Journal of Research Administration
Society of Research Administrators International

OUT-OF-POCKET HEALTH EXPENDITURE OF THE PATIENTS SUFFERING FROM DIABETES MELLITUS & CARDIOVASCULAR DISEASES

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Abstract
"Out of Pocket Health Expenditure" (OOPHE) refers to the amount that the patient or their family pay directly to the healthcare provider without the involvement of a third party (insurance company, state). It is the payment which is directly paid by the patient on the visit to a private clinic or super specialty hospitals, which includes the doctor's fees, injection charges, medicines, if injured the dressing charges, and etc., In addition to medical expenses, non-medical expenses can also be incurred. Non-medical costs include traveling expenses, lodging costs of escorts, attendant fees, charges for blood, etc., whereas OOPHE could include fees of doctors' fees, medicines, diagnostics, operations, and charges for blood. This study especially deals with the out-of-pocket health expenditure of the patients suffering from diabetes Mellitus & Cardio Vascular diseases. A total of 400 patients were taken for the study. Statistical techniques like F-test, unpaired t-test and ANOVA were used in order to determine whether there is any significant difference between the average Out-of -Pocket Health Expenditure of CVD and Diabetes patients. Also, Multiple linear regression was used in order to determine the important independent variables which significantly impacted the total expenditure of the patients. An important variable i.e., total medical expenditure was included in the model and was tested whether it had a significant impact on the total monthly expenditure of patient.

Keywords: Out of Pocket Health Expenditure (OOPHE), Diabetes Mellitus , Cardiovascular diseases, Medical Expenses and Total Expenditure.

1.0 Introduction

Out-of-pocket health expenditure refers to the amount of money individuals pay directly for health services or medications, which are not covered by insurance or other sources. These expenses can include copayments, deductibles, and costs for services or treatments that are not fully covered by insurance plans. Cardiovascular diseases (CVDs) and diabetes are both chronic health conditions that require ongoing management and treatment. The cost of managing these conditions can vary significantly depending on the severity of the disease, the type of treatment needed, the country's healthcare system, and individual insurance coverage. In many countries, including the United States, the out-of-pocket costs for managing CVD and diabetes can be substantial. Patients may need to pay for medications, doctor visits, hospital stays, medical devices (such as glucose meters or blood pressure monitors), and lifestyle modifications (such as diet and exercise programs).

In this chapter the average Out-of-Pocket Health Expenditure (OOPHE) for CVD & Diabetes has been estimated for 400 OPD patients. Statistical techniques like F-test, unpaired t-test and ANOVA were used in order to determine whether there is any significant difference between the average Out-of -Pocket Health Expenditure of CVD and Diabetes patients. Also, Multiple linear regression was used in order to determine the important independent variables which significantly impacted the total expenditure of the patients. An important variable i.e., total medical expenditure was included in the model and was tested whether it had a significant impact on the total monthly expenditure of patient. The out-of-pocket health expenses include the physician's fees, dressing or injection charges, medicines cost, food during hospital visit, hospital stay such as bed charges, diagnostic tests fees, physiotherapy, and transportation and etc.,

