, J and K and Karnataka. NDCP aimed to start services for screening at all levels of health facilities in the health care delivery system for early detection of diabetes, among people coming for other illnesses. This programme could not be expanded due to resource crunch in subsequent years. With the objective of controlling diabetes, the Government of India initiated a national program named 'National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS)' in 2010. The key objectives of this program are 1. Identification of high-risk subjects (sedentary lifestyles and improper dietary practices) through screening at community level and early intervention in the form of health education and treatment if required 2. Early diagnosis and initiating appropriate treatment for the high-risk group. 3. Prevention of acute and chronic

metabolic disorders, cardiovascular, renal, and ocular complication of the diabetes 4. Provision of equal opportunity for physical and scholastic achievements for the diabetics particularly children and adolescents 5. Rehabilitation of partially or totally handicapped diabetes patients [8].

Health care services for diabetes since declaration of Covid 19 Pandemic 2019

The disruption of health, social security services and daily wage-earning opportunities due to Covid 19 Pandemic is wide ranging. The public sector health services were completely disrupted and the services in private sector also were partially affected in many countries. More than half (53%) of the countries surveyed had partial or complete disruption of services for diagnosis and treatment of hypertension; 49% for diagnosis and treatment of diabetes and diabetes-related complications; 42% for cancer detection and treatment, and 31% for cardiovascular emergencies [9]. Rehabilitation services were disrupted in 63% of the countries, despite the dire need of rehabilitation to a healthy recovery following severe illness from COVID-19 [9]. Redeployment of health staff working in NCDs to support COVID-19 was the cause of disruption of services in the majority (94%) of the countries responding to WHO. The most common reasons for reduced availability services were cancellations of planned diabetes OPDs, a lack of staff to provide services as most of the health workers were reassigned to support COVID19 services. A marked decrease in public transport also contributed as commuting was a challenge. One another main reason for discontinuing services was a shortage of medicines, diagnostics, and other technologies in 20% of the countries reporting disruptions [9].

To slow down the COVID-19 pandemic, a strict lockdown was enforced in India in March 2020, initially for a period of 21 days and it was subsequently extended till the end of May. During this time, people faced several challenges; inability to exercise in open

spaces, poor availability of healthy food options and difficulty in accessing medical support. These challenges continue to exist, albeit to a lesser extent, even after lifting of the lockdown. There is, therefore, the possibility of an increase in various lifestyle-related diseases including new-onset diabetes (NOD, henceforth termed as NOD COVID) during this pandemic period. The adverse lifestyle changes occurring because of lockdown might also lead to acceleration of progression from pre-diabetes to diabetes in many individuals. In addition, it is now being recognized that several factors related to COVID-19 infection and its treatment may play a role in the development of NOD [12].

While India also faced disruptions of health care services, we did have a share of positive impact too. The impact of Covid-19 on improving the domestic production of PPE, Gloves, sanitizers, ventilators, and drug/vaccine availability and creation of dedicated hospitals and beds has been enormous. Initial advancement to bring drugs and vaccines in the markets was noticed by the Central Drugs Standard Control Organisation (CDSCO). In September and October 2020 CDSCO has approved close to 60 trials, of which approximately 25% were Covid-19 studies [10].

In India Non-communicable diseases (NCD) clinics have been set up at district and CHC levels to provide services for common non communicable diseases across the country under the National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular diseases, and Stroke (NPCDCS). Since 2014-15 starting with 95 of such district and sub-district level facilities the number has increased to 616 by end of September 2019. Similarly, the CHC clinics rose from 204 in 2014-15 to 3827 by 30 September 2019. The number cumulative screening was 10.7 million in 2014-15, that increased to 72.1 million 2018-19 and 6 million in first of the 2019-20. On an average 6 to 9.7% of the patients undergoing opportunistic screening in clinics and 7.1% to 10.7% in outreach clinics and population-based screening have been detected as diabetics.

Year	AT NCD Clinics		Outreach and Population based screening	
	No of Opportunistic Screening	No Positive for Diabetes	Total No Screened	No Positive for Diabetes
2014-15	5924567	559718 (9.45%)	4777998	442458 (9.26%)
2015-16	12900368	1067774 (8.28%)	9636084	727672 (7.55%)
2016-17	22427125	2175145 (9.7%)	17769369	1492332 (8.4%)
2017-18	46571176	3728436 (8%)	31258756	3350647 (10.72%)
2018-19	67962186	4148681 (6.1%)	45163114	3684718 (8.2%)
2019-20 (April-Sept 19)	33277060	22345609 (6.7%)	27312457	1945029 (7.12%)

Table 2: Trends in Screening and Diagnosis of Diabetes under NPCDCS.

