



Incidence of diabetes mellitus types 1 and 2 in the population of Usheri Dara, Dir Upper, Khyber Pakhtunkhwa, Pakistan

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Abstract: Diabetes mellitus (DM) is a heterogeneous primary disorder of carbohydrates metabolism that generally involves absolute or relative insulin deficiency, insulin resistance or both. The present study is a part of survey regarding the incidence of DM types 1 and 2 in Usheri Dara (UD), Dir Upper (DU), Khyber Pakhtunkhwa (KP), Pakistan during June 2013-August 2014. A questionnaire covering all information about incidence, types, symptoms, age of respondents, treatment of DM and status of people was developed. The designed questionnaires were distributed randomly among the people (n=500) of UD, which was divided in 7 quadrates, viz., Katten, Jabbar, Almas, Tarpatar, Usheri Khas, Batal and Ghar Kohi. About 13.2% of the people of UD have DM. Maximum (7.2%) of patients was suffered from DM type 2, however, DM type 1 was observed in minimum (6.0%) of them. Maximum (49%) of the respondents belong to age group 26-45 years, however, minimum (4%) of them to the age group 2-10 years. Most of DM patients use insulin, however, rapid acting insulin was used by maximum (3.6%), moreover, pre-mixed was used by minimum (0.4%) of them. Types of tests performed by DM patients for monitoring blood sugar level observed were blood and urine tests, however, both blood and urine tests were performed by maximum (9.4%), moreover, only blood test was performed by minimum (3.8%) of them. Maximum (4.6%) of DM patients feel sweating, however, giddiness was observed in minimum (2%) of them. Maximum (19%) of the respondents were businessperson, however, minimum (16%) of them were employee. It was concluded that the most common type of diabetes was DM type 2. Large scales and cost effective prevention programs need to be initiated to maximize health and to reduce the burden of DM.

Keywords: Blood test, diabetes mellitus type 1 and 2, insulin, urine test, Usheri Dara

INTRODUCTION

Usheri Dara (UD) is located between 72° 16'-72° 50' North latitude and 35° 06'-35° 16' East longitudes in Pakistan. Altitude is approximately 1800 m above the sea level. The total area is 113373 acres. The total population is 39386. The mean maximum and minimum temperature in January has been recorded as 13.3 and 3.3 °C, respectively. The UD is home to a number of wildlife species including mammals such as snow leopard, *Panthera uncia* (Schereber, 1775); common leopard, *Panthera pardus* (L, 1758); musk deer, *Moschus anhucnsis* (L, 1758); black bear, *Ursus americanus* (pallas, 1780); wolf, *Canis lupus* (L, 1758); yellow throated marten, *Martes flaviqula* (Pinel, 1792); red fox, *Vulpes vulpes* (L, 1758); pika, *Ochotona daurica* (Link 1795); golden marmot, *Marmota caudate* (Geoffroy, 1844) and rhesus monkey, *Macaca mulatta* (Zimmermann, 1780). Himalayan monal pheasant, *Lophophorus impejanus* (Latham, 1790); Himalayan snow cock, *Tetraoggallus himalayensis* (Gray, 1848) and snow partridge, *Lerwa lerwa* (Hodgson, 1837) are some of the key bird species found here. Blue pine, *Pinus wallichiana* (Jacks, 1939) is dominated species with scattered trees of Himalayan cedar, *Cedrus deodara* (Don, 1831) with frequent occurrence of Himalayan popular, *Populus ciliate* (Royle, 188) [1] (Figure 1).

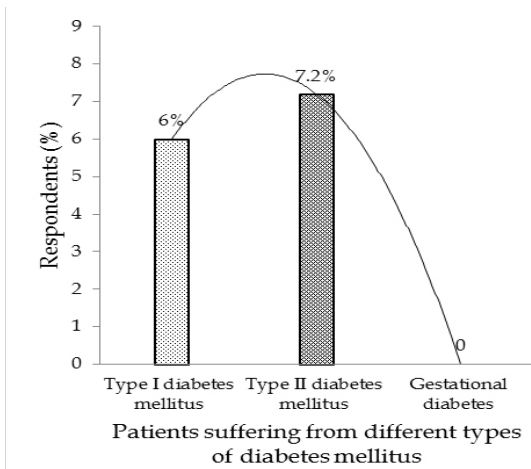
Diabetes mellitus (DM) used to describe a condition characterized by chronic hyperglycaemia and other disorders of carbohydrate, fat, and protein metabolism. The uptake of glucose by the cells is regulated by the hormone insulin, which is produced by the beta cells of the islets of Langerhans in the pancreas [2]. Diabetes mellitus is a chronic and progressive illness that affects all ages. It can affect children, young people, and adults; however, it is becoming more common. It is a condition where the cells of the body cannot utilize glucose properly. It may be categorized into several types but 2 major types are DM type 1 (Insulin dependent DM) and DM type 2 (Non-insulin dependent DM). DM type 1 is present in patients, who have little or no endogenous insulin secretory capacity; therefore, they require insulin therapy for survival. In DM type 1, there is reduced insulin production as the beta cells are gradually destroyed and an increased peripheral resistance in the uptake of insulin [3].

