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Impact of Lifestyle and Demographic Factors on Diabetes-Associated Complications; A Cross-Sectional Study

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ABSTRACT

Globally, the prevalence of Diabetes Mellitus (DM), a leading cause of death and morbidity, is rising, adults with DM have the highest prevalence of chronic illness. This study pursuits to assess and evaluate the impact of life style and demographic factors that aggravates the diabetic complications. **Methods:** A cross-sectional study design was carried out in adult diabetic patients. The study was a nationally based study in Lahore, Pakistan, target population was Medical OPDs and Diabetic Care centers. Participants includes both gender with age 20 year to 70 years who's diagnosed with type 2 Diabetes Mellitus. The study variables include the demographic information, patient assessment, regarding the life style, face to face interview through self-structured questionnaire and anthropometric measurement were taken from every participant (weight, height). SPSS version 20.0 was used for data analysis. **Results:** The sample of this study consisted of 189 (51.1%) females and 181(48.9%) male respondents (N=370). The descriptive Statistics of gender of respondents giving standard deviation of 0.501 and variance of 0.251. As all the respondents are diabetic patients so while cross tabulating the gender with Obese scale 167 of the total population fall in normal weight scale, 110 are categorized as overweight and 33 as obese. The people with good knowledge about their life style impact on Diabetes complications were relatively less affected. **Conclusions:** The findings alert the medical practitioner informed the patients about the significance of impact of sedentary lifestyle on diabetic's complications. Regular screening for diabetic patient is necessary for the early detection of complications by skilled health professionals.

INTRODUCTION

Diabetes, a global health crisis, is projected to affect 552 million people by 2030, with a significant rise in developing nations like the Middle East [1]. It disrupts the body's metabolic system, leading to elevated blood sugar levels and requiring significant physical and mental resources to manage [2, 3]. Psychological implications, including grief stages, accompany the diagnosis, affecting both patients and their families. Studies reveal variations in depression prevalence among Diabetic patients based on factors like Diabetes type, demographics, and geographic location [4, 5]. All things considered; studies showed that 49% of Diabetes patients who were in really poor health were misdiagnosed at clinics that provided important medical care [6, 7]. Diabetes Mellitus is a widespread issue that has a serious financial impact on people and society structures. In 2012, Diabetes affected more than 9% of the population in America, with adults aged 20 and over having a prevalence rate of 12.3%. This amounted to 1.7 million

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people with Diabetes who had been diagnosed, with an additional 8 million suspected cases. In the US, Diabetes is the fifth most common cause of mortality. In 2010, Diabetes was listed as the primary cause of death in more than 69,000 death endorsements, a figure that is thought to be significantly underreported. Without a doubt, Diabetes Mellitus is a serious issue for overall health [8]. Insulin resistance references to cells' inability to successfully use endogenous insulin. The pancreas is so stressed as it tries to overcome this resistance by producing more insulin. Blood glucose levels rise because the pancreas can't meet the body's demands, and they continue to rise [9]. Diabetes patients are twice as likely to have mental health problems as the general population, and one in five of them reported feeling depressed, according to some current studies. One in five Americans over the age of 18 who have Diabetes, which affects 34.2 million people, is unaware of their condition [10, 11]. BDI-II, a tool for measuring depression, was used (BDI-II). 85 (61%) of the 140 patients with type II Diabetes were female, and 55 (39%) were male. The average age was 45.745 years. Eighty-four patients (60%) had severe depression when they first arrived. Women and widows had greater rates of depression than men. Diabetes patients have significant rates of depression, particularly women and widows. It is crucial to note that both for prevention and treatment of Diabetes, psychological care may be required [12]. In 2017, the Global Diabetes Alliance (IDF) estimated that Diabetes caused 4.0 million deaths worldwide, demonstrating the overall number of deaths directly or indirectly caused by the disease [13]. Even though T2DM and troublesome symptoms frequently coexist, 66% of individuals with the two illnesses are predicted to go untreated. This may result in a decline in glycemic control and an increase in Diabetes complications, which may make or break depression due to poor metabolic control and functional incapacity due to growing unforeseen problems [14]. Despite this, there is currently no evidence to support the previous finding that Diabetes and depression have a mutually reinforcing association. Complications and side effects of Diabetes. More specifically, it was shown that there is a strong correlation between sadness and Diabetes problems such retinopathy, nephropathy, neuropathy, and macro vascular issues. Patients with Diabetes who are also clinically depressed (as determined by self-report measures such as the BDI, CES-D, PHQ-9, or DSM-IV guidelines) are associated with a greater number of diabetic complications and side effects. More specifically, it was shown that there is a strong correlation between sadness and Diabetes problems such retinopathy, nephropathy, neuropathy, and macrovascular issues [15].

