

Analysis of Cost of Treatment Opted for Diabetes and Hypertension During COVID-19

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Running Title: "Analysis of Cost of Treatment Opted for DM & HTN Patients during COVID-19 Pandemic."

Abstract: Background: Health sector budget of Himachal Pradesh is ₹ 3, 139 crore as compare to the union budget ₹ 89, 155, for the financial year 2023-24 whereas combined expenditure on health sector is 1.18%. India is lagging far behind to reach target of expenditure of health budget. ₹ 14, 217 crore was spent for COVID-19 emergency response and health system preparedness package and COVID-19 vaccination for healthcare and frontline workers. 18% of total outpatient care and 44% of total inpatient care is encompassed in Indian public health sector. In India, 85% of the services are being paid out of the pocket and about 20% of the patients in the OPD nationwide, prefer go to the private hospitals despite higher out of pocket payments. 67.0% of the healthcare spending of Indians is on medicine alone whereas 33.0% is for other services payments. Public expenditure on healthcare in India, stood at 2.1% of GDP in 2021-22 against 1.8% in 2020-21 and 1.3% in 2019-20. High health and medical expenditure has heavy economic burden on government which required a way to restrain its growth. India have highest proportions of household out-of-pocket expenditures on health in the world which is about 71.1%. Inter-state variations, a greater proportion of health expenditure in urban with 29.2% as compare to rural 11.8%. public expenditures allocated to allopathic services. Government is providing the medication for diabetic and hypertension patients free of cost but many of these patients have to purchase the other medicines which are required from the market for their own pocket. This study is regarding the actual expenditure paid and the government price and market price, for the treatment of these diseases during COVID-19 pandemic. Objective: Analysis of cost of treatment opted by the diabetic and hypertension patients during COVID-19. Material and Method: A cross-sectional descriptive study is conducted at various institutional levels and by visiting randomly in different selected areas with help of well-developed questionnaire. The research work is conducted by collecting the data of diabetic and hypertension patients with their cost of treatment during COVID-19 in the years 2020, 2021, 2022 and 2023. Sample size is between 947 participants and total investigations done, are 5498. Results: Total persons investigated are 5498, normal persons are 4551 (82.78%), diseased persons with diabetes, hypertension and diabetes with hypertension are 947 (17.22%), from these diseased 579 are HTN, 213 are DM and 155 are HTN with DM II. Total government price for purchase of allopathic medicines for the calendar years 2020-23 for 947 patients of DM and HTN patients is ₹1899125/-, market price is ₹17184358/-whereas actual expenditure is ₹5889198/-. The government cost for traditional medicines for these patients, is ₹268448/-, market price is ₹596737/-whereas actual expenditure is ₹596737/-. The total actual expenditure is ₹6485935/- Conclusion: Healthcare is India's large sectors. The union budget allocated for financial year 2023-24 is ₹ 89, 155 crore which is about 13% over ₹ 79, 145 crores allocated in 2022-23. Total actual expenditure for four years 2020-23, of 947 patients of hypertension, diabetes and hypertension with diabetes, is ₹ 6485935/-for the purchase of medicines by the patients and in procurement by the government to be provided free of cost to the patients. For the year 2020 it is ₹1549428, for the year 2021 it is ₹1590778, in year 2022 it is ₹1638764 and in year 2023, it is ₹1706965. Out of total 5498 persons investigated, normal persons are 4551, whereas diseased persons with diabetes, hypertension and diabetes with hypertension are 947, from these diseased 579 are HTN, 213 are DM and 155 are HTN with DM II. The average cost of treatment for the patients taken for sample is 1405475, 1441757, 1487870, 1554096 and for population of Himachal Pradesh is 64650366, 70012755, 77348815, 84984599, respectively for 2020 to 2023 calendar years.

