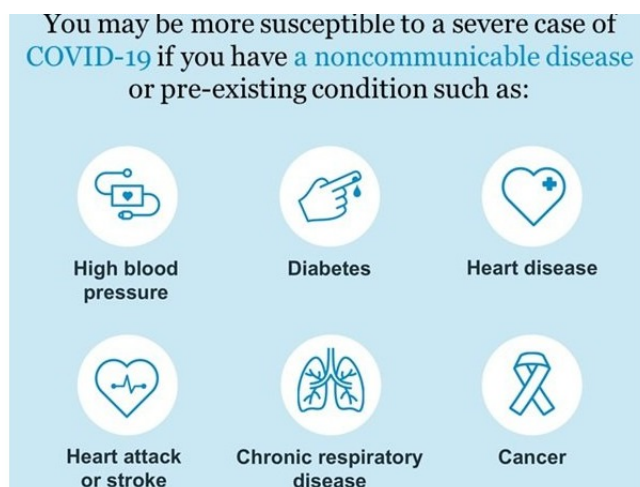


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What Impact Have SARS-CoV-2/Covid-19 Pandemic induced lockdown on the number of OPD patients of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology in India during the lockdown months (April/May/2020) Observational Research Analysis?

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Abstract

The First human case of the covid-19 global pandemic was reported from Wuhan city of China in December 2019. On 27th January 2020, India found a suspected case of covid-19 in Kerala with a recent travel history of Wuhan; china. The suspected case was reported as positive by the National Institute of Virology located at Pune in Maharashtra, India on January 30, 2020 as positive for COVID-19 infection. This was the first documented COVID-19 case in India. The government of India responded to this novel disease by enforcing nationwide lockdown starting on 25/03/2020 and ending on 31/05/2020. In this retrospective observational quantitative and qualitative study I have done assessment of the impact of covid-19 lockdown measures on OPD health services for some important non communicable diseases. The data is collected, observed, analyzed for the years 2020 and 2019 and the lockdown period of April-May 2020 is compared with the same duration of 2019 (excluding period of 7 days of lockdown in

march) . The OPD (outpatient Department) services for the patients of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology were selected for this observational retrospective study-analysis. **In version 2 time series analysis (longer period) will be applied to test the significance of difference between pre and post intervention (lockdown).** The study found as compared to 2019 when lockdown and pandemic was not in existence, 2020 lockdown period have notable reduction in various OPD health services. The study have derived conclusion that lockdown reduced number of OPD patients and hence reduced access to the health services for non-communicable disease which is the major burden of disease in India as well as at global levels. In the final conclusion the author feel the need of more emphasis and priority for NCDs care in any situations of emergency like pandemic and natural calamities, lockdowns etc which usually disrupt routine healthcare. Routine healthcare is very essential in context of chronic diseases which can be converted to acute emergency conditions like CVA.

Keywords: OPD, Health facility, Covid-19, lockdown,

1. Background

The SARS-CoV-2 virus was first reported from Wuhan City, Hubei province of China in December 2019 and has spread worldwide in more than 200 countries. The topmost health organization of the world (World Health Organization) WHO with reference and guidelines of the International Health Regulations (2005) declared COVID-19 outbreak a Public Health Emergency of International Concern on 30 January 2020 last year and started issuing various protocols, guidelines, advisories for all the nations of the world¹. On 27th January 2020, India found a suspected case of covid-19 in Kerala with a recent travel history of Wuhan; china. The suspected case was reported as positive by the National Institute of Virology located at Pune in Maharashtra, India on January 30, 2020 as positive for COVID-19 infection. This was the first documented COVID-19 case in India.

The government of India responded to this novel disease by enforcing nationwide lockdown starting on 25/03/2020 and ending on 31/05/2020². Lockdown procedures, ensuring social distancing, and encouraging the populations to stay at home with hand hygiene and good ventilation with fresh air etc is being recommended by WHO time to time updated on daily basis almost³. Like most of the nations for saving lives India also imposed a strict lockdown countrywide. The lockdown helps to reduce numbers of new cases by putting a barrier in community spread while on the other hand it disrupted the routine-regular functioning of the health system delivery as well as for LMICs (Low-middle-income countries) like India a massive economic impact is inevitable⁴.