Review of Literature

A. Ramachandran (2007) in his study analysed the rising trend in the prevalence of type 2 diabetes in Urban India and Vascular complications in Type 2 diabetes. He also emphasized the socio- economic environment which influenced occupation, lifestyle, and nutrition of social classes. In their study, **Krishna D. Rao et al. (2011)** investigated the effects of socio-economic status on morbidity due to CVDs and diabetes, locations where patients with these conditions seek care, and how a household finances hospitalization. **Yasukyuki Okumura and Hiroto Ito (2013)** examined the prevalence of psychological distress among people who have or do not have cardio-vascular risks or events [cardiovascular disease (CVD) conditions] and studied the impact of psychological distress has on out-of-pocket health care expenditures. **Sadanandam Akari et al. (2013)** conducted a study and analyzed the health – care cost by calculating the direct and indirect costs of diabetes mellitus with co-morbidities in Southern India. The study was a prospective observational study which was conducted at Rohini super specialty hospital (India). **Charles A K Yesudian et al. (2014)** made an assessment of the economic burden of Diabetes. Their Study objectives were addressed in a comprehensive literature review. A data extraction A total of nineteen articles from different regions of India met their study inclusion criteria. **Dinesh Kumar and Kanchan Mukherjee (2014)** examined that substantial costs are linked with diabetes worldwide, that includes both direct cost of medical care as indirect costs involving lost productivity, related morbidity and premature mortality. Diabetes leads to enormous Out-of-Pocket and Catastrophic health expenditure in their study area (Haryana) and people preferred to private facilities. **Taghreed M. Farahat et al. (2018)** studied and distinguished between the dimensions of determinants of Out-of-Pocket (OOP) health expenditure in rural areas of Egypt. It was known that the OOP health expenditure represents 60% of the aggregate health expenditures in Egypt. It impacted the entrance to quality well-being administrations. **Swagatika Priyadarshini Swain et al. (2018)** estimated the amount of out-of-pocket expenses associated with diabetic care and calculated the medication adherence among the patients. **Sakthivel Selvaraj et al. (2018)** attempted to generate new evidence regarding out-of-pocket (OOP) payments for medicines. A second objective was to find out which health conditions caused a significant proportion of households' financial burden. Setting All Indian states, including union territories, 1993-2014.

Objectives

1. To know the Out-of-Pocket health expenditure of the patients suffering with Diabetes Mellitus (DM), cardiovascular diseases (CVDs) and with both DM & CVDs.
2. To find out the significant difference of the out-of-pocket health expenditure of the patients suffering with DM, CVDs and with both DM & CVDs.

1.1 No of Medicines used by DM Patients, CVD Patients and the patients suffering from both DM & CVDs

F test for knowing whether there is equal or unequal variance between both the groups.

F test

Results

Ho: DM patients and CVD patients have equal variance in using medicines.

H1: DM patients and CVD patients have unequal variance in using medicines.

F-Test Two-Sample for Variances

Table 1.1 F -Test for No. of Medicines used for DM & CVDs		
	No. of Medicines for DM	No. of Medicines for CVDs
Mean	**2.333333333**	**4.666666667**
Variance	1.096196868	2.62639821
Observations	150	150
Df	149	149
F	0.417376491	
P(F<=f) one-tail	**7.90739E-08**	
F Critical one-tail	0.763100731	

Since, p-value after running F test was less than 0.01 from table 1.1, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the variance of both DM and CVD patients of taking medicines is not equal. Hence, we run the t test with unequal variance.

t test

Ho: DM patients and CVD patients use equal average number of medicines.

H1: DM patients and CVD patients use unequal average number of medicines.

t-test: Two-Sample Assuming Unequal Variances

Table 1.2 t- test for No. of Medicines used for DM & CVDs		
	No of Medicines for DM	No of Medicines for CVDs
Mean	**2.333333333**	**4.666666667**
Variance	1.096196868	2.62639821
Observations	150	150

Hypothesized Mean Difference	0	
Df	255	
t Stat	-14.81151611	
P(T<=t) one-tail	1.55017E-36	
t Critical one-tail	1.650851092	
P(T<=t) two-tail	**3.10033E-36**	
t Critical two-tail	1.96931057	

It was evident from table 1.2 that the average medicines usage by DM and CVD patients was 2.3 and 4.6 respectively. Hence, the average usage of medicines by the CVD patients was higher than when compared to DM patients. Since, p-value after running t test was less than 0.01 from table 1.2, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the average usage of number of medicines between both DM and CVD patients was not equal.

ANOVA

Anova: Single Factor

Table 1.3 ANOVA-Test for No. of Medicines used for DM, CVDs and Both DM & CVDs

Groups	Count	Sum	Average	Variance
No. of Medicines for DM	150	350	**2.333333333**	1.096197
No. of Medicines for CVDs	150	700	**4.666666667**	2.626398
No. of Medicines for Both DM & CVDs	100	571	**5.71**	2.854444

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	774.6408333	2	387.3204167	183.6548	**3.4E-57**	3.018452
Within Groups	837.2566667	397	2.108958858			
Total	1611.8975	399				

From table 1.3, the average medicines usage by DM patients, CVD patients and patients with both DM & CVDs was 2.3, 4.6 and 5.7 respectively. It was observed that the average usage of medicines by the patients suffering from both DM & CVDs was higher when compared to DM, CVD patients. Since, p-value after running ANOVA was less than 0.01 from table 1.3, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the usage of number of medicines among DM, CVD and both DM & CVD patients was not equal.

