Original article

Frequency of diabetes mellitus in the population of Usheri Dara, Khyber Pakhtunkhwa, Pakistan

Farzana Perveen[1] , Ejaz Ahmad[1]

1-Department of Zoology, Shaheed Benazir Bhutto University (SBBU), Main Campus, Sheringal, Khyber Pakhtunkhwa (KP), Pakistan

Corresponding author: Dr Farzana Perveen Email: farzana_san@hotmail.com

Abstract

Background: Diabetes mellitus (DM) is a metabolic disorder characterized by high blood glucose (HBG) either because of low production of insulin by the pancreas or receptors do not respond to insulin secreted.

Methods: The present study is a part of survey regarding the frequency of DM in Usheri Dara (UD), Dir Upper (DU), Khyber Pakhtunkhwa (KP), Pakistan during June 2013-August 2014. A questionnaire was designed having information about the most of aspects of DM. They were distributed randomly among the people (n=500) of the community of UD, which was divided in 7 quadrates, *viz*., Katten, Jabbar, Almas, Tarpatar, Usheri Khas, Batal and Garkohi.

Results: Out of 500 respondents, 66 were found to have DM, thus making a frequency rate of 13.2%. However, maximum (8.6%) of the DM patients feel increased thirst and frequent urination at night, moreover, minimum (1.8%) of them feel decreased appetite. Further, in maximum number (6%) of the patient, DM occurred at the age of 31-45 years, furthermore, in minimum (0.6%) of them at the age of 2-15 years. However, maximum number (6%) of family members of patients suffered from DM was 4-7, moreover, minimum (0.6%) were 1-3. Further, insulin used by maximum numbers (5%) of DM patients was humulin70/30. Furthermore, minimum (0.4%) of them use lispro. However, medicines used by maximum numbers (3.4%) of DM patients were orinase tablets, moreover, minimum (1%) of them use glucophage

Conclusion: It was concluded that the most common occurring age of DM at diagnosis was 31-45 years. Consequently, adopting healthy life style and use of proper treatment is recommended.

Keywords: *Diabetes mellitus (DM), high blood glucose (HBG), hypertension, insulin, morbidity, mortality, pancreas*

Introduction

The diabetes mellitus (DM) is a group of metabolic diseases, in which a person has high blood glucose (HBG), either because the cells of islet of Langerhans of pancreas does not produce enough insulin or because cells do not respond to insulin, i.e., produced. However, insulin is a hormone that maintains the movement of glucose into the cells. Moreover, this HBG produces the classical symptoms of polyuria (frequent urination), polydipsia (increased thirst), and polyphagia (increased hunger). Further, it is characterized by hyperglycemia resulting from defects in insulin secretion and action or both (1). Furthermore, it is one of the leading causes of death and disability in major population of the world (2). Consequently, the international diabetes federation (IDF) and world health organization (WHO) have declared DM as a global epidemic disease (3) due to it is the major cause of premature mortality (4).

The DM type 1 also called insulin dependent DM (IDDM) is caused due to the destruction or dysfunction of pancreatic B cells or absolute absence of B cells in islets of Langerhans, thus insulin level in the plasma is very low and lead to the ketoacidosis, if the patients do not receive any insulin from outside. Rarely in the starting stages of DM type 1, there may be enough insulin to prevent the danger of ketoacidosis, therefore, at this stage; the patients have no need to take insulin. However, the disease mostly affects young patients, the most commonly under 30 years of age (5).

The DM type 2 also called as adult-onset or maturity onset DM or non-insulin dependent DM (NIDDM) is a chronic condition that affects the process, in which the body metabolizes glucose,

[Downloaded from intjmi.com on 2026-11-08]

which is the body main source of fuel. However, in the case of DM type 2, an individual body either shows resistance to the effects of insulin or it does not produce insulin, therefore, that can maintain a normal glucose level in the body (6). Moreover, in DM type 2, the pancreas has some capability to produce insulin but it is not able to fulfill the basic needs of the body. The body cells also show resistant towards the action of insulin. Further, this type of DM is much common than type 1. Furthermore, it mostly occurs in elders, especially after age of 40 years. Obese people are more significantly exposed to DM type 2. However, it is characterized by slow onset. If this is not treated on time, it can leads to a dangerous condition called ketoacidosis. Actually, DM type 2 is a disorder, in which there is hyperglycemia due to resistance of body to insulin secretion as well as inadequate insulin secretion (7).