Keywords: Healthcare budget, GDP, hypertension and diabetes, out-of-pocket expenditure

1. Introduction

The health sector union budget for the financial year 2023-24 was allocated ₹ 89, 155 crore, with increase of approximately 13% over ₹ 79, 145 crore of 2022-23.1 In Himachal Pradesh for financial year 2019-20 has allocated 6.4% of its total expenditure on health, for 2020-21, it is 6.6%, for 2021-22, it is 6.7% and for 2022-23 it is 6.6%. The healthcare budget for health and family welfare department of Himachal Pradesh for financial year 2017-18 is ₹ 2006 crores, for 2018-19 is ₹ 2557 crores, revised estimate for 2018-19 is ₹ 2644 crores, for 2019-20 is ₹2751 cores, for 2020-21 is ₹ 2497 crores, for 2021-22 is ₹ 2976 crore and revised budget ₹ 3185 crore and for 2022-23 is ₹ 3032 crore whereas for 2023-24 is proposed ₹ 3139 crore.2 The combined expenditure on health sector is 1.18% of GDP whereas economic survey shows it as 2.1% of GDP in 2022-

23, 2.2% in 202-22, 1.6% in 2020-21.3 India is lagging far behind to reach this target of expenditure of health budget.4 The healthcare budget has increased for last 16 years. ₹ 14, 217 crore was spent for COVID-19 emergency response and health system preparedness package and COVID-19 vaccination for healthcare and frontline workers.5 CARE Ratings expect annual rate of ~11% over the next two years to reach more than US\$ 60 billion in value for health sector⁶ India's drugs and pharmaceuticals exports stood 12th position at US\$ 24.44 billion in FY21 and export drugs to more than 200 countries in the world. Medical Device industry is expected to reach US\$ 50 billion by 2030 growing at a CAGR of 15%.7 Cumulative Foreign Direct Investment [FDI] equity inflow into drug and pharmaceuticals industry in India from 2000 to December 2022 was US\$ 22 billion which is projected to US\$ 130 billion by December 2030⁸ FDI is reached US\$ 1414 million

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in financial year 2021-22 in drugs and pharmaceutical sector.⁹ FDI equity inflows received by Hospitals and Diagnostic centres have been increasing positively.¹⁰ Diabetes and hypertension have been identified as risk factors and prognostic for severe COVID-19.¹¹ High inflation of 12%, annually is projected to rise on healthcare.¹² COVID-19 mortality in comorbidities like diabetes and hypertension, in Himachal Pradesh were more than 85%¹³ whereas mortality risk from COVID-19 was up to 50% higher in diabetic and hypertension patients as compare to others.¹⁴ 18% of total outpatient care and 44% of total inpatient care is encompassed in Indian public health sector. In India, 85% of the services are being paid out of the pocket and about 20% of the patients in the OPD nationwide, prefer go to the private hospitals despite higher out of pocket payments.¹⁵ India has developed National Programme for Prevention and control of diabetes, Cardiovascular Diseases and Stroke, to carefully tackle the chronic disorder burden.¹⁶ People suffer and die and other suffer due to debts, selling assets and so forth as they have to pay catastrophic costs for their healthcare services.¹⁷ Non-Conventional treatments are common for diabetes and hypertension due to the reason that the conventional treatment are more expensive comparatively and the costs of healthcare and prescription drugs rapidly increase each year.¹⁸ Several alternative systems of medicines like Ayurveda, Sidha, Unani, Homeopathy, Panchkarma, Massage Therapy and Naturopathy, are used in India for diabetes and hypertension.¹⁹ These systems of medicine are used in many countries and their prevalence is ranged from 9.8% to 76%.²⁰ About 80% of the world populations of developing countries rely on this non-conventional system of medicine.²¹ Over 1000 of years rasayana are used as most of the traditional medicines in India.²² From 21, 000 medicinal plants, 150 species are used on large scale in India.²³ The normal blood pressure should be 120/80 mmHg in adult but it should be in the range of 110-130 mmHg Systolic and 70-90 mmHg diastolic.²⁴ As compare to the global prevalence increase of diabetes from 4% in 1995 to 5.4% by the year 2025, in India approximately 33 million adults of diabetes will increase to 57.2 million by the year 2025.²⁵ Diabetes is increasing in low and middle income countries which is approximately 422 million adults worldwide and 592 million by 2035.²⁶ During COVID-19 lockdown and after lockdown, the diabetic and hypertension patients used conventional as well non-conventional treatments. Non-conventional system is used much more in rural areas.²⁷ 67.0% of the healthcare spending of Indians is on medicine alone whereas 33.0% is for other services payments.²⁸ There are large financial differences in capital structure position of pharmaceutical firms.²⁹ Therefore the cost of medicines in pharmaceutical market, corporate uses of capital must be benchmarked against these capital market alternatives³⁰⁻³². Public expenditure on healthcare in India, stood at 2.1% of GDP in 2021-22 against 1.8% in 2020-21 and 1.3% in 2019-20.³³ High health and medical expenditure has heavy economic burden on government which required a way to restrain its growth.³⁴ Indian Healthcare sector is contributing 6% to the GDP of the country and becoming fast-growing service sector.³⁵ Health economists have documented a problem with supplier induced demand, whereby providers base treatment recommendations on economic, rather than medical criteria.³⁶ India have highest proportions of