The objective of this study was to find the frequency of depression and quality of life in Diabetes Mellitus Type 2 and assess the knowledge can change the life, acceptance of disease and healthy lifestyle.

METHODS

A cross-sectional study design was carried out in adult diabetic patients. The study was a nationally based study in Lahore, Pakistan, the target population was Medical OPDs and Diabetic Care centers. Participants includes both gender with age 20 year to 70 year whose diagnosed with type 2 Diabetes Mellitus. The study was conducted between the time period of March 2021 to October 2021. The study variables include the demographic information, patient assessment, quality of life, face to face interview through self-structured questionnaire and anthropometric measurement were taken from every participant (weight, height). A self-structured questionnaire was used for the data collection. A face-to-face interview was conducted with patients and complete questionnaire and note their anthropometric measurements.

The necessary sample size to this still up in the air utilizing the accompanying equation:

$$N = \underline{2*[Z*\sqrt{2P^{-}(1-P^{-})} + Z\sqrt{P1(1-P1) + P2(1-P2)}]2}$$

Sample size (n) = [DEFF*NP (1-P)]/ [d2/ Z21-∂/2 *N-1) +P *(1-P)]

The sample size calculated through formula is 369 with 95% confidence level.

Organizational and ethical issues were discussed extensively with supervisors, and written consent was obtained from the university's Ethical Review Committee and hospital authorities. All of the participants provided written consent with an informed consent form. The identities of the participants were kept hidden throughout the study. The participants were informed that there are no potential drawbacks or dangers associated with the research methodology. Participants were informed that they could withdraw from the study at any time during the research. Participants remained anonymous, and all information and data collected remained private. After the data collection, data cleaning and data coding were performed. SPSS (Statistical package for the social sciences) version 20 was used for data analysis. Descriptive Statistics (Frequencies, %ages, means, median, standard deviation) were applied to summarize the data. Inferential statistics tests Chi-square test was applied. As inferential statistics to evaluate associations and difference between various independent and dependent variables. Chi-square tests was applied where association was desired b/w dependent and independent variable both being Categorical, this was used for almost all of the parameters. The level of significance set as $p<0.05$.

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RESULTS

A total of 370 diabetic patients consisted of 189 (51.1%) females and 181 (48.9%) male respondents. Half of the of the study participants were lie between the age of 30-49 years age group. The majority of the study participants were employed. About half of the study population had normal weight according to the obese scale defined by WHO (table 1).

Table 1: Demographic Characteristics of Study Participants

Variables	Category	Frequency (%)
Age	30 to 40	195 (52.7)
	40 to 50	158 (42.7)
	50 to 60	17 (4.6)
Occupation of Respondents	Unemployed	63 (17)
	Employed	206 (55.7)
	Retired	35 (9.5)
	Housewife/ Household	66 (17.8)
Obese Scale	Under Weight	60 (16.2)
	Normal Weight	167 (45.1)
	Over Weight	110 (29.7)
	Obese	33 (8.9)

Qualification was compared to the Affected lifestyle, people who were nil by qualification were 7% in number they did not bother rather they are affected or not. People who had middle qualification were 26% number are not affected by being diabetic. Additionally, masters were at highest number with 7% whose life were not affected thus it is claimed that not only the education could reduce the effect on life. The percentages of good literacy rate with middle and higher was 32.2% and 37.3% respectively with the percentage of 16.5% of illiterates. The employment details that about 206 of 370 sample size were employed with the percentage of 55.7% (figure 1).