The complications of DM are decreased in the patients, whose blood glucose level is properly controlled. However, the majority health problems can increase the diagnoses effect of DM like smoking, high cholesterol level, obesity, increased in blood pressure and/or no exercise. Moreover, the complications of DM can be divided into 2 main groups, i.e., acute and chronic complications. Further, acute complications include diabetic ketoacidosis, hyperglycemia, diabetic coma, and respiratory infections. Furthermore, a chronic complication includes diabetic cardio myopathy, nephropathy, neuropathy, and retinopathy. If macro vascular diseases occur to the diabetic patient, therefore, it will results in the cardiovascular diseases (8).

The UD is located between 72° 16'-72° 50' North latitude and 35° 06'-35° 16' East longitudes in Pakistan, however, altitude is approximately 1800 m above the sea level. Further, total area is 113373 acres and population is 39386. Furthermore, 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 wild life species including mammals such as snow leopard, *Panthera uncia* (Schereber, 1775); common leopard, *Panthera pardus* (L, 1758); musk deer, *Moschus anhuicnsis* (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, *Maccaca mulatta* (Zimmermann, 1780). However, 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. Moreover, Blue pine, *Pinnus wallichiana* (Jacks, 1939) is dominated species with scattered trees of Himalayan cedar, *Cedrus deoDara* (Don, 1831) with frequent occurrence of Himalayan popular, *Populous ciliate* (Royle, 188) (9) (Figure 1). The objective of the present research is to estimate the frequency of DM in the population of UD, DU, KP, Pakistan.

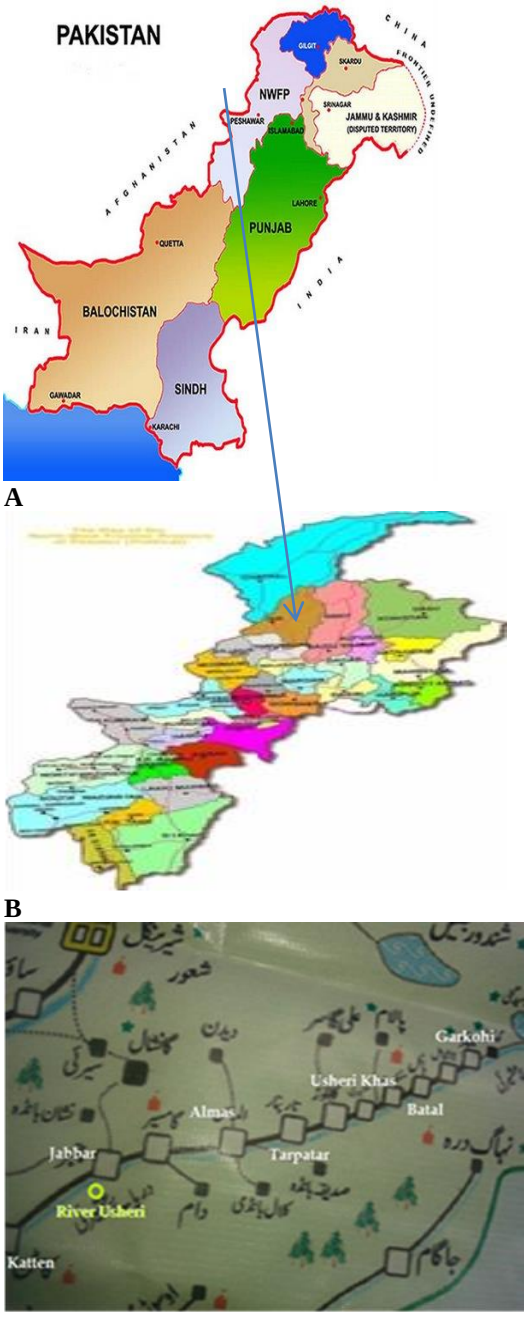


Figure 1 Map of the study area, where the present research was conducted from June 2013-August

