



### RESEARCH ARTICLE

## COMPARATIVE ANALYSIS OF APPROPRIATE AND COST EFFECTIVE SYSTEM OF TREATMENT FOR DIABETES AND HYPERTENSION DURING COVID-19”

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### Abstract

**Background:** Traditional herbal healthcare system is commonly used for diabetes and hypertension due to the reason that modern allopathic system is more expensive comparatively and the costs of healthcare and prescription drugs rapidly increasing each year. About 80% of the world populations of developing countries rely on this traditional herbal healthcare system of medicine. High health and medical expenditure has heavy economic burden on government which requires a way to restrain its growth. Out of pocket expenses for health services in India are 85% and about 20% of the patients in the OPDs, nationwide, prefer to go to the private hospitals despite higher out of pocket payments. The combined Union 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. India is lagging far behind to reach this 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. Cumulative Foreign Direct Investment [FDI] equity inflow into drug and pharmaceutical industries in India from 2000 to December 2022 was US\$ 22 billion which is projected to US\$ 130 billion by December 2030. FDI is reached US\$ 1414 million in financial year 2021-22 in drugs and pharmaceutical sector. Diabetes and hypertension have been identified as risk factors and prognostic for severe COVID-19. Annually, 12% high inflation is projected to rise on healthcare. Diabetes and hypertension are increasing in low and middle income countries which is approximately 722 million adults worldwide and 892 million by 2035. 67.0% of the healthcare spending of Indians is on medicine alone whereas 33.0% is for other services payments. There are large financial differences in capital structure position of pharmaceutical firms. Therefore the cost of medicines in pharmaceutical market, corporate uses of capital must be benchmarked against these capital market alternatives. 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. Indian Healthcare sector is contributing 6% to the GDP of the country and becoming fast-growing service sector. The global diabetes and hypertension prevalence in 2019 is estimated to be 12.3% (722 million people), rising to 15.2% (878

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million) by 2030 and 20.9% (1000 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%). Diabetes causes substantial economic burden for individuals, households and health systems, in addition to morbidity and mortality. 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. Non-conventional medicine system was in prevalence is ranged from 9.8% to 76% during COVID-19.<sup>27-28</sup> Comorbidities deaths with COVID-19, are more than 57% whereas less than 43% are normal deaths which is more than 85% in Himachal Pradesh. Mortality and morbidity of older adults with diabetic and hypertension due to COVID-19, is increased much more.

**Objective:** To do the Comparative Analysis of Appropriate and Cost Effective System of treatment for Diabetes and Hypertension 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, and 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. Government price for modern allopathic system for four years for 947 patients of DM-II and HTN, is ₹1899125/- and for traditional system is ₹268448/-, market price for four years for 947 patients for modern allopathic system is ₹17184358/- and for traditional system is ₹596737/- whereas actual expenditure for modern allopathic system is ₹5889198/- and traditional system is ₹596737/-. Out of total 947 DM-II and HTN patients, 571 (60.30%) are modern allopathic medicine users, 156 (16.47%) are traditional herbal medicines users and 220 (23.23%) are both modern allopathic as well as traditional medicine users.

**Conclusion:** Traditional herbal healthcare system is commonly used for diabetes and hypertension due to the reason that modern allopathic system is more expensive comparatively and the costs of healthcare and prescription drugs rapidly increase each year. High health and medical expenditure has heavy economic burden on government which requires a way to restrain its growth. Out of pocket expenses for health services in Indian, DM-II, HTN and HTN with DM-II patients, in the OPDs, nationwide, prefer go to the private hospitals despite higher out of pocket payments. Total actual expenditure for four years 2020-23, of 947 patients of hypertension, diabetes and hypertension with diabetes, for modern allopathic medicines, is ₹5889198/- whereas for traditional herbal medicines is ₹596737/-.

