GLYCEMIC STATUS, INCOME, SELF-MONITORING, COMPLIANCE, EDUCATION AND PATTERN OF PHARMACOTHERAPY IN 100 PATIENTS OF TYPE 2 DIABETES MELLITUS

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ABSTRACT

Objective: *To assess the glycemic status, income, self-monitoring, compliance, education and pattern of pharmacotherapy in 100 type 2 diabetes mellitus patients.*

Material and Methods: *This descriptive observational study was carried out at Medical A Unit, Khyber Teaching Hospital Peshawar. A total of 100 type 2 diabetic patients were included through non-probability sampling. Glycosylated hemoglobin of each patient was determined and questions were asked about income, self-monitoring of glycemic status, education and compliance of the patients.*

Results: *Majority of the patients (78%) had poorly controlled diabetic mellitus. Most of the patients (42%) were poor and their monthly income was less than 5000 rupees. Only 57% of the patients monitored their blood sugar once a month. No patient was using glycosylated hemoglobin for assessment of his or her glycemic status. Majority of the patients (82%) were illiterate. Oral hypoglycemic agents were used by 81% of the patients.*

Conclusion: *Most of the patients had poorly controlled diabetes mellitus. Majority of the patients were poor and illiterate and there was poor self-monitoring. Most of the patients were using oral hypoglycemic drugs.*

Key Words: *Type 2 diabetes mellitus, Glycemic Status, Glycosylated hemoglobin (HbA1c), Self-monitoring.*

INTRODUCTION

Diabetes mellitus is a metabolic syndrome. Good glycemic control, optimal treatment of associated hypertension and dyslipidemia are the main pillars of treatment to prevent microvascular and macrovascular complications. In *Diabetes Control and Complication Trial (DCCT)* the patients with intensive insulin therapy were able to achieve glycosylated hemoglobin (HbA_{1c}) of 7.2 and there was marked reduction in retinopathy, nephropathy and neuropathy in type I diabetes mellitus. Similarly the landmark *United Kingdom Prospective Diabetes Study (UKPDS)* also showed 25% reduction in microvascular complications in type-2 diabetes mellitus in intensive control group. [2] Similarly the importance of optimal glycemic control was also described by Kumamato study. [3] Before 1975 urine sugar was used to monitor glycemic control. Later on in 1975 and 1980 it was replaced by capillary blood glucose and glycosylated hemoglobin. Since single measurement of glycosylated hemoglobin (HbA_{1c}) gives an idea of glycemic control over weeks. So American Diabetes Association recommends glycosylated hemoglobin (HbA_{1c}) for glycemic status assessment [4]. Although there is great understanding of diabetes mellitus and marked advancement in pharmacotherapy and monitoring of disease by advance laboratory investigations, still the target to achieve euglycemia is a hard task. Education level of the patient, knowledge about diabetes, income of the patients, self monitoring and compliance with drugs are various factors that determine long term glycemic control. [5]

The aims of this study were to asses:

a) Glycemic status.

b) Income, self-monitoring, compliance and

GENERAL CHARACTERISTICS

Characteristics		Frequency (n=100)	% age
Sex	Male	40	40%
	Female	60	60%
Duration of illness	< 5yrs	31	31%
	6-10yrs	36	36%
	11-15yrs	23	23%
	> 15yrs	10	10%

Table 1

education.

c) Pattern of pharmacotherapy in type 2 diabetic patients.

MATERIAL AND METHODS

This study was conducted at Medical A Unit, Khyber Teaching Hospital from 1 January 2005 to 30th July 2005. A total of 100 type 2 diabetes mellitus patients were included through non-probability sampling, observing the following inclusion and exclusion criteria.

Inclusion criteria

All type 2 diabetes mellitus patients irrespective of age and sex.

Exclusion criteria

Patients taking steroids, diuretics and beta-blocker, which could interfere with glycemic status.

After selection of the patients, history was taken regarding duration of disease, mode of therapy, income of patients, self-monitoring of blood glucose, education and compliance with drugs. Body mass index of each patient was calculated by the formula: *weight in kg/height in meter² (kg/m²).* HbA_{1c} of each patient was determined by photoelectric method using Quimica Clinica Aplicada kit.

RESULTS

A total of 100 type 2 diabetes mellitus patients were included among which 40 patients were male and 60 were female patients. Majority of the patients (36%) were having diabetes for 6 to 10 years and only 10% were having diabetes for a duration of >16 years (Table 1). Most of the patients (78%) were having poor glycemic status and their HbA_{1c} was greater than 7% (Table 2). Majority of the patients (42%) were poor and their per month income was less than 5000 Pakistani rupees (PRs.), 40% were having per month income of PRs.5000-10000 and only 18% had per month income greater than 10,000 Prs. Body mass index (BMI) ranged from 15-40 kg /m² and the mean BMI was 23 kg/m^2 ±7.1 SD. Venous glucose sample was used for assessing glycemic status. Fifty seven percent of the patients monitored their glucose once a month, while 20% of the patients did not monitor their glucose at all (Table 3). No patients were using glycosylated hemoglobin for assessment of glycemic status. Most of the of patients (82%) were illiterate and only 14% of the patient attended school followed by college (3%) and university (1%) (Table 4). Sixty-eight patient (68%) claimed good compliance with pharmacotherapy. Majority of the patients (81%) were using oral hypoglycemic followed by combination of oral hypoglycemic and insulin in 17% of the patients. Only 2% patients were using insulin only for their treatment (Table 5).