1.2 Out-of-Pocket Health Expenditure of DM patients, CVD patients and the Patients suffering from both DM & CVD

F test

Ho: DM patients and CVD patients have equal variance in the out-of-pocket expenditure of their medicines.
H1: DM patients and CVD patients have unequal variance in the out-of-pocket expenditure of their medicines.
F-Test Two-Sample for Variances

Table 1.4 F-Test for Out-of-Pocket Health Expenditure of DM Patients, CVD Patients		
	Out-of-Pocket Health Expenditure of DM Patients	Out-of-Pocket Health Expenditure of CVD Patients
Mean	**2666.857143**	**3437.121212**
Variance	1361737.805	2252562.354
Observations	70	66
Df	69	65
F	0.604528351	
P(F<=f) one-tail	**0.020273328**	
F Critical one-tail	0.667953649	

Equal variance
Since, p-value after running F test was greater than 0.01 from table 1.4, hence the null hypothesis was accepted and the alternate hypothesis was rejected that the variance of out-of-pocket health expenditure of DM patients and CVD patients was equal. Hence, we run the t test with equal variance.

t-test
Ho: DM patients and CVD patients have equal average out-of-pocket health expenditure.
H1: DM patients and CVD patients have unequal average out-of-pocket health expenditure.
t-test: Two-Sample Assuming Equal Variances

Table 1.5 t-test for Out-of-Pocket Health Expenditure of DM Patients, CVD Patients		
	Out-of-Pocket Health Expenditure of DM Patients	Out-of-Pocket Health Expenditure of CVD Patients
Mean	**2666.857143**	**3437.121212**
Variance	1361737.805	2252562.354
Observations	70	66
Pooled Variance	1793854.191	
Hypothesized Mean Difference	0	
Df	134	
t Stat	-3.351950553	
P(T<=t) one-tail	0.000521566	

t Critical one-tail	1.656304542	
P(T<=t) two-tail	**0.001043131**	
t Critical two-tail	1.977825758	

Table 1.5 reveals that the average out-of-pocket health expenditure for DM-by-DM patients was Rs. 2,666.85 per month and the average out-of-pocket health expenditure for CVD-by-CVD patients was Rs.3,437.12 per month. Hence, the average out-of-pocket health expenditure of CVD patients was higher than the average OOPHE of the DM patients. Since, p-value after running t test was less than 0.01 from table 1.5, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the out-of-pocket health expenditure between both DM and CVD patients was not equal.

ANOVA

Anova: Single Factor

Table 1.6 ANOVA- Test for Out-of-Pocket Health Expenditure of DM Patients, CVD Patients and Patients with both DM & CVDs

Groups	Count	Sum	Average	Variance
Out-of-Pocket Health Expenditure of DM Patients	70	186680	**2666.857143**	**1361737.805**
Out-of-Pocket Health Expenditure of CVD Patients	66	226850	**3437.121212**	**2252562.354**
Out-of-Pocket Health Expenditure of Patients suffering from both DM & CVDs	38	217600	**5726.315789**	**3289964.438**

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	***P-value***	*F crit*
Between Groups	234381574.3	2	117190787.2	55.34200448	**2.92752E-19**	3.048833
Within Groups	362105145.8	171	2117573.952			
Total	596486720.1	173				

From table 1.6, the average out-of-pocket health expenditure of DM patients was Rs. 2,666.85 per month, average out-of-pocket health expenditure of CVD patients was Rs. 3,437.12 per month and the average out-of-pocket health expenditure of the patients suffering from both DM & CVDs was Rs. 5,726.31. The average out-of-pocket health expenditure of the patients suffering from both DM & CVDs was higher when compared to DM, CVD patients. Since, p-value after running ANOVA was less than 0.01 from table 1.6, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the average out-of-pocket health expenditure among DM, CVD and both DM & CVD patients was not equal.

1.3 Out-of-Pocket Health Expenditure for other than DM & CVDs by DM Patients, CVD Patients and Patients suffering from both DM & CVDs

F test

Ho: DM patients and CVD patients have equal variance in the out-of-pocket health expenditure for other than DM & CVD.