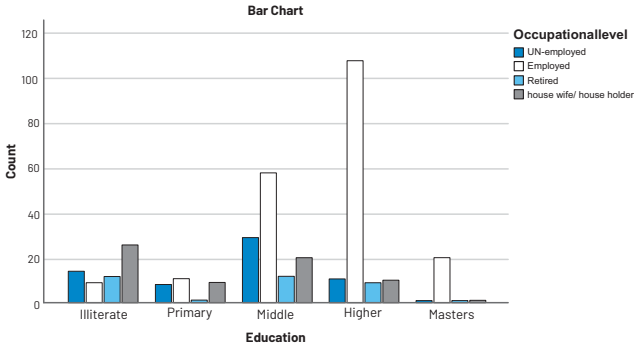

Figure 1: Education Status and Occupation Level

The lifestyle of the respondent was healthy with the percentage of 54.1% and 67.8% of the respondents with the history of Diabetes in family, 32.2% with no family history of Diabetes that means they developed later on. 84.1% of the population with this study indicated a close relationship with depression that effected their life rather they were studying or doing some kind of job. 61.4 % and 61.9% people are reported that their social life and physical life respectively is not affected by being diabetic, having enough knowledge, follow-up with diabetic centers, dietary management. Eating habits are the same with a little change that did not affect their lifestyle and responsible for anger or aggression being diabetic. Aggression/ depression being reported with standard deviation 0.470. The frequency of different health and psychological variables is given in table 2.

Table 2: Effect on Social and Physical life, Eating Habits, Aggression, Height, Weight, and Body Mass Index (BMI)

Variables	Mean ± SD
Weight (kg)	71.80 ± 10.136
Height (cm)	180.89 ± 68.718
BMI	23.4959 ± 5.19487
Obese Scale Record in Different Variables	2.31 ± .848
Effect on Social Life	0.848 ± 0.488
Effects on Physical Life	0.38 ± 0.486
Eating Habits	0.53 ± 0.50
Aggression	0.33 ± 0.47

The aggressive behavior towards the disease process related to its comorbidities and complication. Studies not only justify it with the knowledge of people of their disease process. Table 3 shows the frequency of the comorbidities associated with Diabetes. Hypertension had 30.8% association with Diabetes in the respondents. Different percentages were calculated that indicated that it varied from individual to individual. 13.2 % people got neuropathy complication of Diabetes.

Table 3: Prevalence of Comorbidities of Diabetes Mellitus Respondents

Variables	Frequency (%)
None	117 (31.6)
Hypertension	114 (30.8)
Congestive Heart Failure	32 (8.6)
Myocardial Infraction	3 (.8)
Peripheral Heart Disease	32 (8.6)
Hypertension; Peripheral Heart Disease	38 (10.3)
Hypertension; Congestive Heart Failure	19 (5.1)
Hypertension; Myocardial Infraction	15 (4.1)
Neuropathy	49 (13.2)
Total	370 (100.0)

This research also showed the relationship between the social/ physical life and associated complications with Diabetes that is retinopathy, nephropathy and neuropathy (table 4 and 5). The physical life and the social life were affected but not at that extent which was expected. People were well aware of their disease process. Upon asking about the cure of Diabetes and the motivational level to deal with Diabetes, the mean of 0.72 and 0.86 has been was shown respectively. The standard deviation of 0.804 and 0.351 respectively were revealed in this study.

