

April – October 2022

Chhattisgarh



**Bridging the Gap of Noncommunicable Diseases and
Injuries for Universal Health Coverage in
Chhattisgarh State, India**

**Findings from the Chhattisgarh
NCDI Poverty Commission**

State NCDI Poverty Commission, Chhattisgarh

S.No	Name	Designation
1	Smt. Renu Pillai	Additional Chief Secretary, Health & Family Welfare Department, Chhattisgarh Government
2	Dr. C.R. Prasanna	Commissioner, Health & Family Welfare Department, Chhattisgarh & MD CGMSC
3	Mr. Neeraj Bansod	Director Health Services, Chhattisgarh
4	Dr. Priyanka Shukla	Joint Secretary, Health & Family Welfare Department, Chhattisgarh & MD NHM
5	Dr. R. K. Singh	Director, Medical education, Chhattisgarh
6	Dr. G.S. Badesha	Director, Ayush, Chhattisgarh
7	Dr. Amar Singh Thakur	Director, SIHFW, Chhattisgarh
8	Dr. Prashant Srivastav	Deputy Director, DHS, Chhattisgarh
9	Dr. Rajesh Srivastav	Deputy Director HA & Quality, Chhattisgarh
10	Dr. S. K. Pambhoi	Deputy Director NHM, Chhattisgarh
11	Dr. Srikant Rajimvale	State Nodal Officer, Medical counsel, Health Insurance Chhattisgarh
12	Dr. Smith Srivastav	Professor & HOD Cardiologist, Pt. JNM Medical college, Chhattisgarh
13	Dr. R.K. Panda	Professor & HOD Pulmologist, Pt. JNM Medical college, Chhattisgarh
14	Dr. Kamlesh Jain	State Nodal Officer, Chhattisgarh
15	Dr. Yogesh Jain	Secretary, JSS Ganiyari, Bilaspur, Chhattisgarh
16	Dr. Samir Garg	Executive Director, SHRC, Chhattisgarh
17	Dr. Miza shri Mitra	Professor, anthropologist, Pt. RSSU, Chhattisgarh
18	Dr. Lalit Surjan	Editor, Deshbandhu daily News Paper, Chhattisgarh
19	Mr. Urya Nag	State Programme Manager, NHM, Chhattisgarh
20	Mr. Anand Kumar Sahu	Programme Manager (M&E), NHM, Chhattisgarh

Table of Contents

EXECUTIVE SUMMARY	5
1. INTRODUCTION TO NCDIS IN RELATION TO POVERTY IN CHHATTISGARH	7
1.1 INDIA AND CHHATTISGARH COMMITMENT TO UHC	7
1.2 SITUATION OF POVERTY IN CHHATTISGARH: FINDINGS FROM THE MULTIDIMENSIONAL POVERTY INDEX	9
1.3 NCDIS RESPONSE IN INDIA AND CHHATTISGARH	12
1.4 HEALTH SECTOR SERVICES FOR NCDIS IN CHHATTISGARH	14
1.4.1 SERVICES AVAILABLE UNDER NPCDCS AT A DIFFERENT LEVEL [24].....	15
The health sector-related interventions generally targeted at the upper level of the pyramid are costlier, while interventions at the lower portion of the pyramid cater to larger populations, are more cost- effective and multisectoral (Figure 3).	15
1.4.2 THE CURRENT NCD BASIC SERVICES (FREE OF COST) PROVIDED AT THE LOWEST LEVELS [25].....	15
1.4.3 CURRENT AVAILABILITY OF THE DRUGS AT DIFFERENT HEALTH CENTRE LEVELS 17	
1.4.4 ROLE OF KEY STAKEHOLDERS.....	17
2. BACKGROUND AND OBJECTIVES OF THE CHHATTISGARH NCDI POVERTY COMMISSION	17
2.1 BACKGROUND OF THE COMMISSION	17
2.2 OBJECTIVES OF THE COMMISSION.....	18
3. METHODOLOGY OF THE CHHATTISGARH NCDI POVERTY COMMISSION	18
3.1 LITERATURE REVIEW	18
3.2 STATE HEALTH RESOURCE CENTRE MITANIN DATA AND ANALYSIS	18
3.3 STATE HEALTH RESOURCE CENTRE PREVALENCE SURVEY AND ANALYSIS.....	19
3.4 HEALTH AND WELLNESS CENTRE DATA AND ANALYSIS	19
3.5 RASHTRIYA BAL SWASTHYA KARYAKRAM DATA AND ANALYSIS	20
3.6 GLOBAL BURDEN OF DISEASE DATA AND ANALYSIS	20
4. SITUATION OF NCDIS AND SOCIOECONOMIC STATUS IN CHHATTISGARH	21
4.1 EPIDEMIOLOGY OF NCDIS IN CHHATTISGARH	21
4.1.1 LITERATURE REVIEW	21
4.1.2 MORTALITY FROM NCDIS IN COMMUNITY OF CHHATTISGARH (MITANIN PROGRAM)	21
4.1.3 PREVALENCE OF NCDS IN SURVEYS (SHRC SURVEY DATA)	26
4.1.4 SURVEY OF COMMON NCDS IN CHHATTISGARH (HWC DATA)	29
4.1.5 NCDIS AMONG CHILDREN AND YOUTH IN CHHATTISGARH (RBSK DATA)	32
4.1.6 GBD DATA FINDINGS	34
4.2 NCDIS IN RELATION TO POVERTY.....	41

4.2.1	GRAPHS SHOWING MPI vs DISEASE PREVALENCE	41
5.	PREVALENCE AND EXPENDITURE ON NCDs IN CHHATTISGARH FROM NATIONAL SAMPLE SURVEY	44
5.1	HOUSEHOLD PREVALENCE ON NCDs IN CHHATTISGARH	44
5.2	HOUSEHOLD EXPENDITURE ON NCDs IN CHHATTISGARH	46
6.	SUMMARY OF KEY FINDINGS.....	49
7.	RECOMMENDATIONS.....	50
	APPENDIX A: HEALTH SERVICES AVAILABILITY AND FORMULARIES	52
	APPENDIX B: POTENTIAL ROLE OF STAKEHOLDERS.....	52
	APPENDIX C: DISEASE SPECIFIC LITERATURE REVIEW	52
	REFERENCES.....	52

EXECUTIVE SUMMARY

The Government of Chhattisgarh has committed to the provision and expansion universal health care (UHC) through high-quality and affordable preventive and curative health services. Whereas these services have been primarily focused on maternal, neonatal, and child health (MNCH) and infectious causes of illness, there has been a significant growth in the burden of non-communicable diseases and injuries (NCDIs) in terms of death and disability. The exact burden and risk factors for these conditions has not been thoroughly explored, and the corresponding health sector interventions for these conditions are not well developed.

In order to better understand how to bridge the gap of NCDIs for UHC, the National Health Mission in 2019 established the Chhattisgarh NCDI Poverty Commission. The objectives of this Commission were to analyse the burden of NCDIs in Chhattisgarh State using existing and available data, with a particular focus on socioeconomic and geographic risk factors, and the coverage of health sector interventions within UHC. The Commission was led by the National Health Mission, Directorate of Health Services, and the State Health Resource Centre. The Commission was supported by the *Lancet* Commission on “Reframing NCDs and Injuries for the Poorest Billion” based in the Program in Global NCDs and Social Change at Harvard Medical School and Partners in Health NCD Synergies. This report presents baseline findings from the Commission.

Using community cohort data, health facility data, and data modeling, the burden of NCDIs in Chhattisgarh State is alarming. The share of DALYs due to NCDs in Chhattisgarh has almost doubled from 28.9% to 53.5% of all DALYs, which is likely due in part to the decline in infectious and RMNCH burden over this time. The share for injuries has remained relative constant, increasing from 8.4% to 10.3%. These trends are very similar to India overall.

There are several common NCDs that are highly prevalent based on community-screening, such as hypertension (8.5% of adults), diabetes (7.5%), oral Cancer (0.44%), breast Cancer (0.72%), and cervical cancer (0.82%). Although NCDIs are often believed to only affect elderly populations, 29% of NCD DALYs and 61% of injury DALYs occur before the age of 40. The most prevalent conditions among school children are sickle cell disease, vision impairment, skin conditions, dental conditions, severe acute malnutrition on stunting, vitamin A deficiency, severe anaemia, reactive airway disease, congenital heart disease, and hearing impairment. Despite the traditional focus on four major preventable NCDI conditions (cardiovascular disease, diabetes, cancers, and chronic respiratory conditions), 72% of all the NCDI DALYs are outside of these categories.

Several NCDIs tended to be higher in districts with higher rates of poverty, including cervical cancer, stroke, breast cancer, cardiovascular disease (CVD), chronic obstructive pulmonary disease (COPD), and chronic kidney disease (CKD). Cervical cancer and stroke were statistically related to

poverty levels. Conversely, several conditions tended to be higher in districts with lower poverty levels, such as hypertension, diabetes, and lip/oral cancer. In modelling data, some conditions caused a higher burden of disease in Chhattisgarh compared to India overall, such as stroke, cancers, unintentional injuries, intracerebral haemorrhage, self-harm and interpersonal violence, diabetes, cirrhosis, CKD, substance abuse, and rheumatic heart disease.

Based on community data, 57.2% of all deaths were due to NCDIs (42.9% from NCDs, 14.3% from injuries). The 7 biggest killers overall were all NCDIs: HTN (18.2% of total deaths), “accidents” (7.3%), stroke (7.1%), digestive disease (4.8%), cancer (4.5%), suicide (3.5%), and diabetes (3.2%). Even in individuals younger than 50 years of age, the top five causes of death were all NCDIs: accidents, heart disease, suicides, digestive diseases, and cancers.

In terms of hospitalizations, 32.9% were due to NCDs and 8% due to injuries. Although the community prevalence of NCDs (1.4%) was lower than communicable diseases (3.5%) across all demographic groups; however, the proportion of people hospitalized due to NCDs (0.83%) was higher than that for communicable diseases (0.79%). This suggests that NCDs may be less common, but more severe, and more often resulting in hospitalizations or death. 60.5% of people with NCDs and 48.9% with injuries chose to visit a private health facility, which was much higher than for communicable diseases (36.8%), nutrition (4.7%), or reproductive health (16.7%). The average out-of-pocket (OOP) expenditure for hospitalization episodes for NCDs was 5 times higher than communicable diseases and for injuries was 2.5 times higher than for communicable diseases. Furthermore, the OOP expenses for NCDs was double for rural populations compared to urban populations; this is in contrast to all other conditions, where OOP expenses were much higher for urban populations than rural populations.

Together, these data from various sources demonstrate the diverse and growing nature of NCDIs in Chhattisgarh as a major source of morbidity and mortality. This burden of disease is not limited to older populations, but highly affects children and younger adults as well. Several conditions show a clear trend towards disproportionately affecting populations living in poorer districts of the state. There is evidence that NCDIs may result in more hospitalizations and more out-of-pocket costs than other conditions, particularly for rural populations.

In order to achieve UHC in Chhattisgarh State, this Commission recommends increased focus on interventions to address NCDIs. This Commission proposes to further study the coverage of priority, cost-effective interventions for NCDIs. We further propose to develop integrated models for the effective care of NCDIs, particularly for poor or rural populations. We also aim to provide advocacy for increased financial support to develop and subsidize such programs and interventions in the future. We believe that with these efforts, we may bridge the gap for NCDIs to achieve UHC in Chhattisgarh State.

1. INTRODUCTION TO NCDIs IN RELATION TO POVERTY IN CHHATTISGARH

1.1 INDIA AND CHHATTISGARH COMMITMENT TO UHC

Chhattisgarh is one of the relatively youngest states of the Indian nation. It was constituted on 1st November 2000 by partitioning ten Chhattisgarhi and six Gondi-speaking south-eastern districts of Madhya Pradesh [1]. Chhattisgarh borders the states of Madhya Pradesh in the northwest, Uttar Pradesh in the north, Jharkhand in the northeast, Maharashtra in the southwest, Telangana and Andhra Pradesh in the south, and Odisha in the southeast [2]. Chhattisgarh is one of the 29 states of India, located in the center east of the country. It is the ninth-largest state in India and the 17th most populated state in the country, with a geographical area of 135,192 km² (4.1% of the country), and a projected population of 32.2 million as of 2020 (2.33% of the country).

As of 2011, Chhattisgarh state had a Human Development Index value of 0.537 (medium), ranks 23rd in the Indian state. The national average is 0.467 according to the 2011 Indian NHDR report [3]. Under the NITI Aayog released Health Index report titled, "Healthy States, Progressive India."- Chhattisgarh has an index of 52.02 Out of 100, which is better than states such as Madhya Pradesh, Haryana, Rajasthan, Odisha, Bihar, Assam, and Uttar Pradesh [4]. There are more than 13 million males and 12.9 million females in Chhattisgarh, which constitutes 2.11% of the country's population. The sex ratio in the state is one of the most balanced in India with 991 females per 1,000 males, as is the child sex-ratio with 964 females per 1,000 males (Census 2011).

Chhattisgarh ranked in the bottom three states out of 29 states in India in terms of consumption expenditure in 2011-12 [5]. Chhattisgarh is primarily an agrarian, rural state, with 77% of its population living in rural areas. In addition, scheduled tribes, a vulnerable group in India, make up 31% of Chhattisgarh's population—almost four-fold the national average of 8% [6]. The state has two kinds of geographies – a central plain region with high population density and an undulating plateau around its periphery. The tribal regions pose multiple challenges in delivering healthcare and other services – difficult geography, poor infrastructure, and high levels of under-development and poverty. According to the Reserve Bank of India, 49.4 % of Chhattisgarh's population was Below Poverty Line [7].

Out-of-pocket expenditure (OOPE) remains a critical issue in India and Chhattisgarh. OOPE data on health care in Chhattisgarh shows that 39% of hospitalizations lead to catastrophic health expenditure at a 10% threshold of usual consumption expenditure (NSSO 71st round) [8]. Of total OOPE, 80% is in private sector providers and 20% in the public sector. Since 2009, public funding also finances a large insurance program for in-patient care. The entire population of the state is eligible for free coverage for hospitalization care under the insurance program. It impanels private and public providers for inpatient-based care. OOPE constitutes around 60% of Total Health Expenditure in Chhattisgarh as well as India. [9] Investment in health systems is critical for

improving NCD outcomes. Institutional and human resource capacities and financial resources for NCD prevention and control require strengthening.

The ultimate goal of UHC is to ensure that everyone, and everywhere, should have access to essential healthcare services without facing a financial crisis. And to achieve this goal it is essential that all eligible people should be successfully enrolled and all of them should know their rights. India's commitment towards achieving UHC is directed towards increasing coverage and access to health services which is reflected in policies and institutional mechanisms. India has launched Ayushman Bharat - one of the most ambitious health missions ever to achieve UHC. Ayushman Bharat encompasses two complementary schemes, Health and Wellness Centres and National Health Protection Scheme. Health and Wellness Centres are envisioned as a foundation of the health system to provide comprehensive primary care, free essential drugs, and diagnostic services, whereas National Health Protection Scheme is envisaged to provide financial risk protection to poor and vulnerable families arising out of secondary and tertiary care hospitalization to the tune of five lakh rupees per family per year [10].

To address health inequalities and improve health outcomes, an architectural correction in the public healthcare system was made by the Ministry of Health and Family Welfare (MoHFW) through National Rural Health Mission, which was later redesigned as National Health Mission (NHM) to strengthen both rural and urban public health infrastructure, human resource capacity and service delivery. Rashtriya Swasthya Bima Yojana (RSBY) was another innovative initiative launched by the Ministry of Labour and Employment (now with MoHFW), which provided financial risk protection to poor families through government-funded health insurance [10]. Chhattisgarh is one of the first states to start implementing RSBY (Rashtriya Swasthya Bima Yojana) in 2009. In 2012, the state expanded RSBY, meant for people living below the poverty line, to all families of the state through the Mukhyamantri Swasthya Bima Yojana (MSBY), National Health Mission (NHM) in the year 2013 launched by the government of India [11]. The main programmatic components of NHM include Health System Strengthening, Reproductive-Maternal- Neonatal-Child and Adolescent Health (RMNCH+A), and Communicable and Non-Communicable Diseases. Among the non-Communicable diseases, the main goal is aimed to achieve through the following outcomes such as reduction in exposure to risk factors, lifestyle changes leading to a reduction in NCDs, improved quality of life, early detection, and timely treatment leading to an increase in cure rate/control and survival, reduction in prevalence of physical disabilities including blindness and deafness, providing user-friendly health services to the elderly population of the country, reduction in deaths and disability due to trauma, burns, and disasters, reduction in out-of-pocket expenditure on the management of NCDs and thereby preventing catastrophic implication on the affected individual.

The universal scheme is, thus, supposed to cover all families living in the state, regardless of income or nature or type of employment, and the insurance scheme covers all the districts of Chhattisgarh. The benefits package is uniform for all enrolled, irrespective of economic status, employment, or residence [12].

NCDs are a major challenge to sustainable development and target to achieve a reduction in NCD-related premature mortality. The poorest and the more vulnerable have not been benefitted much

by this already existing NCD agenda and policies. NCD policies and programs need to be designed and implemented to provide maximum care and support the poor. To design the policy local data and context need to be gathered, analyzed, and studied. This report presents the non-communicable disease and Injury burden and their risk factors with the purpose to frame the NCDI policy in Chhattisgarh.

1.2 SITUATION OF POVERTY IN CHHATTISGARH: FINDINGS FROM THE MULTIDIMENSIONAL POVERTY INDEX

The Gross State Domestic Product (GSDP) of Chhattisgarh for 2019-20 (at current prices) is estimated to be Rs 3,63,900 crore. This is 17% higher than the revised estimate for 2018-19. And the per capita GSDP of Chhattisgarh in 2017-18 (at current prices) was Rs 1,02,762. This is 9.4% higher than the per capita GSDP of 2016-17 (Rs 93,890). Chhattisgarh has allocated 5.4% of its total expenditure on health, which is marginally higher than the average expenditure of 26 other states (5.2%), and Chhattisgarh has allocated 5.7% of its expenditure on rural development. This is lower than the average (6.1%) of the 26 other states [12].

To estimate the household poverty the Lancet NCDI Poverty Commission has used a Multidimensional Poverty Index (MPI). The global MPI was developed by the Oxford Poverty and Human Development Initiative (OPHI) at the University of Oxford which consists of three domains and 10 indicators: education (years of schooling, child school attendance); health (child mortality, nutrition); and living standard (electricity, improved sanitation, improved drinking water, flooring and cooking fuel, and assets ownership). A total of 8 non-health indicators (weighting each indicator equally) were adapted by the Lancet NCDI Poverty Commission. And the poverty is measured by recording the acute deprivations that each person faces at the same time concerning education, health, and living standards. And a multidimensionally poor is defined if a person is deprived of a third or more of the weighted indicators [13].

Multidimensional poverty is reported by using three distinctive statistics such as the incidence or headcount ratio of poverty (known as H), the intensity of poverty (known as A), and the MPI, or adjusted headcount ratio (calculated as a product of H and A).

Multidimensional Poverty in India [13]

A remarkable change was observed in the fight against poverty as shown in figure 1. From 2005/6 to 2015/16, India successfully managed to decrease the MPI for more than half (0.283 to 0.123). And the actual number of people who moved out of poverty were 271 million people.

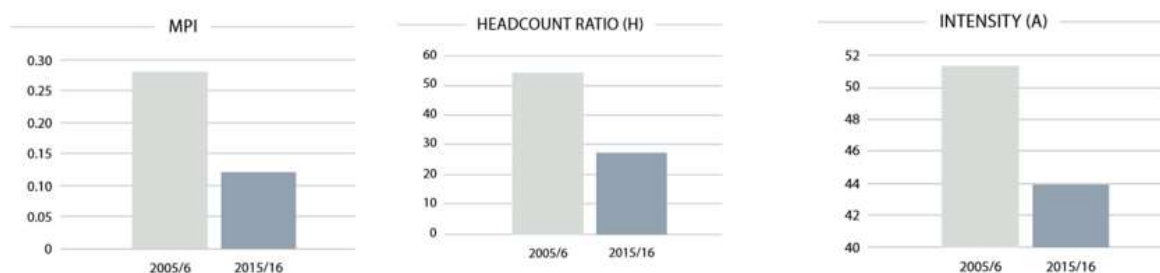


Figure 1: Change in MPI Headcount Ratio and Intensity of Poverty in India from 2005/06 to 2015/16

Source: Author's Calculation Based on NFHS 2005/06 And 2015/16, See Alkire, Oldiges & Kanagaratnam (2020)

A state-wise analysis of poverty revealed that there was a large transition in the poverty levels in the poorest states showing a reduction from 2005/6 to 2015/16 (Table 1). And this is very important in achieving a goal of 'leaving no one behind'. Bihar and Jharkhand were having the highest levels of MPI in 2005/6, which has decreased to almost half in the year 2015/16. Chhattisgarh's leading role in reducing poverty is made visible in the state rankings of Table 1. Chhattisgarh was the fifth poorest state in 2005/6, with an MPI of 0.355. By 2015/16, the MPI had decreased by more than one half to 0.153, and Chhattisgarh was found to be the seventh poorest state in India.

Table 1: MPI Values for Poorest 20 States in India in 2005/6 And 2015/16

Rank (Poorest)	State	MPI in 2005/6	Rank (Poorest)	State	MPI in 2015/16
1	Bihar	0.449	1	Bihar	0.248
2	Jharkhand	0.429	2	Jharkhand	0.208
3	Madhya Pradesh	0.366	3	Uttar Pradesh	0.183
4	Uttar Pradesh	0.361	4	Madhya Pradesh	0.182
5	Chhattisgarh	0.355	5	Assam	0.162
6	Meghalaya	0.340	6	Odisha	0.156
7	Odisha	0.336	7	Chhattisgarh	0.153
8	Rajasthan	0.332	8	Meghalaya	0.146
9	Assam	0.317	9	Rajasthan	0.145
10	Arunachal Pradesh	0.313	10	Arunachal Pradesh	0.108
11	Nagaland	0.295	11	Nagaland	0.099
12	Tripura	0.265	12	Gujarat	0.092
13	Andhra Pradesh	0.236	13	Tripura	0.087
14	Karnataka	0.229	14	Manipur	0.085
15	Manipur	0.204	15	Uttarakhand	0.072
16	Jammu And Kashmir	0.193	16	Maharashtra	0.071
17	Haryana	0.187	17	Karnataka	0.069
18	Maharashtra	0.186	18	Andhra Pradesh	0.067
19	Gujarat	0.185	19	Jammu And Kashmir	0.064
20	Uttarakhand	0.182	20	Haryana	0.046

Source: Alkire, Oldiges and Kanagaratnam (2020).