H1: DM patients and CVD patients have unequal variance in the out-of-pocket health expenditure for other than DM & CVD.

F-Test Two-Sample for Variances

Table 1.7 F-Test for Out-of-Pocket Health Expenditure for other than DM & CVDs by DM Patients, CVD Patients

	Out-of-Pocket Health Expenditure for other than DM & CVD by DM Patients	Out-of-Pocket Health Expenditure for other than DM & CVD by CVD Patients
Mean	**592.8571429**	**690.1515152**
Variance	570238.0952	1009632.284
Observations	70	66
Df	69	65
F	0.564797802	
P(F<=f) one-tail	**0.010122712**	
F Critical one-tail	0.667953649	

Since, p-value after running F test was less than 0.01 from table 1.7, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the variance of out-of-pocket health expenditure other than DM & CVDs for DM patients and CVD patients was not equal. Hence, we run the t test with unequal variance.

t-test

Ho: DM patients and CVD patients have equal average out-of-pocket health expenditure for other than DM & CVD.

H1: DM patients and CVD patients have unequal average out-of-pocket health expenditure for other than DM & CVD.

t-test: Two-Sample Assuming Unequal Variances

Table 1.8 t-test for Out-of-Pocket Health Expenditure for other than DM & CVDs by DM Patients, CVD Patients

	Out-of-Pocket Health Expenditure for other than DM & CVD by DM Patients	Out-of-Pocket Health Expenditure for other than DM & CVD by CVD Patients

Mean	**592.8571429**	**690.1515152**
Variance	570238.0952	1009632.284
Observations	70	66
Hypothesized Mean Difference	0	
Df	120	
t Stat	-0.635439901	
P(T<=t) one-tail	0.263175725	
t Critical one-tail	1.657650899	
P(T<=t) two-tail	**0.526351449**	
t Critical two-tail	1.979930405	

From table 1.8, the average out-of-pocket health expenditure for other than DM & CVDs by DM patients was Rs. 592.85 per month and the average out-of-pocket health expenditure other than DM & CVDs for CVD patients was Rs. 690.15 per month. Since, p-value after running t-test was higher than 0.01 from table 1.8, hence the null hypothesis was accepted and the alternate hypothesis was rejected that the average out-of-pocket health expenditure other than DM & CVDs between both DM and CVD patients was equal.

ANOVA

Anova: Single Factor

Table 1.9 ANOVA-Test for Out-of-Pocket Health Expenditure for other than DM & CVDs by DM Patients, CVD Patients and Patients with both DM & CVDs

Groups	Count	Sum	Average	Variance
Out-of-Pocket Health Expenditure for other than DM & CVD by DM Patients	70	41500	**592.8571**	**570238.1**
Out-of-Pocket Health Expenditure for other than DM & CVD by CVD Patients	66	45550	**690.1515**	**1009632**
Out-of-Pocket Health Expenditure for other than DM & CVD by Patients suffering from both DM & CVDS	38	18300	**481.5789**	**821002.8**

ANOVA

Source of Variation	SS	df	MS	F	**P-value**	F crit
Between Groups	1067681	2	533840.4	0.674451	**0.510786**	3.048833
Within Groups	1.35E+08	171	791518.3			
Total	1.36E+08	173				

From table 1.9, the monthly average out-of-pocket health expenditure for other than DM & CVDs by DM patients was Rs. 592.85, by CVD patients was Rs. 690.15 and the monthly average out-of-pocket health expenditure for other than DM & CVDs by both DM & CVD patients was Rs.

481.57. Since, p-value after running ANOVA was greater than 0.01 from table 1.9, hence the null hypothesis was accepted and the alternate hypothesis was rejected that the average out-of-pocket health expenditure other than DM & CVDs among DM, CVD and both DM & CVD patients was equal.

1.4 Total Out-of-Pocket Health Expenditure of DM Patients, CVD Patients and Patients suffering from both DM & CVDs

F test

Ho: DM patients and CVD patients have equal variance in the total out-of-pocket health expenditure.

H1: DM patients and CVD patients have unequal variance in the total out-of-pocket health expenditure.