The people mostly suffered DM type 1, however, the aetiology of DM type 1 is still unknown, although, it is thought to be the results of genetic, chemicals and environmental factors. DM Type 1 is not directly inherited, however, individuals may inherit a predisposition, in that people with certain human leukocyte antigen (HLA), which is found in the short arm of chromosome 6 and shows increased susceptibility to DM type 1. Studies on monozygotic twins have identified that 40% of monozygotic twins of a person have DM type 1. The increased percentage among monozygotic twins is because of the strong genetic component of the disease [4]. Genetics alone may not be only contributory factor (CF) to DM type 1. Environmental factors such as viruses should also be considered CF in DM type 1. Epidemic parotiditis (mumps), rubella, and entero-viruses have all been considered to the possible cause of DM type 1. Other possible theories include exposure to food-borne chemical toxins and exposure as a very young infant to cow's milk where certain proteins may trigger an autoimmune reaction. Diabetes mellitus type 1 is characterized by the failure of the pancreatic beta cells to secrete insulin and this appears to be due to the destruction of the beta cells of Langerhans of pancreas by the immune system. As a result, there is a rise in blood glucose, since there is no insulin to stimulate glycogen synthesis in the liver [5].

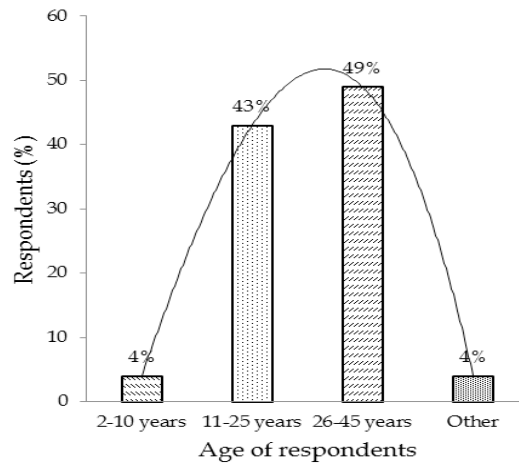


Fig1. Map of 7 quadrates of study area, viz., Katten, Jabbar, Almas, Tarpatar, Usheri Khas, Batal and Garkohi are located in Usheri dara (c) in Khyber Pakhtunkhwa (b) one of the province of Pakistan (a), where the present research was conducted during June 2013-August 2014 [10].

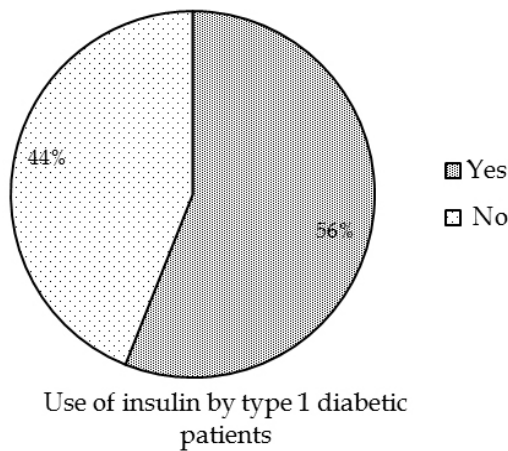
Diabetes mellitus type 2 is the commonest form of diabetes and is characterized by disorders of insulin secretion and insulin resistance; however, about 90% of people with diabetes around the world have DM type 2. It is largely due to the results of excess body weight, physical inactivity, and common in individuals over the age of 40. There is a higher incidence of DM type 2 in urban than in rural areas as well as incidence is associated with population whose lifestyle has changed from traditional patterns to a modern [6]. In DM type 2, the body produces enough insulin, however, the cells develop a condition called insulin resistance where glucose does not move into the cells [7]. The body breaks down fats, proteins, and stored glycogen to produce glucose resulting in high levels of glucose in the blood and excess by products such as ketones, which are products of incomplete fat metabolism. The prevalence of diabetes for all age groups worldwide was estimated to be 2.8% in 2000. The total number of people with diabetes in 2000 estimated was 171 million. The DM in urban population in developing countries is projected to double between 2000 and 2030 [8]. About 1.1 million people were estimated to have died due to diabetes in 2005 and almost 80% of diabetes deaths occur in low- and middle-income countries and mostly people under the age of 70 years and 55% of diabetes deaths are in women [9]. This research is designed to estimate the incidence of DM type 1 and type 2 and to educate the people about the diabetes.