Multidimensional Poverty in Chhattisgarh [13]:

Chhattisgarh state is geographically stratified into 5 divisions (Raipur division, Durg division, Bilaspur division, Bastar division, Surguja division) with 28 districts (one new district created namely "Gaurela-Pendra-Marwahi" on 10th February 2020).

The global MPI in Chhattisgarh included 18 districts for multidimensional poverty statistics from the year 2005/6 to 2015/16. Former many of the districts were combined which now are separated like Sukma was associated with Dantewada, Kondagaon with Bastar, Balrampur, and Surajpur with Surguja, Mungeli with Bilaspur, Baloda Bazar and Gariyaband with Raipur, and Balod and Bemetara with Durg.

Based on the global Multidimensional Poverty Index (MPI), Chhattisgarh had shown a dramatic reduction in multidimensional poverty. In Chhattisgarh, the multidimensional poverty rate was cut from 70% to 37% i.e. bringing 7 million people out of poverty from the year 2005/6 to 2015/16. Still, more than one out of every three (37%) residents of Chhattisgarh lived in multidimensionally poor households (Table 2). Those living in rural areas, children, and members of Scheduled Tribes are the poorest groups, and all these groups reduced MPI the fastest (Table 2). Yet in 2015/16, 37% of people – 11 million – were still MPI poor, and 93% of these live-in rural areas and 5.1 million were members of Scheduled Tribes. One-quarter of poor people are children under 10 years of age.

District-level poverty varies. The poorest districts are Bastar, Narayanpur, and Dakshin Bastar Dantewada. Ending multidimensional poverty requires integrated investments in nutrition (especially for children), improved housing materials, clean energy, and adequate sanitation.

Multidimensional poverty in Chhattisgarh is far higher in rural areas than urban areas as evidenced in Table 2. Translated into actual numbers, more than 10 million people in rural areas were living in multidimensionally poor households compared to fewer than one million in urban areas.

Multidimensional Poverty Statistics for the Global MPI in Chhattisgarh by District, 2015/16

The poverty statistics of the MPI can be disaggregated to whichever geographic level the data allow. In this instance, the poverty rate for Chhattisgarh is calculated at the district level – with district definitions from Census 2011 (so some of the current districts are grouped together) – making it a powerful tool for highlighting pockets of poverty within the state (Figure 2).

The poverty rate in Chhattisgarh varies greatly across districts in 2015/16 (Table 2). Compared to the rate for the state of 36.6%, Table 6 shows that the poverty rate is far lower for the largest urban districts of Durg (24.0%), Dhamtari (25.5%), Raipur (27.1%), and Rajnandgaon (27.8%). In contrast, it is far higher in the districts of Bastar (60.8%) and Narayanpur (62.3%), while in Dakshin Bastar Dantewada two out of every three (65.4%) people are multidimensionally poor.

Table 2: Multidimensional Poverty Statistics for the Global MPI in Chhattisgarh by Year, Area, Caste, and District

Multidimensional Poverty Statistics for the Global MPI in Chhattisgarh from 2005/6 To 2015/16					
Year	Number of Poor		MPI	H (%)	A (%)
2005/6	18 million		0.3555	70	50.8
2015/16	11 million		0.153	36.8	41.5
Multidimensional Poverty Statistics for the Global MPI in Chhattisgarh by Area, 2015/16					
Area	Population Share (%)	Number of Poor	MPI	H (%)	A (%)
Urban	22.9	0.8 million	0.047	11.8	39.9
Rural	77.1	10.3 million	0.183	44.0	41.6
Multidimensional Poverty Statistics for the Global MPI in Chhattisgarh by Caste, 2015/16					
Caste Designation	Population share (%)	Number of Poor	MPI	H (%)	A (%)
Scheduled Castes	14.4	1.5 million	0.132	33.4	39.6
Scheduled Tribes	30.5	5.1 million	0.238	55.1	43.2
Other Backward Classes	47.1	4.2 million	0.118	29.5	40.0
Other Castes	7.5	0.3 million	0.052	13.2	39.5
Multidimensional Poverty Statistics for the Global MPI in Chhattisgarh by District, 2015/16					
District	Population share (%)	Number of Poor	MPI	H (%)	A (%)
Dakshin Bastar Dantewada	2.1	415446	0.323	65.4	49.5
Narayanpur	0.5	99599	0.281	62.3	45.1

Bastar	5.5	1016989	0.268	60.8	44.1
Surguja	8.5	1403190	0.240	54.7	43.9
Jashpur	3.0	493083	0.232	54.0	43.0
Bijapur	1.0	144333	0.205	50.1	40.9
Kabirdham	3.2	465954	0.203	47.8	42.5
Korea (Koriya)	2.4	325938	0.189	44.6	42.4
Korba	4.9	573132	0.164	38.6	42.5
Mahasamund	4.5	560563	0.159	41.3	38.5
Raigarh	5.7	653600	0.153	37.8	40.3
Uttar Bastar Kanker	2.7	304569	0.148	36.7	40.5
Bilaspur	11.7	1036524	0.119	29.2	40.7
Janjgir-Champa	6.6	612027	0.117	30.6	38.2
Raipur	16.0	1308431	0.110	27.1	40.4
Rajnandgaon	6.3	529514	0.105	27.8	37.7
Dhamtari	3.2	243863	0.098	25.5	38.4
Durg	12.2	888536	0.093	24.0	38.8

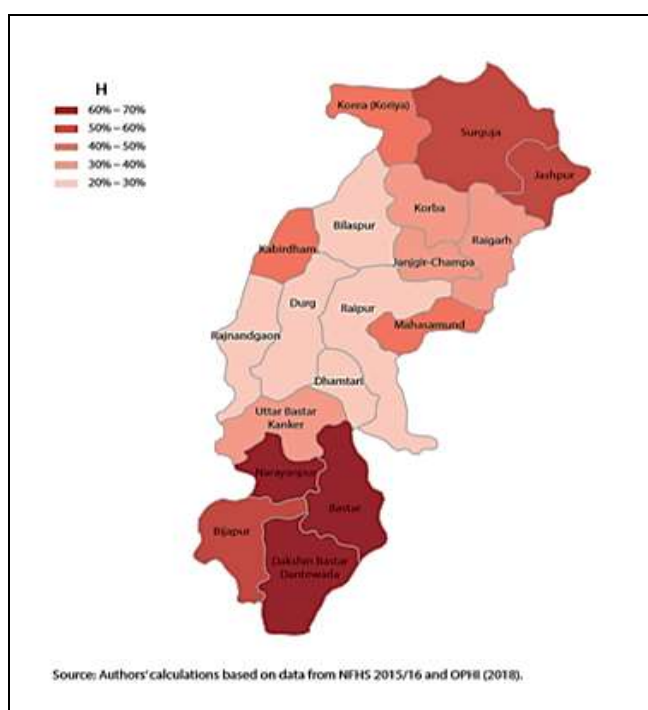


Figure 2: Poverty rate by the district in Chhattisgarh, 2015/16 (Source: Oxford Poverty & Human Development Initiative)

1.3 NCDIS RESPONSE IN INDIA AND CHHATTISGARH

The government of India had supported the States in the prevention and control of NCDs through several vertical programs. National Health Programs for Cancer and Blindness were started as early as 1975 and 1976, respectively, followed by a program on Mental Health in 1982. The National Health Policy 2002 [14] did not spell out any clear directions on prevention and control of NCDs

though it did mention (para 1.6) that there is an increase in mortality due to lifestyle diseases and trauma. Except for Mental Health Services (para 2.13.1 and 4.13.1.1), there is hardly any policy direction spelled on the prevention and control of NCDs and their risk factors.

However, during the 11th Plan (2007-2012), there was a considerable upsurge to prevent and control NCDs [15]. New programs were started on a low scale in a limited number of districts. Convergence with the public sector health system was a feature of these programs. Some of the programs were within the framework of the National Rural Health Mission. However, several challenges were identified, such as lack of comprehensive approach to key NCDs including diabetes and cardiovascular diseases; limited emphasis on health promotion and preventive measures to reduce exposure to risk factors; lack of facilities and capacity for screening, early diagnosis, and effective management within the public health care system was not adequately addressed. Aiming at preventing the rise of NCDs, the government launched the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) in 2010 and planned to expand to all districts of the country in a phased manner. The current program has prioritized preventive and promotive services to the general population and holistic care to the people with NCDs at primary, secondary, and tertiary levels of health-care with integrated management and a strong monitoring system for making services universally accessible in the country.

In the 12th plan (2012-2017) Health promotion and prevention were given more attention to reducing the incidence of NCDs and their risk factors [16]. States were given flexibility in the implementation of the programs based on their public sector health system, prevalence, and distribution of NCDs, and socio-cultural context. After the post-MDGs era, India's paradigm to tackle NCDs has been changed. After the commencement of the National Health policy in 2016, the approach has been shifted to Comprehensive Primary Health Care (CPHC). [17] Under this Government of India is focused on the need to address the high and increasing burden of NCDs and injuries in the country. Briefly, the integrated National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke established NCD units in each state in 2017 to increase the momentum for the prevention and management of major NCDs at the district level, including screening for high blood pressure and blood glucose and oral, breast, and cervical cancers [18]. The National Tobacco Control Programme is facilitating the reduction of the prevalence of smoking in India [19]. The Food Safety and Standards Authority of India last year proposed a tax and advertisement ban on unhealthy foods.[20]

In 2018, the Government of India launched the ambitious Ayushman Bharat program, also referred to as Pradhan Mantri Jan Arogya Yojana. This scheme has two main pillars: strengthening universal comprehensive primary health care and a health insurance scheme to cover 500 million people in need to reduce catastrophic out-of-pocket health spending. [21] Under this government has planned the establishment of 150000 Health and Wellness Centres (HWCs) across India to provide comprehensive primary health-care services that would help to deal with NCDs and injuries along with communicable diseases.

Chhattisgarh has also adopted the central policy of 'Comprehensive Primary Health Care' and Health and Wellness Centres (HWC) have been started for providing a comprehensive range of primary care services closer to where people live. The main objective is to "provide population-

based comprehensive primary health care services including NCDs closer to the population where they live and ensures affordable, sustainable and a continuum of care for every patient” and thus to contribute to the achievement of universal health care [22]. Currently, in Chhattisgarh 1900 HWCs are functional and providing comprehensive ranges of services including NCDs at every 5000 population. It also seeks to provide a continuum of care through referral linkages to facilities above HWC and long-term follow-up of chronic disease cases by the health care team at HWCs led by a Mid-Level Health Care provider (MLHP).

1.4 HEALTH SECTOR SERVICES FOR NCDs IN CHHATTISGARH

Currently, health services for NCDs are provided under the Ministry of Health and Family Welfare. Information regarding the number of health facilities, overall and those providing NCDI services along with human resources are collected via the NCD program site. Various health system working in Chhattisgarh for reducing the burden of non-communicable diseases are NHM, Rashtriya Bal Swasthya Karyakram (RBSK), RSBY (Rashtriya Swasthya Bima Yojana). They are integrated programs for non-communicable diseases, while few are disease-specific programs such as Bal Madhumeh Programme, India Hypertension Control Initiative (IHCI), Mukhyamantri Bal Hridaya Suraksha Yojana, Sanjeevani Kosh Programme.

The availability of health facilities and human resources in adequate numbers and the right skill mix is essential to the functioning of any health system. The table below presents data on the availability of the total number of health care centers at 5 levels in Chhattisgarh state are 8213 including district hospitals, sub-district hospitals, Community health centers, primary health centers, sub-health centers, details of which is mentioned in table 13. Teaching hospitals in medical colleges have super-specialties providing outpatient care, inward, and rehabilitative care.

There are total of 27 NCD clinics with the availability of human resources at just 14 districts (Baloda Bazar, Bastar, Bilaspur, Dhamtari, Durg, Gariyaband, Jashpur, Kanker, Korba, Mahasamund, Mungeli, Raipur, Rajnandgaon, and surguja). Table 14 presents data on the availability of the number of health care centers in each district at each level in Chhattisgarh.

The National Health Mission (NHM) was launched by the government of India in 2013 encompassing its two Sub-Missions, the National Rural Health Mission (NRHM), and the National Urban Health Mission (NUHM). The main programmatic components include Health System Strengthening, Reproductive-Maternal- Neonatal-Child and Adolescent Health (RMNCH+A), and Communicable and Non-Communicable Diseases. The NHM envisages the achievement of universal access to equitable, affordable & quality health care services that are accountable and responsive to people’s needs [23].

The nine NCD-related programs are included under the national health mission such as the National Programme for Control of Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS), National Programme for Control of Blindness (NPCB), National Mental Health Programme (NMHP), National Programme for Health Care of The Elderly (NPHCE), Program for Prevention of Burn Injuries, National Programme for Prevention and Control of Deafness (NPPCD), National Tobacco Control Programme (NTCP), National Oral Health Programme (NOHP), National Programme for Palliative Care. The key role of each program is presented in table 3 [23].

Table 3: Summary of Non- Communicable Disease Programmes

S.No	Program Name	Key Functions
1	National Program for Prevention and Control of Diabetes, CVD, and Stroke (NPCDCS)	Specialized management of Diabetes, CVD, Stroke, and Cancer.
2	National Program for Prevention and Control of Blindness (NPCB)	Providing screening for detection and management of diabetic retinopathy, refractory defects, and glaucoma.
3	National Program for Prevention and Control of Deafness (NPPCD)	Prevention of avoidable hearing loss and early detection & treatment of ear problems.
4	National Mental Health Program (NMHP)	Providing services for early detection & treatment of mental illness in the community
5	National Oral Health Program (NOHP)	Promotive and preventive oral health care at Primary and secondary level.
6	National Program for Health Care of the Elderly (NPHCE)	Specialized accessible healthcare for the elderly.
7	National Iodine Deficiency Disease Control Program (NIDDCP)	To check iodine deficiency-related Health Problems
8	National Tobacco Control Program (NTCP)	To spread awareness and better implementation of tobacco control.

1.4.1 SERVICES AVAILABLE UNDER NPCDCS AT A DIFFERENT LEVEL [24]

The health sector-related interventions generally targeted at the upper level of the pyramid are costlier, while interventions at the lower portion of the pyramid cater to larger populations, are more cost-effective and multisectoral (Figure 3).

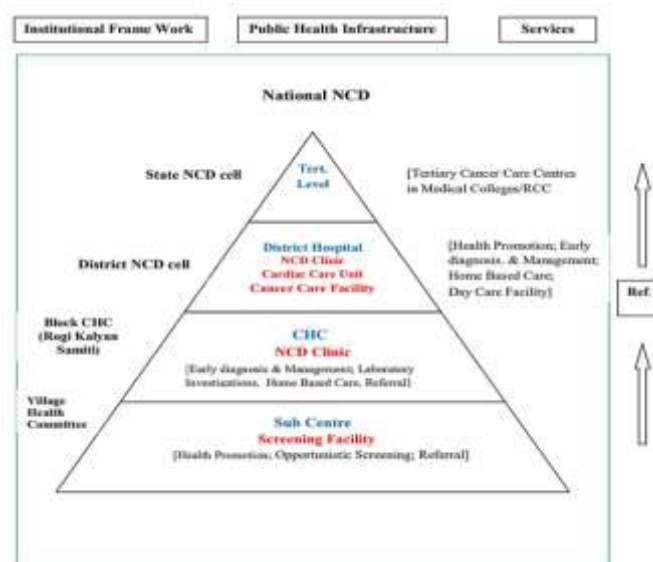


Figure 3: Services available under NPCDCS at a different level

1.4.2 THE CURRENT NCD BASIC SERVICES (FREE OF COST) PROVIDED AT THE LOWEST LEVELS [25]

It is envisaged providing preventive, promotive, curative, and supportive services (core and integrated services) in Cancer, Diabetes, Cardio-vascular diseases (CVD) & Stroke at various

government health facilities. Table 4 shows the package of NCDI services being provided free of cost at different levels. The highest levels are the district hospital levels and the lowest levels are sub-centers and Primary health care.

Table 4: Package of Services at various level of the health system

Health Facility	Packages of services
Sub-center	<ul style="list-style-type: none"> • Health promotion for behavior change and counseling. ‘Population-based/ Opportunistic’ Screening of common NCDs including cancer. • Awareness generation of early warning signals of common cancer & other risk factors of NCDs. • Referral of suspected cases to PHC/CHC/ nearby health facility. Follow up of patient put on treatment.
PHC	<ul style="list-style-type: none"> • Health promotion for behavior change and counseling. ‘Population-based/ Opportunistic’ Screening of Diabetes, hypertension, and three common cancers (oral, breast, and cervical by VIA). • Clinical diagnosis and treatment of common NCDs including Hypertension and Diabetes, referral of complicated cases of DM/HTN to CHC/DH. • Identification of early warning signals of common cancer. • Referral of suspected cases to CHC/DH and follow up of patient put on treatment.
CHC	<ul style="list-style-type: none"> • Health promotion for behavior change and counseling. ‘Population-based/ Opportunistic’ Screening of Diabetes, hypertension, and three common cancers (oral, breast, and cervical by VIA). • Clinical diagnosis and treatment of common NCDs including Hypertension and Diabetes, referral of complicated cases of DM/HTN to CHC/DH. • Identification of early warning signals of common cancer. • Referral of suspected cases to CHC/DH and follow up of patient put on treatment.
District Hospital	<ul style="list-style-type: none"> • Diagnosis and management of cases of CVDs, Diabetes, COPD Stroke, and Cancer (outpatient, inpatient, and intensive Care) including emergency services particularly for Myocardial Infarction & Stroke. • Lab. investigations and Diagnostics: Blood sugar, Lipid Profile, KFT, LFT, X-Ray, ECG, USG ECHO, CT Scan, MRI, etc (To be outsourced, if not available) • Referral of complicated cases to a higher health care facility. Health promotion for behavior change and counseling. ‘Opportunistic’ Screening of NCDs including common cancers (Oral, Breast, and Cervix). • Follow up chemotherapy in cancer cases, Rehabilitation and physiotherapy services. • Mental health services
Medical College	<ul style="list-style-type: none"> • Mentoring of District Hospitals, Early diagnosis and management of Cancer, Diabetes, CVDs, and other associated illnesses, Training of health personnel, Operational Research.
Tertiary Cancer Centre	<ul style="list-style-type: none"> • Mentoring of District Hospital and outreach activities, Comprehensive cancer care including prevention, early detection, diagnosis, treatment, palliative care, and rehabilitation. • Training of health personnel & • Operational Research

1.4.3 CURRENT AVAILABILITY OF THE DRUGS AT DIFFERENT HEALTH CENTRE LEVELS

Essential medicines are those that satisfy the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety, and comparative cost-effectiveness. Essential medicines are intended to be available at all times in adequate amounts, inappropriate dosage forms with assured quality and adequate information, and at a price, the individual and community can afford it. So, the list of medicines available at different health centres is mentioned in table 16-20 [26].

1.4.4 ROLE OF KEY STAKEHOLDERS

Five broad groups of stakeholders are engaged in a successful reduction in non-communicable diseases and injuries in India (Table 21). They are different ministries of the Union Government, States / Union Territories, private sector, civil society, and international partners [27].

2. BACKGROUND AND OBJECTIVES OF THE CHHATTISGARH NCDI POVERTY COMMISSION

2.1 BACKGROUND OF THE COMMISSION

India has a pluralistic healthcare system with allopathic services playing a dominant role. The health system is mixed with public and private providers. The public system is accounting for 48% of the Total Health Expenditure in the Chhattisgarh [9]. The government-run services have a greater focus on public health functions, disease prevention measures, and preventive care services. In healthcare services, the focus has been traditionally on primary care for Reproductive and Child Health (RCH) and infectious diseases like Malaria, Diarrhoea, TB, and Leprosy. The public sector provides around half of the inpatient care (55.2%) and (55.3%) outpatient care (NSSO 71st round) [8]. The private sector is also covering almost half of the inpatient and outpatient care, but it focuses mostly on curative care services. An expanding private sector is operating in bigger urban areas in the central region of the state.

Though, over time health care indices have improved significantly in Chhattisgarh especially in Reproductive and Child Health (RCH) and in some communicable diseases. Nevertheless, the mortality indicators are still poor in Chhattisgarh. Chhattisgarh has a high burden of Malaria, Leprosy, and Tuberculosis with an epidemiological transition ratio of 0.6 in 2016 which indicates increasing trends of non-communicable diseases and injuries [28]. {Epidemiological transition ratio is defined as the ratio of DALYs caused by CMNNDs to those caused by NCDs and injuries. A ratio greater than one indicates a higher burden of CMNNDs than NCDs and injuries while less than one indicates the opposite}. Tribal communities of Chhattisgarh in particular, are highly vulnerable to various genetic diseases, and nutritional deficiencies. Initial screening for sickle cell disease across Chhattisgarh has revealed a prevalence of 10%. [6] In 2016, the proportion of communicable, maternal, neonatal, and nutritional diseases (CMNNDs) was 37.7%, the proportion of non-communicable diseases was 50.4%, and 11.9% of injuries. [28]

The progress made on health indices also represents the selective focus of care that was provided by the government. The public services were highly focused on providing preventive and basic

primary curative care for Reproductive and Child Health (RCH) and Communicable Diseases. The realization that Non-Communicable Diseases (NCDs) also represent a large morbidity burden including for the poor has only recently been understood by policymakers in Chhattisgarh. With the rising importance of Non-Communicable Diseases (NCDs), the state is beginning to recognize that it needs to take up the responsibility for providing preventive and curative care for NCDs.

2.2 OBJECTIVES OF THE COMMISSION

The general objectives of the Chhattisgarh NCDI Poverty Commission are:

1. Establish state-level NCDI burden of disease, particularly about socioeconomic factors
2. Describe the availability and coverage of NCDI services in the health sector
3. Prioritize among NCDI conditions, emphasizing burden of disease, severity, & equity
4. Propose cost-effective interventions to address priority NCDIs within the context of UHC
5. Estimate the cost and potential impact of interventions
6. Forecast potential fiscal space to afford these interventions
7. Highlight voices of patients with NCDIs, particularly affecting populations living in poverty

3. METHODOLOGY OF THE CHHATTISGARH NCDI POVERTY COMMISSION

3.1 LITERATURE REVIEW

A detailed review of the literature was conducted to identify studies that estimated the prevalence of common NCDIs such as cardiovascular diseases, cancers, chronic respiratory diseases, chronic kidney diseases, diabetes mellitus, hypertension, Epilepsy, Sickle cell disease, and skin diseases in and their associated factors in Chhattisgarh state. The following databases were looked into estimates of the burden of major NCDIs, across the country India and Chhattisgarh state, i.e.: MEDLINE/PubMed, Cochrane Libraries, Google Scholar, WHO Regional Databases, and local journals, including grey literature. Grey literature was searched from websites of the Indian Council of Medical Research, Department of Health and Family Welfare of Chhattisgarh and India, and the website of State Health Resource Centre, Chhattisgarh.