The provision of health services is of prime importance and key concern in India especially because of high dense population load as well as fewer resources, old fashioned poor infrastructure and massive demand on healthcare system. The children's, senior citizens, and women's are especially vulnerable because of special requirements of health needs⁵. The ongoing with ups and downs, SARS-CoV-2 pandemic challenged healthcare systems around the world. There is a sense of fear around the whole world due to pandemic

and India is not an exception. The limited healthcare facilities including infrastructure, transportation (ambulance services) etc. manpower, have been chiefly deployed to deal with the situation of Covid-19 pandemic. This shift has detrimental impact on ongoing various health services running previously before the pandemic era. Added to this there are other impacts on domestic violence etc which have shown an increasing trend against women⁶.

This observational retrospective study is highlighting that there is a very big global burden of disease called non-communicable disease particularly India is struggling with this NCD epidemic since several years. Through presentation of facts and figures the author hope that it will help policy and decision makers to think about measures of mitigation and providing relief in form of regular health services to NCDs patients. The research study specially highlights the use of novel intervention of lockdown and its impact on health service delivery and access to healthcare services. Any change in the health outcomes like numbers of OPD patients after application of lockdown intervention are assumed to be effects of this novel intervention. Except one week of March the whole period of lockdown will be compared to previous year of same timeline and duration to know the impact of intervention of lockdown as shown in title of research.

2. Objectives of the study

The key objectives of this retrospective observational analytic study are to evaluate the impact of the SARS-CoV-2 pandemic induced lockdown on OPD health service delivery in India. The prime objectives are to:

1. assess the increase/decrease in total number of OPD patients of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology in India during the lockdown months (April-May-2020) and comparison along the timeline of previous year with no lockdown intervention of same period of all India
2. to assess the difference in rural and urban number of OPD patients of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology in India during the lockdown months (April-May-2020) and comparison along the timeline of previous year with no lockdown intervention of same period of all India
3. to assess the difference in public and private facilities number of OPD patients of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology in India during the lockdown months (April-May-2020) and comparison along the timeline of previous year with no lockdown intervention of same period of all India

In version 2 of this article hypothesis- instituting lockdown controlled the outbreak, but at the same time have devastating- detrimental consequences on health services and non health services will be tested and results will be displayed.

3. Methods

Study method and sources of data

This work is part of my retrospective observational study intended at describing the scenery,

measurements, and range of the indirect health impacts of COVID-19 control measures particularly lockdown during the epidemic. I am using a case study approach for doing this work. This study will continue for a much longer time with focus to build evidence against or for a hypothesis. In this study I am focused on particular but several health effects and outcomes of response to answer objectives which will vary with versions of the study. The source of data is mainly the Health Management Information System (HMIS) of Ministry of Health and Family Welfare (MoHFW), Government of India for knowing the trends of outpatient department visits of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology in India during the lockdown months (April-May-2020), as affected by the covid-19 and also through Google search and personal sources which are accredited document/record/media review etc. to assess the pandemic impacts. The HMIS is a well established reporting system used by all the states and union territories of India available through MoHFW (the Ministry of Health India). The information on HMIS is uploaded on a routine basis from the entire health unit across the nation. Although I am having a very big data collection, in this article research I am discussing only about impact of covid-19 induced lockdown on number of OPD patients of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology in India during the lockdown months (April-May-2020) compared to previous year same timeline and duration.

4. Data analysis

For the assessment of impact of covid-19 induced lockdown on number of OPD patients of Diabetes, Hypertension, Stroke (CVA), Acute Heart Disease, Mental Illness, Epilepsy, Ophthalmic, Dental and oncology in India during the lockdown months (April-May-2020) compared to previous year same timeline and duration, I plotted the monthly numbers of cases-total/public/private/rural/urban against time and compared with previous year. **The version 2 of this article will have more periods of comparison and data of 36 states and union territories will be discussed in brief to reduce the length of article.** The National Disaster Management Authority (NDMA), Headed and chaired by Hon'ble Prime Minister of India Shri Narendra Modi, in exercise of the powers vested under section 6(2)(i) of the Disaster Management Act, 2005, has passed an Order dated 24.03.2020, directing the Ministries/ Departments of Government of India as well as the State/Union Territory Governments and State/ Union Territory concerned authorities to take proper and effective measures-protocols-guidelines to control the proliferation of COVID-19 in the nation.