household out-of-pocket expenditures on health in the world which is about 71.1%. Inter-state variations, a greater proportion of health expenditure in urban with 29.2% as compare to rural 11.8%. public expenditures allocated to allopathic services.³⁷ The global diabetes prevalence in 2019 is estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and 10.9% (700 million) by 2045. The prevalence is higher in urban (10.8%) than rural (7.2%) areas, and in high-income (10.4%) than low-income countries (4.0%).³⁸ Diabetes affects approximately 422 million adults worldwide and 592 million people by 2035.³⁹ Diabetes causes substantial economic burden for individuals, households and health systems, in addition to morbidity and mortality.⁴⁰ As per International Diabetes Federation, India has 73 million diabetic patients, the second-largest in the world which is expected to double by 2045 which encompasses a massive economic burden.⁴¹ Non-conventional medicine system was in prevalence is ranged from 9.8% to 76% during COVID-19.^{42, 43} Non-conventional healthcare may be grouped within five major domains like mind body interventions, biologically-based treatments, alternative medical systems, manipulative and body-based methods and energy therapies.⁴⁴ Normal people and diabetic and hypertension patients among the rural population of Himachal Pradesh in COVID-19 outbreak. COVID-19 vary in mortality and morbidity rates.^{45, 46} IDSP analysis of India, shows comorbidities deaths with COVID-19, are more than 57% whereas less than 43% are normal deaths whereas comorbidity deaths in Himachal Pradesh are more than 85%.⁴⁷ Serious threats mortality and morbidity of older adults with diabetic and hypertension with viral infections of COVID-19 is increased much more.⁴⁸ Non-conventional therapies like dietary supplements, yoga, acupuncture, hydrotherapies and many traditional medicines derived from plants, minerals and organic matters which are scientifically validated, are beneficial for diabetes and hypertension.⁴⁹⁻⁵²

Research Objectives:

Analysis of cost of treatment opted by the diabetic and hypertension patients during COVID-19.

2. Material and Method

A cross-sectional descriptive study is conducted at various institutional levels and by visiting randomly in different selected areas with help of well-developed questionnaire. The research work is conducted by collecting the data of diabetic and hypertension patients with their cost of treatment during COVID-19 in the years 2020, 2021, 2022 and 2023. Sample size is between 947 participants and total investigations done, are 5498.

3. Results

Total persons investigated are 5498, normal persons are 4551 (82.78%), diseased persons with diabetes, hypertension and diabetes with hypertension are 947 (17.22%), from these diseased 579 are HTN, 213 are DM and 155 are HTN with DM II. Total government price for purchase of allopathic medicines for the calendar years 2020-23 for 947 patients of DM and HTN patients is ₹1899125/-, market price is ₹17184358/-whereas actual expenditure is ₹5889198/-. The government cost for traditional medicines for these patients,

is ₹268448/-, market price is ₹596737/-whereas actual ₹6485935/- expenditure is ₹596737/-. The total actual expenditure is

Table 1: Diabetic, Hypertension and Diabetic with Hypertension patients During COVID-19

S. N.	Total Persons Investigated	Normal Persons	Diseased	HTN	DM	HTN with DM II
1.	5498	4551	947	579	213	155
2.	Percentages	82.78%	17.22%	10.53%	3.87%	2.82%