Search terms included various combinations of: ‘cardiovascular diseases’, ‘rheumatic heart disease’, ‘stroke’, ‘ischaemic heart disease’, ‘neoplasms’, ‘cancer’, ‘hypertension’, ‘diabetes’, ‘cause of death’, ‘musculoskeletal disorders’, ‘CVD’, ‘CKD’, ‘chronic kidney diseases’, ‘congenital birth disorders’, ‘oral disorders’, ‘sense organ diseases’, ‘injuries’, ‘accidents’, ‘suicides’, ‘snake bites’, ‘skin disease’, ‘dermatological problems’, ‘skin infections’, ‘asthma’, ‘respiratory diseases’, ‘chronic obstructive pulmonary diseases’, ‘sickle cell diseases’, ‘hemoglobinopathies’, ‘epilepsy’, ‘convulsions’, ‘burden of disease’, combined with the term ‘risk factors’, ‘death’, ‘epidemiology’, ‘morbidity’, ‘mortality’, ‘prevalence’, and ‘trends’, ‘India’, and ‘Chhattisgarh’. And attempts have been made to assess the variations of NCDIs burden and their major risk factors in Chhattisgarh.

3.2 STATE HEALTH RESOURCE CENTRE MITANIN DATA AND ANALYSIS

Chhattisgarh SHRC has initiated and implemented its community health workers program i.e. called Mitanin. Mitanins is a voluntary health worker providing basic primary health care services,

health promotion, and disease prevention activities in her hamlet covers around 100-150 households. As part of community participation activity in the rural areas of Chhattisgarh, Village Health Sanitation and Nutrition Committees (VHSNCs) mandated to record the deaths happening in the villages (Mitani is an Organizing member of VHSNC). The rural population in Chhattisgarh is predominantly poor 83.3% reported by Reserve bank India. Similarly, in the urban areas, it only captures the death in slum areas which include a more vulnerable poor population and mostly migrants' workers living in highly compromised poor conditions. In those slum areas, Mahila Aarogya Samitis (MAS) is mandated to record the deaths. The death registers also record the cause of death as reported at the community level. These deaths were yearly collected, compiled, and analyzed by SHRC to understand the mortality rates for different diseases in its rural and urban slum areas.

3.3 STATE HEALTH RESOURCE CENTRE PREVALENCE SURVEY AND ANALYSIS

The primary household survey conducted in Chhattisgarh in 2019 data was analyzed. WHO and SHRC have together done this survey to identify demand-side issues and gaps that will help in devising recommendations for systemic interventions. This study was conducted in 5 geographically representative districts of the state and 1170 households from rural and 330 from urban areas were selected. In this survey disease burden was measured by self-reported ailments into three categories i.e. Acute Ailments (over last 15 days, irrespective of whether any healthcare was availed or not), Chronic Ailments (current ailments continuing for more than three months, irrespective of whether any healthcare was availed or not) and In-patient care (hospitalization involving an overnight stay, taken over last one year). It also captures the healthcare utilization pattern and Out of pocket expenditure by households.

The reason to use this primary survey was to triangulate the disease burden reported by NSS. Additionally, 75th NSS reports disease burden only in two categories i.e. acute ailments in 15 days and one-year hospitalization which underreports the chronic illness. In the WHO & SHRC, 2019 survey chronic diseases were also included along with acute ailments and hospitalization. Since most NCD diseases are chronic diseases therefore this survey gives a detailed and clearer picture of NCD burden in Chhattisgarh.

3.4 HEALTH AND WELLNESS CENTRE DATA AND ANALYSIS

Considering the state's priority in reducing the high burden of NCDs, a month-long campaign called 'NCD Suraksha Maah' was launched to achieve the desired goals. As part of this campaign all individuals 30 or more years of age were screened for NCDs at the AB-HWCs and were given the required treatment after confirmation of diagnosis. A total of 6,839 NCD screening outreach camps were conducted across 900 AB-HWCs during NCD Suraksha Maah. The state has achieved 140% of the screening target as per the NCD portal. The intervention reached more than 8.3 lakh individuals during this month. [29]

For the analysis of common NCDs in Chhattisgarh, the health and wellness center data of Chhattisgarh was extracted in March 2020 and analyzed. In this study we have considered five major NCDs viz; Hypertension, Type 2 Diabetes, Oral Cancer, Breast Cancer, and Cervical Cancer. Further, standard metrics i.e. Prevalence are calculated to evaluate the contribution of each disease burden of NCDs in Chhattisgarh. And as per available data total of 3292303 patients were screened for hypertension, diabetes, oral cancer, breast cancer, and cervical cancer. And a total of 1147317 patients was screened for hypertension, 971629 for diabetes, 665402 for oral cancer, 330071 for breast cancer, 177884 for cervical cancer. Prevalence of hypertension, diabetes, oral cancer, breast cancer, and cervical cancer was calculated for Chhattisgarh and each district based on the total population of each district. Further, a relation between the multidimensional poverty index of each district and prevalence rate was analyzed for each disease.

3.5 RASHTRIYA BAL SWASTHYA KARYAKRAM DATA AND ANALYSIS

The 'Child Health Screening and Early Intervention Services' Programme under the National Rural Health Mission initiated by the Ministry of Health and Family Welfare, aims at early detection and management of the 4Ds prevalent in children. These are Defects at birth, Diseases in children, Deficiency conditions, and Developmental Delays including Disabilities. The high burden of this childhood ill-health contributes significantly to child mortality, morbidity, and out of pocket expenditure of the poor families.

Health screening of children is a known intervention under the School Health Programme. The services aim to cover all children of 0-6 years of the age group in rural areas and urban slums, in addition to older children up to 18 years of age enrolled in classes 1st to 12th in Government and Government aided schools. The Programme has been initiated as significant progress has already been made in reducing child mortality under the National Rural Health Mission.

For the analysis of common NCDs in children of Chhattisgarh, the RBSK data of Chhattisgarh was extracted from the Chhattisgarh health government website for the duration between august 2014 to march 2020 and analyzed. A total of 33714829 children aged from birth to 18 years were screened. Further, standard metrics i.e. Prevalence are calculated to evaluate the contribution of each disease burden of NCDs in Children based on the total population of each district. [30]

3.6 GLOBAL BURDEN OF DISEASE DATA AND ANALYSIS

To measure the prevalence and DALY rates for NCDs Global Burden of Diseases (GBD) unit data for India and Chhattisgarh has been analyzed and reported. [31] Along with other studies using GBD data sets for disease, estimation was also searched and reported. The burden of NCDI was estimated using all accessible data sources as part of the Global Burden of Diseases, Injuries, and Risk Factors Study 2017 of Chhattisgarh state. The diseases or conditions were explained in three levels. Overall consolidated categories of diseases are explained under Level 1 and are broadly classified under it as communicable, maternal, neonatal, and nutritional diseases; non-communicable diseases; and injuries. Subcategories of the three categories of Level 1 are presented under Level 2. And Level 3 consists of all individual conditions listed in the GBD and state NCDI database. Attributed risk factors related to NCDI are based on the estimates from the GBD. The

diversity of the burden of major NCDs was also analyzed across India and Chhattisgarh, and the contribution of risk factors to them.

Risk factors are characterized as behavioral (i.e. smoking, a diet low in whole grains, fruits or high in sodium and alcohol intake, etc.), metabolic (i.e., high systolic blood pressure, fasting plasma glucose and body mass index, etc.), and environmental (i.e., household air pollution from solid fuels, ambient particulate matter pollution, and occupational economic factors, etc.), behavioral in union with metabolic, behavioral in union with metabolic and environmental, behavioral in union with environmental, environmental in union with metabolic. The burden of disease that cannot be associated with any given risk factor in the data provided within GBD is considered “unattributable.”

4. SITUATION OF NCDs AND SOCIOECONOMIC STATUS IN CHHATTISGARH

4.1 EPIDEMIOLOGY OF NCDs IN CHHATTISGARH

4.1.1 LITERATURE REVIEW

Globally, NCDs contribute to more than two-thirds of all deaths and the majority of all early deaths and disability. Around 80% of these deaths due to NCDs occur in low- and middle-income countries with further increases predicted in the prevalence of the four most prevalent NCDs- cardiovascular disease (CVD), type 2 diabetes (T2DM), cancer, and chronic obstructive (COPD) respiratory diseases. [32] This growing burden compounds already stressed health systems, disproportionately affecting the poorest populations, and hindering the country's social and economic development. It has been noted that NCDs and their risk factors worsen poverty, while poverty contributes to rising rates of NCDs, posing a threat to public health and economic and social development. According to WHO, an important way to control NCDs is by reducing the associated behavioral risk factors like smoking, alcohol use, physical inactivity, and unhealthy diets [32]. These behavioral risk factors are closely linked with other social determinants like inequitable access to healthcare, poverty, gender, dietary factors, and education. The lack of physical exercise and a lower intake of fruits and vegetables, coupled with unhealthy food habits is rapidly progressing in urban poor populations. Please refer appendix for a full literature review of each NCDs.

4.1.2 MORTALITY FROM NCDs IN COMMUNITY OF CHHATTISGARH (MITANIN PROGRAM)

In the rural areas of Chhattisgarh, Village Health Sanitation and Nutrition Committees (VHSNCs) is mandated to record the deaths happening in the villages. Similarly, in the urban-slum area of Chhattisgarh, MahilaAarogya Samitis (MAS) is mandated to record the deaths. The death registers also record the cause of death as reported at the community level.

For rural areas, this report analyses nearly 91202 deaths that were recorded by VHSNCs during the year 2018. The deaths covered in the 2018 compilation constitute 53% of the total no. of rural deaths expected according to Crude Death Rate of the state.

In the urban-slum area, this report analyses 8878 deaths that were recorded by MAS during the year 2018. The deaths covered in the 2018 compilation constitute 75% of the total no. of deaths expected according to Crude Death Rate of the state.

In 2018 total of 100080 deaths were reported in both rural and urban areas. The cause of deaths was classified as per the NCDI commission’s classification of cause of deaths. Of total deaths, 42.86% were NCD related deaths and 14.30% were Injury related deaths. Thus, NCDI related deaths account for 57.16% of total deaths in the state. (Figure 4)

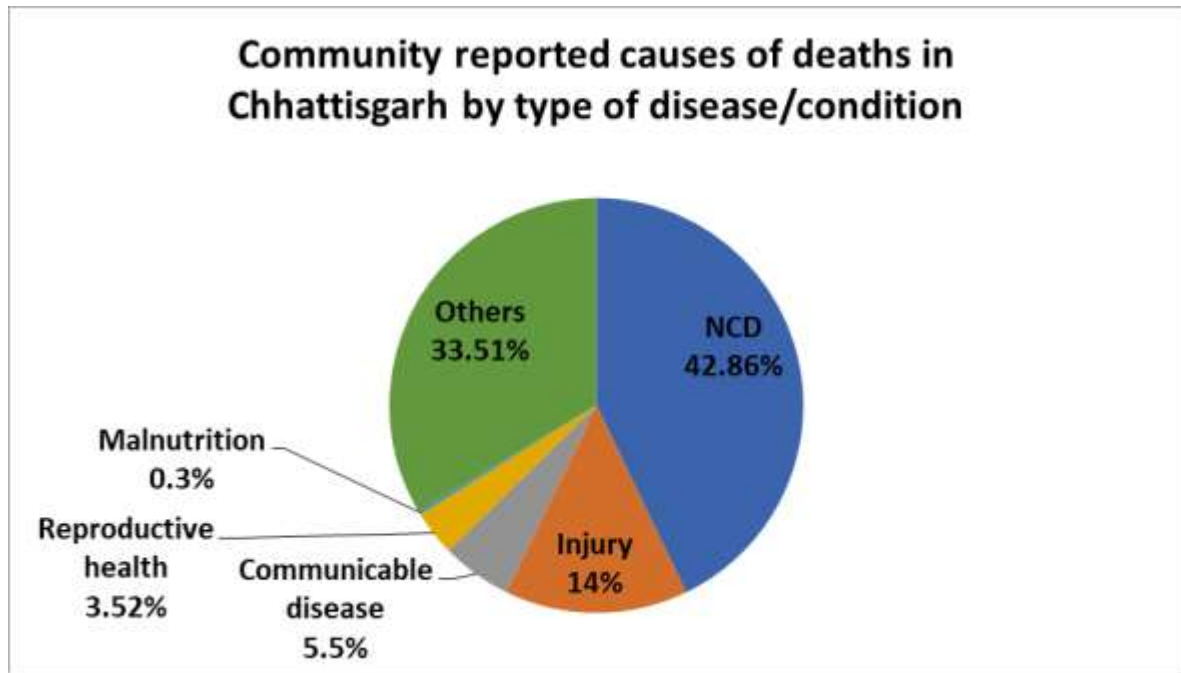


Figure 4: Proportion of Different types of diseases in Community reported causes of deaths in Chhattisgarh -2018

The disease-specific proportion of community reported deaths is shown in (Figure 5). The highest proportion of deaths was from hypertension, accidents, Stroke, digestive disorders, cancers, suicide, and diabetes.

Deaths due to High BP, Heart Diseases, Stroke (including congenital heart disease & anomalies): VHSNCs in rural areas have reported 25847 deaths during 2018 for which the cause is recorded as High BP, Stroke, and Heart disease (including congenital heart disease & anomalies) which are 28.34% of total reported deaths in rural areas. Gender wise classification of deaths shows that 57% of these deaths are of a male person.

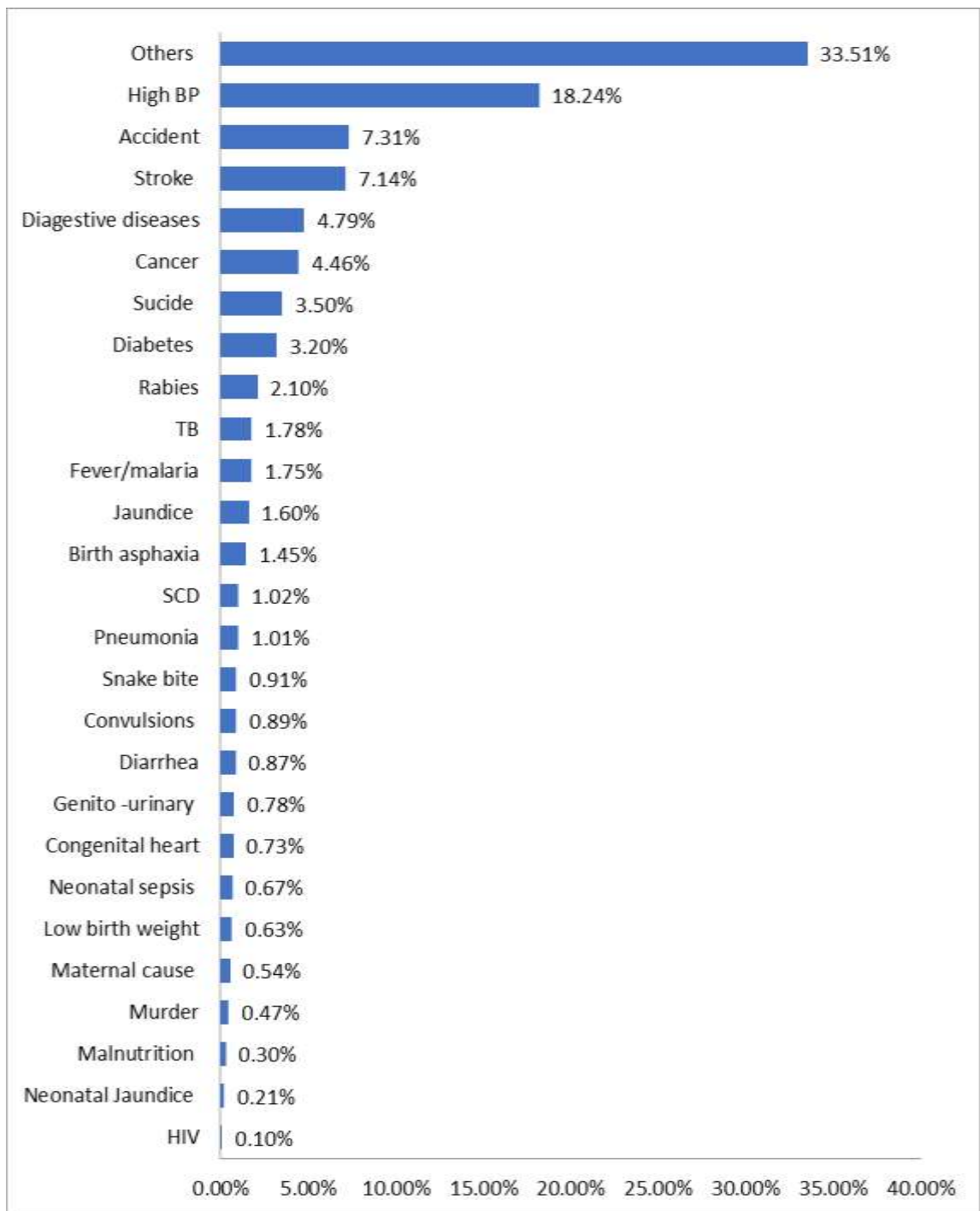


Figure 5(a): Disease-specific community reported cause of deaths in Chhattisgarh-2018

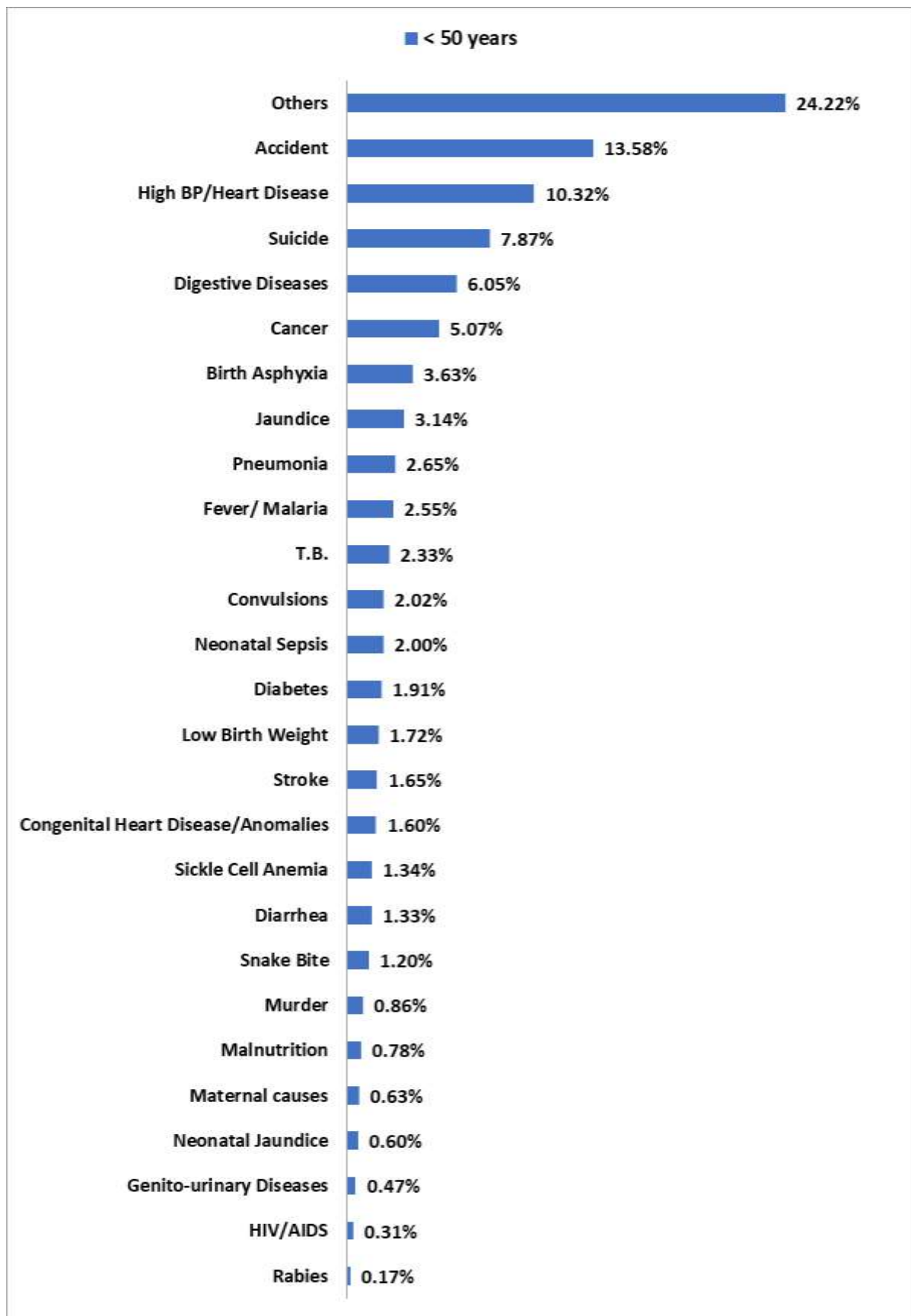


Figure 5(b): Disease-specific community reported cause of deaths in < 50 years age group in Chhattisgarh-2018

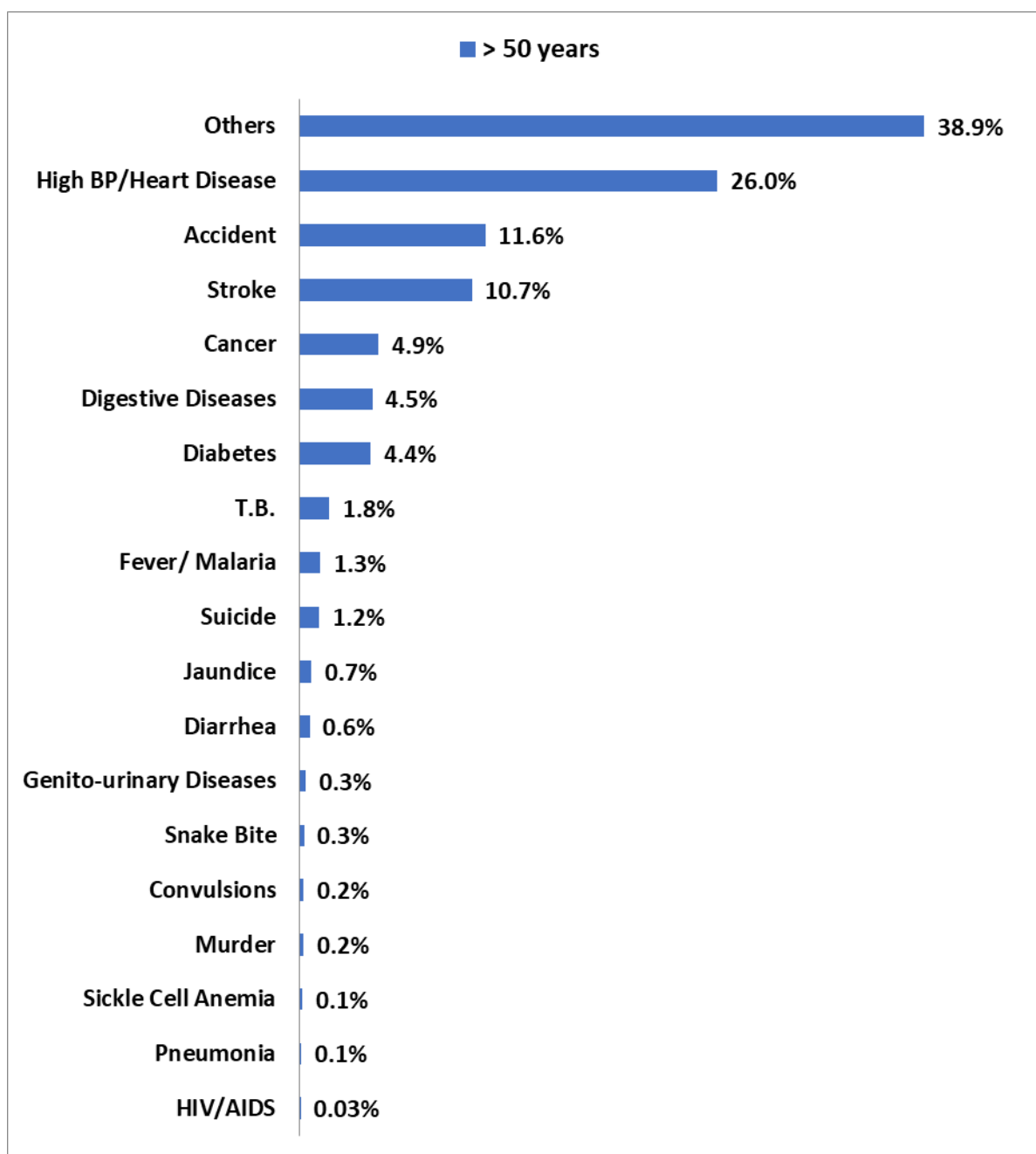


Figure 5(c): Disease-specific community reported cause of deaths in >50 years age group in Chhattisgarh-2018

Age-wise deaths data shows that 83% of these deaths are in the above 50-year age group. The deaths which are of greater concern are in under-50-year age and they constitute 17% of the deaths due to this composite category of causes.