[Downloaded from intjmi.com on 2026-11-08]

2014. There were 7 quadrates of the 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) (10).

Method

The present survey was done through the questionnaire concerning the frequency of diabetes mellitus (DM) in Usheri Dara (UD), Dir Upper (DU), Khyber Pakhtunkhwa (KP), Pakistan. The questionnaire including information about the frequency, signs, symptoms, treatment, family history and occurrence of diabetes was developed in Computer Program Microsoft Word (CPMSW). They were distributed randomly among the community (n=500) of 7 quadrates of the study area, *viz*., Katten, Jabbar, Almas, Tarpatar, Usheri Khas, Batal and Ghar Kohi from June 2013-August 2014. Data was analyzed statistically by using CPMSE and Statistical Package for Social Sciences (SPSS) version 16 and are showing in percentage (%).

Results

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

Number of diabetic patients per quadrate of study area were as follow: Tarpatar (13) > Jabber (12) > Katten (10) > Almas (09) = Batal (09) > Usheri Khas (07) > Ghar Kohi (06). Maximum (2.6%) of DM patients was in Tarpatar and minimum (1.2%) was in Ghar Kohi. The average patients per quadrate were 2.0±0.3 (Table 1).

Table 1 The frequency of diabetes mellitus (DM) among the people of Usheri Dara, Dir Upper, Khyber Pakhtunkhwa, Pakistan where questionnaires (n=500) were distributed randomly during June 2013-August 2014.

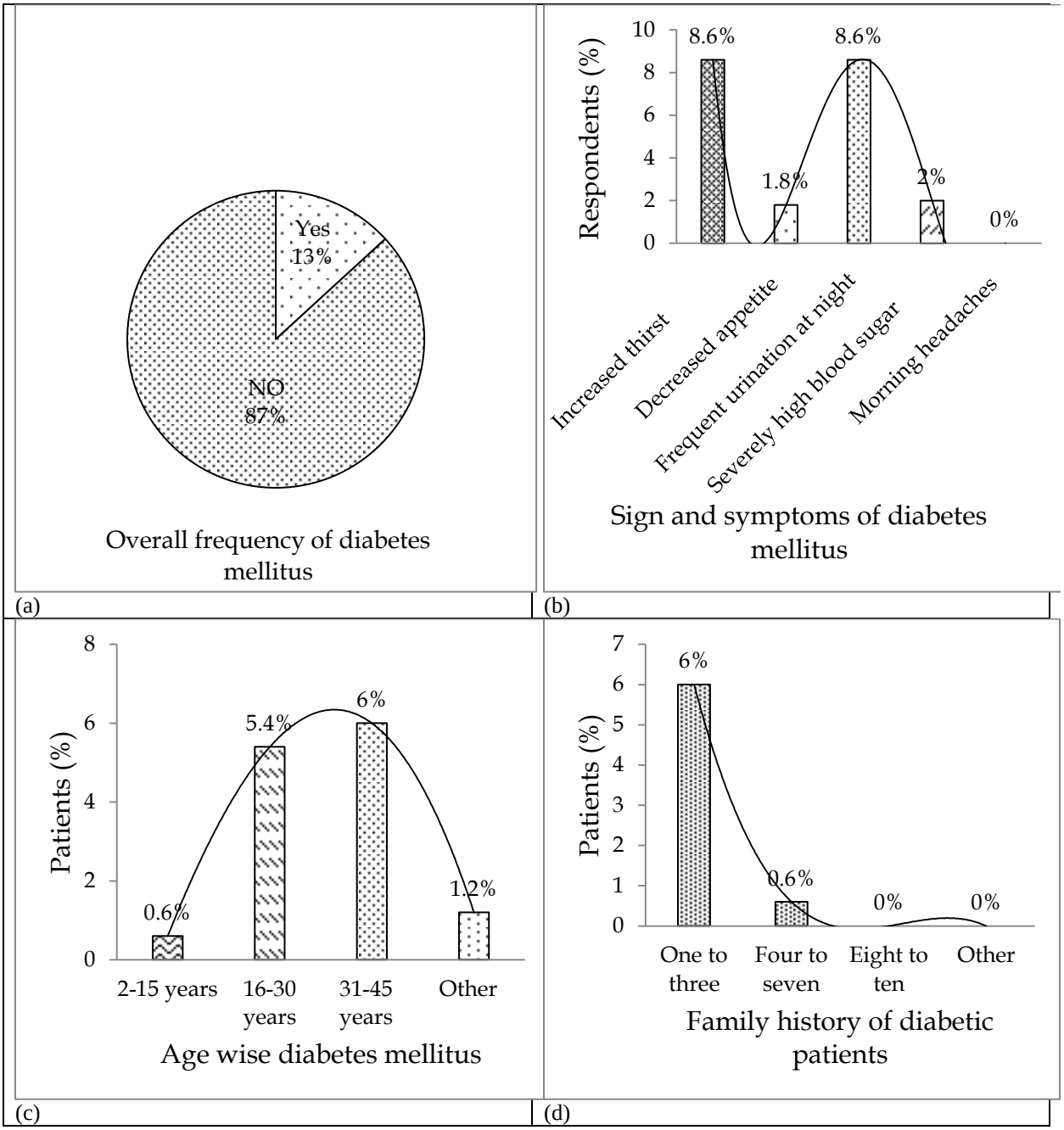
Quadrates	n	1	2	3	4	5	6	7	M±SD
Diabetic	500	1.8%	2.4%	1.8%	2.6%	1.4%	1.8%	1.2%	2.0±0.3