(a)

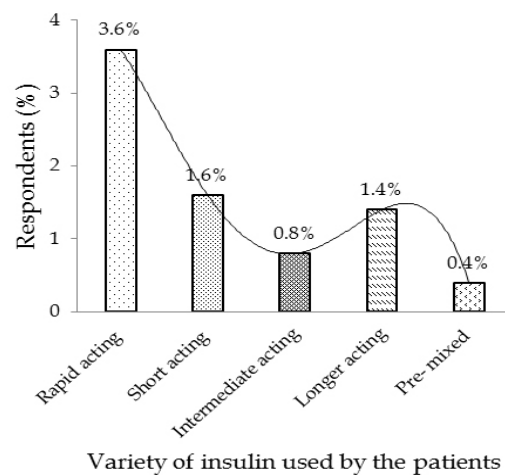


(b)



Use of insulin by type 1 diabetic patients

(c)



Variety of insulin used by the patients

(d)

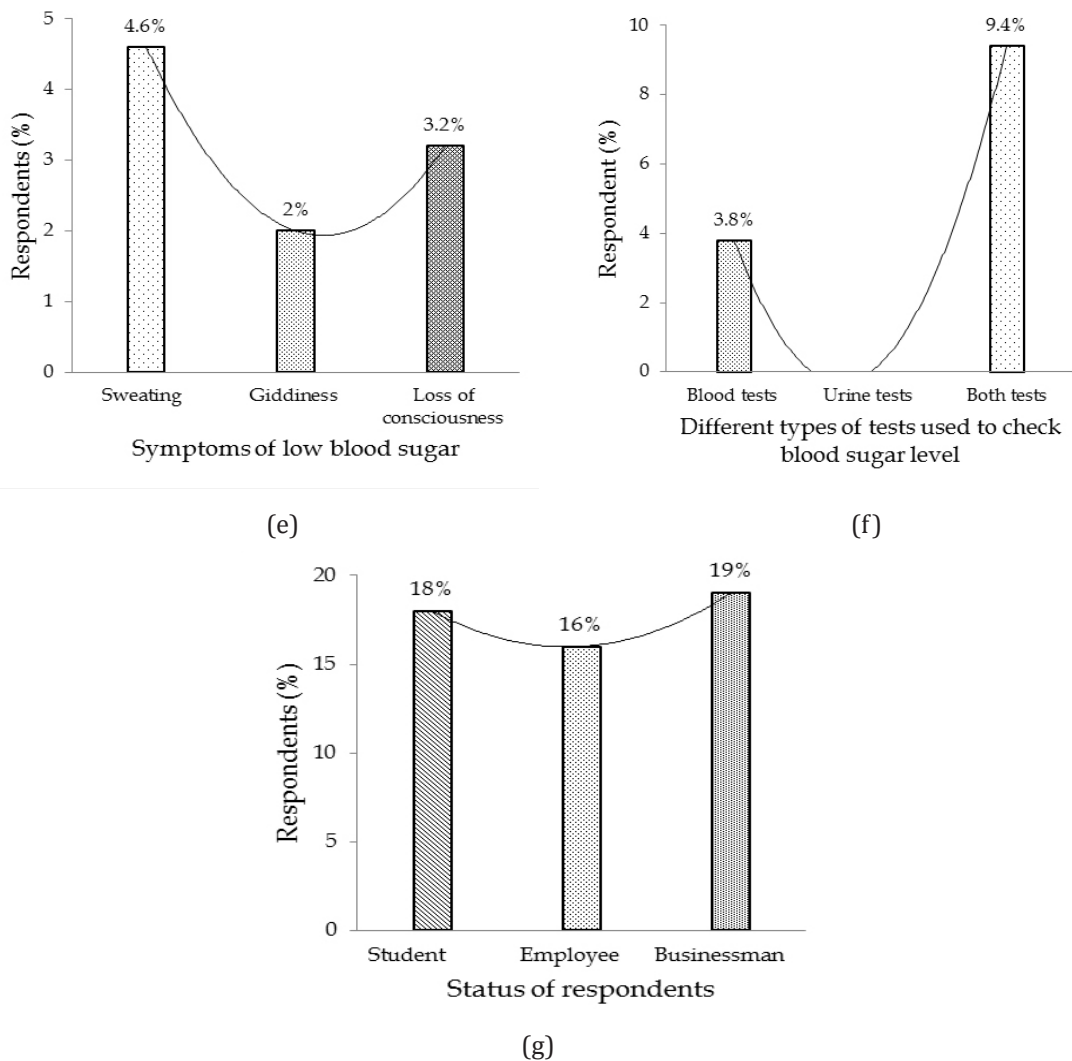


Fig2. Incidence of type 1 and type 2 diabetes mellitus in the population of Usheri Dara, Dir Upper, Khyber Pakhtunkhwa, Pakistan was investigated in the present survey during June 2013-August 2014: frequency of different types of diabetes mellitus (a); age of respondents (b); insulin used by diabetic patients (c); variety of insulin used by diabetic patients (d); symptoms of low blood sugar (e); types of tests used to check blood sugar level (f); status of respondents (g); Usheri Dara has been divided in 7 quadrates: Katten, Jabbar, Almas, Tarpatar, Usheri khas, Batal and Garkohi, where questionnaires (n=500) were distributed randomly; trend line: polynomial line; data were analyzed statistically by using Computer Program Microsoft Excel (CPMSE) and Statistical Package for Social Sciences (SPSS) version 16; data are showing in percentage (%).

MATERIALS AND METHODS

The aim of the present research was to estimate the incidence of type 1 and type 2 DM in Usheri dara (UD), Dir Upper (DU), Khyber Pakhtunkhwa (KP), Pakistan. Study was conducted through questionnaire including information about the incidence, types, symptoms, age of respondents, treatment of diabetes mellitus (DM) and status of people. It was developed in Computer Program Microsoft Word (CPMSW). The questionnaires were distributed randomly among the people (n=500) of 7 quadrates of study area, viz., Katten, Jabbar, Almas, Tarpatar, Usheri khas, Batal and Ghar Kohi during June 2013-August 2014. Data was analyzed statistically by

using Computer Program Microsoft Excel (CPMSE) and Statistical Package for Social Sciences (SPSS) version 16. Data are showing in percentage (%). Tests for screening and diagnosis of DM are now readily available, however, due to limited resources for the present research, they were not be used.

RESULTS