Deaths due to Diabetes: VHSNCs in rural areas have reported 3151 deaths during 2018 for which the cause is recorded as Diabetes which are 3.45% of total reported deaths in rural areas and 61% of these deaths are of a male person. Table 10 shows 80% of diabetic deaths were in more than 50 years of age group.

Deaths due to Cancer: VHSNCs in rural Chhattisgarh have reported 4450 deaths during 2018 for which the cause is recorded as Cancer which is 4.89% of total reported deaths in rural areas and

52% of these deaths are of a male person. Table 10 shows 38% of cancer deaths were in 50 years age group.

4.1.3 PREVALENCE OF NCDS IN SURVEYS (SHRC SURVEY DATA)

In 2019 in Chhattisgarh, WHO and SHRC have together done a study to identify demand-side issues and gaps that will help in devising recommendations for systemic interventions. This study was conducted in 5 geographically representative districts of the state and 1170 households from rural and 330 from urban areas were selected. [33]

Data on the share of self-reported different chronic ailments (current ailments continuing for more than three months) shows that hypertension has the highest share among the chronic diseases (28.87%), followed by diabetes (16.84%), rheumatic conditions (6.62%), skin conditions (3.76%), stroke (3.76%) and mental illness (2.41%) were other common chronic ailments. TB was the most common infectious chronic disease. (Figure 6) As per NCDI disease classification, 82.69% of chronic ailments were NCDI diseases, 10.22% were communicable diseases, 6.92% were other illnesses and 0.15% were under nutrition (Figure 7).

Share of different illness in In-patient care episodes (hospitalization over last one year) shows that as per NCDI disease classifications Injuries were the most common cause for hospitalization, (7.46%) followed by Diabetes (3.08%), Cardiovascular diseases (2.83%), Hypertension (2.31%), stroke (1.29%) and Cancer (1.03%) (Figure 8). As per NCDI disease classification, 32.09% of hospitalization was for NCD related, 28.80% were communicable diseases, 25.45% were for Reproductive health, 7.98% were injury-related and 4.88% were other illness (Figure 9).

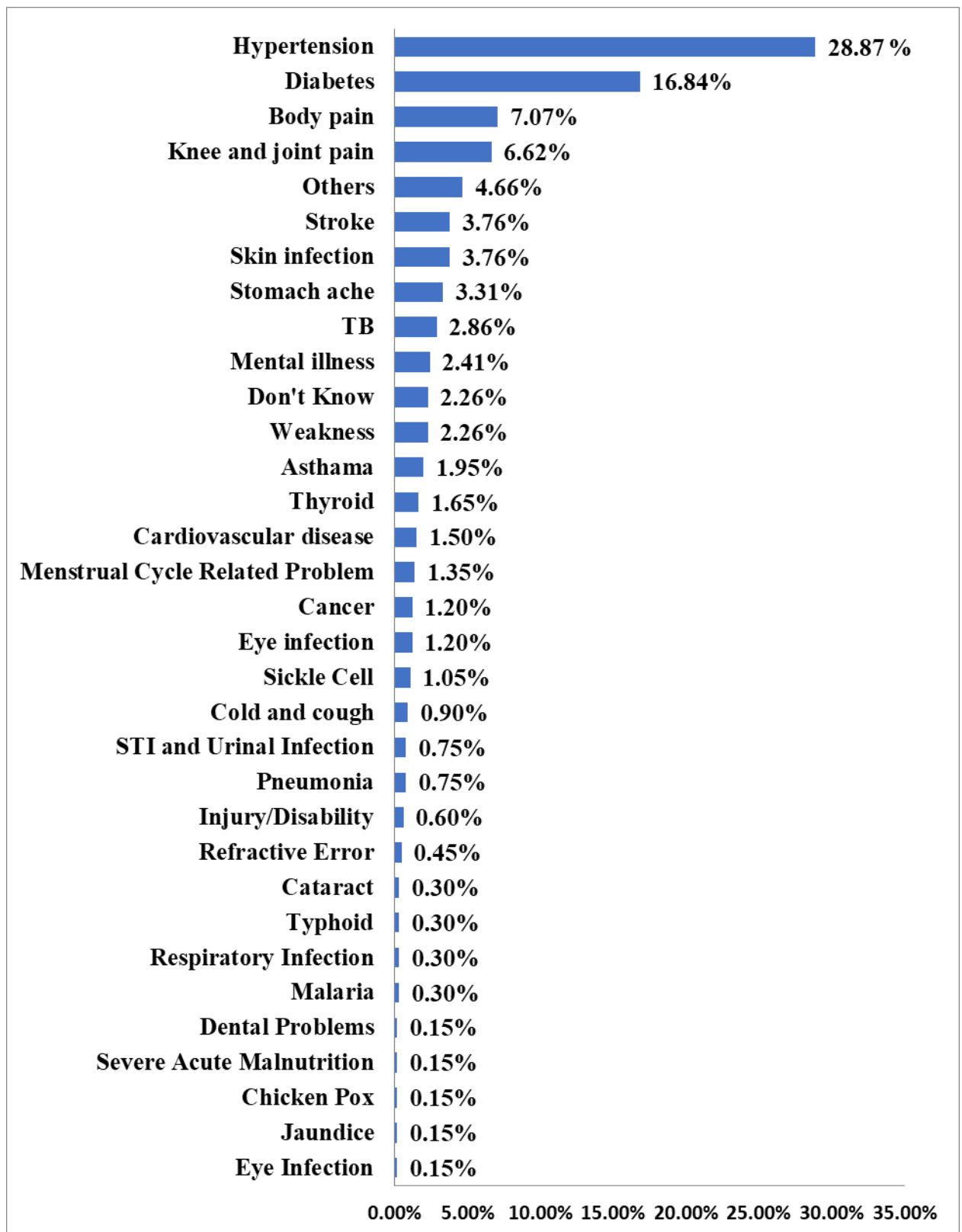


Figure 6: Proportion of different ailments reported as chronic illnesses

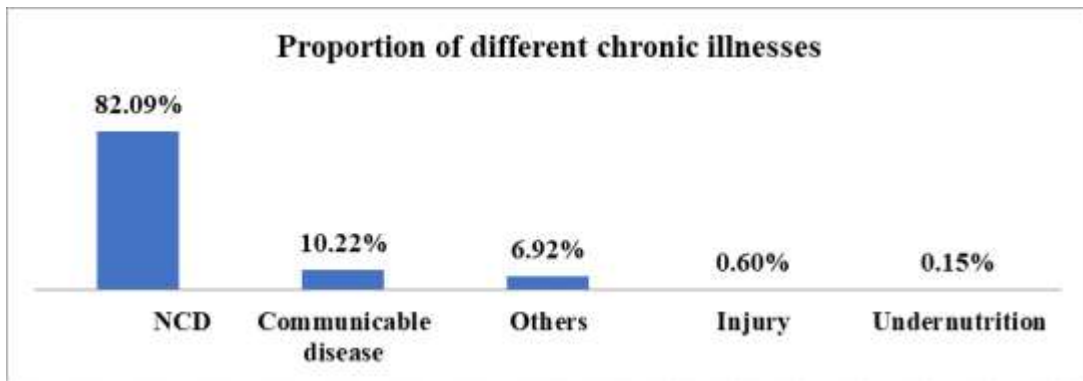


Figure 7: Proportion of different chronic illnesses

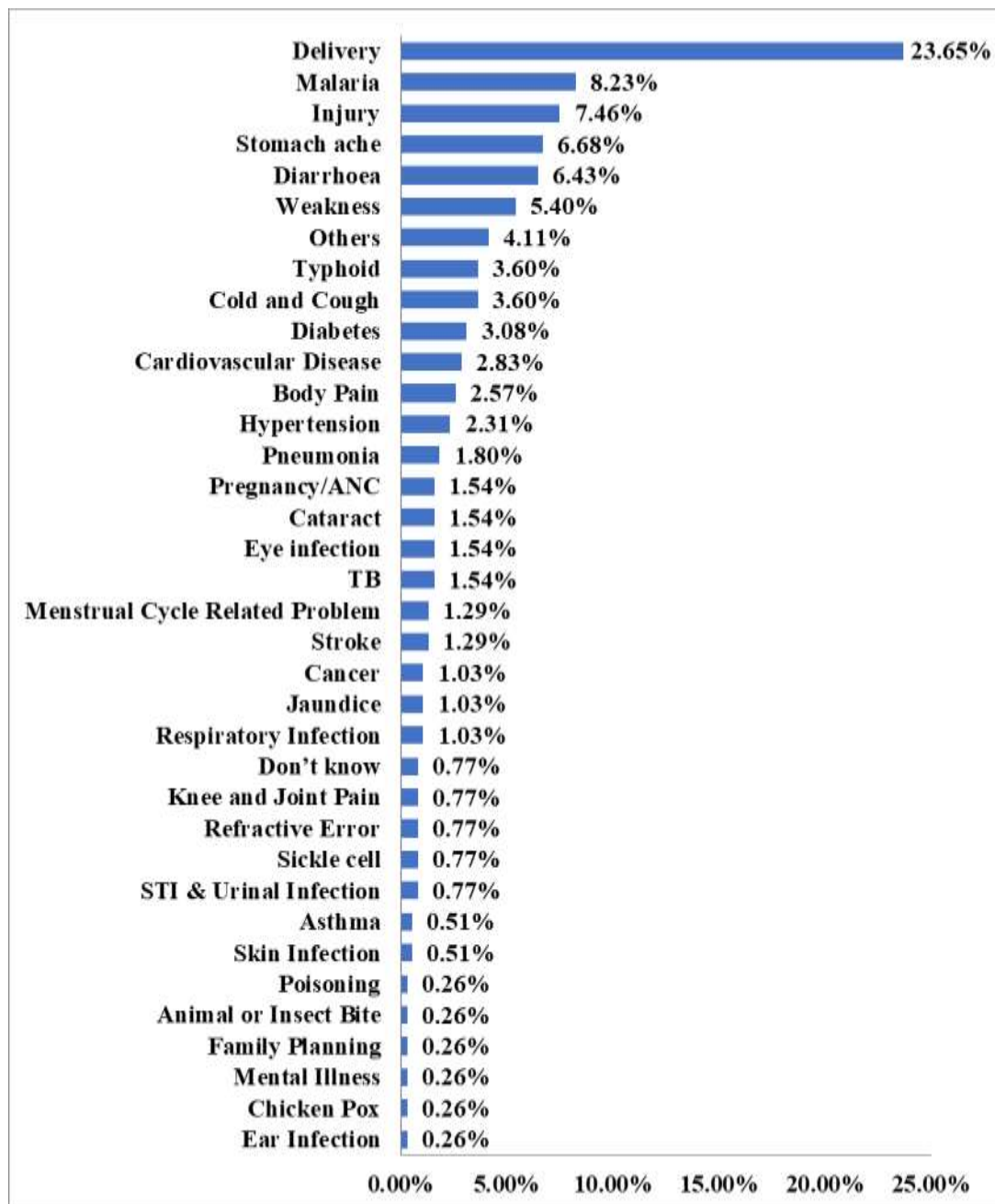


Figure 8: Share of different illness in In-patient care episodes (hospitalization over last one year)

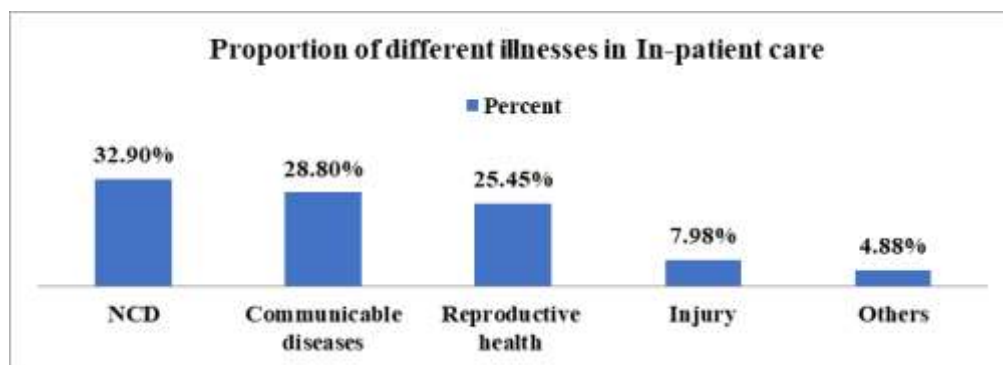


Figure 9: Proportion of different category illnesses in In-patient care

4.1.4 SURVEY OF COMMON NCDS IN CHHATTISGARH (HWC DATA)

4.1.4.1 PREVALENCE OF MOST COMMON NCDS IN CHHATTISGARH

The Prevalence of selected NCDs is calculated from the HWC data of Chhattisgarh state. The prevalence of hypertension, Diabetes, Oral Cancer, Breast Cancer, and Cervical Cancer in overall Chhattisgarh are 8.46%, 7.50%, 0.44%, 0.72%, and 0.82% respectively. It has been seen that hypertension and diabetes got a higher prevalence among all five NCDs. Hence, we can say that hypertension and diabetes have more contribution to the burden of NCDs in Chhattisgarh. Whereas, the other three viz, oral cancer, breast cancer, and cervical cancer have less contribution to the burden of NCDs as shown in figure 10.

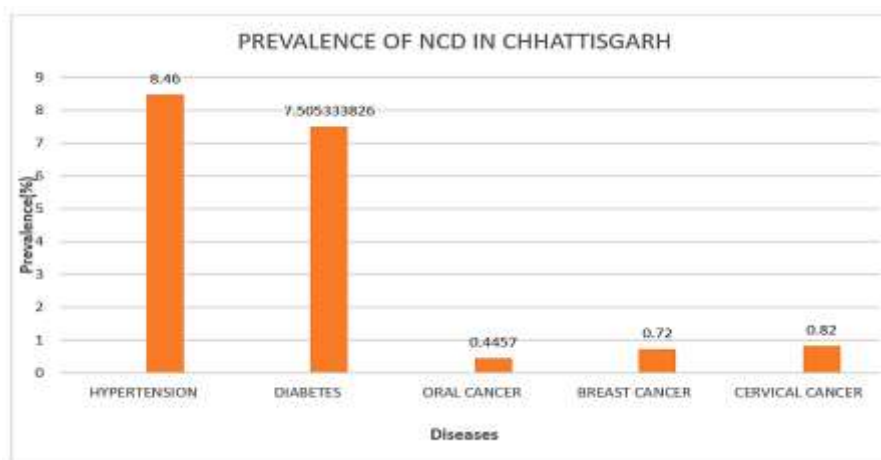


Figure10: Comparative analysis of the prevalence of five major NCDs in Chhattisgarh

4.1.4.2 DISTRICT-WISE ANALYSIS OF NCDS

For a more detailed analysis, the prevalence of NCDs is estimated district-wise. The detailed of which is presented as a graphical illustration of the estimated prevalence of hypertension, diabetes, oral cancer, cervical cancer, and breast cancer. It has been observed that the prevalence of hypertension for all districts is ranging from 1.23-13.17% with an average of 8.24% (figure 11). And among 27 districts, the highest prevalence for hypertension is observed in Balrampur (13.17%), Durg (13.01%), and Korba (12.68%), and the lowest prevalence being observed in Bastar (4.37%), and Bijapur (1.23%). Similarly, the prevalence of diabetes for all districts is ranging from 0-11.88% with an average of 6.45% (figure 12). Among all 27 districts Durg (11.88%), Balrampur (11.19%) and Baloda Bazar (11.14%) showed the highest prevalence of diabetes and Bastar (1.8%)

and Bijapur (1.3%) being the lowest. On the other hand, the prevalence of oral cancer (figure 13), cervical cancer (figure 14), and breast cancer (figure 15) is less ranging from 0-2.19% (average 0.21%), 0-4.71% (average 0.48%), 0-4.95% (average 0.65%) respectively. Among all 27 districts, the highest prevalence for oral cancer is observed in Raipur (2.19%), while for cervical cancer and breast cancer it has been seen in Jashpur (4.71%) and Narayanpur (4.95%) respectively.

