THE PREVALENCE OF DIABETES MELLITUS AND ITS ASSOCIATED SYMPTOMS IN THE ELDERLY POPULATION OF UNIVERSITY CAMPUS PESHAWAR

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ABSTRACT

Objective: To find the frequency of diabetes with associated symptoms in elderly people aged 60 and above residing on the university campus in Peshawar.

Materials & Methods: This community-based descriptive cross-sectional study included a total of 103 elderly people aged 60 and above, selected from the university campus in Peshawar by simple random sampling from January to April 2023. Random blood sugar was measured by using a glucometer. Those having a random blood sugar of greater than 200g/dl and those who were having signs and symptoms of diabetes and were on diabetic medications were considered diabetics Semi-structured questionnaires were used to collect the data. Data was entered and analyzed on SPSS version 20 and Microsoft Excel 2013.

Results: The prevalence rate of diabetes in the study population was 32% (33/103). Diabetes was more common among females than males. The mean RBS value was 195.48 mg/dl (SD 43.78 mg/dl, 95% CI 180.55-210.42) in the diabetic population (32.04%, 33/103). Of the total diabetic population, 57.58% (19/33) had controlled diabetes. The diabetes was more controlled in males than females.

Keywords: Elderly, Diabetes, random blood sugar

INTRODUCTION

The steady degradation of physiological function with age, including decreased productivity, is termed aging. [1] Aging is a normal, continuing process. Aging in humans refers to the accumulation of changes in a person over time, including physical, psychological, and social change. Diabetes mellitus is a set of metabolic diseases characterized by persistently elevated blood sugar levels. Type II diabetes is most common in the elderly. [2] In the elderly, it is usually caused by insulin resistance, which is caused by a deficiency in the responsiveness of the insulin receptor, resulting in high glucose levels. Diabetes in the elderly is caused primarily by lifestyle and hereditary factors. Obesity, sedentary lifestyle, urbanization, lack of physical activity, stress, poor nutrition such as eating a lot of white rice, and increased intake of sugar-sweetened drinks and food are all thought to contribute to type II diabetes in the elderly. [3, 4] It is a serious condition with serious sequelae like stroke, neuropathies, nephropathies, and retinopathies. Diabetes claimed the lives of 1.5 million people in 2012. High blood glucose levels contributed to an additional 2.2 million deaths by raising the risk of cardiovascular and other illnesses. [5] Forty-three percent of these 3.7 million deaths occur before the age of 70 years. The percentage of deaths attributable to high blood glucose or diabetes that occurs before age 70 is higher in low- and middle-income countries than in high-income countries. [6] Almost half of all deaths caused by high blood glucose occur before the age of 70. Diabetes is expected to be the seventh greatest cause of mortality by 2030, according to the WHO. [7] In 2015, there were approximately 7

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million diabetes cases in Pakistan.

Studies evaluating the prevalence of diabetes in elderly individuals based on birth weight have also been conducted. It has been observed that midlife body mass index (BMI) and birth rate have an impact on the metabolism of glucose and insulin in later life. Low birth weight and body length were reported to be associated with higher levels of insulin, HbA1c, and fasting glucose in both diabetes and non-diabetic older individuals. [8] When comparing this to those who were born with higher birth weights and lower BMIs in their middle years, the likelihood of developing diabetes could increase up to five times for those with low birth weights and high BMIs. [9]

It is also known commonly that type 2 diabetes mellitus is characterized by the burning up of beta cell function and also its mass in the islets of Langerhans. The incidence of this increases with age. Autophagy can be parted as a process of cellular components degradation, especially the proteins. Impairment of this function of cells can also cause age-related problems such as age-related type 2 diabetes mellitus. [10] This function of autophagy is necessary for the proper functioning of as well as maintaining the structure of islets in the pancreas. In a study of clinical trials, it was found that beta cell function decreases gradually with age. The expression of protein for autophagy markers such as LC3/Atg8 and Atg7 was found to show a marked decline in aged islets of Langerhans. The expression of Lamp-2 which is also an indicator for autophagic degradation was found to decline with age in a study done on rats. Also, while analyzing the islets under an electron microscope, it was found that there was swelling as well as the disintegration of cristae in the mitochondria of those rats that were aged. [11, 12]

There is evidence from clinical studies that diabetes mellitus in older patients delays the onset of pancreatic cancer due to non-functional islets of Langerhans [13]. The mean age of onset of pancreatic cancer in patients with diabetes mellitus was found to be 71 years while in those without diabetes, the mean age was found to be 67.5. [14] This significantly shows how diabetes has a protective effect against pancreatic cancer. [15]

The study will add new data in the field of diabetes. There is a need to better understand the realities of living with diabetes to tailor adequate and appropriate medical and psychosocial interventions. Many studies have focused on quality of life, patient activation, resource utilization, or the clinical aspects of diabetes, but there has not been a concerted effort to simultaneously address all of these to gain a more holistic understanding of the everyday experiences of people living with diabetes and inform health policy planning and service delivery. This study will help health practitioners know the burden of diabetes with associated symptoms and their treatment options.

MATERIALS AND METHODS

This Descriptive cross-sectional study was conducted in the University Campus Peshawar, Pakistan, from 1st January 2023 to 30th April 2023 on 103 participants (residents of the university campus) using a convenient probability sampling method. Elderly people aged 60 and above were included in our study. Informed verbal consent was taken, and those who were willing were included in our study. Severely ill, bedridden, and unwilling to participate were excluded from our study.