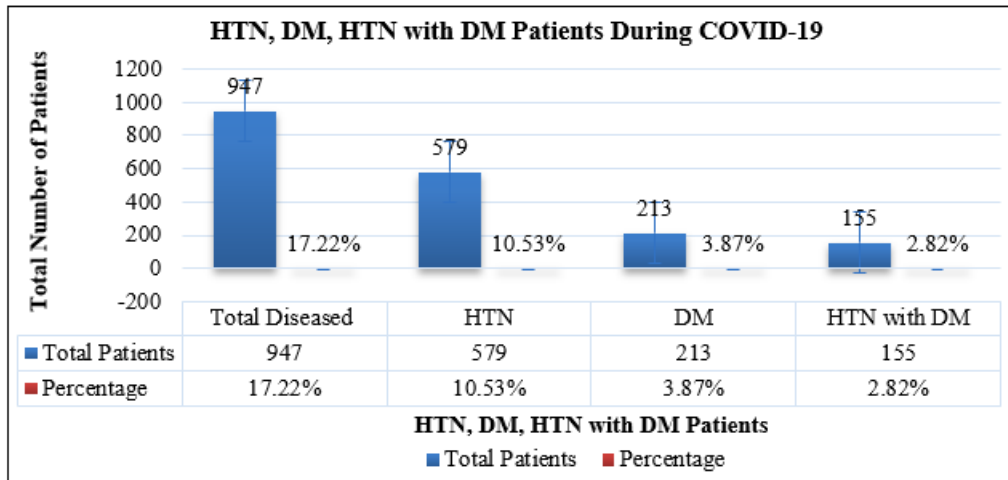


Figure 1

DM II: Diabetic mellitus type II
HTN: Hypertension.

Table 2: Comparison of Cost of the Treatment during COVID-19:

S. No	Particulars of Treatment System Used	Total Cost Utilised during COVID-19 in ₹ (Rs) (Calendar Years Wise)					Total
		2020 (Jan. to Dec.)	2021 (Jan. to Dec.)	2022 (Jan. to Dec.)	2023 (Jan. to Dec.)		
i)	Modern Allopathic medicines/ Conventional System	GP	451563	464783	489036	493743	1899125
		MP	4251920	4280104	4308380	4343954	17184358
		AE	1405475	1441757	1487870	1554096	5889198
ii)	Traditional Medicines (TM) / Non – Conventional System	GP	63578	65614	68911	70345	268448
		MP	143953	148921	150894	152969	596737
		AE	143953	148921	150894	152969	596737
Total Actual Cost			1549428	1590778	1638764	1706965	6485935