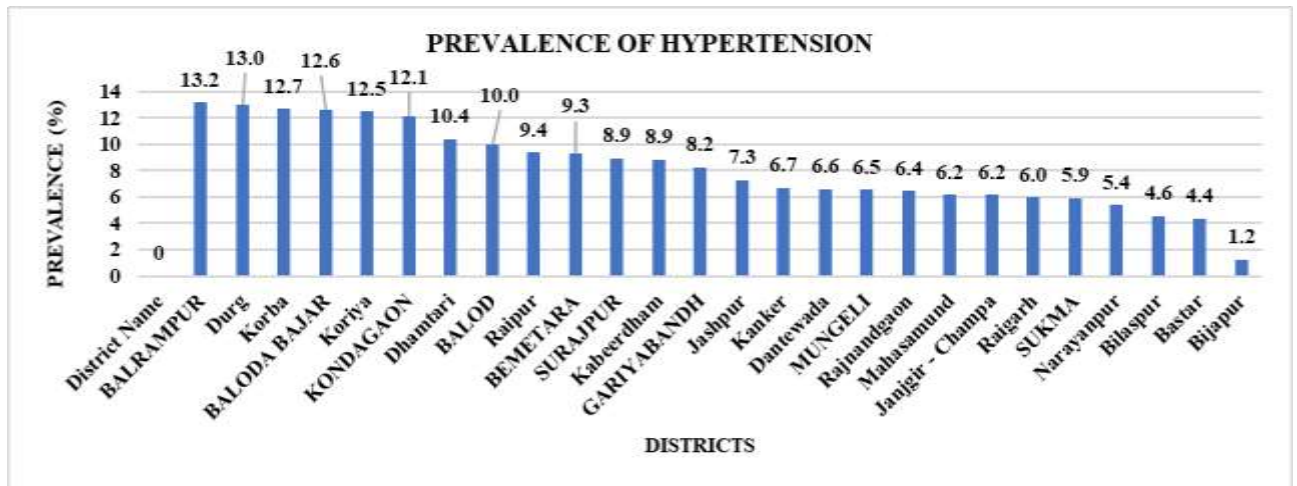


Figure 11: District-wise analysis of the prevalence of hypertension

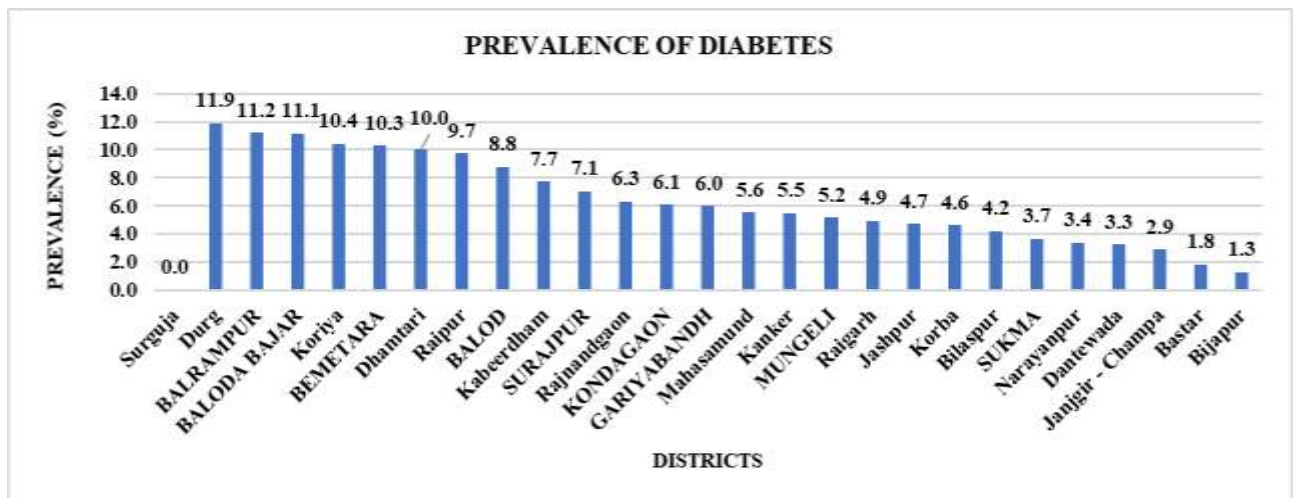


Figure 12: District-wise analysis of the prevalence of diabetes

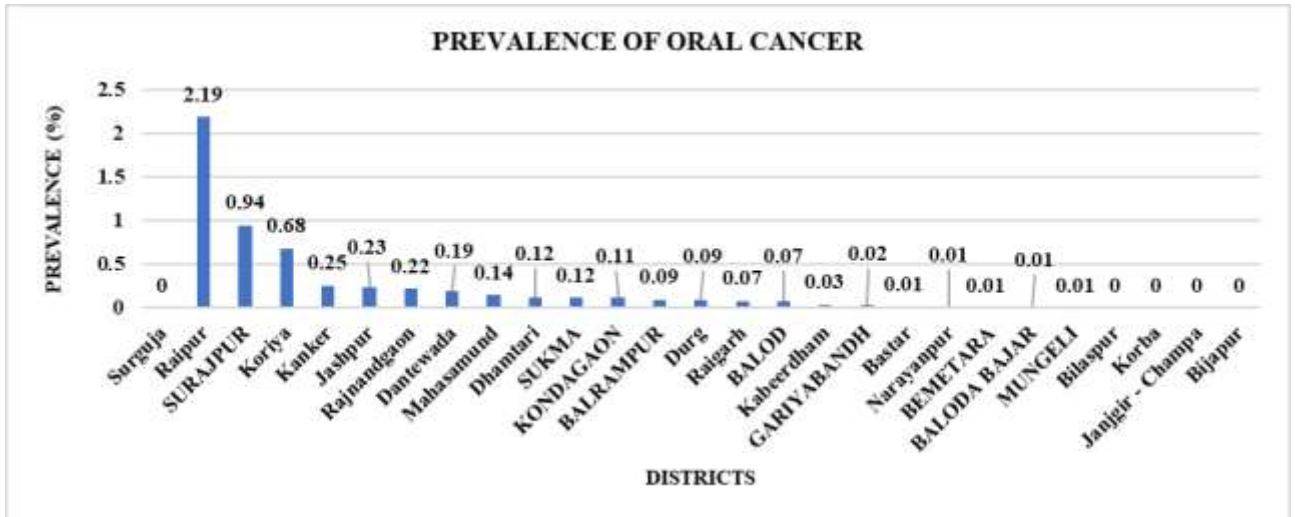


Figure 13: District-wise analysis of the prevalence of oral cancer

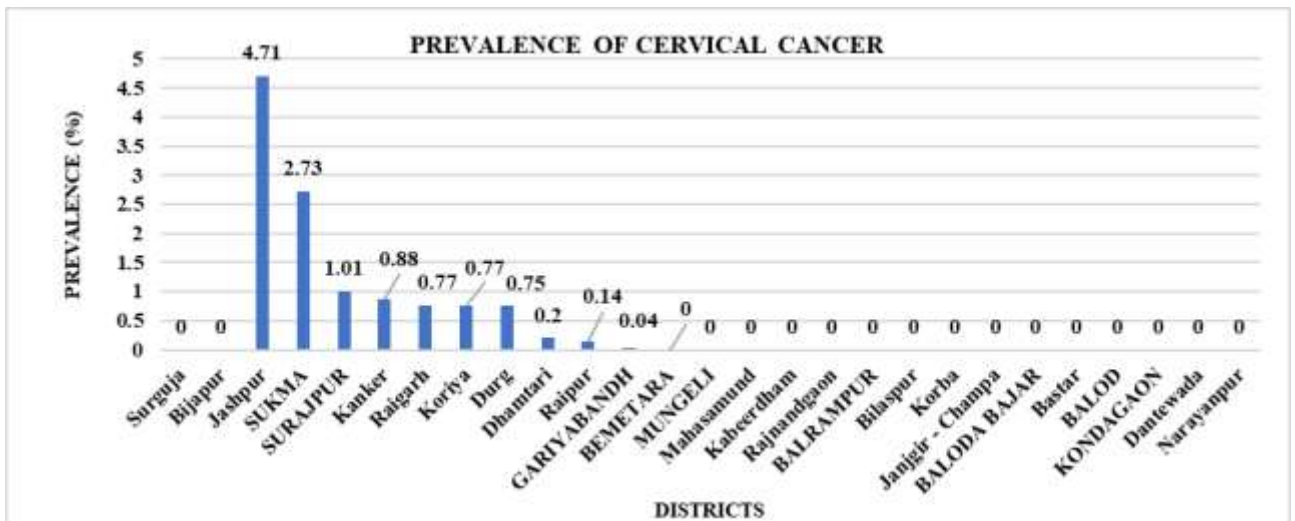


Figure 14: District-wise analysis of the prevalence of cervical cancer

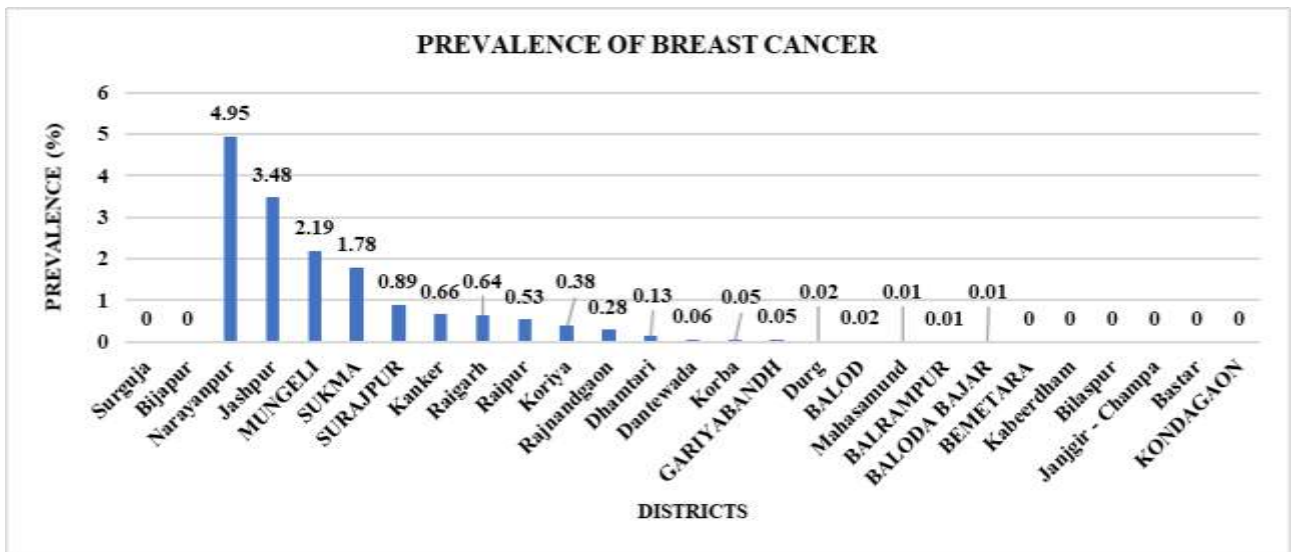


Figure 15: District-wise analysis of the prevalence of breast cancer

4.1.5 NCDIS AMONG CHILDREN AND YOUTH IN CHHATTISGARH (RBSK DATA)

4.1.5.1 PREVALENCE OF NCDS AND NUTRITIONAL DEFICIENCIES IN CHHATTISGARH

Children suffered from a large diversity of noncommunicable diseases and nutritional deficiencies in Chhattisgarh. Among the total screening of 33714829 children (from august 2014 to march 2020, source: <https://dkbssy.cg.nic.in/rbsk/Admin>), 413849 (1.23%) children were found to be suffering from a large diversity of noncommunicable diseases and nutritional deficiencies.

In Chhattisgarh, the conditions with large proportions of prevalence in children include sickle cell disease (0.22%), vision impairment (0.2%), skin conditions (0.16%), dental conditions (0.15%), severe acute malnutrition on stunting (0.14%), vitamin A deficiency (0.1%), severe anaemia (0.06%), reactive airway disease (0.03%), congenital heart disease (0.03%), hearing impairment (0.021%), speech and language delay (0.02%), learning disorder (0.01%), rickets (0.01%) and other diseases being less prevalent (figure 25). Among the congenital birth defect the most prevalent defect being congenital heart disease (0.03%), followed by congenital deafness (0.009%), cleft lip and palate (0.01%), and congenital cataract (0.01%) other being less prevalent. The detailed presentation of noncommunicable diseases and nutritional deficiencies is shown in the figure 16.

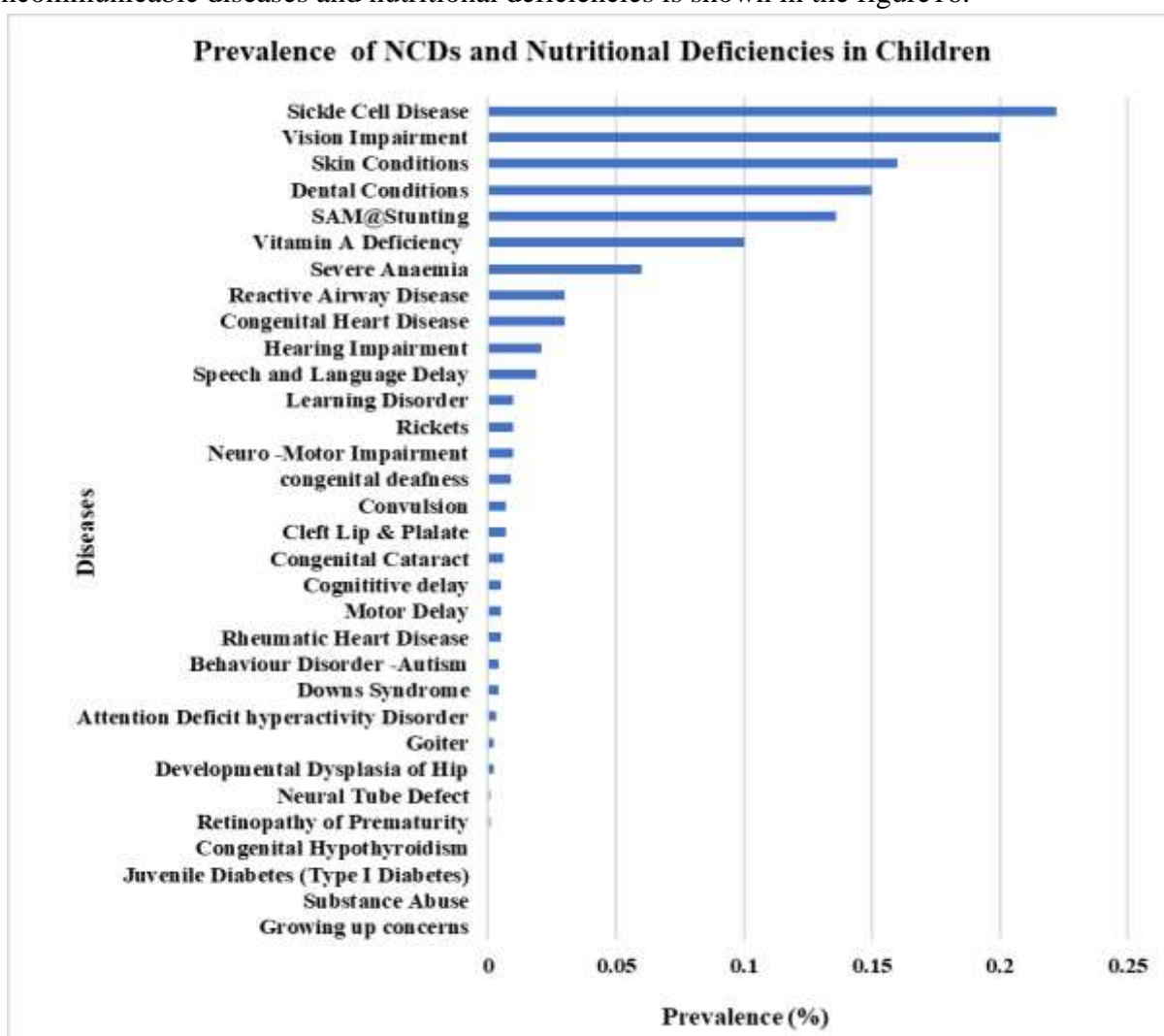


Figure 16: Prevalence of NCDs and Nutritional Deficiencies in Chhattisgarh

4.1.5.2 DISTRICT-WISE ANALYSIS OF NCDS

Later, for a thorough analysis of the distribution of more common non-communicable diseases among children in each district of Chhattisgarh was analyzed and presented in the form of graphical illustrations. They were presented under the classification of sense organ diseases, congenital birth defects, neurological disorder, cardiovascular diseases, skin diseases, oral disorders, type I diabetes, hemoglobinopathies, and substance abuse.

Among sense organ diseases the most prevalent diseases are vision impairment in Dantewada (0.39%), followed by speech and language delay in Bemetara (0.052%), and hearing impairment in Dantewada (0.05%) (figure 26). Among congenital birth defect, the most prevalent are congenital heart disease in Durg (0.05%), congenital cataract in Balrampur (0.0155), cleft lip and palate in Bijapur (0.015%), down syndrome in Bemetara (0.012%), neural tube defect in Dantewada (0.008%), developmental dysplasia of the hip in Sukma (0.008%), premature retinopathy in Balrampur (0.0027%), congenital hypothyroidism in Kondagaon (0.0008%) (figure 27). The most prevalent cardiovascular disease among children is rheumatic heart diseases. Rheumatic heart diseases were found to be most prevalent in Rajnandgaon with 0.017%, followed by Mahasamund and Balrampur (0.011%), and is least prevalent in Narayanpur (0.001%) (figure 28). Skin diseases contribute to be the third most common disease in children of Chhattisgarh. And it is found to be most prevalent in Bemetara (0.42%) and Narayanpur (0.39%) and is least prevalent in Kondagaon (0.07%) and Sukma (0.06%) (figure 29). The most prevalent neurological disorders in children are learning disorder in Bemetara (0.04%), neuro-motor impairment in Sukma (0.026%), motor delay in Bemetara (0.02%), convulsion in Bemetara (0.019%), cognitive delay in Koriya (0.013%), attention deficit hyperactivity disorder in Bemetara (0.0098%), Autism in Koriya (0.009%) (figure 30). Dental diseases in children were found to be most prevalent in Bemetara (0.49%) and Dantewada (0.47%), and least prevalent in Raigarh (0.05%) and Bijapur (0.02%) (figure 31). Type I diabetes was found to be most prevalent in Janjgir-Champa (0.0015%) and Surguja (0.0009%), and least prevalent in Gariyaband (0.0001%) (figure 32). Sickle cell diseases were found to be the most prevalent diseases among children in Chhattisgarh and are the most common Hemoglobinopathies. Sickle cell disease is most prevalent in Bemetara (0.7%) and Balod (0.514%), and least prevalent in Surguja (0.011%) and Bijapur (0.004%) (figure 33). Substance abuse disorder is found to be most prevalent in Baloda Bazar (0.0018%) and Surguja (0.0006%) and least common in Balod and Gariyaband (0.0001%) (figure 17).

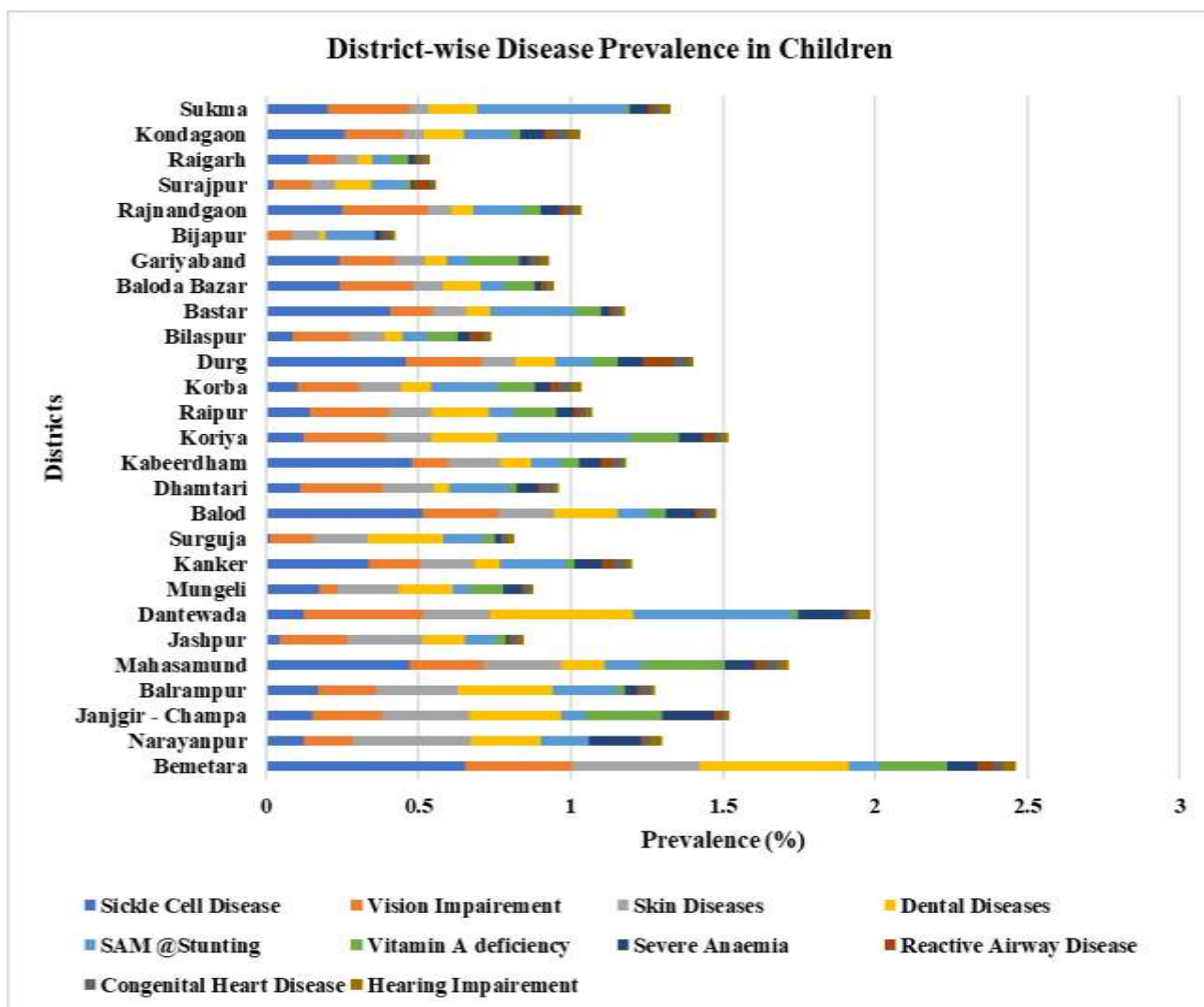


Figure 17: District-Wise comparison of Prevalence of Top 10 NCDs and Nutritional Deficiencies in Children in Chhattisgarh state.

4.1.6 GBD DATA FINDINGS

4.1.6.1 BURDEN OF DISEASES IN CHHATTISGARH

The trend of disease pattern has shown a drastic change in the distribution of communicable, maternal, neonatal, and nutritional deficiencies, non-communicable diseases, and Injuries since 1990. In 1990 the communicable, maternal, neonatal, and nutritional deficiencies (63.01%) were the leading cause of total DALYs followed by non-communicable diseases (28.92%), and injuries (8.07%), while in the year 2017 the leading cause of total DALYs was non-communicable diseases (53.45%), followed by communicable, maternal, neonatal, and nutritional deficiencies (35.04%), and Injuries (11.52%). Hence, it can be concluded that the non-communicable diseases contributed to the largest proportion of total DALYs in Chhattisgarh which is almost double to that observed in 1990. On the other hand, the total DALYs for communicable diseases, maternal, neonatal, and nutritional diseases have reduced to almost half in 2017. As well as there is a mild increase in the total DALYs for Injuries since 1990. Figure 5 presents the increasing trend of both non-communicable diseases and injuries since 1990.

The age-standardized DALYs per 100,000 population due to NCDs in Chhattisgarh has increased from 22762.17 in the year 2007 to 26837.48 per 100,000 population in the year 2017 but the DALY rate for injuries has decreased from 5147,4 per 100,000 in the year 2007 to 4984.3 per 100,000 population in 2017.

Share of the burden of disease from NCDs and injuries, 1990-2017

From the analysis of GBD estimates, it was observed that there was not much difference between the DALY rate of non-communicable diseases, communicable, maternal, neonatal, and nutritional deficiencies, and injuries between India and Chhattisgarh (Figure 19). The non-communicable diseases contribute to the largest proportion of total DALYs in India (55.96%), followed by communicable, maternal, neonatal, and nutritional deficiencies (33.7%) and injuries (10.34%) in 2017. In India, the DALY is slightly higher compared to that of Chhattisgarh for noncommunicable and communicable, maternal, neonatal, and nutritional deficiencies diseases.