Ministries/ Departments of Government of India as well as the State/Union Territory Governments and State/ Union Territory concerned authorities in compliance of the said Order of NDMA as well as order issued by Ministry of Home Affairs (MHA) dated 24.03.2020 under Section 10(2)(I) of the Disaster Management Act, directing the Ministries/ Departments of Government of India, State/Union Territory Governments and State/ Union Territory Authorities to take effective measures for ensuring social distancing so as to prevent the spread of COVID-19 in the country. The Order of lockdown remained in force, in all parts of the country, for a period of 21 days with effect from 25.03.2020 and extended further

upto 31st May. This fact is well documented in the newspapers, and international agencies like WHO and Government reports.

Data analysis presented in Table 1, 2,3,4,5,6,7,8,9,10 shows the list of OPD indicators and numbers of OPD used in the study for specific diseases mentioned in the title to know the intervention lockdown impacts of COVID-19 on health service delivery and utilization. Lockdown period is compared to same period of previous year. It's a well documented fact that population and NCD is increasing by leaps and bounds in India. Hence it is evident from the data analysis that the novel intervention of complete lockdown in India tends to have a detrimental and deleterious impact on health delivery services and utilization.

April-2019 & 2020

Table 1- showing total numbers of specific diseases OPD during April 2019 and 2020 and decrease in OPD during lockdown

Services	Total Apr-20(Number of OPD)	Total Apr-19(Number of OPD)	Total decrease in Apr- 2020(Number of OPD) in comparison to Apr-2019	Percent decrease in total OPD in Apr-2020 in comparison to Apr-2019
Outpatient - Diabetes	1644625	2644246	-999621	37.803631
Outpatient - Hypertension	2092962	3048900	-955938	31.3535373
Outpatient - Stroke (Paralysis)	32918	64075	-31157	48.6258291
Outpatient - Acute Heart Diseases	78852	237022	-158170	66.7322021
Outpatient - Mental illness	170345	486869	-316524	65.0121491
Outpatient - Epilepsy	42966	91340	-48374	52.9603679
Outpatient - Ophthalmic Related	644210	2665999	-2021789	75.836075
Outpatient - Dental	678914	2335144	-1656230	70.9262469
Outpatient - Oncology	42566	167477	-124911	74.5839727

Table 2- showing total numbers of specific diseases OPD at Public Health facilities in India during April 2019 and 2020 and decrease in OPD during lockdown

Services	Public Health Facility Apr-20(Number of OPD)	Public Health Facility Apr-19(Number of OPD)	Total decrease in Public Health Facility Apr- 2020(Number of OPD) in comparison to Apr-2019	Percent decrease in public health facility OPD in Apr-2020 in comparison to Apr-2019
Outpatient - Diabetes	1605927	2546368	-940441	36.9326429
Outpatient - Hypertension	2056021	2969055	-913034	30.7516701
Outpatient - Stroke (Paralysis)	30350	59595	-29245	49.0729088
Outpatient - Acute Heart Diseases	69002	206141	-137139	66.5267948
Outpatient - Mental illness	161080	449545	-288465	64.1682145
Outpatient - Epilepsy	41512	86650	-45138	52.0923254
Outpatient - Ophthalmic Related	625829	2516472	-1890643	75.1306989
Outpatient - Dental	667478	2285057	-1617579	70.7894376
Outpatient - Oncology	33381	145540	-112159	77.0640374

Table 3- showing total numbers of specific diseases OPD at Private Health Facilities in India during April 2019 and 2020 and decrease in OPD during lockdown