Source: Annual Report 2020-21, CHEB, MOH &FW, <https://main.mohfw.gov.in/sites>.

Materials and Methods

This article uses the data available from Central Health Education Bureau (CHEB) of Ministry of Health and Family Welfare, recent studies and media coverage and anecdotal experiences.

Results

Results (Known impacts of Covid 19 pandemic on diabetes diagnosis and treatment in 2020)

The statistic of diabetes case detection in 2020-21 is not readily available. However, based on the NHM monthly progress reports it is estimated that the process of screening has been affected at least by 50% in clinics and more than 70% in outreach and population-based screening since April 2020. This is due mainly to both suspension of most of services in facilities and outreach and population-based surveys and lukewarm response of people attending the NCD clinics in last 1 year.

Among around 25 diabetics under my care with quarterly in-person consultation (with diabetes profile laboratory investigation), in the last year (2020) only 2 turned for personal consultation for complications of diabetic foot. The rest all had video/audio consultations with investigations in February 2020, and 8 of them

have gone from fair maintenance to poor maintenance as they had resorted to sedentary life and defaulted in diet management.

I, being public health professional and active diabetes practitioner working with Diabetes Foundation of India (DFI) Vasantkunj, New Delhi for 10 years and diabetic for 30 years, was used to get weekly blood sugar level monitoring (Glucometer at home), quarterly HbA1C test and consultation with an endocrinologist. In 2020 I had reduced the home monitoring to average once a month and got done HbA1C after 1 year recently and had postponed annual consultation with an endocrinologist.

In the absence of data for diabetes case detection, I used Cataract surgeries as a proxy since 2018-19 (assuming it to be representative of NCD services). One can see that there is a drop from about 62 lakh surgeries (520,000/month) annually, to only 4.62 lakh surgeries (77000/ per month) annually (20% of a normal year) across the country in the first half of 2020-21. The fall in high focus states (HFS) is sharper at 25000/per month or 90% of previous 2 years as compared to Non-High focus 55000 per month (82%) southern states. Given the population proportion in HFS states the backlog will be hard to catch up in the next 2 years.

Quarterly NHM MIS report					
		NHFS	HFS(NE)	HFS	India
Cataract Surgeries done in lakhs	2018-19	36.7	0.8	23.15	61.57
	2019-20	35.2	0.8	25.71	62.57
	2020(mar-sept)	3.3	0	1.31	4.62

Table 3: Trends in Cataract Surgeries in last 3 years in India

Source: Quarterly NHM MIS report (STATUS AS ON 30.09.2020), <https://nhm.gov.in>

In a community-based prospective study, the progression to diabetes among Indians with Impaired Glucose Tolerance (IGT) and if it could be influenced by interventions were studied. The population who was younger, leaner (mean age 45.9+/-5.7 years, BMI 25.8+/-3.5 kg/m) and more insulin resistant than the general were selected. A randomised prospective community-based study of 531 (421 men 110 women) subjects with IGT were divided into four groups. In this study Group 1 was the control, Group 2 was given advice on lifestyle modification (LSM), Group 3 was treated with metformin (MET) and Group 4 was given LSM plus MET. The primary measure was type 2 diabetes diagnosis using WHO criteria. The cases were followed-up for a median period of 30 months.

After 3years cumulative incidences of diabetes was highest at 55.0% in Group I, followed by 40.5%, 39.3%, and 39.5% in Groups 3, 4 and 2, respectively. The relative risk reduction was 28.5% with LSM (95% CI 20.5-37.3, p = 0.018), 26.4% with MET (95% CI 19.1-35.1, p = 0.029) and 28.2% with LSM + MET (95% CI 20.3-37.0, p = 0.022). The number of cases needed to treat to prevent one incident case of diabetes was 6.4 for LSM, 6.9 for MET and 6.5 for LSM + MET, respectively. The Progression of Impaired Glucose Tolerance to diabetes was high in native Indians. Both Lifestyle Modification and Metformin treatments significantly reduced the incidence of diabetes in Indians with IGT. But it was observed that there was no added benefit from combining them.

