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RESEARCH PAPER

Frequency of hyperglycemia and its associated risk factors in diabetic patients

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Abstract

Diabetes is a disorder of metabolism in which body unable to secrete sufficient or produce insulin. Hyperglycemia may lead to cadriomyopathies, neurophathies, nephropathies and retinopathies. The objective of this was to investigate the frequency of hyperglycemia and associated risk factors among people of Khyber Pakhtunkhwa, Pakistan. This study was a population based cross sectional study, conducted on randomly collected samples from 384 individuals of age more than 25 years. Demographic data were collected by questionnaire while blood samples were collected for determination of plasma glucose through spectrophotometer (Micro Lab 300). Patients were considered diabetic if plasma glucose level were from 140-199mg per dl. All the data were analyzed through statistical package for social sciences version 22. A total of 384 samples were collected from patients in 19.3% were hyperglycemic. Out of total (n=384), male were 62.2% (n=239) and female was 37.8% (n=145). Majority patients were found in age of 26-39 years with 41.4% (n=159), followed by age of 40-54 years with 40.1% (n=154) and 18.5% (n=71) at age of 55-70 years. Overall percentage of obesity, hypertension and positive family history was 28.0% (n=109), 30.0 (n=116) and 29.9% (n=115) patients respectively. Our results suggest that type II Diabetes has become a health problem in district Charsadda, especially in adults. Therefore, proper and better strategies are required to overcome the issue.

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Introduction

Diabetes is a metabolic disorder of hyperglycaemic due to deficiencies of insulin or abnormal secretion of insulin (Alberti *et al.,* 1998). The sign and symptoms of diabetes are thirst, weight loss, polyphagia and high concentration of glucose level in blood (Haque *et al.,* 2011). Several types of disease occur due to diabetes mellitus including loss of vision, renal failure, stroke, nervous disorders, cardiac diseases and diabetes foot (Al-Hakami *et al.,* 2016).

The Diabetes Type II is global difficulty, which approximately affects 415 million persons and it is estimated to spread up to 62 million individuals in the completion in the year 2040 (Shaw *et al.,* 2010). Increasing developments of diabetes type II in developing countries as well as in developed nations (Bimenya *et al.,* 2010). The prevalence of diabetes mellitus is 7.2%, 11.1%, 11.6% and 20.4 in Turkey, Pakistan, India and Hawaii respectively (Akter *et al.,* 2015). According to world health organization (WHO) that 12.9 million peoples are suffered from the diabetes in which 10% (9.05 million) diabetic patients was identified and 4.05 million peoples was not detected in Pakistan (Nardone *et al.,* 1995).

Diabetes are linked to micro vascular, Macrovascular and metabolic modifications which consists of peripheral arterial, cerebrovascular and cardiovascular disease, as well as retinopathies, neuropathies and also the nephropathies. Risk features linked with the type II diabetes consist of obesities, dieting and physically activities, Diabetes positive family's history, increasing age, insulin resistance, genetic factors, and competition (Abbott *et al.,* 2002).

This study was conducted to identify the percentage of diabetes and to aware people of less developed regions about diabetes.

Methodology

Study design, duration and study setting

This cross sectional study was conducted from March to July 2019 at THQ Hospital Shabqadar district Charsadda, Khyber Pakhtunkhwa province of Pakistan.

Sample size, inclusion and exclusion criteria

Sample size (n=384) was calculated by WHO calculator. All diabetic individuals of age 25 and above along with volunteer individually were included in present study. Pregnant female and non-residents of Tehsil Shabqadar individuals were excluded from this study.

Data collection procedure

All the demographic data were collected from patients through questionnaire. Diabetic patients were screen through random plasma glucose (mg/dl) using spectrophotometer (Micro Lab 300). Blood samples were collected through sterilized disposable vacationer tubes containing sodium fluoride (Glucose tube) within one hour of blood collection.

Then samples were centrifuged and transported for further analysis. Blood glucose was measure using by method of glucose oxidase peroxidase. Those individuals who have type II diabetes mellitus if levels of the random blood glucose are 200mg/dl or high but pre diabetes mellitus when there Random Blood Sugar are 140-199mg per dl 7.8-11.0mmol/Liter. In the same way when a (BP) of 140/90 or higher were considered hypertension. Persons were confirmed to obesity if (BMI) Body Mass Index more than 30 kg per mm.

Data analysis

Data were analyzed through statistical package for social sciences (version 21) and microsoft excel (version 2007). Categorical variable like gender, age, hypertension, obesity and positive family history was presented in term of frequency and percentages.