Services	Private Health Facility Apr-20(Number of OPD)	Private Health Facility Apr-19(Number of OPD)	Total decrease in private Health Facility Apr- 2020(Number of OPD) in comparison to Apr-2019	Percent decrease in private health facility OPD in Apr-2020 in comparison to Apr-2019
Outpatient - Diabetes	38698	97878	-59180	60.463025
Outpatient - Hypertension	36941	79845	-42904	53.73411
Outpatient - Stroke (Paralysis)	2568	4480	-1912	42.678571
Outpatient - Acute Heart Diseases	9850	30881	-21031	68.103365
Outpatient - Mental illness	9265	37324	-28059	75.17683
Outpatient - Epilepsy	1454	4690	-3236	68.997868
Outpatient - Ophthalmic Related	18381	149527	-131146	87.707237
Outpatient - Dental	11436	50087	-38651	77.167728
Outpatient - Oncology	9185	21937	-12752	58.1301

Table 4- showing total numbers of specific diseases OPD at urban health facilities in India during April 2019 and 2020 and decrease in OPD during lockdown

Services	Urban Health Facility Apr-20(Number of OPD)	Urban Health Facility Apr-19(Number of OPD)	Total decrease in urban Health Facility Apr- 2020(Number of OPD) in comparison to Apr-2019	Percent decrease in urban health facility OPD in Apr-2020 in comparison to Apr-2019
Outpatient - Diabetes	413624	703624	-290000	41.2151945
Outpatient - Hypertension	505659	769481	-263822	34.2857069
Outpatient - Stroke (Paralysis)	7921	10233	-2312	22.5935698
Outpatient - Acute Heart Diseases	13708	39127	-25419	64.9653692
Outpatient - Mental illness	33083	107230	-74147	69.1476266
Outpatient - Epilepsy	11913	20358	-8445	41.4824639
Outpatient - Ophthalmic Related	99196	547754	-448558	81.8904107
Outpatient - Dental	123720	430124	-306404	71.2362017
Outpatient - Oncology	8326	43244	-34918	80.7464619

Table 5- showing total numbers of specific diseases OPD at rural health facilities of India during April 2019 and 2020 and decrease in OPD during lockdown

Services	Rural Health Facility Apr-20(Number of OPD)	Rural Health Facility Apr-19(Number of OPD)	Total decrease in Rural Health Facility Apr-2020(Number of OPD) in comparison to Apr-2019	Percent decrease in rural opd in Apr-2020 in comparison to Apr-2019
Outpatient - Diabetes	1231001	1940622	-709621	36.5666781
Outpatient - Hypertension	1587303	2279419	-692116	30.3637023
Outpatient - Stroke (Paralysis)	24997	53842	-28845	53.5734185
Outpatient - Acute Heart Diseases	65144	197895	-132751	67.0815331
Outpatient - Mental illness	137262	379639	-242377	63.8440729
Outpatient - Epilepsy	31053	70982	-39929	56.2522893
Outpatient - Ophthalmic Related	545014	2118245	-1573231	74.2704928
Outpatient - Dental	555194	1905020	-1349826	70.856264
Outpatient - Oncology	34240	124233	-89993	72.438885

May 2019 & 2020

Table 6- showing total numbers of specific diseases OPD during May 2019 and 2020 and decrease in OPD during lockdown

Services	Total May-20(Number of OPD)	Total May-19(Number of OPD)	Total decrease in May- 2020(Number of OPD) in comparison to May-2019	Percent decrease in total OPD in May-2020 in comparison to May-2019
Outpatient - Diabetes	1703871	2795140	-1091269	39.041658
Outpatient - Hypertension	2141928	3281803	-1139875	34.7331939
Outpatient - Stroke (Paralysis)	36011	67151	-31140	46.3730994
Outpatient - Acute Heart Diseases	97046	249823	-152777	61.1540971
Outpatient - Mental illness	197833	505997	-308164	60.9023374
Outpatient - Epilepsy	46798	88047	-41249	46.8488421
Outpatient - Ophthalmic Related	815141	2734647	-1919506	70.1920943
Outpatient - Dental	791717	2536955	-1745238	68.7926274
Outpatient - Oncology	63196	169710	-106514	62.7623593

Table 7- showing total numbers of specific diseases OPD at Public Health facilities in India during May 2019 and 2020 and decrease in OPD during lockdown