To evaluate the incidence of type 1 and type 2 DM in Usheri Dara a study was conducted during June 2013-August 2014. The questionnaires (n=500) were distributed randomly among the people of 7 quadrates of Usheri Dara, viz., Katten, Jabbar, Almas, Tarpatar, Usheri khas, Batal and Ghar Kohi.

During the present survey, incident rate of different types of DM was observed, which are in descending order as following: DM type 2 (7.2%) > DM type 1 (6%) > gestational diabetes (0%) (Figure 2a). The people to whom questionnaire were distributed their age groups with descending order are as following: 26-45 years (49%) > 11-25 years (43%) > 2-10 years = other (each 04%) (Figure 2b). Maximum number (56%) of the diabetic patients use insulin, however, minimum (44%) of them use tablets (Figure 2c). Variety of insulin used by diabetic patients in order to: rapid acting (3.8%) > short acting (1.6%) > longer acting (1.4%) > pre-mixed (0.4%) (Figure 2d). Symptoms of low blood sugar observed were sweating (4.6%) > loss of consciousness (3.2%) > giddiness (02%) (Figure 2e). The order of types of tests performed by diabetic patients to manage their blood sugar level is: both blood and urine tests (9.4%) > blood test (3.8%) > urine test (0%) (Figure 2f). Status of respondents observed were: businessman (19%) > students (18%) > employee (16%) (Figure 2g).

DISCUSSION

Currently, a study was done to estimate the incidence of diabetes mellitus type 1 and type 2 in the population of Usheri Dara during June 2013-August 2014. Questionnaires (n=500) were distributed by random method among the people of 7 quadrates of study area, viz., Katten, Jabbar, Almas, Tarpatar, Usheri Khas, Batal and Ghar Kohi.

Adil et al. [11] undertook survey of DM type 2 patients by developing questionnaire and interviewing the patients. Analysis using SPSS versions 10.0 showed that majority of the patients were suffering DM type 2. In the current work, it was observed that majority of patients was suffered from DM type 2, which show that both results are the same. The similarity in the results may be due to genetic factors and same method of data collection.