[1]Quadrates: study areas; 1: Katten; 2: Jabber; 3: Almas; 4: Tarpatar; 5: Usheri Khas; 6: Batal; 7: Garkohi; n: number of respondents

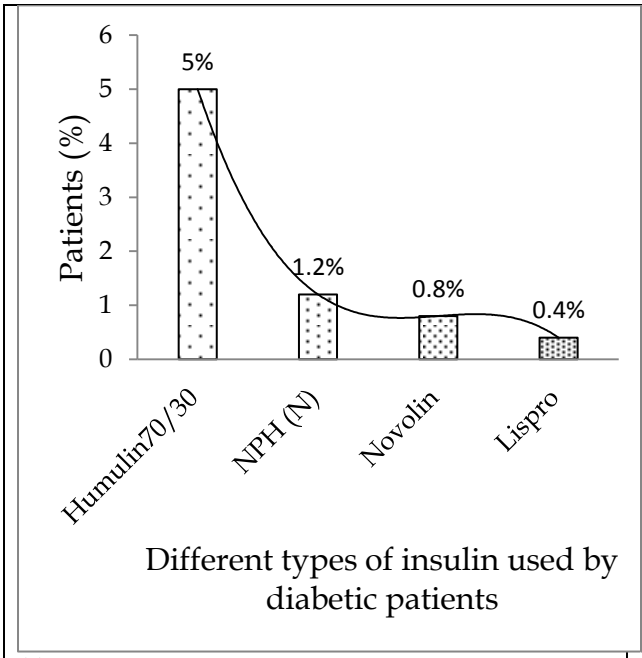
[2]Data were analyzed statistically by using Computer Program Microsoft Excel (CPMSE) and Statistical Package for Social Sciences (SPSS) version 16; %: percentage

During the present survey, the overall frequency rate of DM in the population of UD reported was 13.2% (Figure 2a). Sign and symptoms of DM observed were: increased thirst (8.6%) = frequent urination at night (8.6%) > severely high blood sugar (02%) > decreased appetite (1.8%) > morning headaches (0%) (Figure 2b). Diabetes mellitus occurring age studied were: 31-45 years (06%) > 16-30 years (5.4%) > other (1.2%) > 02-15 years (0.6%) (Figure 2c). Numbers of family members suffered from DM observed were: 1-3 (06%) > 4-7 (0.6%) > 8-10 (0%) = other (0%) (Figure 2d). Types of insulin used by DM patients studied were: humulin70/30 (5%) > neutral protamine hagedorn (NPH) (1.2%) > novolin (0.8%) > lispro (0.4%) (Figure 2e). Medicines used by DM pateints observed were: orinase (3.4%) > tolinase (1.4%) > glucophage (1%) > glucophage XR (0%) (Figure 2f).

