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Pharmacoeconomic evaluation and quality of life of patient with diabetes mellitus in a tertiary care hospital

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Abstract
Aim: To determine the Pharmacoeconomic evaluation and quality of life of patient with diabetes mellitus in a tertiary care hospital.
Materials and methods: A prospective – observational study was carried out in diabetes mellitus patients with history on oral hypoglycemic therapy on 10 months period of time. Patient's demographic details were previous medical and medication history of DM and duration on oral hypoglycemic drugs was collected. And evaluate cost minimization analysis and SF-36 questionnaires using with help of paired t-test, mean, standard deviation.
Results: The study results showed that the individual drugs of oral hypoglycemic drugs cost minimization-the order of cost list to cheapest drug prescribed was below: Voglibose> Gliclazide> glimepiride> metformin> Glipizide. The combination drugs of oral hypoglycemic drugs cost-minimization- the order of cost list to cheapest drug prescribed was below: Glimepride+metformin+voglibose>Glimepiride+metformin>Linagliptin+metformin>Voglibose+metformin>Vidagliptin+metformin>Acarbose+metformin>glibenclamide+metformin>glipizide+metformin.
General health, pain, energy and emotions were showed significant P value less than 0.05. The limitation of activity, physical health problems, emotional health problems, social activity, social activity and general health were showed non-significant.
Conclusion: A Pharmacoeconomic approach was commonly used to evaluate the health benefit of drug treatments to gain good value for money. Cost minimization analysis was the evident that same drug molecule varying in costs has same drug strength content. To improve the health related quality of life the patients would awareness of the disease. The patient with economically weak the cost minimization analysis was much helpful in improves the quality of life and disease progression.

Keywords: Diabetes mellitus, cost minimization analysis, SF-36 questionnaire (Short Form-36)

Introduction
Diabetes mellitus is a group of metabolic disorder characterized by hyperglycemia. It is associated with abnormalities in carbohydrate, fat and protein metabolism and results in chronic complications including microvascular, macrovascular and neuropathic disorders. It has an impact of an individual's subjective perception of physical, emotional and social well-being, including both a cognitive component and an emotional component.[1] Pharmacoeconomics has been defined as the description and analysis of the cost of drug therapy to healthcare systems and society. Quality of life is defined as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectation, standards and concerns. So in this present study we have evaluated the cost minimization and quality of life of patient with diabetes mellitus and hypertension.

Materials and Methods
A prospective – observational study was carried out in total 117 diabetes mellitus patient's aged 35-100 years with demographic details were previous medical and medication history of diabetes mellitus and duration on oral hypoglycemic drugs was collected. We have evaluated the cost minimization analysis and SF-36 questionnaires by using paired t-test, mean, and standard deviation.

Results
The study comprised of 117 patients diagnosed as diabetes mellitus. In this study population, 16.23% were in the age group of 35-50 years, 31.62% were in the age group of 51-60 years, 32.59% were in the age group of 61-70 years, 15.38% were in the age group of 71-80 years,

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4.27% were in the age group of 81-100 years. Males were accounted for 66.66% and Females were accounted for 33.33%. Majority of patients were having normal body mass index BMI (8.5-24.9). Alcoholic were accounted for 26.53%, smoker were accounted for 33.88%. Majority of patients were taking both vegetarian and non-vegetarian.

On therapy were significant differences between drug lowest-cost (Group-A) to highest cost (Group-B). The cost difference to compare saving in annual cost by using cost minimization analysis (Table 1).

Table 1: Range Of Drugs Prescribed In Oral Hypoglycemic Agents in Diabetes Mellitus

S. no	Name of the Drug	Dose	Highest drug cost (Rs)	Lowest drug cost (Rs)	Annual cost for 365 days (Rs)	Cost difference	Saving in annual cost (%)
1	Metformin	250mg	9.0	1.08	394.2-3285	2890.8	88
2	Metformin	500mg	34.86	1.52	554.8-12723.9	12169.1	95.64
3	Metformin	850mg	32.80	2.75	1003.75-11972	10968.25	91.62
4	Acarbose + metformin	50mg + 500mg	102.91	12.25	4471.25-37562.15	33090.9	88.10
5	Glipizide	5mg	12.00	0.61	222.65-4380	4157.35	94.92
6	Glibenclamide + Metformin	5mg + 500mg	47.50	2.65	967.25-17337.5	16370.25	94.42
7	Glimepiride + voglibose + metformin	1+500+0.2mg,	16.60	11.60,	4234-6059	1825,	30.12
8	Glimepiride+ voglibose+ metformin	2+500+0.2mg.	16.93	14.40	5256-6179.45	923.45	14.94
9	Glipizide + metformin	5mg+500mg	10.78	1.39	507.35-3934.7	3427.35	87.11%
10	Gliclazide	80mg	79.50	5.9	2153.5-29017.5	26864	92.58
11	Glimepiride	2mg	117.23	2.92	1065.8-42788.95	41723.15	97.51
12	Glimepiride + metformin + voglibose	1mg+500mg+0.2mg	12.30	11.75	4288.75-4489.5	200.75	4.47
13	Glimepiride + metformin	2mg+500mg	8.70	7.19	2624.35-3175.5	551.15,	17.35
14	Glimepiride + metformin	3mg+850mg	15.40	8.25	3011.25-5621	2609.75	46.42
15	Voglibose	0.2mg	7.59	4.67	1704.55-2770.35	1065.8	38.47
16	Vildagliptin + metformin	50mg+500mg	198	25.75	9398.75-72270	62871.25	86.99
17	Metformin + voglibose	0.2mg+ 500mg	57.00	7.99	2916.35-20805	17888.65	85.98
18	Linagliptin + metformin	5mg+ 500mg	20.50	8.7	3281.35-7482.5	4201.15	56.15