National Diabetes and Diabetic Retinopathy Survey 2019 report released by the Ministry of Health and Family Welfare; puts the prevalence of diabetes at 11.8% in people over the age of 50 [12]. The prevalence of diabetes among the adults below the age of 50 years was 6.5% and in addition prediabetes was 5.7%, according to the DHS [10]. There was no gender difference in prevalence as it was (12%) and (11.7%) among male and female populations, respectively. Prevalence of diabetes was higher in urban areas when compared to rural India [12]. A survey for diabetic retinopathy which threatens eyesight, indicated that 16.9% of the diabetic population aged 50 years and above were found to be affected with retinopathy. Diabetic retinopathy in the 60-69-years age group was highest at 18.6%, followed by among those who were more than 80 years (18.4%) and in the 70-79-years age (18.3%) and among the 50-59 age group it had lowest prevalence of 14.3%. High prevalence of diabetes is reported in socially economically and epidemiologically advanced states such as Maharashtra, Tamil Nadu, and Kerala, where many research institutes conduct prevalence studies and provide better care. In India, most diabetes cases (90-95%) are of type 2 diabetes as Type 1 diabetes mellitus accounts for only about 5%-10% of all cases of diabetes [12].

Because of the considerable disparity in the availability and affordability of diabetes care, as well as low awareness of the disease, the glycaemic outcome in treated patients is far from ideal. Lower age at onset and a lack of good glycaemic control are likely to increase the occurrence of vascular complications. Covid 19 Pandemic has complicated these challenges due inaccessibility of services and fear of contacting Covid 19 in seeking care. There are excellent examples of diabetes patients modifying their Lifestyle by diet control, exercises and yoga and timely treatment. These approaches have proved as effective tools for the primary prevention of diabetes in Indians. Therefore, India needs to urgently do screening for diabetes on a large scale, diagnose and treat the cases as early as possible using available drugs, motivate individuals to monitor the blood sugar levels and adjust the drug dosage, consult physicians and endocrinologists. The health system must improve the ability to accelerate treatment quickly- along with minimizing the variation in different levels of care. Access to advanced diabetes treatments equipment that transmit glucose readings to the person wearing the device and helps delivering appropriate quantity of Insulin for type 1 diabetes is still limited in major cities of India only. This sensor-augmented insulin pump (SAP) combines the technology of an insulin pump with a continuous glucose monitoring sensor that transmits glucose readings to the person wearing the

device need to be popularized.

In a recent study undertaken among newly diagnosed adults with type 2 diabetes mellitus (T2DM) cases were compared to examine the differences between patients of diabetes with onset during COVID-19 (NOD COVID) and new onset diabetes before COVID-19 pandemic (before April 2020) in two tertiary care hospitals located in South India (Chennai) and North India New Delhi. Gold standard RTPCR test for SARS-CoV-2 virus was done as recommended by national covid 19 guidelines, and COVID-19 antibody test was done in all other NOD COVID patients.

In this study a total of 555 patients with new onset diabetes were recruited (282 New Onset Diabetes cases and 273 New Onset Diabetes COVID positive patients). The key laboratory findings of fasting (FBS) and post prandial blood glucose (PPBS) and glycat-ed haemoglobin levels (Hb1Ac) were higher among Patients with NOD COVID as compared to NOD patients. In terms of BMI both the groups had high average body mass index $\sim 28 \text{ kg/m}^2$. Striking observation of the study was fasting C-peptide levels were significantly higher in the NOD COVID group compared to NOD group. The comparison of C-peptide levels or glycaemic parameters among COVID-19 antibody positive and negative cases did not show any significant difference. This study confirms that the Individuals who were diagnosed with diabetes during COVID-19 epidemic (since April 2020) did not differ in symptomatology, phenotype, and C-peptide levels from cases diagnosed before April 2020. However, they had more severe glycemia [13] at the time of the diagnosis.

Experts estimated that up to half a million cataract removal surgeries might have been delayed over the last few months in the wake of the pandemic. Eye care programmes at ground level have also suffered a setback due to the pandemic with the District Blindness Control Societies halting their eye camps. This has increased the burden of untreated cataract and cataract induced blindness. "Cataract surgeries had dropped to 30% in initial months and now are about 70% of pre-COVID times. In many patients, the delay in consultation has led to the cataracts progressing to advanced stages, increase in the complexities of the surgery, delayed post-operative recovery and suboptimal outcomes [14].