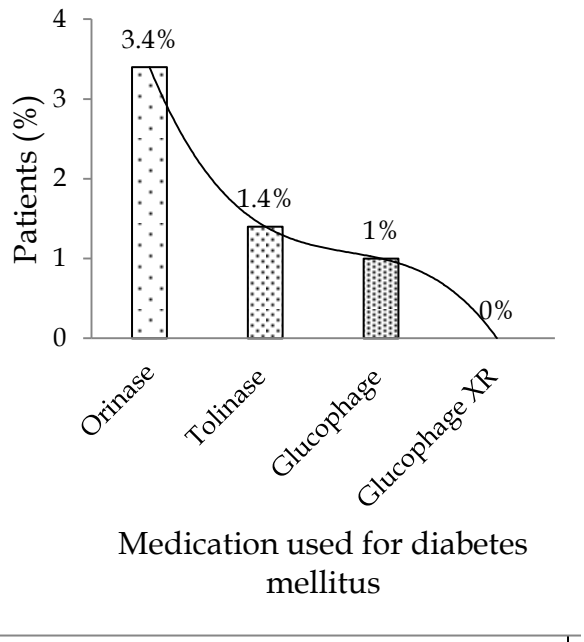
[Downloaded from intjmi.com on 2026-11-08]



[Downloaded from intjmi.com on 2026-11-08]



(e)



(f)

Figure 1 Frequency of diabetes mellitus (DM) in the population of Usheri Dara, Dir Upper, Khyber Pakhtunkhwa, Pakistan was investigated in the present survey during June 2013-August 2014: overall frequency of DM (a); signs and symptoms of DM (b); diabetes occurring age (c); family history of DM (d), types of insulin used (e); types of medicines used for the treatment of DM (f); 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 (%).

Discussion

Currently, a study was conducted to estimate the frequency of DM in the population of UD from 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.

Hydrie et al. (11) made a survey on prevalence of DM. Sixteen randomly selected villages of Lasbella district of Baluchistan were included in this study. Prevalence rate of MD was 6.3%, however, Khan et al. (12) investigated prevalence of DM in 2 districts of Azad Jammu and Kashmir, i.e., in Mirpur and Kotli. 600 families were randomly selected from both districts. The mean prevalence of DM was 1.7% in the targeted area. However, Atta et al. (13) made a survey in health care setting in various cities of Pakistan for 8 months. Out of the total 152 patients screened the prevalence of DM in the adult population was found to be 0.74%. Diabetes mellitus Type 2 was observed at a prevalence rate of 0.72% and type 1 DM with a rate of 0.21%. Moreover, Akther et al. (14) made a cross sectional study in the remote rural areas of Northern Bangladesh. The prevalence of DM was found to be 7.2%. Moreover, Nozha et al. (15) made a community based national epidemiological health survey by examining Saudi community in the age group of 30-70 years. A total of 17232 people were selected for the study and 16917 participated, i.e., 98.2% response rate. People 4002 (23.7%) out of 16917 were diagnosed to have DM. Thus, overall prevalence of DM obtained from this study was 23.7% in Saudi Arabia. In the current study, the frequency rate of DM was 13.2%, which was high as compare to the above. The high prevalence in the current study may be either due changed environments, genetic factors and lack of knowledge about DM.

Adil et al. (16) undertook cross sectional 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 also observed that majority of patients was suffering from DM type 2, which showed that both results were the same. The similarity in both of the results may be due to same method of data collection.

Hameed et al. (17) study epidemiology of DM in and around Faisal Abad, Pakistan. The age of diabetic patients ranged from 5-82 years. The most

[Downloaded from intjmi.com on 2026-11-08]

frequent age at diagnosis was 45, 40 and 10 years, respectively. In the current study, the most frequent age was 16-30 years and 31-45 years. The difference may be due to difference in life style in the study of Hameed et al. (17)

Anandakumar et al. (18) reported the basic elements of DM type 1 management are insulin administration, nutrition management, physical activity, self-monitoring of blood glucose and the avoidance of hypoglycemia. In DM type 1, since the pancreas can no longer produce insulin, patients are required to take insulin daily, either by injection or via an insulin pump. In the current work, it was observed that majority of the patients with DM type 1 use insulin for the treatment of DM, however, they are mostly uneducated and have no basic knowledge about the management of DM.