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## Introduction:-

Traditional herbal healthcare system is commonly used for diabetes and hypertension due to the reason that modern allopathic system is more expensive comparatively and the costs of healthcare and prescription drugs rapidly increase each year.<sup>1</sup> About 80% of the world populations of developing countries rely on this traditional herbal system of medicine.<sup>2-4</sup> High health and medical expenditure has heavy economic burden on government which

required a way to restrain its growth.<sup>5</sup> Out of pocket expenses for health services in India are 85% and about 20% of the patients in the OPDs, nationwide, prefer go to the private hospitals despite higher out of pocket payments.<sup>6-7</sup> The combined Union 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.<sup>8</sup> India is lagging far behind to reach this target of expenditure of health budget.<sup>9</sup> ₹ 14,217 crore was spent for COVID-19 emergency response and health system preparedness package and COVID-19 vaccination for healthcare and frontline workers.<sup>10</sup> 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 2030.<sup>11</sup> FDI is reached US\$ 1414 million in financial year 2021-22 in drugs and pharmaceutical sector.<sup>12-13</sup> Diabetes and hypertension have been identified as risk factors and prognostic for severe COVID-19.<sup>11</sup> Annually 12% high inflation is projected to rise on healthcare.<sup>14</sup> Diabetes and hypertension are increasing in low and middle income countries which is approximately 722 million adults worldwide and 892 million by 2035.<sup>15-16</sup> 67.0% of the healthcare spending of Indians is on medicine alone whereas 33.0% is for other services payments.<sup>17</sup> There are large financial differences in capital structure position of pharmaceutical firms.<sup>18</sup> Therefore the cost of medicines in pharmaceutical market, corporate uses of capital must be benchmarked against these capital market alternatives.<sup>19-21</sup> 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.<sup>22</sup> Indian Healthcare sector is contributing 6% to the GDP of the country and becoming fast-growing service sector.<sup>23</sup> The global diabetes and hypertension prevalence in 2019 is estimated to be 12.3% (722 million people), rising to 15.2% (878 million) by 2030 and 20.9% (1000 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%).<sup>24</sup> Diabetes causes substantial economic burden for individuals, households and health systems, in addition to morbidity and mortality.<sup>25</sup> 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.<sup>26</sup> Non-conventional medicine system was in prevalence is ranged from 9.8% to 76% during COVID-19.<sup>27-28</sup> Comorbidities deaths with COVID-19, are more than 57% whereas less than 43% are normal deaths which is more than 85% in Himachal Pradesh.<sup>29</sup> Mortality and morbidity of older adults with diabetic and hypertension due to COVID-19, is increased much more.<sup>30-34</sup>

### Research Objectives:-

To do the Comparative Analysis of Appropriate and Cost Effective System of treatment for Diabetes and Hypertension 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, 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. Government price for modern allopathic system for four years for 947 patients of DM-II and HTN, is ₹1899125/- and for traditional system is ₹268448/-, market price for four years for 947 patients for modern allopathic system is ₹17184358/- and for traditional system is ₹ 596737/- whereas actual expenditure for modern allopathic system is ₹5889198/- and traditional system is ₹596737/-. Out of total 947 DM-II and HTN patients, 571 (60.30%) are modern allopathic medicine users, 156 (16.47%) are traditional herbal medicines users and 220(23.23%) are both modern allopathic as well as traditional medicine users.