F-Test Two-Sample for Variances

Table 1.10 F-Test for Total Out-of-Pocket Health Expenditure of DM Patients, CVD Patients

	Total Out-of-Pocket Health Expenditure of DM Patients	Total Out-of-Pocket Health Expenditure of CVD Patients
Mean	**3259.714286**	**4127.272727**
Variance	2424017.308	3803013.986
Observations	70	66
df	69	65
F	0.63739374	
P(F<=f) one-tail	**0.033298909**	
F Critical one-tail	0.667953649	

Equal variance

Since, p-value after running F test was greater than 0.01 from table 1.10, hence the null hypothesis was accepted and the alternate hypothesis rejected that the variance of total out-of-pocket health expenditure of DM patients and CVD patients was equal. Hence, we run the t test with equal variance.

t-test

Ho: DM patients and CVD patients have equal average total out-of-pocket health expenditure.

H1: DM patients and CVD patients have unequal total average out-of-pocket health expenditure.

t-test: Two-Sample Assuming Equal Variances

Table 1.11 t-test for Total Out-of-Pocket Health Expenditure of DM Patients, CVD Patients

	Total Out-of-Pocket Health Expenditure of DM Patients	Total Out-of-Pocket Health Expenditure of CVD Patients
Mean	**3259.714**	**4127.273**
Variance	2424017	3803014
Observations	70	66
Pooled Variance	3092934	
Hypothesized Mean Difference	0	
Df	134	
t Stat	-2.87518	
P(T<=t) one-tail	0.002349	
t Critical one-tail	1.656305	
P(T<=t) two-tail	**0.004699**	
t Critical two-tail	1.977826	

From table 1.11, the average total out-of-pocket health expenditure of DM patients was Rs. 3,259.71 per month and the average total out-of-pocket health expenditure of CVD patients was Rs. 4,127.27 per month. The average total out-of-pocket health expenditure of CVD patients was higher when compared to the average total out-of-pocket medical expenditure of Diabetes patients. Since, p-value after running t test less than 0.01 from table 1.11, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the average total out-of-pocket health expenditure between DM patients and CVD patients was not equal.

ANOVA

Anova: Single Factor

Table 1.12 ANOVA-Test for Total Out-of-Pocket Health Expenditure of DM Patients, CVD Patients and Patients with both DM & CVDs

Groups	Count	Sum	Average	Variance
Total Out-of-Pocket Health Expenditure of DM Patients	70	228180	**3259.714**	**2424017**
Total Out-of-Pocket Health Expenditure of CVD Patients	66	272400	**4127.273**	**3803014**
Total Out-of-Pocket Health Expenditure of Patients suffering from both DM & CVDs	38	235900	**6207.895**	**4643044**

ANOVA

Source of Variation	SS	df	MS	F	**P-value**	F crit
Between Groups	2.15E+08	2	1.08E+08	31.39359	**2.44E-12**	3.048833
Within Groups	5.86E+08	171	3428338			
Total	8.02E+08	173				

From table 1.12, the average total out-of-pocket health expenditure of DM patients was Rs. 3,259.71 per month, the average total out-of-pocket health expenditure of CVD patients was Rs. 4,127.27 per month and the average total out-of-pocket health expenditure by the patients suffering from both DM & CVDs was Rs. 6,207.89 per month. The average total out-of-pocket health expenditure by the patients suffering from both DM & CVDs was higher when compared to DM patients, CVD patients. Since, p-value after running ANOVA was less than 0.01 from table 1.12, hence the null hypothesis was rejected and the alternate hypothesis was accepted that the average total out-of-pocket health expenditure among DM patients, CVD patients and both DM & CVD patients was not equal.

1.5 Determining significant variables which impacts the total expenditure of patients using Multiple Linear Regression

Multiple linear regression was used in order to determine the impact of independent variables on the total expenditure of patients. The dependent variable was total expenditure (Y) of patients and there were seven independent variables which were expenditures on food, alcohol/smoking, house rent, electricity bill, medical, gas, petrol. The multiple linear regression for model estimating important factors that impacts total expenditure of patients can be specified as shown in equation 1.1.

$$Y = \alpha+\beta_1X_1+ \beta_2X_2+ \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6+ \beta_7X_7 + \epsilon \quad \text{--- (1.1)}$$

where,

Table 1.13 Variables in Multiple Line

Dependent Variable

Y	=	Total Monthly Expenditure (Rs.)

