



Prevalence, biochemical and hematological study of diabetic patients

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Abstract

Diabetes is a rapidly and serious health problem in Pakistan. This chronic condition is associated with serious long-term complications, including higher risk of heart disease and stroke. Aggressive treatment of hypertension and hyperlipidaemia can result in a substantial reduction in cardiovascular events in patients with diabetes 1. Consequently pharmacist-led diabetes cardiovascular risk (DCVR) clinics have been established in both primary and secondary care sites in NHS Lothian during the past five years. An audit of the pharmaceutical care delivery at the clinics was conducted in order to evaluate practice and to standardize the pharmacists' documentation of outcomes. Pharmaceutical care issues (PCI) and patient details were collected both prospectively and retrospectively from three DCVR clinics. The PCI's were categorized according to a triangularised system consisting of multiple categories. These were 'checks', 'changes' ('change in drug therapy process' and 'change in drug therapy'), 'drug therapy problems' and 'quality assurance descriptors' ('timer perspective' and 'degree of change'). A verified medication assessment tool (MAT) for patients with chronic cardiovascular disease was applied to the patients from one of the clinics. The tool was used to quantify PCI's and pharmacist actions that were centered on implementing or enforcing clinical guideline standards. A database was developed to be used as an assessment tool and to standardize the documentation of achievement of outcomes. Feedback on the audit of the pharmaceutical care delivery and the database was received from the DCVR clinic pharmacist at a focus group meeting.

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Introduction

Diabetes mellitus is a chronic metabolic disease characterized by disorders in carbohydrate, fat and protein metabolism and resulting hyperglycemia. Hyperglycemia is caused by defects in insulin secretion, insulin action or both. Over time chronic hyperglycemia can lead to severe long-term complications, affecting several organ systems. Abnormalities in insulin secretion and insulin action occur due to several pathogenic processes, which range from autoimmune destruction of pancreatic beta-cells to abnormalities that result in resistance to insulin action. There are several different categorizes of diabetes according to the underlying etiologic cause of the disorder. Most cases of diabetes mellitus fall into two main categorizes: type 1 diabetes and type 2 diabetes. Another common type of diabetes is gestational diabetes mellitus (GDM) which refers to glucose intolerance first recognized during pregnancy (Herfindal, 2000; Association, 2007).

Type 1 diabetes mellitus is recognized by an absolute deficiency of insulin resulting from immune-mediated destruction of the beta-cells of the pancreas. Only 5 to 10% of people with diabetes fall into this category previously known as insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes.

It usually presents in early childhood and has a peak incidence around puberty; however it can present at any age. The autoimmune destruction of the beta-cells is related to multiple genetic predispositions and environmental factors that are still poorly defined. The rate of beta-cells destruction is quite variable and the patient becomes overly diabetic only when more than 90% of the beta-cells have been destroyed (Rang, 2003). Onset of the disease is in most cases abrupt and may present with ketoacidosis as the first manifestation of the disease. The patient also typically presents with all of the classical symptoms: polydipsia, weakness, weight loss and dry skin, which makes it easy to diagnose. The majority of these patients require insulin for survival, even though some patients may briefly return to normoglycaemia (Herfindal, 2000; Association, 2007).

Type 2 diabetes mellitus is the most common type of diabetes. It is responsible to approximately 90 to 95% of all cases. This form of diabetes was previously referred to as non-insulin dependent diabetes (NIDDM) or maturity onset diabetes. The main characteristics of type 2 diabetes are impaired insulin secretion and some degree of insulin resistance of target tissues, primarily the liver and skeletal muscle. Many patients therefore have normal to elevated levels of insulin, due to increased secretion of insulin in an attempt to compensate for the diminished activity of insulin.

Typically type 2 patients are over 40 years of age and most of them are obese, and obesity itself causes some degree of insulin resistance. Weight loss and/or oral hypoglycemic drugs may improve insulin resistance. The risk of developing this form of diabetes increases with age, obesity and lack of physical activity. Today there are an increasing number of people in younger age groups with type 2 diabetes due to obesity and sedentary lifestyle (Hu, 2011). The International Diabetes Federation (IDF) has stated that up to 80 % of type 2 diabetes is preventable by adopting a healthy lifestyle, in terms of nutrition, physical activity and ideal body weight (Mokdad *et al.*, 2000).

Insufficient data is available regarding prevalence of diabetes in Pakistan. For the first time a phased nationwide prevalence study of DM in Pakistan was conducted in 1994 in both rural and urban areas of the four provinces (Shera *et al.*, 1995; Shera *et al.*, 1999). In current study prevalence, biochemical and hematological study of diabetic patients of district Bannu were studied.