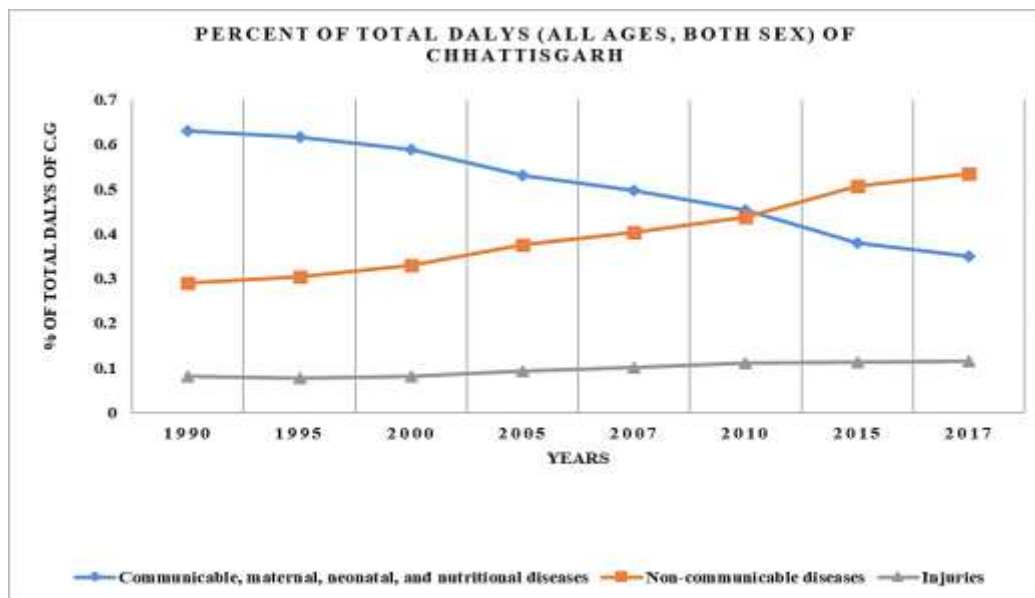


Figure 18: Major causes of burden of diseases (Level 1) in Chhattisgarh (DALY = Disability Adjusted Life Years) (Source: Global Burden of Disease 2017)

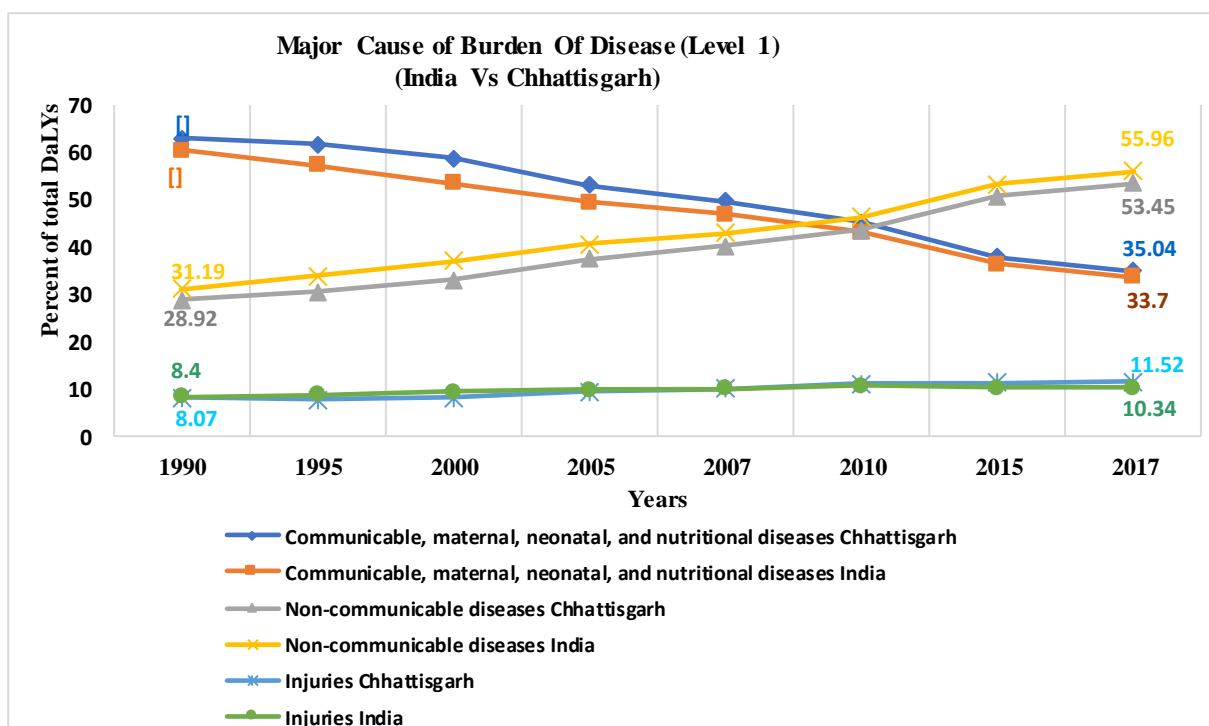


Figure 19: Comparative analysis of major causes of the burden of diseases (Level 1) between Chhattisgarh and India (DALY = Disability Adjusted Life Years) (Source: Global Burden of Disease 2017)

The trend of communicable diseases was found to be decreasing from neonates to elder age groups (<65 years) and again it is slightly increasing as it crosses 65 years. On the other hand, NCD is found to be increasing from teenagers i.e. 13 years to the elder age group (65 years). The percentage of death due to injuries was found to be more in the mid-range age population i.e. from 15-50 years age group and is again exponentially decreasing (Figure 20).

Here also a similar trend in percent of total DALYs by age had been noted for Chhattisgarh. From this analysis, we can say that the population below the age of 14 years shows the highest dominance among the best age group in the burden of communicable, maternal, neonatal, and nutritional diseases. While the population above the 40 years shares more in the burden of non-communicable diseases. In 2017, the total percentage of DALYs due to Noncommunicable diseases under 40 years accounts for around 29.2 %, and for injuries it accounts for around 61% among NCDIs of all age groups.

Major Causes of Burden of Disease by Age

There is a large diversity of disease categories showing the burden of NCDI in Chhattisgarh. The conditions with large proportions of DALYs include cardiovascular diseases (14.85%), neoplasms (5.55%), chronic respiratory diseases (5.29%), Unintentional injuries (5.22%), digestive diseases (4.25%), other non-communicable diseases (4.07%), musculoskeletal disorder (3.88%), diabetes and CKD (3.62%), mental disorder (3.56%), self-harm and interpersonal violence (3.43%), neurological disorders (3.26%), transport injuries (2.86%), sense organ diseases (2.43%), substance abuse (1.37%), and skin diseases (1.32%). The “4x4” conditions (cardiovascular diseases, diabetes, cancer, chronic obstructive lung disease) emphasized global intervention and monitoring by the WHO which account for about 27.91% of the DALYs due to NCDIs in Chhattisgarh (Figure 21).

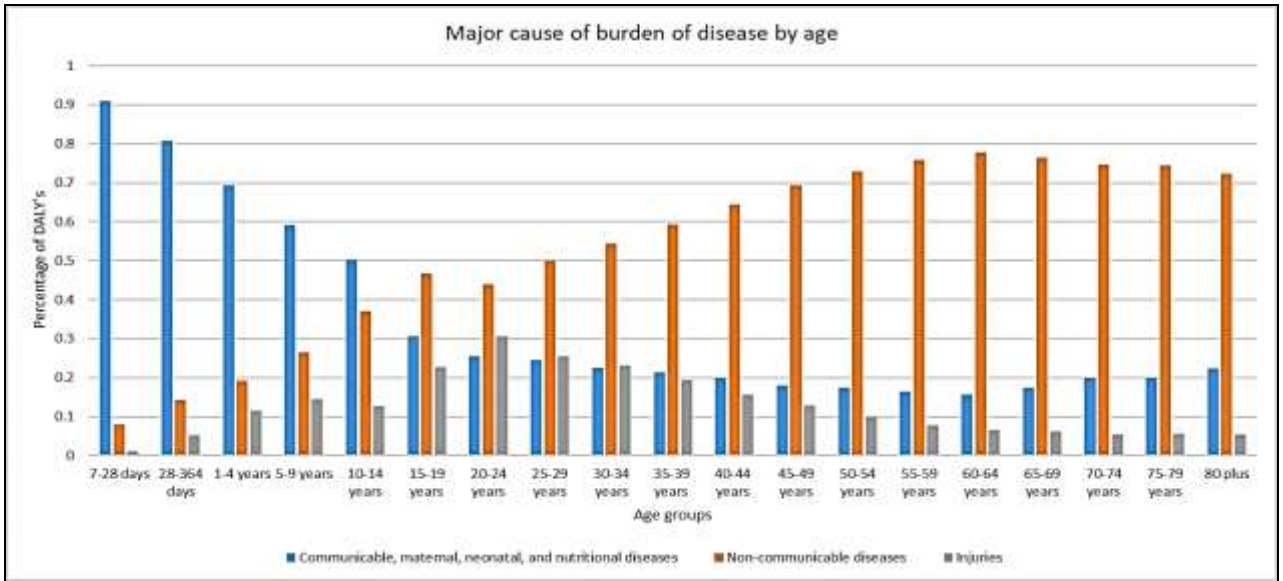


Figure 20: Major causes of DALYs by age, Chhattisgarh. (DALYs= Disability Adjusted Life Years) (Source: Global Burden of Disease, 2017)

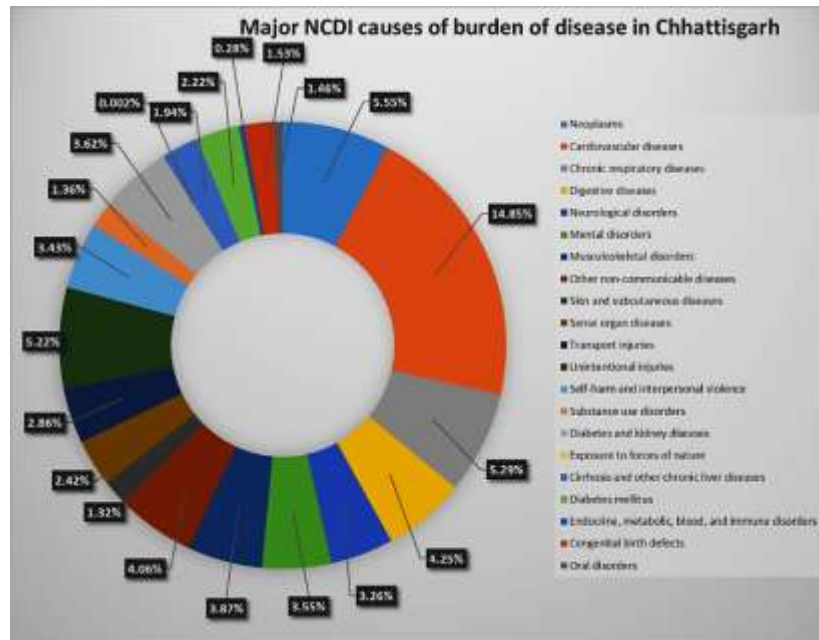


Figure 21: Percent of NCDI DALYs for each disease (Level 2) category in Chhattisgarh (all ages, both sexes, 2017) (Source: Global Burden of Disease, 2017)

A further detailed breakdown of DALY rates in Chhattisgarh shows that there is no single condition which comprises a large proportion of the NCDI disease burden in Chhattisgarh. The major cause of DALYs in Chhattisgarh was due to stroke, ischemic heart diseases, neoplasms, COPD, and diabetes. In contrast with the traditional “4x4” conditions emphasized by the global monitoring framework, the population of Chhattisgarh shows a diversity in the burden of NCDI disease pattern. The diseases other than covered under “4x4” conditions which were common in Chhattisgarh populations are unintentional injuries, self-harm and interpersonal violence, intracerebral hemorrhage, mental disorders, road injuries, Cirrhosis, headache disorders, migraine, other musculoskeletal disorder, congenital anomalies, falls, blindness and vision impairment, chronic kidney diseases, substance use, lower back pain, skin disease, asthma, rheumatic heart disease,

drowning, major depressive disorder, epilepsy, hypertensive heart diseases, and hypertensive kidney diseases. Notably, six of these conditions are related to injuries, such as unintentional injuries, road injuries, falls, self-harm and interpersonal violence, and drowning.

A large variation in non-communicable diseases and injuries has been observed between overall India and Chhattisgarh (Figure 22). The conditions which had shown a more DALY rate in Chhattisgarh compared to India are stroke (2723.85 per 100000 population), neoplasms (2297.02 per 100000 population), unintentional injuries (2163.15 per 100000 population), intracerebral haemorrhage (1514 per 100000 population), self-harm and interpersonal violence (1421.87 per 100000 population), diabetes (919.36 per 100000 population), cirrhosis (803.25 per 100000 population), CKD (579.63 per 100000 population), Substance abuse (566.28 per 100000 population), and RHD (424.23 per 100000 population). While the conditions which had shown a more DALY rate in overall India compared to Chhattisgarh are Ischaemic heart disease (2679.17 per 100000 population), COPD (1789.03 per 100000 population), Mental disorder (1628.71 per 100000 population), congenital anomalies (784.35 per 100000 population), and mental depressive disorder (550.17 per 100000 population).

4.1.6.2 PARADIGM SHIFT OF DISEASE PATTERN

There is a wide change in the disease pattern from the year 1990 to 2017 (figure 23). Former in India, in the year 1990 the top two causes of DALYs were diarrhoeal disease and lower respiratory infection while in the year 2017, the top two causes were ischaemic heart disease and COPD which has upgraded from sixth and eighth place, respectively. In 2017, the third and fourth most common cause of DALYs were diarrhoeal diseases and lower respiratory infection.

Noncommunicable diseases such as unintentional injuries, mental disorders, self-harm, migraine, intracerebral haemorrhage, Diabetes has also gained attention due to its increasing trend from the year 1990 to 2017.

“These changing trends of disease pattern from communicable diseases to non-communicable diseases are due to the impact of lifestyle changes that come with a rapidly industrializing, urbanizing society—from changes in diet and activity levels to more traffic on the roads,” according to the report.

In Chhattisgarh, 60.07% of death is due to non-communicable diseases, 29.22% due to communicable, maternal, neonatal, and nutritional deficiencies, and 10.71% due to injuries in the year 2017, which was 36.75% for non-communicable diseases, 54.42% for communicable, maternal, neonatal, and nutritional deficiencies, and 8.83% for injuries respectively in the year 1990. There is a drastic change in disease patterns from the year 1990 to 2017 in terms of death rate too.

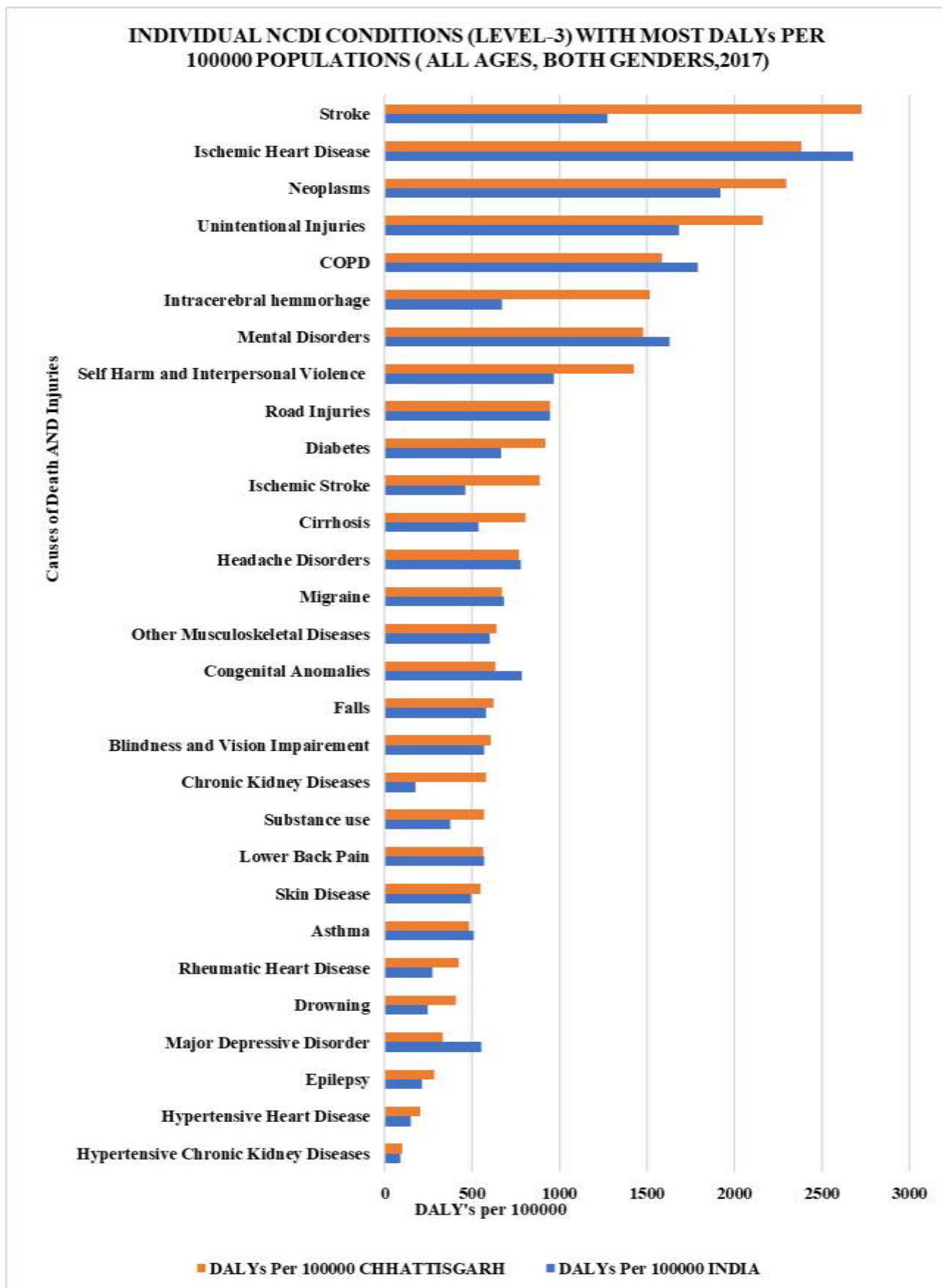


Figure 22: Comparative analysis of individual NCDI conditions (Level 3) with most DALYs per 100,000 populations, between India and Chhattisgarh (all ages, both sexes, 2017) (Source: Global Burden of Disease, 2017)

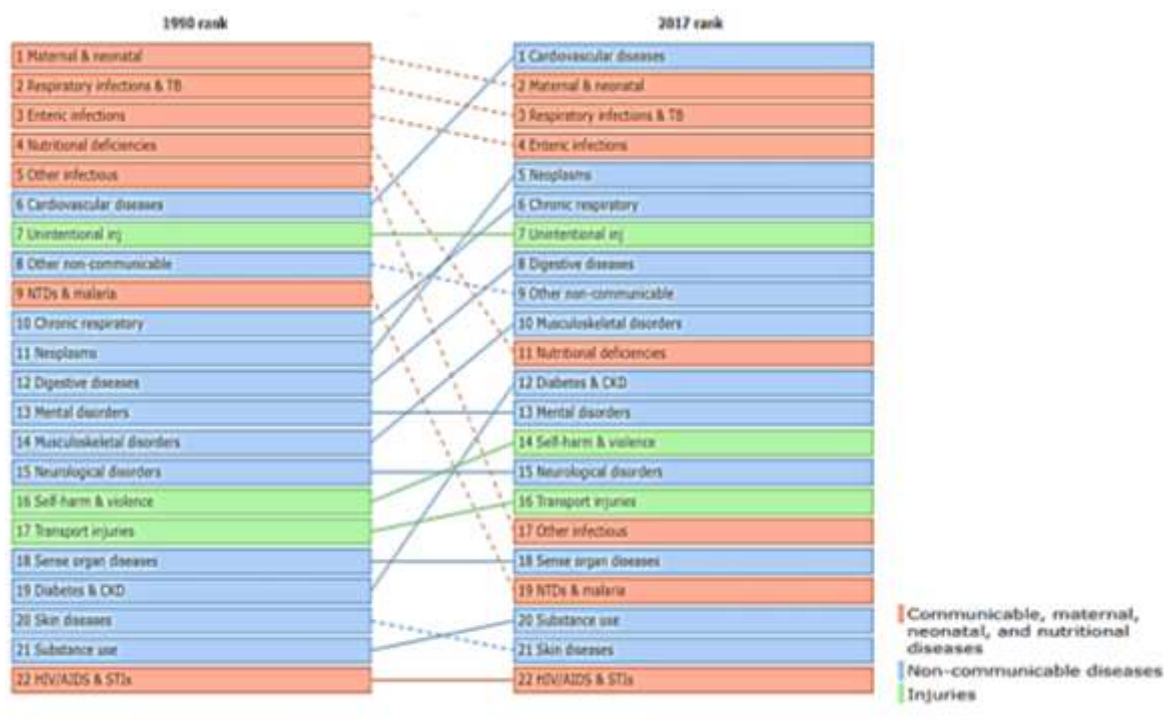


Figure 23: Percent of DALYs for non-communicable diseases, communicable, maternal, neonatal, and nutritional deficiencies, and injuries DALYs for each disease (Level 2) category in Chhattisgarh (all ages, both sexes, 2017) (Source: Global Burden of Disease, 2017)

4.1.6.3 RISK FACTOR PROFILE FOR NCDIS IN CHHATTISGARH

The risk factor leading to the burden of NCDI disease was categorized into two i.e. attributable risk factors and unattributable risk factors. The attributable risk factors are those which are based on GBD defined risk factors and unattributable risk factors are those which are not associated with any given risk factor in the data provided within GBD is a consideration. The total DALYs attributed to NCDIs to various risk factors are based on the GBD.

Attributable risk factors characterized as behavioral (i.e. smoking, a diet low in whole grains, fruits or high in sodium and alcohol intake, tobacco, drug use, low physical activity, child and maternal malnutrition, unsafe sex, childhood maltreatment, and intimate partner violence), metabolic (i.e., high systolic blood pressure, fasting plasma glucose, high LDL cholesterol, body mass index, impaired kidney function, low bone mineral density), and environmental (i.e., household air pollution from solid fuels, ambient particulate matter pollution, and occupational economic factors, etc.).

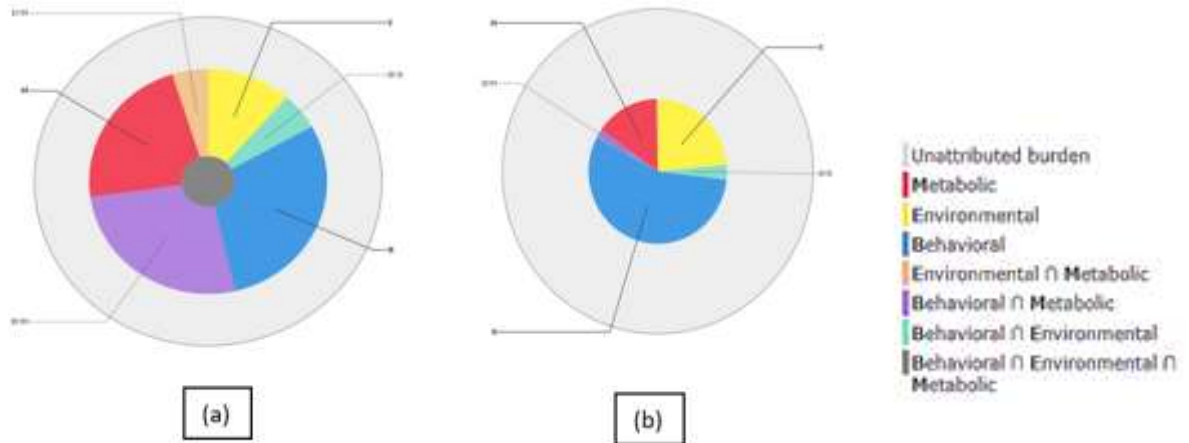


Figure 24: a) Percent of NCD DALYs attributable to risk factor categories within the Global Burden of Disease, 2017, b) Percent of Injuries DALYs attributable to risk factor categories within the Global Burden of Disease, 2017

As displayed in the figure, 26.29% of NCD DALYs could be attributed to behavioral risk factors, and 19.9% could be attributed to metabolic risk factors, and 10.32% to environmental risk factors, followed by 23.64% of behavioral risk factors in union with metabolic risk factors, 4.74% of behavioral risk factors in union with environmental risk factors, 4.37% of environmental risk factors in union with metabolic risk factors, and 10.81% of metabolic risk factors in union with environmental risk factors and behavioral risk factors (Figure 24a).