GP = Government Price
MP = Market Price
AE = Actual Expenditure

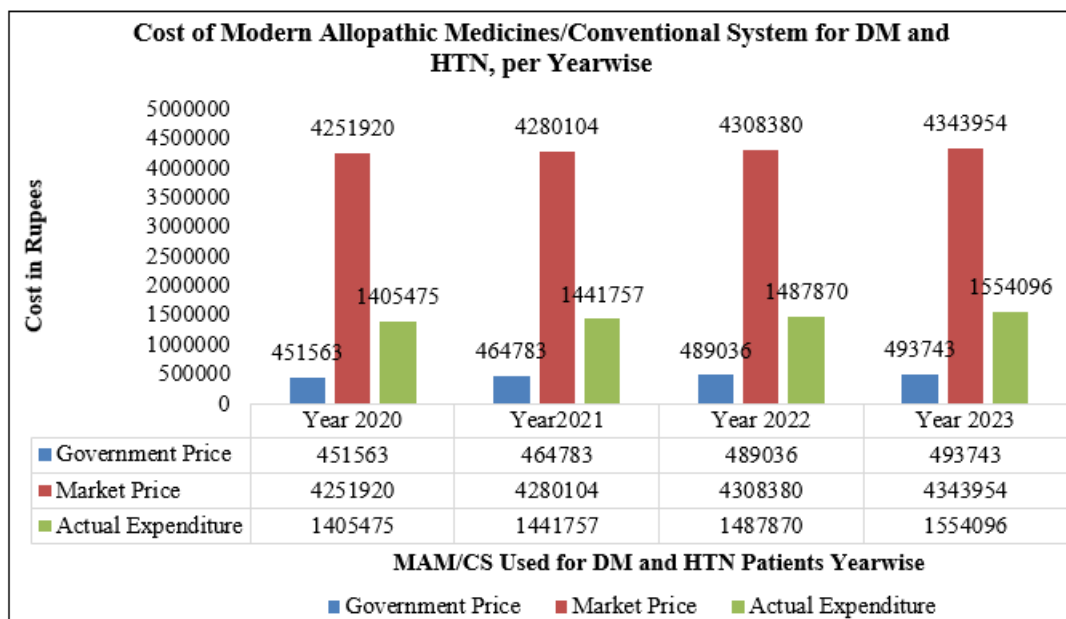


Figure 2

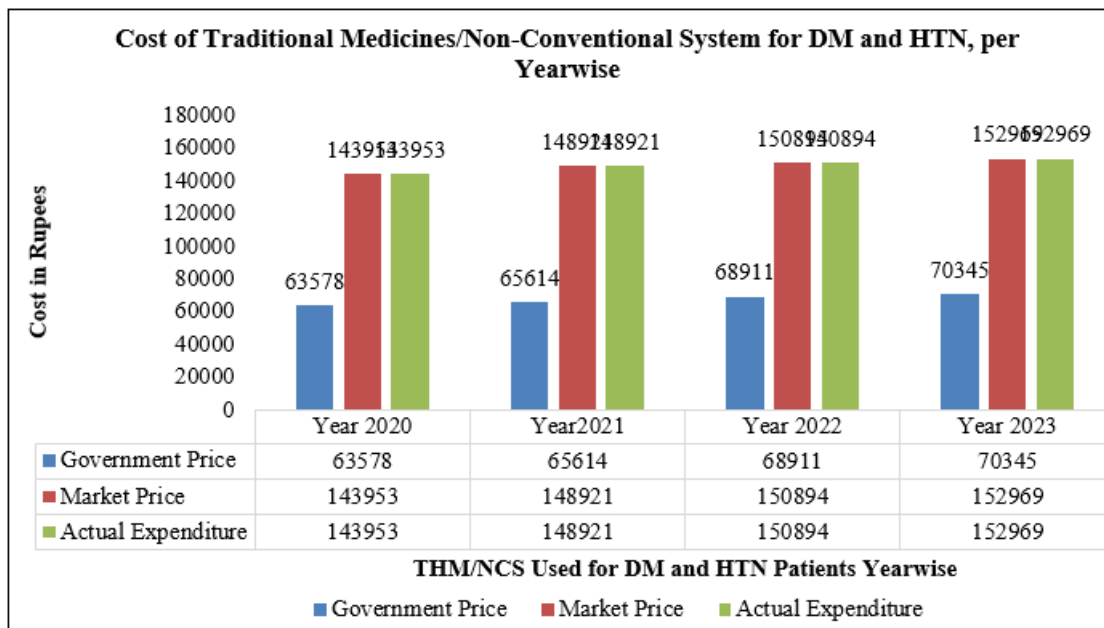


Figure 3

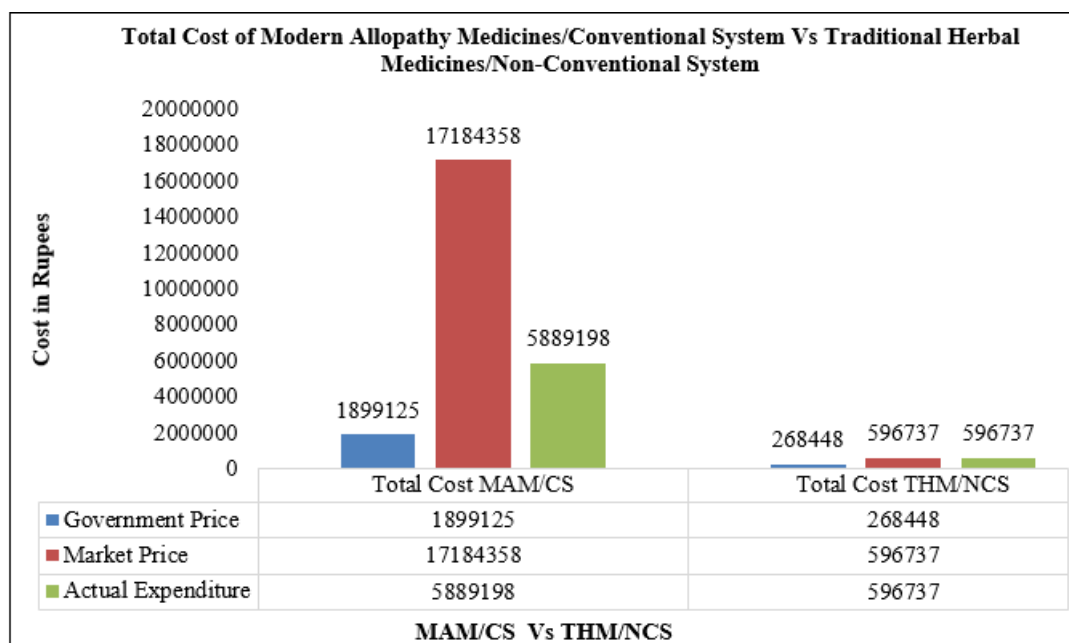


Figure 4

MAM = Modern Allopathic Medicines
 CS = Conventional System
 THM = Traditional Herbal Medicines
 NCS = Non-Conventional System