The present study demonstrates that overall health related quality of life is a complex concept comprised of various aspects, Andres Fontalba Navas et al [1, 2] this quality of life SF36 scale general health baseline was 60.79±22.43, an 1st follow up shows 60.89±25.77 and 2nd follow up shows 66.66±20.77 significant (p<0.05). The limitation of activity baseline was 257.73±112.6, an 1st follow up shows 255.44±86.09 and 2nd follow up shows 219.23±79.82 non-significant (p>0.05). Physical health problems baseline was 104.48±65.35, an 1st follow up shows 95.4±45.47 and 2nd follow up shows 80.02±49.26 non-significant (p>0.05). Emotional health problems baseline was 75.42±48.13, an 1st follow up shows 72.86±41.13 and 2nd follow up shows 62.60±40.55 non-significant (p>0.05). Social activity baseline was 27.45±13.85, a 1st follow up shows 29.05±12.8 and 2nd follow up shows 25.32±13.58 non-significant (p>0.05). Pain baseline was 60.36±28.81, an 1st follow up shows 67.09±19.59 and 2nd follow up shows 67.52±22.02 significant (p<0.03). Energy and emotions baseline was 246.66±57.15, an 1st follow up shows 262.9±273.80 and 2nd follow up shows 223.54±41.51 significant (p<0.05). Social activity and general health baseline was 116.23±33.4, an 1st follow up shows 111.64±30.86 and 2nd follow up shows 100.96±30.13 non-significant (p>0.05)

Table 2: Quality of Life in Sf-36 Scale Domains for Diabetes Patients

S. No	Domains	Baseline (Mean±Sd)	Follow Up1 (Mean±Sd)	Follow Up2 (Mean±Sd)
1	General Health	60.79±22.43	60.89±25.77	66.66±20.77*
2	Limitation of activity	257.73±112.6	255.44±86.09	219.23±79.82
3	Physical health problems	104.48±65.35	95.4±45.47	80.02±49.26
4	Emotional health problems	75.42±48.13	72.86±41.13	62.60±40.55
5	Social activity	27.45±13.85	29.05±12.8*	25.32±13.58
6	Pain	60.36±28.81	67.09±19.59	67.52±22.02*
7	Energy & emotions	246.66±57.15	262.9±273.80*	223.54±41.51
8	Social activities & general health	116.23±33.4	111.64±30.86	100.96±30.13

[SD- Standard Deviation, x*- significant]

Discussion
Diabetes mellitus was one of the common chronic diseases worldwide. This study comprised of total populations out of which, most of the patients were in the age group of 60-70 years. This coincides with the study conducted by K. V. Ramanath [2] et al., were age group 41-80 years are more prominent to diabetes than the other groups. Diabetes mellitus associated complications caused the negative impact on life; which intern leads to a substantial increase in the cost of health care. So the Pharmacoeconomic consideration in each step will help in minimizing the cost therapy and helps in optimizing the quality of life of patients.

In this study total populations on therapy there were significant difference between drugs lowest cost to highest cost it's divided into group A and group B. Shah Jainam V [3] *et al.*, the cost analysis of anti-diabetic agents show huge variations in the prices of different brands of same molecule. The individual drugs of oral hypoglycemic drugs cost minimization- the order of cost list to cheapest drug prescribedwasbelow:Voglibose(0.2mg)>Gliclazide(80mg)>glimepiride(2mg)>metformin(850mg)>metformin(500mg)>metformin(250mg)>Glipizide(5mg). The combination drugs of oral hypoglycemic drugs cost-minimization- the order of cost list to cheapestdrugprescribedwasbelow:Glimepride+metformin+voglibose(1mg+500mg+0.2mg)>Glimepiride+metformin(3mg+850mg)>Glimepiride+metformin(2mg+500mg)>Linagliptin+metformin(5mg+500mg)>Voglibose+metformin(0.2mg+500mg)>Vidagliptin+metformin(50mg+500mg)>Acarbose+metformin(50mg+500mg)>glibenclamide+metformin(5mg+500mg)>glipizide+metformin(5mg+500mg)

The present study demonstrates that overall health related quality of life is a complex concept comprised of various aspects, Andres Fontalba Navas [4] *et al.*, this quality of life SF36 scale General health, pain, energy and emotions were showed significant P value less than 0.05. The limitation of activity physical health problems, emotional health problems, social activity, social activity and general health were showed non-significant. So the scientific approach has been implemented to educate people about the physical and mental disturbances related to diabetes patients.

Conclusion
A pharmacoeconomic approach was commonly used to evaluate the health benefit of drug treatments to gain good value for money. Cost minimization analysis was the evident that same drug molecule varying in costs has same drug strength content. The cost minimization study illustrates that conversion to anti-diabetes drugs would result in lower overall treatment costs in patients with diabetes from the health care systems perspective. An intensive information campaign providing detailed advice for patients, physicians and pharmacist is essential for the prevention of medication errors and reduction of overall costs. It is concluded that cheaper drugs can be prescribed to patients for reducing the health economic burden on diabetes mellitus patients.

To improve the health related quality of life the patients would awareness of the disease. The patient with economically weak the cost minimization analysis was much helpful in improves the quality of life and disease progression.

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