Mumtaz et al. [12] evaluated 350 patients, 139 patients (39.7%) were between 35-45 years age and 183 patients (52.5%) were > 45 years, while 28 patients (8%) were < 35 year of age. However, 42 patients (12%) were having DM type 1, while 308 patients (88%) were having DM type 2. Moreover, 79 patients (22.6%) were having the knowledge about DM, while 270 patients (77.1%) were unaware of DM. Further, 47 patients (13%) were aware that DM leads to cardiac problems, while 74 patients (21.1%) know that DM causes ophthalmological complications. Furthermore, 48 patients (13.7%) were aware of neurological complications and 180 patients (51.4%) were aware of hypoglycemia. Although, 341 patients (97.4%) aware of diet management. In the current study, it was observed that out of 500 respondents 66 were found to have DM thus making a frequency rate of 13.2%. Majority (7.2%) of respondents were suffered from DM type 2. People of the study area are mostly illiterate and have no basic knowledge about DM. The difference in the results may be due to differences in life style.

Ethiraj et al. [13] conducted a study, to identify patterns of anti-diabetic drugs prescribing in DM type 2. Patients suffered with DM type 2, who attended the endocrinology outpatient clinic in the Postgraduate Institute of Medical Education and Research, Chandigarh, India were evaluated for social, demographical, clinical variables and medications, however, 1185 DM type 2 patients were assessed. Metformin was the most commonly prescribed drug (70 %), followed by insulin (53 %), sulfonylureas (44 %) and pioglitazone (28 %). Moreover, 704 (59 %) treated patients had uncontrolled hyperglycemia. Family history, diabetes duration, neuropathy,

nephropathy, retinopathy, coronary arterial disease, and diabetic foot were all significantly associated with insulin therapy. In the current study, it was observed that mostly prescribed drug was orinase tablets (3.4%) followed by tolinase (1.4%). Majority of the DM type 1 patients use insulin for the treatment of DM. Mostly prescribed insulin was rapid acting insulin. Retinopathy and diabetic foot was observed in some of the patients suffering from DM. The difference in the results may be due difference in the method of study, data analysis and other environmental factors.

Satyanarayana et al. [14] conducted a study to determine the knowledge, attitudes and practices (KAP) of diabetes and its complications among the population of rural Southern-India. However, 380 people with diabetes (group 1) and 380 people from the general population (group II) aged ≥ 40 years were randomly enrolled. A questionnaire was used to document the knowledge, attitude and practices. The mean score of knowledge ($P < 0.001$), attitude ($P < 0.001$) and practices ($P < 0.001$) was significantly higher in diabetic patients. Among the patients in-group I, 28.2, 36.1 and 40.3 % had the correct knowledge, a positive attitude and good practices, respectively, whereas the scores of group II were comparatively low. According to multiple linear regression analysis, education in the subjects is the main influencing factor for correct knowledge ($P < 0.001$) and a positive attitude ($P < 0.001$) in both groups. In the current study, it was observed that majority of the respondents were illiterates having no knowledge of DM, its causes and complications. Health education programs need to be organized to increase the awareness resulting in positive practices.

Sebnem et al. [15] conduct a study to determine anxiety, depression, life and sleep qualities in patients with DM type 2 in the Turkish University Hospital in 2010. The Pittsburgh sleep quality index (PSQI), the Short Form-36 quality of life scale (SF36), beck depression inventory (BDI), beck anxiety inventory (BAI) and self-designed questionnaires were used. Sleep quality was bad in 67.9 % of the patients. The mean incidence of depression in patients was 6.35 ± 4.08 , and mean frequency of anxiety was 7.81 ± 3.98 . In the current study, it was observed that some of the diabetic patients were suffered from sleeping disorder. They were worried and depressed about their illness and their management. They have no such knowledge of how to manage their illness. Tests for screening and diagnosis of DM are now readily available, but due to limited availability of time and resources for the present research, they were not be used. Therefore, according to a questionnaire, we couldn't get a good estimate of the DM incidence. For example, Type 2 DM normally accounts for 85-90% of all cases, however, in this paper, the incidence of Type 2 DM and Type 1 DM is 7.2% and 6%, respectively. It was observed that inadequate healthcare teams, economic resources, and educational facilities constitute significant barriers in the management of DM. In the study area, providing basic knowledge through health care team can help them to manage their illness.

CONCLUSION

In the present study, the overall frequency rate of DM found was 13.2 %, however, most (7.2%) of them was suffered from DM type 2. Majority (9.4%) of the diabetic patients perform blood and urine tests to manage DM, however, in 4.6% of them sweating symptom was observed, moreover, rapid acting insulin was used by maximum (3.6%) of them.

RECOMMENDATION

Knowledge about diabetes mellitus, its medication, complication, and risk factors can show the best results in the management of DM. Therefore, awareness programs are needed to be provided through both electronic and print media. Governmental and non-governmental organizations (NGOs) are recommended to pay their attention to the increasing situation of DM. Low cost drugs need to be provided, which can helps in the better management of DM.

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