Independent variables

X_1	=	Food (F)
X_2	=	Alcohol/Smoking (S)
X_3	=	House Rent (R)
X_4	=	Electricity Bill (E)
X_5	=	Medical (M)
X_6	=	Gas (G)
X_7	=	Petrol (P)
α	=	Intercept
$\beta_{1 \text{ to }} \beta_7$	=	Partial coefficients of the model
ϵ	=	Error term

Table 1.14 Regression Result for Monthly Expenditure	
Multiple R	0.940445
R Square	0.884436
Adjusted R^2	0.882373
Standard Error	6639.635
Observations	400

ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	1.32E+11	1.89E+10	428.58	2.5066E-17
Residual	392	1.73E+10	4408475		
Total	399	1.5E+11			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	2028.13	1238.512	-1.63755	0.10231	4463.08582	406.827485
Food	1.595209	0.224418	7.108208	5.6E-12	1.15399552	2.03642181
Alcohol/Smoking	0.72424	0.34095	2.124183	0.03428	0.05392076	1.39455969
House Rent	1.214051	0.090951	13.34836	9.14E-3	1.03523781	1.39286456
Electricity Bill	10.86449	0.881746	12.32156	1.03E-2	9.13094797	12.5980338
Medical	1.34793	0.14267	9.447863	3.19E-1	1.06743549	1.62842519
Gas	-2.29695	1.133761	-2.02595	0.04344	4.52595935	0.06793201
Petrol	1.986085	0.187097	10.61527	2.62E-2	1.61824629	2.35392420

After the computed results, the mathematical equation for total expenditure of a patient can be written as shown in the equation 1.2. As shown in the table 1.14, the adjusted R^2 for the model was about 88% which means that the independent variables have high impact on the dependent variable. Found at 5% level the null hypothesis can be rejected and it shows that expenditures on food, house rent, electricity bill, medical bills and petrol bills has a significant impact on the total expenditure of any patient. The p-value of all the variables except smoking and gas bills is less than 0.05. In other words, all the variables except smoking and gas bills have a significant impact on the total expenditure of a patient. For an increase of Rs. 1 change in food, house rent, electricity bill, medical bills and petrol bills there will be an increase of Rs. 1.59, Rs. 1.21, Rs. 10.8, Rs. 1.34 and Rs. 1.98 increase in total monthly expenditure of a patient. The p-value of smoking and gas bills was insignificant as its p-value was more than 0.01.

Total Expenditure = 2028 + 1.59*(F) + 1.21*(H) + 10.8*(E) + 1.34*(M) + 1.98*(P) + ϵ ---(1.2)

Summary:
After determining the average out-of-pocket health expenditure of the patients suffering from DM, CVD and both DM & CVD per month by using F-Test, t-test, ANOVA and Granger Causality test. It was observed that regarding the average medicines usage, the average medicines usage by patients suffering from both DM & CVD was higher followed by CVD patients and DM patients respectively. The monthly average out-of-pocket health expenditure of DM patients was Rs. 2,666.85 and the average out-of-pocket medical expenditure of CVD patients was Rs. 3,437.12 per month and the average out-of-pocket health expenditure of patients suffering from both DM & CVD was Rs. 5,726.31 per month and it was evaluated that the average out-of-pocket medical expenditure of patients suffering from both DM & CVD patients was higher followed by CVD patients and DM patients respectively. The average out-of-pocket medical expenditure for other than DM & CVD by DM patients, CVD patients and both DM & CVD patients was almost the same. The monthly average total out-of-pocket medical expenditure of DM patients, CVD patients and the patients suffering from both DM & CVD was Rs. 3,259.71, Rs. 4,127.27, Rs. 6,207.89 respectively. The average total out-of-pocket medical expenditure of the patients suffering from both DM & CVD was higher when compared to DM, CVD patients. It was also found that the independent variables have high impact on the dependent variable. It shows that expenditures on food, house rent, electricity bill, medical bills and petrol bills has a significant impact on the total expenditure of any patient.

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