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Table 4: Association of Social Life with Complications of Diabetes Mellitus

Complications of DM	x^2 value	df	p-value
Retinopathy	8.036	7	.329
Nephropathy	3.146	6	.790
Neuropathy	5.398	7	.612
None	12.803	5	.025

Table 5: Association of Physical Life with Complications of Diabetes Mellitus

Complications of DM	x^2 value	df	p-value
Retinopathy	6.359	7	.499
Nephropathy	9.582	6	.143
Neuropathy	1.404	7	.985
None	10.166	5	.071

DISCUSSION

With a percentage of between 54.1% and 67.8% of respondents reporting a family history of Diabetes, and 32.2% reporting no such history, the respondent's lifestyle is healthy. According to this report, 84.1% of the population experiences severe depression that has an impact on their lives whether they are at school or working. Nazar *et al.*, and their colleagues conducted research in Swat population incidence of DM is 56 % as compared to 37 % in rural areas. According to the findings of the Nazar *et al.*, older age groups had a greater incidence of Diabetes. The age groups 51-60, 61-70, and 71-80 years had the highest occurrence in both urban and rural areas [16]. Compared to another recent longitudinal research by Teigland and colleagues (47% and 38%), the prevalence rates of anxiety and depressive symptoms in this study (27.5% and 19.8%, respectively) are almost twice as low [17]. Our observed prevalence rate of depressive symptoms (19.8%) and the results of an earlier study on the epidemiology of depression in patients with type 2 Diabetes (19.1%) revealed results that are remarkably close [18]. Additionally, we discovered that more than 50% of Diabetes patients with anxiety symptoms also had depressive symptoms. This outcome was anticipated because anxiety-depression comorbidity has been discovered in a number of groups and symptoms of depression and anxiety frequently overlap [19, 20]. As diabetic patients, 37.6% of persons are regulating their diet. However, as shown by high HbA1c, FPG, and PPG, they had generally been permitted to deteriorate to glucose control levels considerably over target values. People with T2DM starting insulin have been found to have similar poor glycemic control across nations [21]. Due to their awareness, follow-up with diabetic centers, and nutritional management, 61.4% and 61.9% of persons say that having Diabetes has little impact on their social and physical lives, respectively. With a minor modification that had no impact on their way of life, their eating habits remained same, and Diabetes was to blame for any anger or aggressive behavior. With a standard deviation of 0.470 and a variance of 0.221, aggression and depression are reported. The comorbidities and complications of the illness process are related to its aggressive character. Studies support it in addition to people's understanding of their disease process. Notably, when compared to those who did not get DSME, 61.9% of interventions led to statistically significant and clinically meaningful improvements in A1C. Here, DSME participants experienced A1C reductions ranging from 0.1 to 2.50, while CG participants experienced changes between 1.5 and 1.7. A 0.9% decline in A1C was associated with a reduction of 25% in microvascular complications, 10% in Diabetes-related mortality, and 6% in all-cause mortality, according to Beckam *et al.*, and Lin *et al* [22, 23]. Associated comorbidities of Diabetes Mellitus included hypertension, which the respondents' 30.8% relationship with Diabetes. Different percentages are calculated to show how it varies from person to person. Diabetes-related neuropathy affected 13.2% of the population. 6.2% of people who were diagnosed with Diabetes Mellitus faced complications three or more. This study also demonstrates the link between comorbid conditions, such as retinopathy, nephropathy, and neuropathy, and the complications of Diabetes. It has been found that individuals with poor Diabetes control experience these problems. Although not to the amount that was anticipated, both the physical and social lives have been impacted. People were fully informed on how their illness worked.

CONCLUSIONS

A multitude of factors, such as diet—eating fruits and vegetables and avoiding fats and sweets—lack of exercise, inability to handle stress, or, to put it another way, improper life style management are among the risk factors for Diabetes complications. People will need to be trained and educated about self-care in order to prevent diabetic complications.

Authors Contribution

Conceptualization: MMA, SN[1], MSN, UH, SN[2], MJ, M
Methodology: MMA, SN[1], MSN, UH, SN[2], MJ, M
Formal analysis: MMA, SN[1], MSN, UH, SN[2], MJ, M
Writing-review and editing: MMA, SN[1], MSN, UH, SN[2], MJ,M

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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