Carolyne et al. (19) conducted a study to assess the prevalence and awareness of DM type 2 in Mwanza city, Tanzania. Information about causes and risk factors were collected using structured questionnaire. In addition, community random blood glucose testing was employed to identify those at risk. A total of 640 respondents were participated. Most (46.4%) respondents were in the age group 30-40 years. Overall prevalence of DM type 2 was 11.9%, (n=76). The age between 41-50 years had the highest prevalence of DM type 2 (28.6%) followed by 51-60 years age group (17.2%). First degree relative having DM, alcohol intake, smoking and hypertension were the main risk factor observed. Only 49.2% (n=315) of the respondents knew about the causes and symptoms of DM type 2. In the current work, majority (7.2%) of the respondents was suffered from DM type 2. The most frequent age at diagnosis was 31-45 years (6%) followed by 16-30 years (5.4%). The significant risk factor observed were positive family history of DM. People of the study area were mostly illiterate and have no knowledge about diabetes. The difference in the current study may be genetic factor and difference in feeding habits.

Pinhas et al. (20) reported that it is the best to treat DM type 2 as vigorously as possible to avoid or delay the long term consequences of elevated blood glucose levels, high blood pressure, and dyslipidemia. Treatment focused on discovering the most effective method to lower blood glucose levels, whether it is lifestyle modifications, insulin therapy, oral agents, or any combination of these factors. The diabetes team worked with the teenagers and the family to educate them about the importance of good control and to make the necessary adjustments in treatment every 4-6 weeks until acceptable control was achieved. In the current study, it was observed that majority of DM type 2 patients use insulin and tablets to control their blood glucose levels. There are no such diabetes treatment teams to educate the people about DM in the UD.

Alka et al. (21) conducted a study, to find out the efficiency of the diabetic clinic, in improving the adherence of patients with known DM attending diabetic clinic of Medical College Hospital, Sangli. Study was conducted through questionnaires distributed randomly. Out of 282 patients, the observed rate for adherence to pharmacological treatment was 93.3 %, while adherence to non-pharmacological treatment was 78.3 %. Unaffordable drug price was one of the main causes of non-adherence. In the current study, it was observed that majority of the diabetic patients belong to poor families and they cannot afford high price of drugs/medicines used for the treatment of DM. Adherence to treatment of diabetic patients can be improved with efficient diabetic clinic and by providing low cost drugs. Diabetes mellitus has emerged a major health problem, therefore, a national strategy is required to reduce its burden.

There were many limitations of the current survey including shortage of time for research and unavailability of funding etc. In study area, there were also many limitations related to people of community such as very low literacy rate, poor people and unawareness of DM. However, there were unavailability of facilities of hospital/clinic, drugs/medicines and literatures etc. Moreover, there was low standard of living and feeding habits, many cultural forbid, unhygienic way of living and low values of ethical norms. Further, there was no NGOs/teams work for awareness of DM. Furthermore, no seminars, conferences, symposiums and workshops were conducted for the same purpose. In addition, second author is a patient of DM and belongs to the same area with age of 25 years. In study area, literacy rate should be improved and awareness of DM should be provided. However, availability of facilities of hospital/clinic, drugs/medicines and literatures etc should be assured. Moreover, Cultural norms, standard of living and feeding habits should be improved. Hygienic way of living and high values of ethical norms should be introduced. Further, the NGOs/teams should work for awareness of DM. Furthermore, seminars, conferences, symposiums and workshops should be conducted for the same purpose. Finally, preventative measures are required to prevent DM and its complication specifically in the rural areas like UD.

Conclusion

In the present study, the overall frequency rate of diabetes found was 13.2 %. Most of the patients feel increase thirst and frequent urination at night. The most frequent age at diagnosis was 31-45

[Downloaded from intjmi.com on 2026-11-08]

years. It was observed that most of the patients have family history of DM. **Recommendation**
Mass education is required to determine the causes of DM. Moreover, to educate the people about DM, media should play its significant role. Further, Non-Governmental Organizations (NGOs) can also play their role with the help of well-trained health care team. Furthermore, awareness about DM to the community is required to prevent it.