RESULTS

Of the total population, 32.04% (33/103) had diabetes. The diabetes was more common among females (16.50% 17/103) than males (15.53% 16/103). Among the male population, 28.57% (16/56) had diabetes, while 71.43% (40/56) had not. Among the female, population, 36.17% (17/47) had diabetes, while 63.83% (30/47) had not. Table 1 shows Diabetes in gender-wise distribution in different age groups. Most of the diabetic males were in the age group 81 years and above whereas diabetes in females was seen mostly in the age group 60-65 as shown.

The mean RBS value was 195.48 mg/dl (SD 43.78 mg/dl, 95% CI 180.55-210.42) in the diabetic population (32.04%, 33/103). The mean RBS value in diabetic males (15.53%, 16/103) was 189.44 mg/dl (SD 41.53 mg/dl, 95% CI 169.09-209.78). The mean RBS value in diabetic females (16.50%, 17/103) was 201.18 mg/dl (SD 46.32 mg/dl, 95% CI 179.16-223.20). The maximum RBS value among males was 270 mg/dl while the minimum was 126 mg/dl. The maximum RBS value among females was 300 mg/dl while the minimum was 125 mg/dl.

Of the total diabetic population, 57.58% (19/33) had controlled diabetes i.e., RBS value 200 mg/dl and below, while 42.42% had uncontrolled diabetes i.e., more than 200 mg/dl. Of the diabetic male population, 62.50% (10/16) had controlled diabetes, while 37.50% (6/16) had uncontrolled. Of the diabetic female population, 52.94% (9/17) had controlled diabetes, while 47.06% (8/17) had uncontrolled.

Table 1: The presence or absence of diabetes in different age groups according to sex in the age above 60 years with %ages in particular age groups

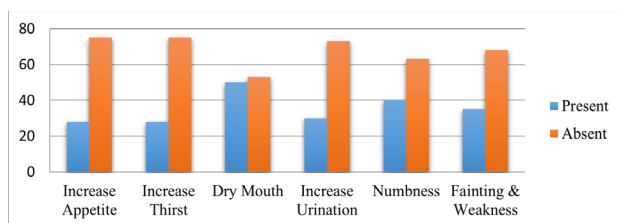| **60-65**	**0 (0.00)**	**11 (36.67)**	**7 (23.33)**	**12 (40.00)**	**30 (100.00)**
66-70	4 (11.76)	17 (50.00)	5 (14.71)	8 (23.53)	34 (100.00)
71-75	7 (36.84)	9 (47.37)	2 (10.53)	1 (5.26)	19 (100.00)
76-80	3 (23.08)	1 (7.69)	3 (23.08)	6 (46.15)	13 (100.00)
81 and above	2 (28.6)	2 (28.6)	0 (0.00)	3 (42.9)	7 (100.00)

Fig 1: Diabetes-associated symptoms in the total population in the age above 60 years

In our survey, the diabetes-associated symptoms were assessed in the subjects, out of whom 27.18% (28/103) had increased appetite, 27.18% (28/103) had increased thirst, 48.54% (50/103) had dry mouth, 29.13% (30/103) had increased urination, 38.84% (40/103) had numbness and 33.98% (35/103) had weakness and fainting as shown in Figure 1.

DISCUSSION

Diabetes was also found to be a major problem of old age because it occurs due to hormonal imbalance and much of the time superimposed by unhealthy diet, malnutrition, adulterations, and sedentary lifestyles. In our study, 32% (33/103) of subjects were suffering from this disorder which is by the 2014 study in Peshawar in which the prevalence was 32%, and also similar to the 2015 study in district Karachi in which the prevalence was 38%. But these findings are more than the 2014 study by CDC conducted in the USA according to which 9.3% of the total US population was diabetic in 2014. [16] This prevalence is also higher than the study done in Chandigarh, India in which prevalence was 14%. The reason for this high prevalence is that growing urbanization has led to a sedentary lifestyle, advanced calorie food intake, eating more and consuming less, and also stressful conditions added to the increasing prevalence of DM. Other reasons for this high prevalence are unhealthy food and lack of exercise in both groups. [17] The differences in physiology, anatomy, and biochemistry of the elderly, their psychological make-up, and social environments often lead to unique clinical presentations of geriatric diabetes. [18]

In males, the prevalence was found to be 15.5% (16/103) which is similar to the 2008 study in Punjab according to prevalence was 15%. In males, this high prevalence is due to smoking habits and more exposure to a polluted environment which causes metabolic disorders like diabetes mellitus. In females, the prevalence was found to be 16.5% (17/103) which is more than the 2008 study of Punjab 6. This high prevalence is due to obesity, sedentary lifestyles, fatty diets, and stress. Also, there are fewer concerns in society for female health care. Gestational diabetes with all the other causes that have been mentioned leads to the high prevalence of diabetes in females. A direct relation was observed between the prevalence of diabetes and the age of the subjects among both

males and females. Half of the subjects had dry mouth as their chief complaint associated with diabetes, followed by numbness, and weakness. 58% (19/33) were found to have controlled diabetes because they were well aware of their health problems and were taking good care of them. [19, 20]

CONCLUSION

The results of the study showed that a major proportion of the elderly were suffering from diabetes which, may lead to other chronic problems like nephropathy, retinopathy, neuropathy, and cardiovascular problems. The results of the study showed that there is a need for geriatric counseling centers that can take care of their physical and psychological needs. There must be regular blood sugar checkups to prevent this disease. The elderly people should be compelled to do easy exercises and should be prevented from stress.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Abbas M	✓	✗	✓	✗	✓	✗
Nadeem F	✓	✓	✗	✓	✓	✗
Irshad S	✗	✓	✗	✗	✓	✗
Shafiq H	✓	✓	✓	✗	✓	✓
Khan MA	✓	✓	✗	✓	✓	✗
Wasif M	✓	✓	✗	✓	✓	✗

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.