Services	Public Health Facility May-20(Number of OPD)	Public Health Facility May-19(Number of OPD)	Total decrease in Public Health Facility May- 2020(Number of OPD) in comparison to May-2019	Percent decrease in public health facility OPD in May-2020 in comparison to May-2019
Outpatient - Diabetes	1653763	2696173	-1042410	38.662578
Outpatient - Hypertension	2093739	3200349	-1106610	34.577791
Outpatient - Stroke (Paralysis)	32336	61844	-29508	47.713602
Outpatient - Acute Heart Diseases	81880	218110	-136230	62.45931
Outpatient - Mental illness	186264	468451	-282187	60.238317
Outpatient - Epilepsy	45268	83440	-38172	45.747843
Outpatient - Ophthalmic Related	779471	2577502	-1798031	69.758666
Outpatient - Dental	773557	2433846	-1660289	68.216683
Outpatient - Oncology	44506	139843	-95337	68.17431

Table 8- showing total numbers of specific diseases OPD at Private Health Facilities in India during May 2019 and 2020 and decrease in OPD during lockdown

Services	Private Health Facility May-20(Number of OPD)	Private Health Facility May-19(Number of OPD)	Total decrease in private Health Facility May- 2020(Number of OPD) in comparison to May-2019	Percent decrease in private health facility OPD in May-2020 in comparison to May-2019
Outpatient - Diabetes	50108	98967	-48859	49.3689816
Outpatient - Hypertension	48189	81454	-33265	40.8390012
Outpatient - Stroke (Paralysis)	3675	5307	-1632	30.7518372
Outpatient - Acute Heart Diseases	15166	31713	-16547	52.1773405
Outpatient - Mental illness	11569	37546	-25977	69.1871305
Outpatient - Epilepsy	1530	4607	-3077	66.7896679
Outpatient - Ophthalmic Related	35670	157145	-121475	77.3012186
Outpatient - Dental	18160	103109	-84949	82.3875704
Outpatient - Oncology	18690	29867	-11177	37.4225734

Table 9- showing total numbers of specific diseases OPD at urban health facilities in India during May 2019 and 2020 and decrease in OPD during lockdown

Services	Urban Health Facility May-20(Number of OPD)	Urban Health Facility May-19(Number of OPD)	Total decrease in urban Health Facility May-2020(Number of OPD) in comparison to May-2019	Percent decrease in May-2020 in comparison to May-2019
Outpatient - Diabetes	409952	733674	-323722	44.1234118
Outpatient - Hypertension	488199	796315	-308116	38.6927284
Outpatient - Stroke (Paralysis)	8895	13029	-4134	31.7292194
Outpatient - Acute Heart Diseases	16176	41360	-25184	60.8897485
Outpatient - Mental illness	48147	110314	-62167	56.3545878
Outpatient - Epilepsy	12489	20025	-7536	37.6329588
Outpatient - Ophthalmic Related	128354	522125	-393771	75.4169978
Outpatient - Dental	142821	463955	-321134	69.2166266
Outpatient - Oncology	13111	33255	-20144	60.5743497

Table 10- showing total numbers of specific diseases OPD at rural health facilities of India during May 2019 and 2020 and decrease in OPD during lockdown

Services	Rural Health Facility May-20(Number of OPD)	Rural Health Facility May-19(Number of OPD)	Total decrease in Rural Health Facility May-2020(Number of OPD) in comparison to May-2019	Percent decrease in May-2020 in comparison to May-2019
Outpatient - Diabetes	1293919	2061466	-767547	37.23307
Outpatient - Hypertension	1653729	2485488	-831759	33.46462
Outpatient - Stroke (Paralysis)	27116	54122	-27006	49.89838
Outpatient - Acute Heart Diseases	80870	208463	-127593	61.20655
Outpatient - Mental illness	149686	395683	-245997	62.17022
Outpatient - Epilepsy	34309	68022	-33713	49.56191
Outpatient - Ophthalmic Related	686787	2212522	-1525735	68.95909
Outpatient - Dental	648896	2073000	-1424104	68.69773
Outpatient - Oncology	50085	136455	-86370	63.29559

In version 2 of the article which is under process, the Interrupted time series (ITS) analysis will be done which is a strong quasi-experimental design and utilized to judge the effectiveness of a population-level based intervention such as Lockdown.

5. Ethics approval for the study

The data was made available from the Ministry of Health and Family Welfare. Being a Government servant of Health department author consulted some officials. The study have not involved any human being or animal in real and no trial etc. was done by the author hence this study didn't required any approvals from the concerned body or departments.