Discussions

It is well-known that viral infections can trigger diabetes. Incidence of diabetes have been reported following influenza and dengue viruses' infections in India. In the past following H1N1

Influenza pandemic, islet cell autoimmunity and subsequent type 1 diabetes was reported [13]. Some recent studies from India and other countries have reported cases of pancreatic damage and new-onset diabetes, diabetic ketoacidosis and cases mimicking type 1 diabetes following COVID-19 infections. Pancreatic beta-cells carry Angiotensin Converting enzyme-2 (ACE-2), a receptor which facilitates entry of SARS-CoV-2 into the cell. This is followed by damage to the cell and subsequent development of diabetes [13].

Public health professionals hypothesize that both the COVID-19 pandemic and the response to it increased the incidence and severity of diabetes compared to before the pandemic because of the multiple pathophysiological factors. It would also result in increased incidence of diabetes related cataract incidence and delayed surgeries with poorer outcomes even after surgeries.

Way Forwards

Ensuring employment under Mahatma Gandhi National Rural Employment Guarantee Act (MANREGA) and some such new initiatives for improved daily wages and direct transfers, minimum number of workdays protection will be critical to saving lives and protecting public health, people's livelihoods, and food security. The need and the urgency of meaningful actions like extending social protection towards universal health coverage and income support for that most affected need emphasis. India must extend different forms of support to its population like cash transfers, feeding in Ananganwadi Centres, and healthy school meals. The daily wage earners and farm labours will have to be provided shelter and food relief initiatives. Medium and small industries need to be supported for employment retention and recovery. Becoming Atma - Nirbhar (self-sufficiency) in health care will be critical for large country like India. This can be achieved by investing in producing equipment, drugs, vaccines, and health research. The Medical Devices Industry (MDI) in India must play a critical role in the healthcare ecosystem and will play a critical role in achieving the goal of health for all citizens of the country. Indian manufacturing companies and start-ups must move towards creating innovative products of the domestic market, as they are import-driven (over 65%) now the developing countries dependant on donor countries had the most disruption in screening, early diagnosis and initiating treatment in the last one year. Therefore, this is the time for global solidarity and support, especially for the most vulnerable population in our societies, particularly in the emerging and developing world. The health, social and economic impacts of the pandemic

and its escalation into a protracted humanitarian and food security catastrophe can be prevented only by all countries coming together and helping each other. The most recent four countries cooperation 'The Quad summit' hosted by US President Joe Biden on March 12 program of vaccine production between India, Japan and Australia and USA. The most notable takeaway from the first-ever "Quad" leaders meeting was the agreement on expanding the global vaccine supply. The vaccination capacity of India will be increased to produce 1 billion doses by 2022. The US and Japan plan will fund Indian production of Johnson and Johnson's single-dose vaccine, and Australia will distribute across Southeast Asia. So far India has given 71 countries vaccines manufactured in India, most of these are developing countries which did not have adequate access to the vaccine. This will undoubtedly boost India's vaccine diplomacy efforts where it has been providing vaccines to the developing countries, both in its neighbourhood as well as globally. India's vaccine diplomacy has won attention for its efforts to make vaccine availability more equitable following the principle of while we vaccinate our own people, we will inoculate other people who need it as much as we do." The strategic significance of India's vaccine diplomacy also cannot be overlooked. India is now competing with China in the vaccine diplomacy sphere, as both countries vie for strategic influence in the region.

In the longer term all countries especially the developing ones, need to take policy decisions to protect population health by avoiding a continued period of austerity and the associated reductions in social security and public service spending. They must also build a more sustainable and inclusive economy.

Conclusions

- Covid 19 Pandemic has led to disruption of lot many health services in India since April 2020
- Disruption of diabetes screening, early diagnosis and treatment in Public sector has derailed
- Online consultation and advise has become a norm, that to not complied by many patients
- The glycaemic parameters are significantly higher among patients with onset of diabetes during COVID-19 pandemic as compared to diabetics with onset before the pandemic
- Among the diabetes consultations in last 3 months proportion of patients with known complications has increased

- Recovery of screening, early diagnosis, and treatment initiation services is slow and may reach pre-pandemic levels only in 2022.
- Providing simple, low-cost tech-enabled care to diabetics is the need of the time and must be hastened. Timely treatment and changing treatment plans based on bold sugar monitoring will minimize the damages due to uncontrolled blood sugar. Integrated management will minimise complications by boosting heart health by lowering blood pressure and bad cholesterol and improving blood glucose control.

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