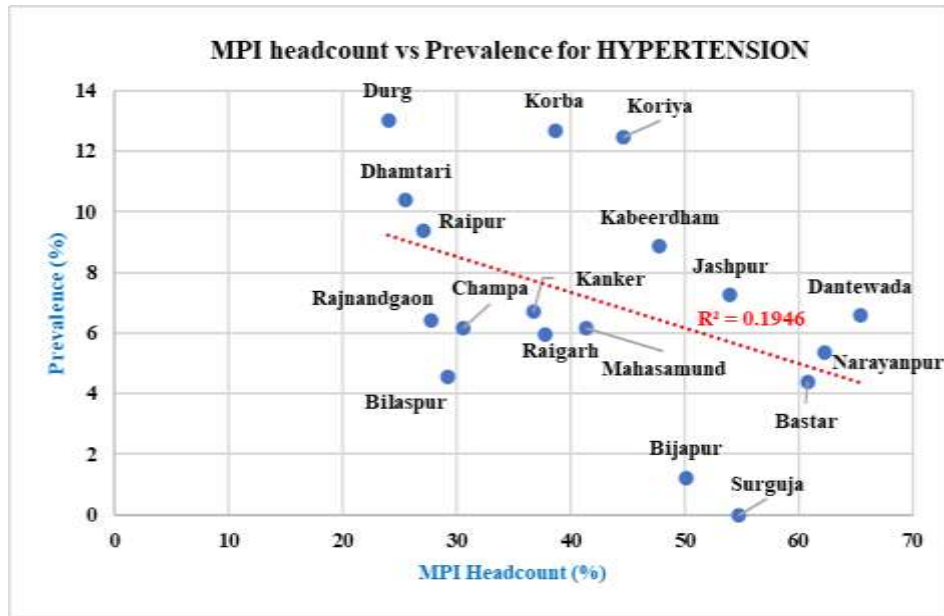
On the other hand, 55.91% of injuries DALYs could be attributed to behavioral risk factors, 23.53% to environmental risk factors and 14.92% could be attributed to metabolic risk factors, followed by 3.31% of environmental risk factors in union with behavioral risk factors, 1.93% of behavioral risk factors in union with metabolic risk factors, and 0.1% of metabolic risk factors in union with environmental risk factors and behavioral risk factors (Figure 24b).

4.2 NCDIS IN RELATION TO POVERTY

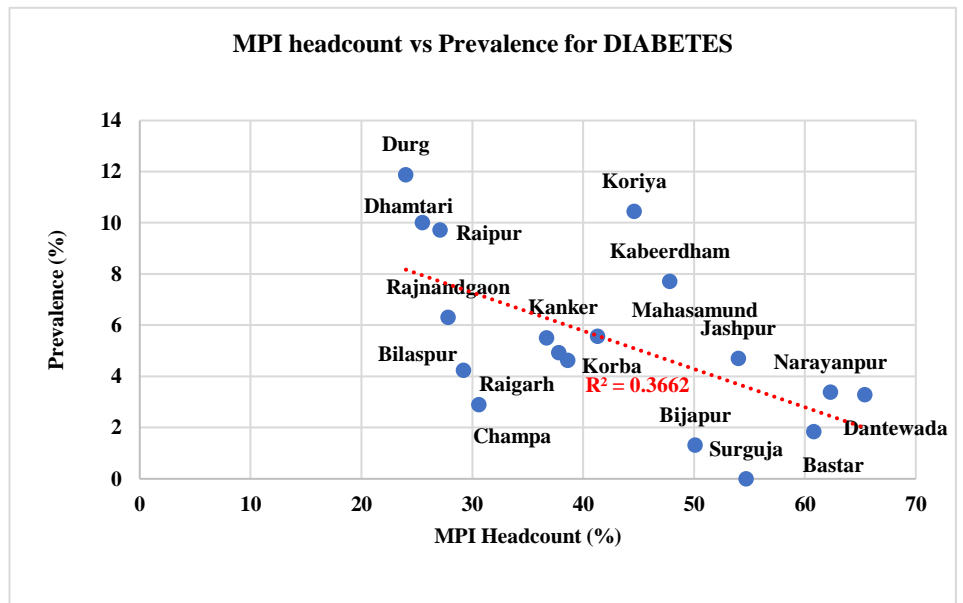
4.2.1 GRAPHS SHOWING MPI vs DISEASE PREVALENCE

The correlation between MPI headcount and prevalence of common NCDIs was evaluated for each district in Chhattisgarh from the HWC data and NCD dataset. Analysis of MPI headcount is carried out to set up a relationship between MPI headcount in the district and the prevalence of the common NCDs in the district, including hypertension, diabetes, oral cancer, cervical cancer, breast cancer, CVDs, stroke, COPD, and CKD and presented in the form of graphs as shown in figure 35. The R^2 indicates the average variation between dependent variables i.e. the prevalence of NCDs and MPI headcount and independent variable i.e. various districts of Chhattisgarh.

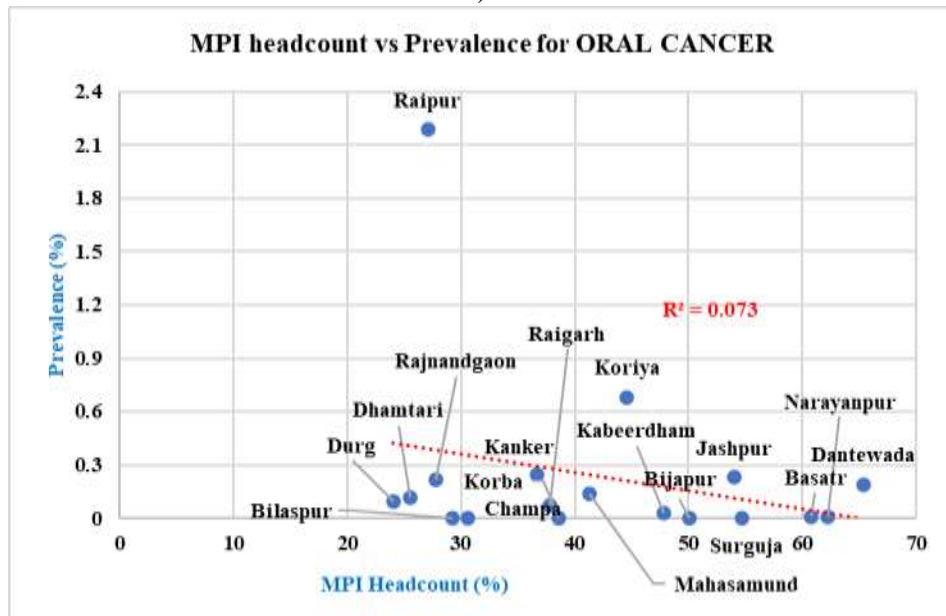
It is observed that there is a significant association (i.e. $R < 0.05$) with the indirect relation between the prevalence of lip and oral cancer, and MPI headcount as well as the direct relation between the prevalence of cervical cancer, and stroke; and MPI headcount were found. On the other hand, there is no significant association (i.e. $R > 0.05$) observed with indirect relation between the prevalence of hypertension, diabetes, and MPI headcount, as well as a direct relation between the prevalence of breast cancer, CVD, COPD, and CKD; and MPI headcount (figure 25).



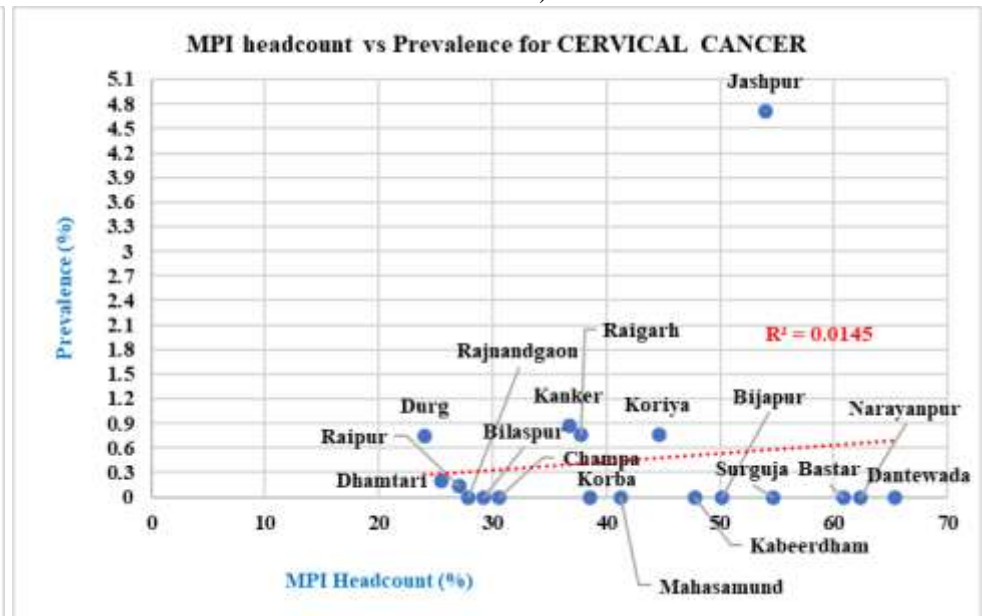
a)



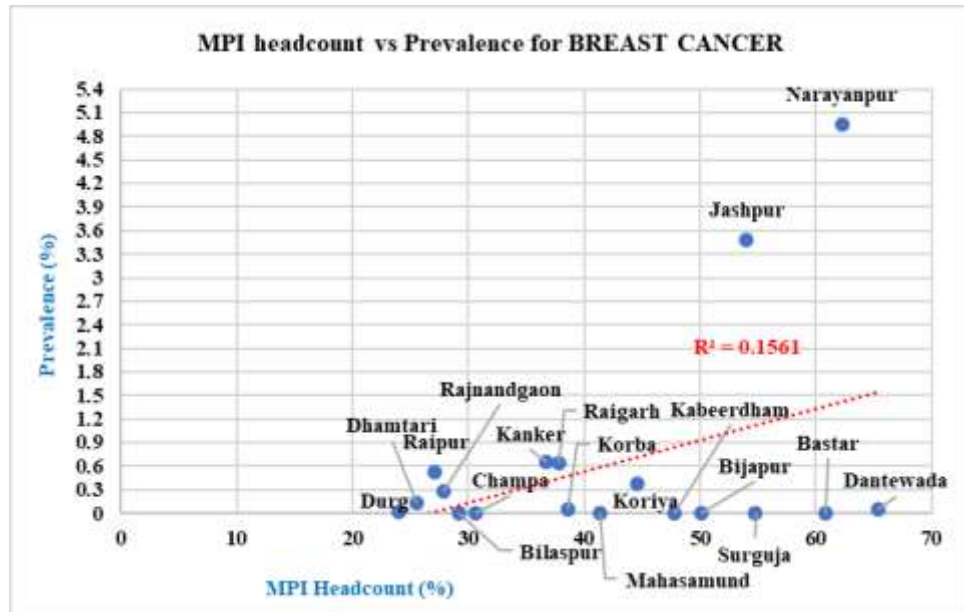
b)



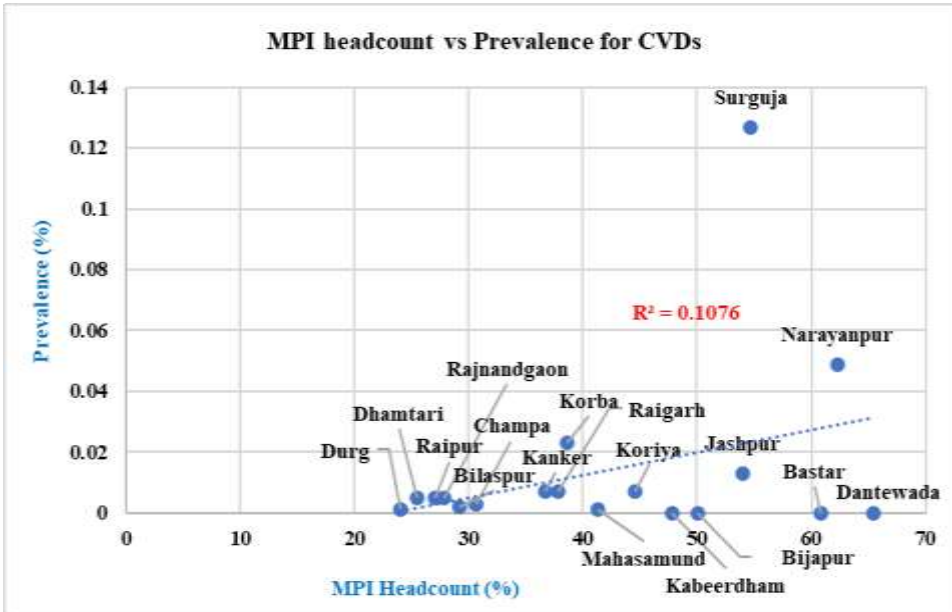
b)



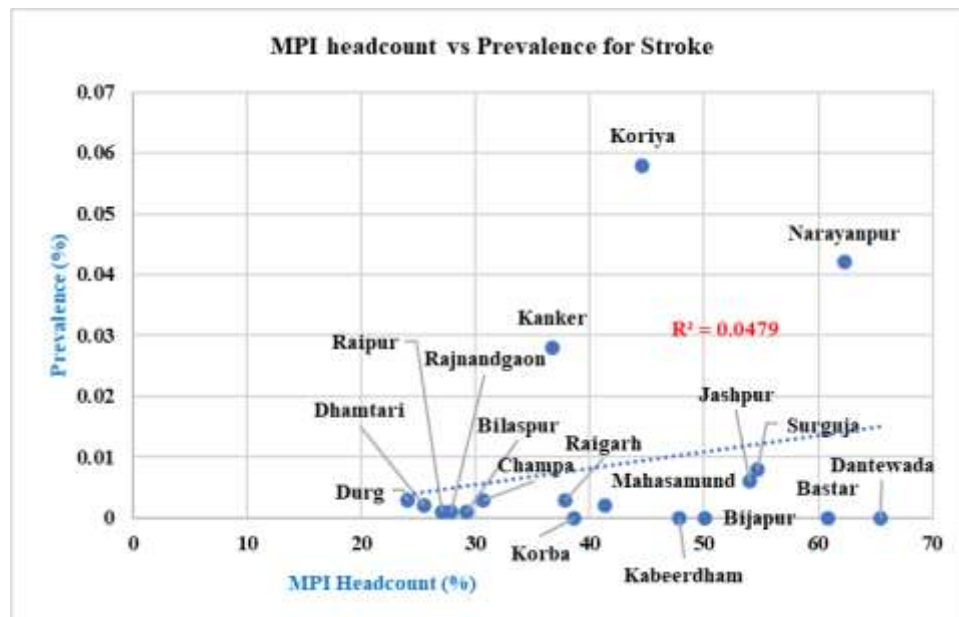
d)



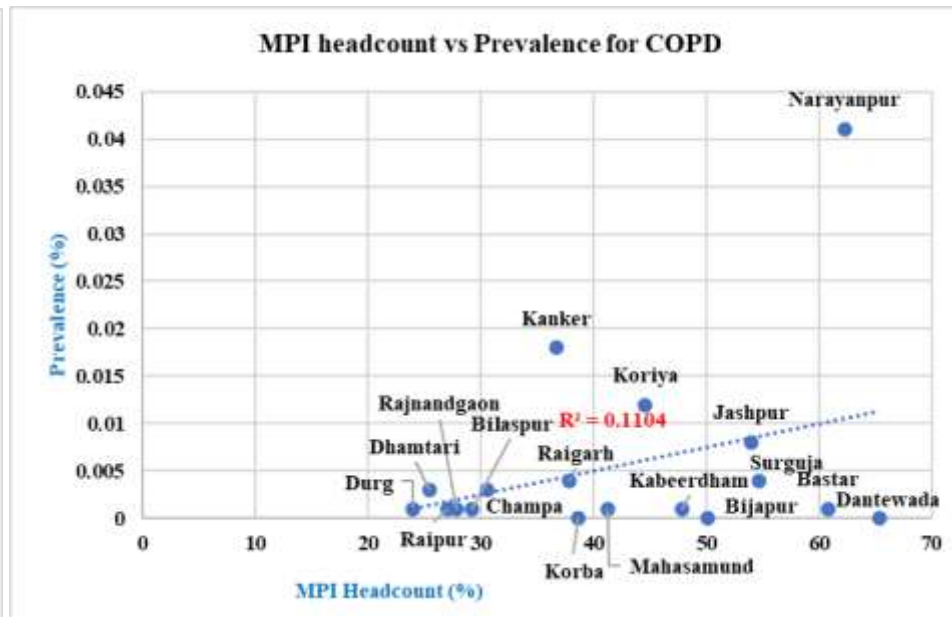
e)



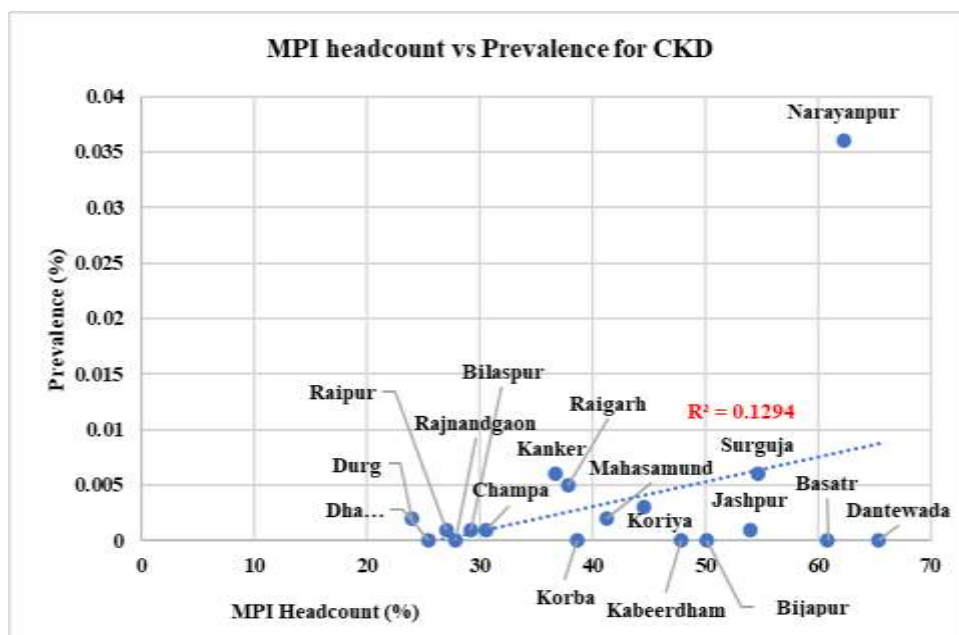
f)



g)



h)



i)

Figure 25: The District-Wise relation between the percentage of MPI Headcount and common NCDs

5. PREVALENCE AND EXPENDITURE ON NCDs IN CHHATTISGARH FROM NATIONAL SAMPLE SURVEY

5.1 HOUSEHOLD PREVALENCE ON NCDs IN CHHATTISGARH

Evidence on the burden of diseases and their risk factors is important to understand the overall epidemiological profile of diseases in a country; as such data could help health care planners and decision-makers in prioritizing health care interventions. Several data sources could be utilized in the assessment of disease burden. There is no universal data set or disease registry is available in Chhattisgarh for measuring or estimating the disease burden. Whereas various data sets are used to estimate the disease burden and its mortality. For this purpose, to measure the burden of non-communicable disease and injuries in Chhattisgarh, data from the National Sample Survey (NSS) 75th round was analyzed. [34]

National Sample Survey (NSS) 75th round was conducted from July 2017 to June 2018 covered the whole of the Indian Union. Chhattisgarh data were separately analyzed to measure the disease burden. In Chhattisgarh, it collected data from 5277 households from rural and urban areas. These households include 28115 persons i.e. 18818 from rural and 9297 from urban areas. It captures the details of each case of hospitalization of any household member during the 365 days before the date of the survey, including expenditure incurred for treatment while in hospital and details of all ailments (due to illnesses or injuries) experienced by household members during the 15 days before the survey.

From the NSS data set prevalence of surveyed NCD and injury conditions as compared to other disease categories was estimated from the ailments experienced in people in 15 days. In Chhattisgarh, 5.07% of the sampled population has some form of ailments in the last 15 days. Of 5.07% ailing persons 3.51% were from Communicable Diseases, 1.41% from Non-

Communicable Diseases (NCD), 0.05% from Injuries, and 0.10% from other diseases (Table 5).

Table 5: Prevalence of Ailment Episodes (%) in the last 15 Days Period

NCDI Disease Classification	Percent With CI
Communicable Disease	3.51 (2.91-4.23)
NCD	1.41 (1.11-1.78)
Injury	0.05 (0.02-0.10)
Others	0.10 (0.02-0.37)

Table 6: Prevalence of Ailment Episodes (%) in the last 15 Days Period as Per NSS Disease Classification

NSS Disease Classification	Percent With CI
Infection	2.52 (2.01-3.14)
Blood Disease	0.07 (0.03-0.18)
Endocrine Nutritional	0.31 (0.19-0.51)
Psychiatric	0.07 (0.03-0.15)
Genitourinary	0.06 (0.02-0.18)
Eye	0.05 (0.01-0.20)
Ear	0.01 (0.01-0.03)
Cardio Vascular	0.03 (0.22-0.61)
Respiratory	0.94 (0.64-1.37)
Gastro-Intestinal	0.11 (0.06-0.22)
Skin	0.11 (0.04-0.31)
Musculo-Skeletal	0.24 (0.13-0.45)
Injuries	0.04 (0.02-0.10)
Others	0.09 (0.02-0.37)

The prevalence of surveyed NCD and injury conditions differ from the rural and urban locations of patients. In urban areas, NCD patients are more than two times of the rural area. (Table 7) Similarly, the prevalence of injury cases in an urban area is more than two times of rural areas. Data shows the urban population has a higher burden of NCDI compare to a rural area. This is a health system equity issue as the rural population has less access to health care services especially NCDIs.