6. Results

Secondary impacts of COVID-19 induced lockdown on health services:

The lockdown imposition controlled the outbreak at the cost of health service systems and livelihoods disruption. The government, diverted health personnel and resources away from priority NCD and other services like immunization, ANC, Family Planning, domestic violence, mental health etc. resulting in deterioration of essential health service utilization and delivery^{5,6,7,8,9}. **The impact on patients of chronic conditions such as NCDs who need regular check-up and medicines for better health and good quality of life were unable to reach at OPD as evident from this retrospective observational study.** India being a poor country, it is expected that most of the population below poverty line could not afford medication during the lockdown which is provided free at public health facilities

Patients with newly diagnosed NCDs may not be able to get the treatment, while the old chronic NCDs patients may have missed their regular therapy. It is quite evident from this study that majority of patients with the mentioned conditions faced an increased risk of complications, morbidity and mortality due to inability to access healthcare because of the novel intervention of lockdown causing fear of contracting the virus from healthcare facilities/personals, transport restrictions, curfew, etc. It's also a well documented fact that delayed initiations and interruption of treatment regimens may increase disease progression, recurrence, stress, anxiety, and premature mortality with morbidity.

Access to health service and utilization

The total OPD of all diseases in this study have shown a drastic reduction in numbers as well as in percentages of OPD during lockdown intervention period as shown in table 1 and 6 and annexure 1, 2 for the month of April and May respectively.

The total number of diabetes patients accessing health facilities declined by -999621 numbers and 37.803631% as compared to previous year April 2019 OPD. The total number of diabetes patients accessing health facilities declined by -1091269, 39.041658 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of hypertension patients accessing health facilities declined by -955938, 31.3535373 numbers and percent respectively as compared to previous year April 2019 OPD. The total number of hypertension patients accessing health facilities declined by -1139875, 34.7331939 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of Stroke (Paralysis) patients accessing health facilities declined by -31157, 48.6258291 numbers and percent respectively as compared to previous year April 2019 OPD. The total number of Stroke (Paralysis) patients accessing health facilities declined by -31140, 46.3730994 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of Acute Heart Diseases patients accessing health facilities declined by -158170, 66.7322021 numbers and percent respectively as compared to previous year April 2019 OPD. The total number of Acute Heart Diseases patients accessing health facilities declined by -152777, 61.1540971 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of mental illness patients accessing health facilities declined by -316524, 65.0121491 numbers and percent respectively as compared to previous year April 2019 OPD. The total number of mental illness patients accessing health facilities declined by -308164, 60.9023374 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of epilepsy patients accessing health facilities declined by -48374, 52.9603679 numbers and percent respectively as compared to previous year April 2019 OPD. The total number of epilepsy patients accessing health facilities declined by -41249, 46.8488421 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of eye patients, accessing health facilities declined by -2021789, 75.836075 numbers and percent respectively as compared to previous year April 2019 OPD. The total number of eye patients accessing health facilities declined by -1919506, 70.1920943 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of dental opd patients, accessing health facilities declined by -1656230, 70.9262469 numbers and percent respectively

as compared to previous year April 2019 OPD. The total number of dental opd patients accessing health facilities declined by -1745238,68.7926274 numbers and percent respectively as compared to previous year May 2019 OPD. The total number of oncology opd patients, accessing health facilities declined by -124911, 74.5839727 numbers and percent respectively as compared to previous year April 2019 OPD. The total number of oncology opd patients accessing health facilities declined by -106514, 62.7623593 numbers and percent respectively as compared to previous year May 2019 OPD.

The total public health facility OPD of all diseases in this study have shown a drastic reduction in numbers as well as in percentages of OPD during lockdown intervention period as shown in table 2 and 7 and annexure 3, 4 for the month of April and May respectively. All the **results are not described here in sentences as it is well presented in the form of tables 1 to 10 and annexure 1,2,3,4,5,6,7,8,9,10 to reduce the length and words of this article.**

7. Discussion

As mentioned above, the results of this study found that the complete lockdown in India during April, and May-2020 had negatively affected access and utilization of health services of OPD of title mentioned diseases. This negative impact of lockdown intervention is due to many factors, such as health workers being shifted for controlling the COVID-19 pandemic and therefore not available for other healthcare services. The number of OPD declined may be explained by a possibility that prior knowledge of COVID-19 through media and communication channels might have influenced prior health-seeking behavior. The government is forced by external and internal pressure to impose strict restrictions due to novel nature of covid-19 which is still under study. Lockdowns are not the best choice for countries like India, and other LMICs with a huge population.