Materials and methods

Location of the study

The trial was conducted in the Department of Biotechnology, University of science and technology bannu. The diabetic volunteers were registered with khalifa gul nawaz teaching hospital Bannu. DHQ Bannu, DHQ Karak, And Tehsil head quarter hospital Takht-i-nasrati karak.

Sample Size

68 sample of diabetic individuals of both sexes were screened and 23 are above diabetic patients were registered for this study.

Screening of Subject

All the diabetic patients included in this study were informed through personal contact/ local health worker. The diabetic individuals were called to the KGN hospital, DHQ karak & DHQ bannu for screening test. All the patients were informed to come with the fasting state for test and also for other information and the screening process were continued for few weeks.

All the parameters like name, address, sex, level of exercise dose of medication were noted and serum glucose level of these individual were screened.

Criteria for the Diabetic Individual

The age of the diabetic patient should be above than 30 years and of both sexes. The diabetic patient should not be non insulin therapy and should not be use any medication other than anti diabetic. There fasting glucose range should be in the range 160 mg/dl to 250mg/dl.

Duration of the research

The total duration of the research is 6 month in which one month is for the sample collection 4 month for experiments and 20 days for collection results and 10 days for observation.

Collection Of Blood Sample And Biochemical Anylsis

Approximately 5ml of blood sample were taken from the patient. Blood sample were transfer to centrifuge tubes and allowed to clot at room temperature for 10 to 15 mints. After clotting the blood sample were centrifuge for 15 to 20 mints at 1500 to 2500 rpm for serum separation.

In this way if some serum was not separated then clot was broken through a sharp or needle and was centrifuged again for 15 mints and serum was separated and analyzed through micro lab (SD300) OR spectrophotometer.

Results

Total 68 samples (male & female) were studied in rural area of Bannu. In which 19 female and 49 male were studied for biochemical and hematological study.

Prevalence of Diabetic Patients

Normal range of glucose level in human blood in fasting condition is 65-125, while in random condition 65-165. Among our 68 samples of data 15 male were diabetic and 34 male were non-diabetic patients while 7 females were diabetic and 12 were non-diabetic.

Hemoglobin Level

Normal level of hemoglobin in female is 12-16 while in adults 14-18. Among our diabetic patients 22 were having normal HBS levels while only 1 having abnormal level of HBS. In non diabetic samples 44 have normal HBS level while 1 have abnormal level of HBS.

Malarial Parasite

Among our diabetic patients 1 have malarial parasite and 22 had no malarial parasite while in non daiabetic samples 10 had malarial parasite and 35 had no malarial parasite.

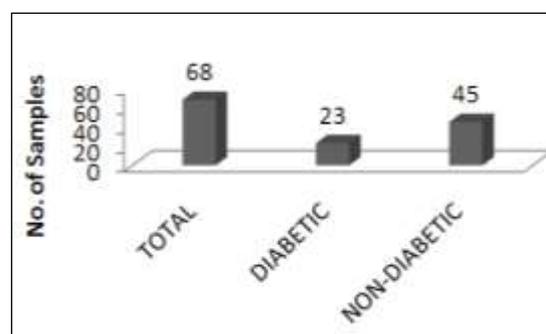


Fig. 1. Prevalence of Diabetes.

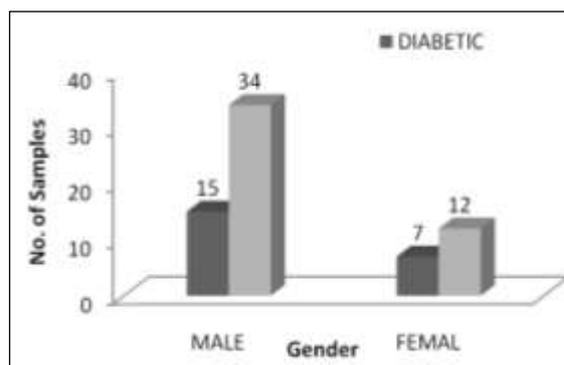


Fig. 2. Prevalence of diabetes (Male & Female).