Table 3: Comparison of Total Cost for DM and HTN Patients’ to Total Health Budget of Himachal Pradesh:

S. No.	Year (w. e. f.01-01 Jan. to 31 Dec.)	Patients of DM, HTN and HTN with DM		Average Cost of Treatment		Total Average Population Covered	
		Sample Size of Patients	Total Patients in HP	For Sample Size Patients	For Total Patients in HP	For Sample Size Patients	For Total Patients in HP
1.	2020	947	43561	1405475	64650366	29858	3465743
2.	2021	947	45987	1441757	70012755	30155	3787895
3.	2022	947	49231	1487870	77348815	32456	4056742
4.	2023	947	51786	1554096	84984599	35876	4687156

DM – Diabetic Mellitus
 HTN – Hypertension
 HP-Himachal Pradesh

4. Discussions

Total persons investigated are 5498, out of these investigations, normal persons are 4551 (82.78%) and diseased persons with diabetes, hypertension and diabetes with hypertension (DM, HTN and DM with HTN) are 947 (17.22%). from these diseased 579 (10.53% of total investigations) are HTN, 213 (3.87% of total investigations) are DM and 155 (2.82% of total investigations) are HTN with DM II [Table-1 & Figure-1]. In calendar year 2020, for modern allopathic medicines or conventional healthcare system government price [GP] is ₹451563/-, market price [MP] is ₹4251920 and actual expenditure [AE] is ₹1405475/-whereas for traditional medicines or non-conventional healthcare system GP is ₹63578/-, MP is ₹143953/-and AE is ₹143953/-. In year 2021, for modern allopathic medicines, GP is ₹464783/-, MP is ₹4280104/-and AE is ₹1441757/-whereas for traditional medicines, GP is ₹65614/-, MP and AE is ₹148921/-. In year 2022, for allopathic medicines, GP is ₹489036/-, MP is ₹4280104/-and AE is ₹1487870/-whereas for traditional medicines, GP is ₹68911/-, MP and AE are ₹150894/-. In year 2023, for allopathic medicines, GP is ₹493743/-, MP is ₹4343954/-and AE is ₹1554096/-whereas for traditional medicines, GP is ₹70345, MP and AE is ₹152969/-. Total GP for four years is ₹1899125/-, MP is ₹17184358/-, AE is ₹5889198/-. Total traditional medicines cost of four years, GP is ₹268448/-, MP and AE are ₹596737/-whereas total allopathic and traditional medicines AE, for 2020, is ₹1549428/-, for 2021, is ₹1590778/-, for 2022, is ₹1638764/-and for 2023, is ₹1706965/-whereas total AE for both these healthcare systems is ₹6485935/-[Table-2 and Figure-2, 3, 4].

In the calendar years 2020 to 23, sample size is 947, whereas total patients in Himachal Pradesh are 43561, 45987, 49231, 51786, respectively in the years 2020 to 2023. The average cost of treatment for the patients taken for sample is 1405475, 1441757, 1487870, 1554096 and for population of Himachal Pradesh is 64650366, 70012755, 77348815, 84984599, respectively for 2020 to 2023 calendar years. Total average population covered for sample size is 29858, 30155, 32456, 35876, respectively whereas for Himachal Pradesh is 3465743, 3787895, 4056742, 4687156 respectively for the years 2020 to 2023. [Table 3]

5. Conclusions

Healthcare is India's large sectors. The union budget allocated for financial year 2023-24 is ₹ 89, 155 crore which is about 13% over ₹79, 145 crore allocated in 2022-23. Total actual expenditure for four years 2020-23, of 947 patients of hypertension, diabetes and hypertension with diabetes, is ₹6485935/-for the purchase of medicines by the patients and in procurement by the government to be provided free of cost to the patients. For the year 2020 it is ₹1549428, for the year 2021 it is ₹1590778, in year 2022 it is ₹1638764 and in year 2023, it is ₹1706965. Out of total 5498 persons investigated, normal persons are 4551, whereas diseased persons with diabetes, hypertension and diabetes with hypertension are 947, from these diseased 579 are HTN, 213 are DM and 155 are HTN with DM II. The average cost of treatment for the patients taken for sample is 1405475, 1441757, 1487870, 1554096 and for population of Himachal

Pradesh is 64650366, 70012755, 77348815, 84984599, respectively for 2020 to 2023 calendar years.

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Conflict of Interest

No

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