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

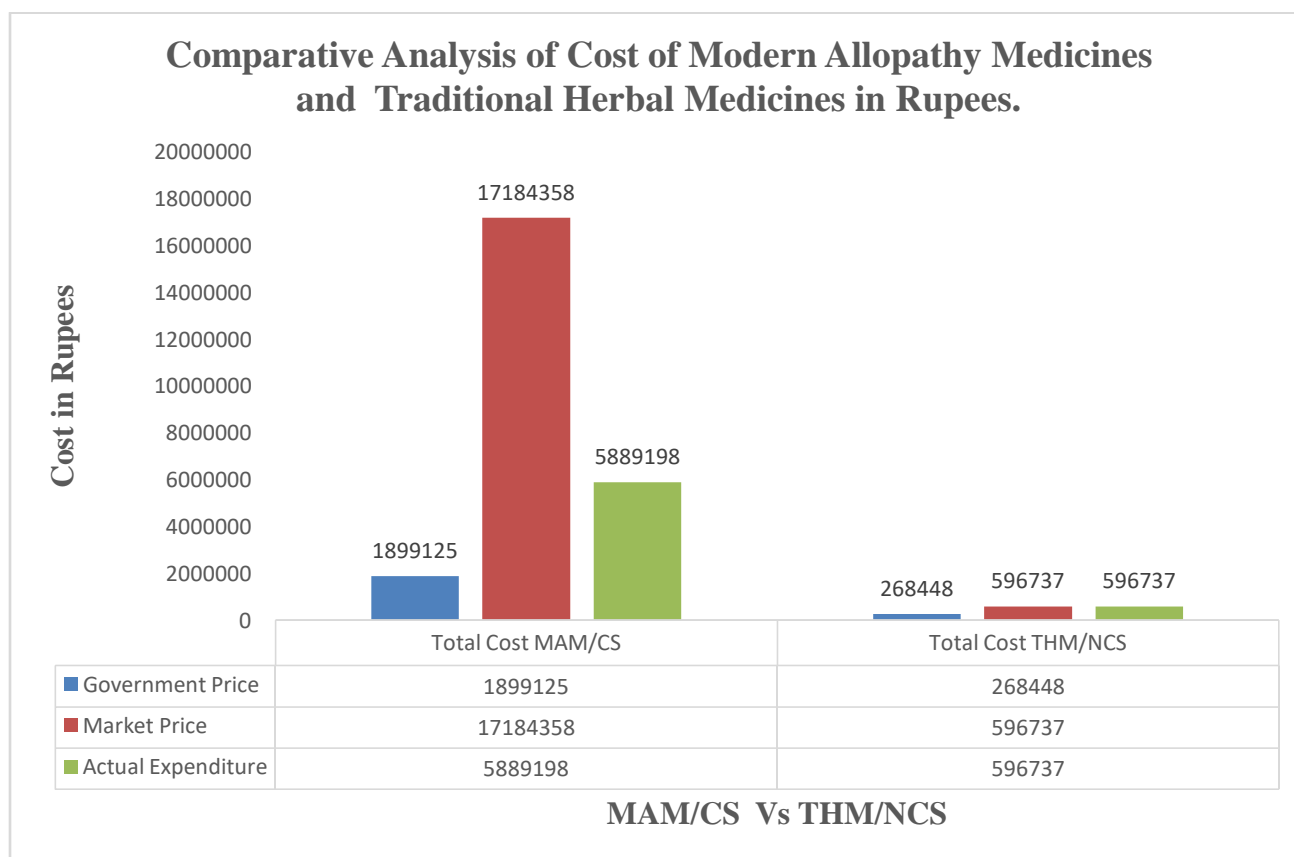
S.N.	Total Persons Investigated	Normal Persons	Diseased	HTN	DM	HTN with DM II
1.	<b>5498</b>	<b>4551</b>	<b>947</b>	<b>579</b>	<b>213</b>	<b>155</b>

DM II : Diabetic mellitus type II

HTN : Hypertension.

**Table 2:-** Comparison of Appropriate and Cost Effective Treatment during COVID-19:

Comparative Analysis of Appropriate and Cost Effective Treatment during COVID-19 for DM & HTN for 947 Patients between Years 2020-23.		
Particulars	Cost for Modern Allopathic System	Cost for Traditional System
Government Price	<b>1899125</b>	<b>268448</b>
Market Price	<b>17184358</b>	<b>596737</b>
Actual Expenditure	<b>5889198</b>	<b>596737</b>



