



Review on diabetes mellitus

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Article History

Received: 05-12-2021

Revised: 03-01-2022

Accepted: 20-01-2022



Keywords: Diabetes mellitus, autoimmune disease, β cells.

Abstract

Diabetes is one of the most common chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. This leads to an increased concentration of glucose in the blood (hyperglycaemia) Diabetes mellitus (DM) also known as simply diabetes, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger. Untreated, diabetes can cause many complications. Acute complications include diabetic ketoacidosis and non-kenotic hyperosmolar coma. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcers and damage to the eyes. Diabetes is due to either the pancreas not producing enough insulin, or the cells of the body not responding properly to the insulin produced Type 1 diabetes is a chronic autoimmune disease characterized by insulin deficiency and resultant hyperglycaemia. Knowledge of type 1 diabetes has rapidly increased resulting in a broad understanding about many aspects of the disease, including its genetics, epidemiology, immune and β -cell phenotypes, and diseased burden. Interventions to preserve β cells have been tested, type 1 diabetes and our ability to standardize clinical care and decrease disease-associated complications and burden. The presence of additional chronic conditions has a significant impact on the treatment and management of type 2 diabetes (T2DM). Little is known about the patterns of comorbidities in this population. The aims of this study are to quantify comorbidity.

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 <https://doi.org/10.37022/jiaps.v7i1.273>

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Introduction

Diabetic

Diabetes is a chronic disease. The term "diabetes mellitus" describes a metabolic disorder of multiple aetiologies most common reason considered is when pancreas does not produce insulin and it is characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin

secretion, insulin action, or both. The effects of diabetes mellitus include long-term damage, dysfunction and failure of various organs and symptoms of diabetic mellitus

Type 1 Diabetic mellitus

Type 2 Diabetic mellitus

Type 1 diabetes (T1B) usually patients require lifelong insulin injections for survival.

- **Type 2 diabetes** (T2B): This is the most common type of diabetes (representing 90% of diabetic cases worldwide). Type 2 diabetes (Non-insulin-dependent diabetes mellitus (NIDDM).
- It majorly occurs due to insulin resistance which is characterized by hyperglycemia and it develops in adulthood who are at risk of obesity, decreased physical activity and unhealthy diets and can be managed with the help of oral hypoglycemic agents

And lifestyle modifications such as diet, exercise etc. Patients are at lower risk of micro vascular and macro vascular complications unlike Type 1 diabetes.

Symptoms

- Such as polyuria, polydipsia, polyphagia, and unexplained weight loss before diagnosing.
- May also experience numbness in extremities, pain in feet and blurred vision and may have recurrent and severe infections.
- Patients may present with loss of consciousness or coma but this is less common than in Type-1 diabetes.

Treatment

The main aim of the treatment is to prevent or delay the complication of diabetes. It is also necessary to provide the education regarding the importance of diet, exercise, and foot care.

Diabetic Treatments

- 1) Oral hypoglycaemic therapy.
- 2) Insulin treatment.
- 3) Diet (combined with exercise).

Drug	Initial dose	Maximum dose	Usual dose
Biguanide			
Metformin	500mg bid	2550 mg/d	500-1000mgbid
Sulfonylurea			
Glimepiride	1-2mg/d	8mg/d	4mg/d
Glipizide	2.5-5mg/d	40mg/d	10-20mg/d
Thiazolidinedione			
Pioglitazone	15-30mg/d	45mg/d	15-45mg/d
Dpp4 inhibitor			
Saxagliptin	2.5mg/d	5mg/d	5mg/d
Bile and sequestrate			
Colesevelam	375mg/day	375mg/day	375mg/day

Complications of diabetes:

1. Diabetic retinopathy (eye disease).
2. Nephropathy (kidney disease).
3. Neuropathy (nerve disease).
4. Cardiovascular diseases

Pharmacogenomics:

- The field of study that evaluates the behaviour of individuals, firms, and markets relevant to the use of pharmaceutical products, services and programs,
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- And which frequently focuses on the costs (inputs) and consequences (outcomes) of that that use.
- Thus, pharmacogenomics (PE) is a subfield of health economics. Operationally, the field of Pharmacogenomics consists of comparing outcomes (clinical, economic, and humanistic)
- The basic task of economic evaluation is to identify, measure, value, and compare the costs and consequences of the alternatives being considered.
- A full economic evaluation encompasses both characteristics, whereas a partial economic evaluation addresses only one.

Cost –Utility Analysis

- Cost-utility analysis (CUA) is a method for comparing treatment alternatives and also can compare cost, quality and quantity of patient years that integrates patient preferences and HRQOL.

Advantages of cost–utility analysis

- Cost–utility analysis can capture the value of improvements in morbidity and mortality.
- Cost–utility analysis thus increasingly facilitates the transparency of resource allocation processes.

Disadvantages of cost–utility analysis

- With many healthcare interventions, there are significant concerns about the ability of cost–utility analysis to capture all the valued characteristics.
- For chronic conditions, the assumption that the utility of a health state is independent of the time spent in that health state is considered problematic

Cost-Of-Illness

- Cost-of-illness studies measure the economic burden of a disease or diseases and estimate the maximum amount that could potentially be saved or gained if a disease needs to be eradicated. Numerous cost-of-illness studies.
- policy debates because they highlight the magnitude of the impact of an illness on society or a part of society and it can help policy makers to decide which diseases need to be addressed first by health care and prevention policy
- Cost-of-illness studies can show the financial impact of a disease that has on public programs, such as Medicare and Medicaid. Cost-of-illness studies are often cited in disease studies.
- That attempt to highlight the importance of studying a particular disease, as well as in cost-effectiveness and cost -benefit studies.