Results

A total of 384 blood samples were collected from patients in which 19.3% (n=74) were hypeglycemic and remaining 80.7% (n=310) was normal individuals as shown in Table 1.

Table 1. Incidence of hyperglycemic patients.

Parameters	Frequency	Percentage
Hyperglycemia	74	19.3
Normal	310	80.7
Total	384	100.0

Out of total, 62.2% (n=239) were male and 37.8% (n=145) were female patients as shown in Table 2.

Table 2. Gender frequency of individuals.

Gender	Incidence	Percentage
Male	239	62.2
Female	145	37.8
Total	384	100.0

Highest number of patients was found in age of 26-39 years with 41.4% (n=159), followed by age 40-54 years with 40.1% (n=154) and 18.5% (n=71) patients in age of 55-70 years as shown in Table 3.

Table 3. Age wise frequency of individuals.

Age (Years)	Frequency	Percentage
26-39	159	41.4
40-54	154	40.1
55-70	71	18.5

All patients were filled the questionnaire of obesity, hypertension and family with positive history.

Obesity was found in 28.0% (n=109), hypertension in 30.0% (n=116) and 29.9% (n=115) patients were found with positive family history as shown in Table 4.

Discussion

According to our study, 19.3% were hyperglycemic patients; almost similar percentage was reported in United State (US), which is 21.7% (Stanifer *et al.,* 2016). Chiwanga *et al.* Reported 10.1% prevalence of diabetes from Uganda (Chiwanga *et al.,* 2016). The diabetes survey in Pakistan reported 26.3% prevalence in whole country (Basit *et al.,* 2018). Patients having age higher than 43 years, hypertensive patients and obese individuals are more prone to diabetes as compared to healthy individuals (Basit *et al.,* 2018). The majority patients were unware about the clinical diabetes in Charsadda region. The variation in prevalence status is the knowledge and awareness about diabetes among community. Additionally, the reasons of high prevalence may be due to dietary patterns, not taking treatment and precautionary measurement. Therefore, the urgent public health awareness is required to overcome the burden of diabetes in our regions. Moreover, the early diagnosis and treatment of communicable diseases are required especially in backward areas of Pakistan.

Table 4. Risk factors of hyperglycemia.

Parameters	Obesity	Hypertension	Family positive history
Yes	28.0% (109)	30.0% (116)	29.9% (115)
No	72.0% (275)	70.0% (268)	70.1% (269)

In present study, diabetes were found more in male than female. The prevalence of male patients was lesser than female from various studies in other countries of the world (Stanifer *et al.,* 2016). Higher number of female patients were found in Punjab, Sindh and Balochistan province of Pakistan as compared to male individuals but male diabetic patients (54.1%) were high than female patients (45.9%) in Khyber Pakhtunkhwa province of Pakistan (Basit *et al.,* 2018), similar to present

study results. Highest number of patients was found in age of 26-39 years with 41.4% while study from US reported 35.8% within age of 18-39 years (Stanifer *et al.,* 2016). Chiwanga *et al.* (2016) reported more patients in age of 18-39 with 53.6% from Uganda.

The hypertension were found in 30.0% patients in present study whereas 31% reported from US (Stanifer *et al.,* 2016). Chiwanga *et al* from Uganda

reported similar hypertension prevalence in diabetes patients with 29.5% (Chiwanga *et al.,* 2016). The hypertensive patients were high in diabetic individuals (Basit *et al.,* 2018), similar to the present study.

Obesity were observed in 28.0% in our study whereas 58.0% reported by Stanifer *et al* (Stanifer *et al.,* 2016). Chiwanga *et al* from Uganda reported 43.2% obesity in diabetes patients (Chiwanga *et al.,* 2016).

Positive family history was found in 29.9% patients in present study. Chiwanga *et al* from Uganda reported 19.5% family positive history (Chiwanga*et al.,* 2016). The prevalence of positive family history was high in present study than reported from Uganda (Chiwanga *et al.,* 2016).

The diabetes survey of Pakistan revealed 30.2% prevalence of positive family history (Basit *et al.,* 2018). As expected, the prevalence of diabetes was high in positive family history as compared to individuals without family history of diabetes. This indicates that diabetes will increase in future coming decades (Danquah *et al.,* 2012). The significant association of diabetes and positive family history has been reported from two to six times high in diabetes individuals than without diabetes (Harrison *et al.,* 2003).

Conclusion

This study determined the high prevalence of diabetes along with significant association of various risk factors (hypertension, obesity and family positive history). Special attention is required for communicable diseases (diabetes) especially in lower middle class regions of Pakistan. It is suggested that higher literacy level and health education by medical professionals are necessary.

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