Acknowledgement
Authors are grateful to all those who assisted in conducting this survey. We would like to thanks Mr Bakht Zaman, Lecturer in Statistics, SBBU for his kind suggestions and cooperation in data analysis. The present research complies with the current laws of the institute and country, in which they were performed.

References

1. Alberti KGMM, Zimmet PZ. Definition, diagnosis and classification of diabetes mellitus. J Diab, Canada, 1998; 15(7): 1-15.
2. Turner AP, Chen B, Piletsky SA. Vitro diagnosis in diabetes. British J Diab, 1999; 45(4): 1596-1601.
3. Zimmet P, McCarty D. The epidemic global estimates and projection of diabetes. International J Diab, 1995; 40(3): 08-16.
4. Guk CC, Harris M I. Mortality in adults with and without diabetes. Diab Care, USA, 1998; 21(2): 1138-1145.
5. David JS, Eram R, Hassan S. High prevalence and metabolic syndrome in a South Africa
population. S A Med J, 1999; 102(11): 841-844.
6. Danish AF, Khan A, Muzaffar AK. Prevalence of diabetes mellitus and its relation to diet and physical work in Azad Jammu and Kashmir. Pakistan Journal of Nutrition, 2002; 1(5): 217-222.
7. Raskin P, Rosenstock J. Diabetes and its complication. World J Diab, Birmingham, 1988; 4(5): 417-435.
8. Khan A J. Prevalence of diabetic retinopathy in Pakistani subjects. J Pak Med Association, 1991; 41(1): 49-50.
9. Online, (2013) Districts census report; www.google.com; (Accessed: 23/11/2013).
10. Online maps, (2013) www.google.com; (Accessed: 07/12/2013).
11. Hydrie MZI, Basit A, Ahmad A. Prevalence of diabetes mellitus and impair fasting glucose and associated risk factors in rural area of Baluchistan province according to new American Diabetes Association criteria. J Pak Med Association, 2002; 52(357): 112-118.
12. Khan S, Abbas M, Habib F, Iqbal N. Prevalence of diabetes mellitus in Kotli district of Azad Jammu Kashmir. Sarhad J Agriculture, 2007; 23(4): 1141-1144.
13. Atta, A, Mehwish, R, Sidra, T, Imran, M. Epidemiological study of diabetes mellitus among different ethnic segments in the population of Pakistan. Intl J Res Pharmacology Pharmacotherapeutics, 2014; 3(1): 40-45.
14. Akhter A, Fatema K, Afroz A, Bhowmik B, Ali L, Hussain A. Prevalece of diabetes mellitus in a rural Bangladesh Population. The Open Diab J, 2011; 4(2): 6-13.
15. Nozha M, Mohammad A, Yaqoub Y. Diabetes mellitus in Saudi Arabia. Saudi Med J, 2004; 25(11): 1603-1610.
16. Adil M, Alam A, Jaffery T. Knowledge of type 2 diabetes patients about their illness. Pak J Diab, 2005; 55(5): 221-224.
17. Hameed A, Ahmad S, Rabbi F. Epidemiology of diabetes mellitus in and around Faisal Abad, Pakistan. Pak J Biol Sc, 2002; 5(8): 878-880.
18. Anandakumar, A, Kalpana, T, Mohan, V. child hood and adolescent onset type 1 diabetes mellitus in India. J Med Sc, 2013; 1(1): 46-53.
19. Carolyne, CR, Theobald CE, Cornelio, NM. Prevalence and awareness of type 2 diabetes mellitus among adult population in Mwanza city, Tanzania, Tanzania J Health Res, 2014; 16(2): 01-11.
20. Pinhas, HO, Dolan L, Daniels, SR, Standiford D, Khoury PR, Zeitler P. Increased incidence of non-insulin dependent diabetes mellitus among adolescents. J Pediatr, 1999; 128 (3): 608-615.
21. Alka, DG, Dhumale, GB, Kumbhar, UT, Kadam, YR. Treatment adherence of diabetic patients attending diabetic clinic. Intl J Diab, 2015; 35(1): 19-25.

[Downloaded from intjmi.com on 2026-11-08]