Methodology

Study design

It is a Pharmacoepidemiological study involving cohort study design. Stratified convenience sampling with matching for factors such as gender, age is used. All diabetic type 2 patients under medication of Metformin, Glibenclamide and insulin were included.

Data collection and processing

Data was collected from patients diagnosed as Diabetic type-II and continuing anti diabetic drugs (Metformin, Glibenclamide, and Insulin and others²⁰) for their diabetic management.

Inclusion criteria

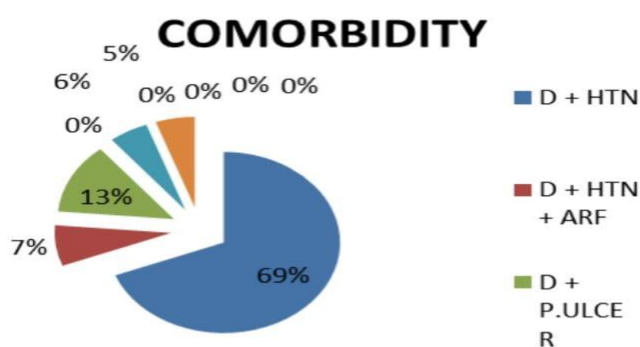
1. All in patients and out patients who are diagnosed as diabetic type-2
2. Continuing anti diabetic drugs (Metformin, Glibenclamide and Insulin,) for their diabetes Management.
3. All patients of above 40 years old.
4. Diabetics with Co-morbidities were also involved in this study.

Exclusion Criteria

1. Patient who are diagnosed as Diabetic type-I.
2. Those who are non-compliant.
3. Those who have communication problems.
4. Patients with pregnancy.
5. Paediatric patients.
6. Patients who are not willing to participate in the

Patients with co morbidities

- By involving co morbidity we include all the diabetes patients who are suffering with co morbidity.



Cost Analysis for Calendar Year

- We calculated cost of therapy according to co-morbidity No of patients: patients who are suffering from particular disease.
- Avg cost of therapy: average cost of entire therapy through one year.
- Cost of drugs: total expenditure of amount on medicines from all patients.

- Other hospital cost: laboratory and hospital charge.

Table 1: cost of illness in different. Co morbidity

Disease	No .of pt's	Tot al drug cost	Av g drug Co st	To tal he r ho ps co st	Ot he r Av g ho ps cos t	Tot al cost	Co 1%	C ol
Diabetics	10	22,800	1,200	2800	150	25688	1352	1
DM+HT N	30	63,960	1,500	23370	570	87330	2130	1.57
DM+HT N+ Ulcer p	8	52,800	4,800	12540	1140	65340	5940	1.78
Dm+HT N+CRF	9	1,69,000	10,090	20475	1755	54765	18255	1.255
DM+HT NCRF	7	1,03,640	11,510	15480	1750	119124	13236	1.272
DM+HT N+tumor	3	93,000	18,600	12850	2570	105850	21170	1.02

Average utility of drugs

Table 2: Comparison of utility and cost of drugs per number of patients

Drugs	Number of pts	Avg utility	Avg cost
Metformin+ Glibenclamide	46	0.35	3,518
Met+Glib+ insulin	19	0.4	5,532

Table 2 All Patients data showing with charlson co morbidity index.

Age group	Number	Average utility	Cci
41-50	36	0.8	5.0
51-60	40	0.7	6.3
61-70	46	0.6	7.0
71-80	7	0.5	6.7
Greater than 80	3	0.5	6.0

Table3: CCI for years of disease

Suffering from year	Number	Average utility	CCI
1-2	23	5	6
2-5	33	5.2	6.01
5-10	38	6.7	7.06
Above 10	Above 10	7.9	8.0

Discussion:

In this study, diabetic patients were included out of which male and females are nearly equal in number and adults are higher than the geriatric patients.

In our study, higher number of patients are having the comorbidity of hypertension and other comorbidities include peptic ulcer, congestive cardiac failure, acute renal failure, chronic renal failure, leukaemia, lymphoma, other tumours, nephropathy, acute liver disease, moderate liver disease. Average utility of therapy: comparison of utility and cost for number of patients was analysed and it seems like combination therapy of Metformin + Glibenclamide was most popularly consumed when compared with other combinations. Insulin is advised to very few patients.

Basically study place is rural area with most of the subjects are with poor knowledge about disease and its complications. In our study it was identified that, many of the patients are facing economic burden, even sometimes they are not able to consume sufficient quantity of medications due to the high costs.

Conclusion

From the study conducted, the higher prevalence of concordant comorbidity among diabetic patients was investigated. Furthermore, older in age, T2DM, prolonged duration of treatment, and poor glycaemic control were factors associated with diabetic Comorbidities. Patients with diabetes to manage the disease effectively and to prevent the devastating complications. Lastly we recommend that more economic studies should be done which play an important role in applying the frame work for resources allocation in diabetes prevention and control.

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