DISCUSSION

Euglycemia is the main aim of pharmacotherapy of type 2 diabetes mellitus. Achieving a target glycosylated hemoglobin (HbA_{1c}) of less than 7% is a hard target Kumamato study.[1-3] This study showed interesting trends. Majority of the patient had poorly controlled diabetes mellitus. Most of the patients were poor and illiterate. Only 57% of the patient monitored their blood glucose once in a month and no patient

GLYCEMIC STATUS

Glycemic Status			Frequency (n=100)	Percentage
Overall glycemic status	Optimally control diabetes (HbA1c <7%)		22	22%
	Poorly control diabetes (HbA1c >7%)		78	78%
Glycemic status according to the gender of the patients	Male Patients	Good glycemic control	10	10%
		Poor glycemic control	30	30%
	Female Patients	Good glycemic control	12	12%
		Poor glycemic control	48	48%
Glycosylated hemoglobin	Mean	9.34 ± 2.1SD		
	Range	6.2-16.5%		

Table 2

SELF-MONITORING

Self Monitoring	Frequency (n=100)	% age
Once a month	57	57%
Once every 6 month	19	19%
Once every year	4	4%
No monitoring	20	20%

Table 3

EDUCATION

Education	Frequency (n=100)	% age
No education	82	82%
Attended school	14	14%
Attended college	3	3%
Attended university	1	1%

Table 4

PATTERN OF PHARMACOTHERAPY

Pattern of pharmacotherapy	Frequency (n=100)	% age
Oral hypoglycemic agents Insulin + oral	81	81%
hypoglycemic agents	17	17%
Insulin alone	2	2%

Table 5

had their HbA_{1c} estimated in the past. Although 68% of the patient admitted good compliance with pharmacotherapy but they were taking drugs in inappropriate doses. Thus poverty, low literacy rate, poor monitoring and follow up probably accounted for this threatening scenario. In our study 78% of the patients were having poorly controlled diabetes. This favours results of another study conducted at Peshawar showing poor glycemic control in 79% of the patients. [6,7,8] Another study from the same area showed that HbA_{1c} >7% was present in about 69% of the patients .[9] Similarly, in another study from Malaysia only 20% achieve HbA_{1c} of <7%. In Philippine, diabetes is poorly controlled in 73% of the patients. [9,10] In majority of Asians diabetic population blood sugar is poorly controlled and mean HbA_{1c} is usually >7%.[11] In Italy, SFIDA study group reported mean HbA_{1c} of 7.6 $\pm$ 1.6[12]. This might reflect better management, good economy and high literacy rate in this part of the world.

Although HbA_{1c} of <7% was achieved in intensive groups in both DCCT trial in type I diabetes mellitus and UKPDS study in type 2 diabetes. This tight control was at the expense of hypoglycemia. Thus aggressive therapy in this part of the world also needs frequent monitoring to avoid fatal hypoglycemia especially in patients with coronary artery disease. This is a hard task in country like ours. Being a developing country majority of the patients belong to lower socioeconomic group. Diabetes is associated with high pharmacy cost. Increasing medicine expenditures are associated with improvement in HbA_{1c}[13] level. Similarly finances and access to care are barriers to blood glucose monitoring. [14] Thus in country like Pakistan, poverty is one of the barriers to achieve good glycemic control. Self-monitoring is another factor to achieve good glycemic control as supported by various studies in various parts of the world. [15,16] In our study only 57% of the patient checked their blood glucose once a month and no patient used HbA_{1c} for their monitoring. Good literacy rate and knowledge about diabetes are helping a lot to achieve euglycemia. Simply educating the patient about diabetes helps a lot to achieve euglycemia as evident by various studies. [15-19] Thus low literacy rate and probably failure on part of physician to educate patients about diabetes might be accounting for this threatening scenario. From this study emerges a picture of diabetic patients with poorly controlled diabetes mellitus, low literacy and lack of knowledge about diabetes and little financial resources for self-monitoring and pharmacotherapy.

CONCLUSION

From this study it is concluded that:

1) Majority of our patients had poorly controlled diabetes.
2) Most of the patients are poor, illiterate and none of the patients used glycosylated hemoglobin for self-monitoring.
3) Majority of type 2 diabetic patients used oral hypoglycemic agent followed by insulin and oral hypoglycemic combination.

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