8. Limitations of this study

The key data source for this study is HMIS, MoHFW. In this covid-19 pandemic, proper data collection is a big task and questionable. HMIS does data refreshment sometimes and personal collection of such big data is impossible and thus further analysis is limited. A very important limitation is that health awareness and related communication against COVID-19 started earlier than lockdown period. Hence very cautious people may have stopped visiting healthcare centers as a preventive action against COVID-19. The lockdown intervention was implemented throughout the nation leading to no areas that can be taken as control.

9. Conclusions and recommendations derived from this study

This retrospective observational quantitative and qualitative research study came to conclusion that the lockdown management to reduce or control COVID-19 had a massive negative impact on delivery and utilization of important/essential health services, and this aspect is clearly evident in April-May 2020. In the light of findings of this study I recommend the following:

- Governments of India should think of ways and strategies on priority basis to reduce the burden as well as morbidity and mortality occurring from NCDs. Compared to COVID-19 cases and deaths there are

several other diseases which can obstruct India's way to reap the benefits of **Demographic Dividend**. The COVID-19 management should be prioritized, along with proper management of Other NCDs and CDs otherwise there are chances of increase in morbidity and mortality from several other diseases.

- Government should respond to COVID-19 with due considerations of stringent restrictions which can disrupt essential health services, leading to a **vicious cycle** and devastating effect on the health of population and economic crisis. Government should think of alternatives such as implementing standard operating procedures rather than imposing a lockdown.
- Government of India should give more focus on data collection system with inputs from local communities. There could have been more persons in the communities such as new NCDs cases who have not reached public/private health facilities which are not reflected in the HMIS data.

'Declarations':

-This paper has not been previously published and is not currently under consideration by another journal. The document is Microsoft word with English (United States) language & 5350 words Total.

- **Ethics approval and consent to participate:** Not applicable. This study has not involved any human or animals in real or for experiments. The data on the prevalence and mortality due to COVID-19 pandemic were taken from the Health Department, Bihar and other organizations which are also available online, hence ethical approval was not required.

-**Consent for publication:** Not applicable

-**Availability of data and materials:** The data & materials for study are mentioned in article and available as reference.

-**Conflicts of Interest/ Competing Interest:** There are no conflicts / competing of interest

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- **Authors' contributions:** The whole work is solely done and verified by the Author - Dr Piyush Kumar, M.B.B.S. - Sri Krishna Medical College, EMOC- General Medical Officer- Bihar Health Services- Government of Bihar, India.

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Annexure-1- comparison of total numbers of specific diseases OPD during April -2019 and 2020- see table 1

Annexure-2- comparison of total numbers of specific diseases OPD during May-2019 and 2020- see-table-6

Annexure-3- Comparison of total numbers of specific diseases OPD at Public Health facilities in India during April 2019 and 2020 – see table-2

Annexure-4- Comparison of total numbers of specific diseases OPD at Public Health facilities in India during May 2019 and 2020 – see table-7

Annexure-5- Comparison of total numbers of specific diseases OPD at private Health facilities in India during April 2019 and 2020 – see table-3

Annexure-6- Comparison of total numbers of specific diseases OPD at private Health facilities in India during May 2019 and 2020 – see table-8

Annexure-7- Comparison of total numbers of specific diseases OPD at Urban Health facilities in India during April 2019 and 2020 – see table-4

Annexure-8- Comparison of total numbers of specific diseases OPD at Urban Health facilities in India during May 2019 and 2020 – see table-9

Annexure-9- Comparison of total numbers of specific diseases OPD at Rural Health facilities in India during

April 2019 and 2020 – see table-5

Annexure-10- Comparison of total numbers of specific diseases OPD at Rural Health facilities in India during May 2019 and 2020 – see table-10