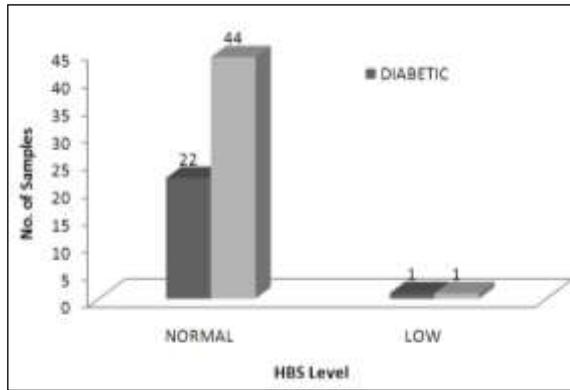


Fig. 3. Prevalence of HBS (Diabetic & Non-diabetic).

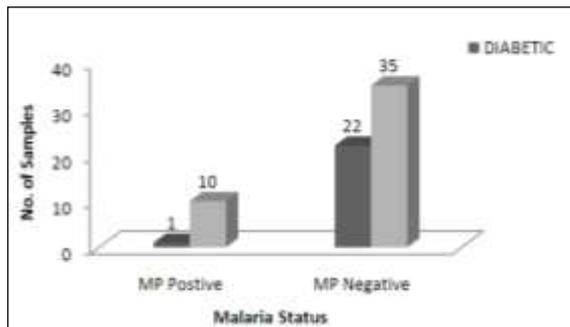


Fig. 4. Prevalence of MP (Diabetic & Non-Diabetic).

Discussion

Diabetes mellitus is emerging as an epidemic all over the world (Amos *et al.*, 1997; Passa, 2002). It is one of the metabolic disorders which if not properly managed can lead to long term life threatening complications and premature deaths (Wannamethee *et al.*, 2004; Mulnier *et al.*, 2006). Moreover the cost involved in management of this disease and its complications is quite high (Gadbsy, 2002). There is 170% increase in the incidence of diabetes in developing countries as compared to 47% in developed countries (Wild *et al.*, 2004). Main reasons are population growth, ageing, urbanization, increased prevalence of obesity and physical inactivity (King *et al.*, 1998). Pakistan stands on number 6 among the Top Ten countries having increased burden of diabetes mellitus (WHO, 2003).

The Importance of my research on Diabetes is that most of the people of the ruler area of Bannu are unaware from diabetes. They do not know about the symptoms, diagnosis in treatment of diabetes. They consider this disease is a common.

Through my research many of the people know about this big disease the ruler area of Bannu. We found a prevalence of Abnormal Glucose Tolerance of 33.8% among residents living in a rural area of Bannu which is low as compared to that reported by Pakistan National Diabetes Survey (15.9%) done in 1957.

In a study about 1091 respondents were selected after cleaning the data, among them 293 were males and 798 were females. Of the total 15.41% of the males and 12.31% of females were found to have diabetes mellitus. Thus making a total prevalence of 13.14%. Impaired fasting glucose (IFG) was found in 5.14% males and 5.78% females making a total prevalence of 5.61%. Over all (DM & IFG) was found to be 20.55% in males and 18.09% in females. The main risk factors identified were obesity, family history, hypertension and increasing age (Zafar *et al.*, 2011). In our study age was a risk factor for diabetes with the mean age increasing from non-diabetics to IFG and diabetics in both sexes. Prevalence of diabetes increased with advancing age in both sexes reaching a peak in the 55-64 years group in both males and females; this was also seen in other studies done in the sub continent. The decline in rates of prevalence seen in the 65 and above age group may be due to the fact that the diabetics are not surviving over 65 years of age and dying earlier due to poor control and early complications. The peak prevalence of IFG in both sexes was seen a decade earlier than diabetics, at age of 45-54 years.

Prevalence rates of hypertension increased from non-diabetics to IFG to diabetic group, showing an association of hypertension with diabetes. This association was stronger in females as compared to males (p value <0.001) and also seen in similar studies done in the region.

In a survey an increased association of family history of diabetes with risk of diabetes and impaired fasting glucose was observed (Zafar *et al.*, 2011). In our study family history of diabetic patients was also recorded in which many people were not aware if their relatives having diabetes or were hesitant to disclose this information. The same results were shown by Shera *et al* that the relative risk for developing diabetes was more with family history (Shera *et al.*, 2007).

Conclusions

The results from the audit showed that the pharmacist made a major contribution to ensure effective and safe treatment for the patients and optimizing drug doses. Lack of pharmacist documentation was the reason for discrepancy from practice in some areas of the pharmaceutical care delivery. A database would help to standardize the documentation of pharmacist actions and identification of pharmaceutical care issues. Further refinement of the tool will likely improve the ease of use and minimize the time required for application.

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