MAM = Modern Allopathic Medicines

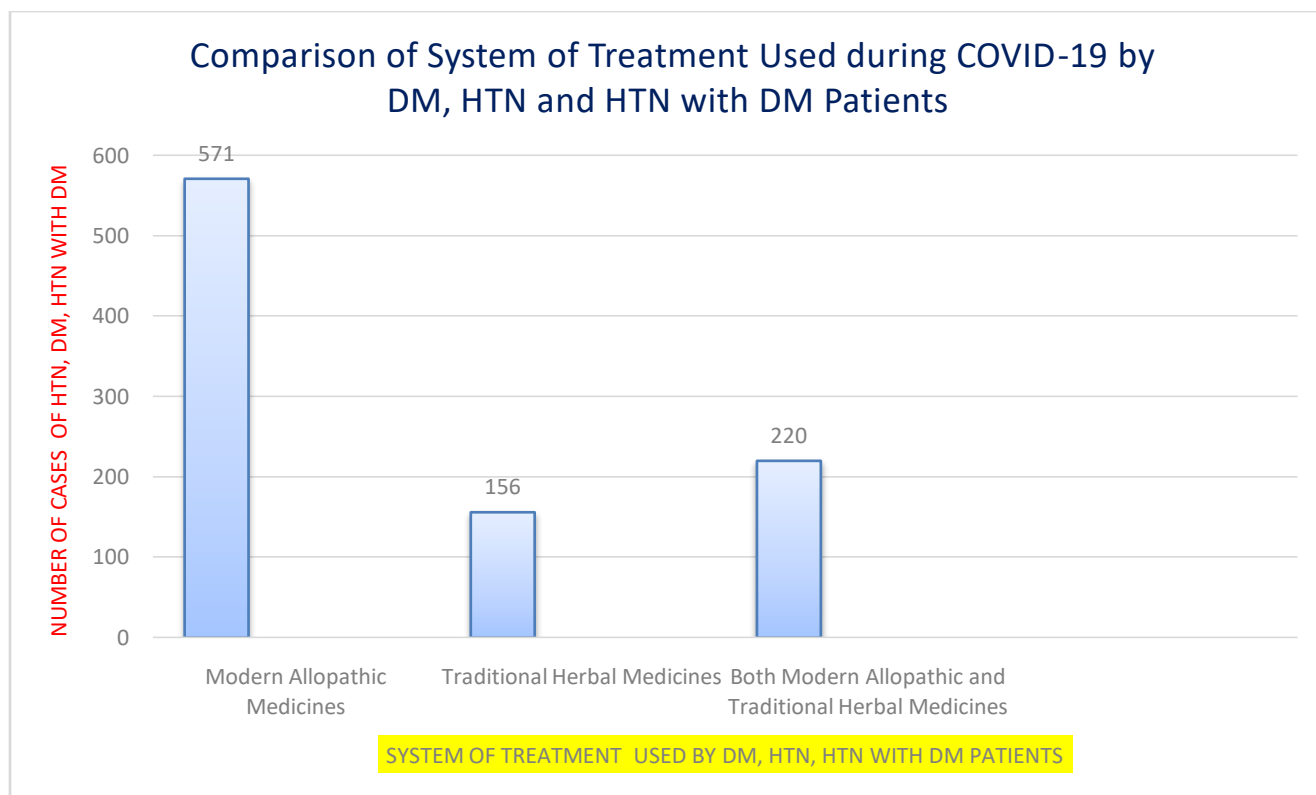
CS = Conventional System

THM = Traditional Herbal Medicines

NCS = Non-Conventional System

**Table 3:-** Comparative Analysis of Patients Using Different System of Medicines:

S.No	Particulars of Treatment System Used	Total Patients of DM,HTN, HTN with DM
i)	Modern Allopathic Medicine Users	571(60.30%)
ii)	Traditional Herbal Medicines Users	156(16.47%)
iii)	Both Modern Allopathic Medicines and Herbal Medicines Users	220(23.23%)
Total		947



### Discussions:-

Total persons investigated are 5498, normal persons are 4551, 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. Total persons investigated are 5498, out of these investigations, normal persons are 4551 and diseased persons with diabetes, hypertension and diabetes with hypertension (DM, HTN and DM with HTN) are 947, from these diseased 579 are HTN, 213 are DM and 155 are HTN with DM II [Table- & Figure]. Government price for the purchase of medicines for 947 patients of DM-II, HTN and HTN with DM-II for modern allopathic medicines, for four years 2020-23 is ₹1899125/- whereas government price for traditional herbal medicines is ₹268448/-, market price for allopathic medicines is ₹17184358/- whereas for traditional medicines is ₹596737/-. Actual expenditure for modern allopathic medicines is ₹5889198/- whereas for traditional herbal medicines is ₹596737/-.

### Conclusions:-

Traditional herbal healthcare system is commonly used for diabetes and hypertension due to the reason that modern allopathic system is more expensive comparatively and the costs of healthcare and prescription drugs rapidly increase each year. High health and medical expenditure has heavy economic burden on government which required a way to restrain its growth. Out of pocket expenses for health services in Indian DM-II, HTN and HTN with DM-II patients in the OPDs, nationwide, prefer go to the private hospitals despite higher out of pocket payments. Total actual expenditure for four years 2020-23, of 947 patients of hypertension, diabetes and hypertension with diabetes, for modern allopathic medicines, is ₹5889198/- whereas for traditional herbal medicines is ₹596737/-.

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