Table 7: Prevalence of NCDI (%) by Place of Living

Place	Communicable Disease	NCD	Injury
Urban	4.2 (2.6-4.1)	2.6 (1.9-3.6)	0.08 (0.02-0.2)
Rural	3.3 (2.6-4.1)	1.1 (0.8-1.5)	0.03 (0.01-0.1)
Overall	3.5 (2.9-4.2)	1.4 (1.1-1.7)	0.04 (0.02-0.1)

Prevalence of NSS reported NCDI conditions were analysed in relation to household expenditure quintile (Table 8) it shows the richest quintile has more NCD cases, as compared

to the poorest quintile. This is also a health system equity issue where the richest population has more access to NCD and specialized health care services as compared to the poorest.

Table 8: Prevalence of NCDI (%) by Household Expenditure Quintiles

Household exp Quintile	Communicable Disease	NCD	Injury
Poorest – 1 st Quintile	3.5 (2.4-5.1)	0.9 (0.4-1.8)	0.01 (0.01-0.03)
2 nd Quintile	3.7 (2.6-5.1)	1.3 (0.8-2.1)	0.09 (0.02-0.3)
3 rd Quintile	3.6 (2.3-4.5)	1.2 (0.6-2.2)	0.06 (0.01-0.28)
4 th Quintile	2.6 (1.7-4.1)	1.6 (0.9-2.7)	0.01 (0.01-0.06)
Richest -5 th Quintile	4.2 (2.1-7.9)	3.4 (2.3-4.9)	0.03 (0.01-0.08)
Overall	3.5 (2.9-4.2)	1.4 (1.1-1.7)	0.04 (0.02-0.1)

The hospitalization rate in the past one year for persons affected by NCDs and injuries (Table 9) shows that a total of 3.48 percent of the sampled population was hospitalized. Of that maximum 1.6% was hospitalized for the reproductive illness, followed by 1.08% for NCDI cases (NCD+Injuries) and 0.79% for communicable diseases.

Table 9: Hospitalization Rates for Different Disease Categories in the Last One Year

NCDI Disease Classification	Proportions (%)	Prevalence per 1000 population
Communicable Disease	0.79 (0.67-0.93)	8
NCD	0.83 (7.1-0.99)	8
Under-Nutrition	0.006 (0.001-0.03)	1
Reproductive Health	1.6 (1.42-1.81)	16
Injury	0.25 (0.19-0.32)	3
Others	0.01 (0.009-0.02)	1

5.2 HOUSEHOLD EXPENDITURE ON NCDIs IN CHHATTISGARH

Household average medical expenditure in Indian net rupees (INR) for (per cases of hospitalization in one year) NCD conditions by place of living shows that in rural areas it is around double of urban areas (Table 10). For injury cases, it is opposite to NCD cases here in urban areas total medical expenditure is double of rural areas.

If we compare the total medical expenditure per case of hospitalization in different disease conditions (Table 18) it is highest for NCD cases followed by injury cases, reproductive health cases, others, and least for communicable disease cases.

It shows that household average total medical expenditure per case hospitalization in one year is highest for NCD conditions (INR 37578) followed by Injury (INR 18492) cases. This indicates the clear demand for free NCDI services as it is very costly and causing impoverishment to people.

Table 10: Mean Out of Pocket Medical Expenditure per Hospitalization Episode in One Year for Different Disease Conditions by Place of Living and Household Expenditure Quintiles

Household Characteristics	Communicable Disease (INR)	NCD (INR)	Reproductive Health (INR)	Injury (INR)	Other (INR)
Place					
Rural	5641 (4436-6846)	44859 (0-91037)	11759 (0-24877)	16269 (8725-23813)	7315 (3489-11141)
Urban	15640 (3975-27306)	23485 (18267-28703)	10974 (8767-13180)	30935 (15854-46015)	15432 (1684-29181)
Household exp Quintile					
Poorest	7515 (4331-7098)	19642 (11592-27692)	3386 (2503-4269)	11814 (7315-16313)	7539 (3733-11344)
Poor	6709 (3934-9484)	19315 (11729-26901)	4094 (2161-6027)	30131 (16033-44229)	15888 (0-38486)
Middle	4110 (2634-5585)	11753 (6512-16994)	85907 (0-207543)	15407 (9583-21232)	4400 (0-10545)
Rich	12063 (6582-17545)	22553 (14090-31015)	13513 (9315-17712)	44102 (14384-73820)	2860
Richest	24275 (5022-43527)	136410 (10974-261845)	13128 (8167-18089)	36375 (2628-70122)	28825 (13810-43841)
Total	7867 (4454-11280)	37578 (6254-68901)	11619 (831-22407)	18492 (12000-24985)	10252 (4388-16115)

Household average Out of pocket expenditure (OOPE) for (per cases of hospitalization in one year) NCD conditions by place of living shows that in rural areas it is 2.3 times more of urban areas (Table 19). For injury cases in urban areas, OOPE is 1.7 times more than rural areas.

Out of pocket expenditure (OOPE) for hospitalization for different disease conditions (Table 11)

Household average out of pocket expenditure for per case hospitalization in one year is highest for NCD conditions (INR 37078) followed by Injury (INR 17957) cases.

Out of pocket expenditure in Indian net rupees (INR) per case in one-year hospitalization was compared for different disease conditions in relation to household expenditure quintile (Table 11). It shows that for NCD cases richest quintile has the highest OOPE per case of hospitalization. The richest have 12.7 times more out of pocket expenditure compare to the poorest quintile. In injury cases out of pocket expenditure (OOPE) was highest in the rich quintile and around two times more as compared to the poorest quintile.

Table 11: Out of Pocket Expenditure (Indian Rupees) Per Hospitalization Episode in One Year for Different Disease Conditions by Place of Living and Household Expenditure Quintile

Household Characteristics	Communicable Disease	NCD	Reproductive Health	Injury	Other
Place					
Rural	4881 (3920-5842)	46278 (0-95630)	9854 (0-20310)	16184 (7873-24495)	6296 (1551-11041)
Urban	15776 (3178-28375)	20220 (15050-25391)	10057 (7967-12147)	27944 (15832-40055)	15796 (1345-30247)
Household exp Quintile					
Poorest	4979 (3813-6146)	19692 (11552-27832)	3167 (2420-3913)	12523 (8203-16842)	6627 (1867-11386)
Poor	5128 (3388-6868)	17359 (9614-25104)	4161 (2398-5925)	32174 (15398-48949)	16157 (0-39623)
Middle	4810 (3342-6279)	9942 (4988-14896)	78371 (0-187077)	7533 (2201-12866)	2827 (0-6418)
Rich	11553 (6260-16846)	22164 (14265 -30064)	9774 (6070-13478)	41066 (13552-68580)	3400
Richest	24926 (3718-46134)	123266 (0-256267)	12558 (8169-16946)	23073 (5559-40587)	30913 (14981-46845)
Total	7185 (3722-10848)	37086 (4113-70058)	9886 (1099-18674)	17957 (10938-24975)	9733 (3266-16200)

For the last hospitalization episode (Table 12), care for different disease conditions shows that for NCD related hospitalization around 40% and injury-related more than 50% sought care from public health facilities. For reproductive health >80% and for communicable diseases >60% seek hospitalization care from public hospitals. One of the important reasons for this is that after the commencement of the National Rural Health Mission (NRHM) a major focus of service delivery in public hospitals was on reproductive child health and to communicable diseases to some extent. Therefore, the coverage of RCH services in public health facilities was high and very little policy attention was on NCDI. NCD is a very recent program in Chhattisgarh with limited services to offer and needs more advocacy and support for strengthening its services and coverage.

Table 12: Share of Last Hospitalization Care for Different Diseases Conditions: Public Vs Private Health Facilities

NCDI Disease Classification	Public	Private
Communicable Disease	63.2 (55.5-70.3)	36.8 (29.6-44.6)
NCD	39.5 (32.1-47.4)	60.5 (52.5-67.9)
Under-Nutrition	95.4 (61.8-99.6)	4.7 (0.3-38.1)
Reproductive Health	83.3 (79.6-86.5)	16.7 (13.5-20.3)
Injury	51.1 (37.7-64.1)	48.9 (35.8-62.2)
Others	45.6 (22.9-70.1)	54.4 (29.8-77.1)

6. SUMMARY OF KEY FINDINGS

Summary of interesting new findings from analysis are as follows:

Overall Burden of NCDI Disease

- After rigorous screening campaigns, the population-based prevalence of common NCDs were high: hypertension (8.5%), diabetes (7.5%), oral Cancer (0.44%), breast Cancer (0.72%), and cervical cancer (0.82%) [HWC data, Fig 10].
- Based on childhood screening, the most prevalent conditions are sickle cell disease (0.22%), vision impairment (0.2%), skin conditions (0.16%), dental conditions (0.15%), severe acute malnutrition on stunting (0.14%), vitamin A deficiency (0.1%), severe anaemia (0.06%), reactive airway disease (0.03%), congenital heart disease (0.03%), hearing impairment (0.021%) [RBSK data, Fig 16-17].
- Modelling data from Global Burden of Disease show:
 - The relative share of DALYs due to NCDs in Chhattisgarh has almost doubled from 28.9% to 53.5% of all DALYs, which is likely due in part to the decline in infectious and RMNCH burden over this time. The share for injuries has remained relative constant, increasing from 8.4% to 10.3%. These trends are very similar to India overall [GBD data, Fig 18-19].
 - 29.2% of NCD DALYs and 61% of injury DALYs occur before the age of 40 [GBD data, Fig 20].
 - There is a large diversity of NCDI conditions in the model. 72.1% of all the NCDI DALYs are not in the major categories of cardiovascular disease, diabetes, cancers, and chronic respiratory conditions [GBD Data, Fig 21].

Socioeconomic Determinants of Burden of NCDI Disease

- The trend of several NCDIs was higher in districts with higher rates of poverty. These conditions were cervical cancer, stroke, breast cancer, CVD, COPD, and CKD. Only cervical cancer and stroke were statistically confirmed relationship with poverty. Conversely, several conditions increased in districts with increasing wealth. These conditions were lip and oral cancer, hypertension, and diabetes. Only lip/oral cancer was statistically confirmed relationship with increasing wealth [HWC data, Fig 25].
- The prevalence rate of NCDs was lower in rural (1.1%) and poorer groups (0.9-1.3%) than in urban (2.6%) and richer (1.6-3.4%) groups [NSS data, Table 8].
- There is variation in NCDIs between Chhattisgarh compared to overall India. The conditions which had shown a more DALY rate in Chhattisgarh compared to India are stroke, neoplasms, unintentional injuries, intracerebral haemorrhage, self-harm and interpersonal violence, diabetes, cirrhosis, chronic kidney disease, substance abuse, and rheumatic heart disease. While the conditions which had shown a more DALY rate in overall India compared to Chhattisgarh are ischaemic heart disease, COPD, mental disorder, congenital anomalies, and mental depressive disorder [GBD data, Fig 22].

Hospitalizations due to NCDIs

- SHRC data showed that for hospitalizations, 32.9% were due to NCDs and 8% due to injuries [SHRC data, Fig 9].
- The prevalence of NCDs (1.4%) was lower than communicable diseases (3.5%) across all demographic groups; however, the proportion of people hospitalized due to NCDs (0.83%) was higher than that for communicable diseases (0.79%). This suggests that NCDs may be less common, but more severe, and more often resulting in hospitalizations or death [NSS data, Table 8-9].
- 60.5% of people with NCDs and 48.9% with injuries chose to visit a private health facility, which was much higher than for communicable diseases (36.8%), nutrition (4.7%), or reproductive health (16.7%) [NSS data, Table 12].
- The average out of pocket expenditure for hospitalization episode for NCDs was 5 times higher than communicable diseases and for injuries was 2.5 times higher than for communicable diseases. The out of pocket expenses for NCDs was double for rural populations compared to urban populations whereas for all other conditions out of pocket expenses were much higher for urban populations than rural populations [NSS data, Table 10-11].

Deaths due to NCDIs

- Community-based reported causes of deaths were 42.9% NCDs and 14.3% injuries (57.2% total deaths from NCDIs). The 7 biggest killers overall were all NCDIs: HTN (18.2% of total deaths), “accidents” (7.3%), stroke (7.1%), digestive disease (4.8%), cancer (4.5%), suicide (3.5%), and diabetes (3.2%) [Mitani data, Fig 4-5].
- Even in individuals younger than 50 years of age, accidents, heart disease, suicide, digestive diseases, and cancers were still the top five causes of death above infectious and RMNCH causes [Mitani data, Fig 4-5].

7. RECOMMENDATIONS

1. **Services for NCDIs must be expanded through government facilities.** This must include efforts at communitization of services in the peripheral health centres, similar to the WHO-PEN package. We must strengthen the capacity of the district hospital and other secondary care services for a diverse set of NCDs prevalent among the local communities, beyond the classically recognised NCDs such as diabetes type 2, hypertension, and ischemic heart disease.
2. **Integration of NCD services is necessary.** Integrated care for NCDs is the way forward for health systems for a diverse set of NCDs, including conditions such as epilepsy, mental health disorders, sickle cell disease, cardiomyopathies and rheumatic heart diseases, chronic lung diseases, asthma, and rheumatoid arthritis, amongst others. We need to be mindful that such integration of care will need to go across the clinical spectrum of making a diagnosis, planning and executing treatment, ensuring cure where possible, following up and offering rehabilitative and palliative care as appropriate for all people. This may require implementation research to determine appropriate integrated care models for NCDs.

3. **Mental health illnesses are a key neglected NCD.** We recommend not only communitising diagnosis and initiating treatment for serious mental disorders, but also ensuring compliance for those who have been started on treatment. Critically, we recommend support services for suicide prevention be set up at the primary health centre level.
4. **Out-of-pocket expenditures for NCDIs must be controlled.** This report again highlights that OOP expenditures for NCDIs continue to be a huge issue in Chhattisgarh, and twice as much in rural areas as in urban areas. Without strengthening the public sector, we cannot make progress in mitigating the impact of NCDs and injuries among the marginalised communities.
5. **Universal health care (UHC) is a pathway to strengthen the NCDI response.** UHC should be aspired for, so that not only we provide free and affordable health care to all people for all illnesses, but also work on the social determinants of health and diseases of NCDIs. The government of Chhattisgarh has committed to working for UHC for its citizens and this effort should be doubly strengthened.
6. **Essential drugs and diagnostics must be availed and provided free of charge.** To achieve this, there is a need for improvement in timely procurement, logistics, and distribution. There is a need for strengthening of government laboratories and defining the minimum essential test to be done at each level. This should be ensured by adequate financial allocation and logistical support of pooled procurement, supply chain management, STG guided prescription and follow-up, and monitoring and evaluation of interventions.
7. **Rational drug usage is necessary at all levels.** This would be supported by Standard treatment guidelines and by continuing education of all cadres of health workers including senior health professionals.
8. **More data on the burden and phenotypes of local NCDIs are necessary.** This includes study of risk factors and conditions which are not self-reported. This will allow better definition of conditions such as “lean diabetes”, which is common manifestation of diabetes in Chhattisgarh, and heart diseases commonly observed among the marginalised populations.
9. **Human resources require strengthening.** In order to achieve NCDI control, there needs to be an increase in human resources as per need and norms, and ensure not only proper training, but also individual mentorship to allow teams to deliver comprehensive primary health care.
10. **There is a need for functional referral systems to ensure the continuum of care.** This continuum will include forward referrals to higher levels of care for diagnostic and therapeutic purpose, but also back referrals to peripherally positioned health staff for them to continue treatment close to the residence of their patients.

11. **Communitization of care for NCDs should include engaging people with NCDs in their own care.** This includes developing and supporting peer support groups for all types of NCDs and developing federations of such NCD peer groups.
12. **Earlier detection and treatment of NCDs is needed.** This will include not only organising people-friendly screening camps at the community level, but also ensuring follow-up visits to physicians and decision-making on the diagnosis and follow-up plans. Merely screening for NCDs with inadequate assurance of follow-up has to be discouraged.
13. **Information technology is a valuable tool to improve NCDI care.** Teleconsultation and tele-prescribing can be valuable aids for continuity of care. Although this is not a replacement for physicians and specialists, it will also optimize more efficient use of human resources.
14. **The budgetary allocation for NCDs has to be rationalised based on the burden on the society.** Whether measured according to morbidity or mortality, the present investment in care and control of NCDIs is less than desired.
15. **Private sector health services will continue to play an important role in NCD care.** Their services should be sourced in by the public system for both diagnostic work up and for treatment where major gaps exist.
16. **Health sector interventions must build on policy and multi-sectoral interventions for NCDI prevention.** Lifestyle initiatives must still be promoted and investment in infrastructure development and (eg. neighborhood parks) and policies (eg., controlling sale of salted snacks, taxation on trans fats) should be also explored proactively.

APPENDIX A: HEALTH SERVICES AVAILABILITY AND FORMULARIES

APPENDIX B: POTENTIAL ROLE OF STAKEHOLDERS

APPENDIX C: DISEASE SPECIFIC LITERATURE REVIEW

REFERENCES

- 1) "Madhya Pradesh Reorganisation Act, 2000" (PDF). Archived from the original (PDF) on 18 July 2013. Retrieved 29 September 2013.
- 2) "Chhattisgarh profile- Know all you want to know about state and "Google Maps". Google Maps. Retrieved 6 December 2015.
- 3) Gandhi, Ankita; et al. (2011). India Human Development Report 2011: Towards Social Inclusion (1st ed.). New Delhi: Institute of Applied Manpower Research, Planning Commission, Govt. of India. ISBN 978-0-19-807758-9. Retrieved 26 October 2015
- 4) Pandey, Kundan (9 February 2018). "NITI Aayog's Health Index: Kerala on top; Rajasthan, Uttar Pradesh among worst performers". Down To Earth. Archived from the original on 10 August 2018. Retrieved 29 September 2018.

- 5) Gupta, S., Singh K. 2016. An Analysis of Changing Rural-Urban Consumption Pattern in India. IOSR Journal of Humanities and Social Science (IOSR-JHSS) Volume 21, Issue 9, Ver. 8 (Sep. 2016) PP 56-71
- 6) Ministry of tribal affairs statistics division, 2013. Government of India Census of India. Statistical profile of scheduled tribes in india 2013. <https://tribal.nic.in/ST/StatisticalProfileofSTs2013.pdf>.
- 7) Reserve Bank of India. 2020. NUMBER AND PERCENTAGE OF POPULATION BELOW POVERTY LINE 2018. Available at: <https://rbidocs.rbi.org.in/rdocs/Publications/PDFs/TABLE%20156A7147403DBEA442AA5BA53528C78BF15.PDF>
- 8) GoI (Government of India). 2016 (Ministry of Statistics and Programme Implementation. National Sample Survey Organisation NSSO).2016. Health in India-NSS 71st Round (January to June 2014).
- 9) Census (2011), Primary Census Abstracts, Registrar General of India, Ministry of Home Affairs, Government of India, Available at: http://www.censusindia.gov.in/2011census/PCA/pca_highlights/pe_data.NHSRC. 2018. National Health Accounts Estimates Report 2015-16. New Delhi. 2018.
- 10) Zodpey S, Farooqui HH. Universal health coverage in India: Progress achieved & the way forward. Indian J Med Res. 2018;147(4):327-329. doi:10.4103/ijmr.IJMR_616_18
- 11) Nandi S, Schneider H, Garg S. Assessing geographical inequity in availability of hospital services under the state-funded universal health insurance scheme in Chhattisgarh state, India, using a composite vulnerability index. Glob Health Action. 2018;11(1):1541220. doi:10.1080/16549716.2018.1541220
- 12) Chhattisgarh Budget Analysis 2019-20: <https://www.prsindia.org/parliamenttrack/budgets/chhattisgarh-budget-analysis-2019-20>
- 13) OPHI (2020). Multidimensional Poverty in Chhattisgarh: A Measure for Action. Oxford Poverty and Human Development Initiative, University of Oxford.
- 14) National Health Policy-2002. Available from: <http://www.mohfw.nic.in>
- 15) 11th five-year plan, Government of India. 2006. Planning Commission, Government of India. New Delhi
- 16) 12th five-year plan, Government of India. 2011. Planning Commission, Government of India. New Delhi
- 17) National Health Policy-2016. Ministry Of Health and Family Welfare. Government of India. Available from: <http://www.mohfw.nic.in>
- 18) Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India. National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke. [http://dghs.gov.in/content/1363_3_National Programme Prevention Control.aspx](http://dghs.gov.in/content/1363_3_National%20Programme%20Prevention%20Control.aspx)
- 19) India State-Level Disease Burden Initiative CVD Collaborators. The changing patterns of cardiovascular diseases and their risk factors in the states of India: the Global Burden of Disease Study 1990–2016. Lancet Glob Health 2018; published online Sept 12. [http://dx.doi.org/10.1016/S2214-109X\(18\)30407-8](http://dx.doi.org/10.1016/S2214-109X(18)30407-8)

- 20) Food Safety and Standards Authority of India, Government of India. Report of the expert group on consumption of fat, sugar & salt and its health effects on Indian population. New Delhi: Food Safety and Standards Authority of India, 2017
- 21) National Health Portal, Centre for Health Informatics, Ministry of Health and Family Welfare, Government of India. Ayushman Bharat Yojana. https://www.nhp.gov.in/ayushman-bharat-yojana_pg
- 22) MoHFW. 2018. Comprehensive Primary Health Care (CPHC) – Operational Guidelines. NHSRC. New Delhi. 2018
- 23) National health mission (NHM) - Manual for district level functionaries: India, 2017:14
- 24) National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases & Stroke (NPCDCS): operational guideline: Directorate General of Health Services Ministry of Health & Family welfare Government of India: 11
- 25) National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke: Training Module for Medical Officers for Prevention, Control and Population Level Screening of Hypertension, Diabetes and Common Cancer (Oral, Breast & Cervical):2017: 4.
- 26) Chhattisgarh list of essential medicines. Department of health & family welfare: Government of Chhattisgarh:2019
- 27) National multisectoral action plan for prevention and control of non-communicable diseases: Ministry of health and family welfare Gov of india:2017-2022: 37-46.
- 28) India: Health of the Nation's States the India State-Level Disease Burden Initiative.2017. Department of Health Research, Ministry of Health and Family Welfare.
- 29) Health & Wellness Centers (HWC): [Login | Ayushman Bharat - Health and Wellness Centre](#)
- 30) Rashtriya Bal Swasthya Karyakram (RBSK): <https://dkbssy.cg.nic.in/rbsk/>
- 31) Global Burden of Disease (GBD): <https://vizhub.healthdata.org/gbd-compare/india>
- 32) World health organization. Global status report on noncommunicable diseases 2014. Geneva, Switzerland: World health organization; 2014.
- 33) State Health Resource Centre (SHRC). <https://shsrc.org/>
- 34) National Statistics Office, Ministry of Statistics and Programme Implementation, Government of India. Key Indicators of Social Consumption in India: Health. National Sample Survey 75th Round July 2017-June 2018. November 2019.