ORIGINAL ARTICLE

ANNALS OF PUNJAB MEDICAL COLLEGE

Prevalence of Psychological Stress in Diabetes Mellitus and Factors Affecting it

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Submitted for Publication: 08-06-2022
Accepted for Publication 18-06-2023

How to Cite: Yousaf P, Hussain M, Mughal TS, Raza H, Waheed A, Khan SA, Ijaz N. Prevalence of Psychological Stress in Diabetes Mellitus and Factors Affecting it. APMC 2023;17(2):158-163. **DOI: 10.29054/APMC/2023.1374**

ABSTRACT

Background: Diabetes Mellitus has become a global epidemic in the recent past. Psychological distress in people suffering from diabetes is quite significant as it contributes to disease-related burden. **Objective:** The aim of our study was to evaluate stress in diabetics and also correlate it with various factors for example age, gender, socio-economic status and presence of co-morbidities. **Study Design:** Cross-sectional study. **Settings:** Shaikh Zayed Hospital, Lahore Pakistan. **Duration:** Three months from August 01, 2020 to October 31, 2020. **Methods:** Using database (psychosocial and demographic) of 138 volunteers through PAID scale of diabetes, a cross-sectional study was performed in Pakistan. **Results:** Females (60%), those belonging to high and middle class (53.6% and 51.6% respectively), people with 3 (68.75%) and 4 (60%) co-morbidities and the ones aged 80-90 years and 20-30 years reported stress through PAID scale of Diabetes. **Conclusion:** Stressed diabetic patients need counselling and support of health care workers and their family in order to continue living their life without having diabetes having an impact on it.

Keywords: *Stress, Diabetes, Pakistan, PAID scale, Psychological factors.*

INTRODUCTION

There is no denying that diabetes mellitus is a health condition on the rise not just in Pakistan but also worldwide.[1] The aetiology is multifactorial with poor eating habits and obesity, sedentary lifestyle due to urbanization, genetics, environment and aging remain at the top of the list. It is estimated that number of diabetics will raise from 451 million in 2017 to 693 million in the year 2045.[2] This disease is characterized by a high blood sugar levels (random blood sugar of more than 11.1 mmol/L or 200 mg/dL and fasting blood sugar of more than 7.0 mmol/L or 126 mg/dL) as a result of defective insulin secretion, insulin action or both. Its symptoms include polydipsia, polyuria, weight loss and sometimes polyphagia.[3] Nonketotic hyperosmolar syndrome and diabetic ketoacidosis are two common life-threatening complications in these patients with uncontrolled diabetes. Non-emergency complications range from diabetic retinopathy, neuropathy and nephropathy to loss of sensation in extremities, ulcers, gangrene, cardiovascular and sexual dysfunction.[4,5] Amongst complications, we must keep in view the psychological aspect of this disease and its seriousness.[6] Emotional dysfunction is associated with diabetes and while medically treating diabetes mellitus, physicians should take into consideration behavior therapies for better outcome. Depression and distress are common in patients suffering from diabetes and it affects their glycaemic control and lives in general, negatively. This in turn leads to poor prognosis of the disease.[7]

The mainstay of treatment of diabetes is either insulin administration or medication for glucose homeostasis.

Therapeutic advancements have led to prompt results while treating it. Nevertheless, patient's perception of the disease and willingness to work together with the health care professionals for their own benefit is equally important. This is where psychological stress comes into play. Various factors affect a patient's state of mind from finances to fear of needles, from stigma of chronic, lifelong disease to compliance to long term medication.[8] A patient who is mentally upset by the disease and its implications is more likely to give up on themselves and let go of the will to be healthy.[9] This may lead to increased mortality and morbidity of diabetes hence, increasing overall burden of the disease on people and their health and ultimately the whole nation. It is therefore important to recognize diabetes-related emotional distress to have better clinical outcome.[10]

METHODS

This is a cross-sectional study that was conducted in different cities of Pakistan. A statistically significant sample size was calculated using valid formulas. A total of 135 sample size was agreed upon. After running the questionnaire on pilot group of 5 patients, the universally acceptable and previously validated PAID (Problem Areas in Diabetes) scale was sent to 140 volunteers over electronic media.[11] Originally the authors had targeted diabetic clinics of Lahore, Pakistan however due to lockdown in the country owing to COVID-19 pandemic they settled on online questionnaires. Along with the 20 questions of the PAID scale, four demographic questions were also included in the questionnaire to know about the age, gender, place of residence, education, socio-economic status and co-morbidities of the patients.[12] All questions were answered in succession as the patients filled out the forms which took 10 to 15 minutes maximum for each of them. Random sampling technique was used to collect data from people who were known diabetics. The inclusion criteria included a) known diabetic patient of any duration (I.e., diagnosed with diabetes as children, adolescent or adult) b) patients with or without comorbidities while the exclusion criteria included a) age less than 15 or greater than 70 b) any psychological or psychiatric illness diagnosed before and/or during diagnosis of diabetes. Patients filled out informed consent before attempting to fill out the questionnaires provided. Before beginning to collect data, approval of the study was taken from the Institution Review Board (IRB). All of the subjects were given option to withdraw from the study anytime they wanted even after having submitted the informed consent. The entire process of data collection was completed over a period of three months (August, September and October 2020). Out of the 140-sample population, 2 people withdrew their participation. The final sample size was 138. The data which was collected over Google Forms was then converted into a file and later added to SPSS version 22 to be analyzed using frequencies and percentages. Analysis of previously classified variables was performed to assess associations.

This 20-item psychometrically robust questionnaire, PAID scale also known as PAID20, is well validated and used internationally in context of diabetes. Each item or question has 0 to 4 scoring, answers to all of which are summed up and multiplied by 1.25 to obtain a total score out of 100. It is interpreted as; a) severe diabetes distress: total score of 40 and above and b) moderate to severe distress: individual items scored 3 or 4. In simple words, PAID scores are converted to a 0 to 100 scale, higher the scale more is the level of emotional distress in the patient.[13]

RESULTS

Gender: There were 54.6% males and 42.6% females while 2.8% subjects did not want to specify their gender (Table 1). In accordance with the values of PAID scale, it was found that out of a total of 60 females who had participated in the research 36 (60%) were stressed. Males population however displayed far less stress levels with 35 out of 77 (45.45%) of them being psychosocially upset (Table 3).

Socioeconomic Status: This was categorized into three; high, middle and low class with 9.2%, 86.5% and 2.1% of our study population belonging to each of them, respectively (Table 1). Amongst these, patients who reported stress in diabetes belonged to high and middle class mostly. 53.6% (7 out of 13) from high class and 51.6% people (63 out of 122) from middle class were positive for stress levels. Only 33.33% patients (1 out of a total of 3) were stressed out because of the disease (Table 3).

Age Group: We had targeted 8 different age groups, all ten years apart starting from under 20, all the way up to over 90 years of age. We calculated percentage of patients belonging to each group; 7.1% participants were under 20 years, 28.4% fell under 20-30 years, 5% belonged to 30-40 years, 15.6% were aged 40-50 years, 24.1% were 50-60 years, 10.6% were 70-80 years, 5.7% were 80-90 years and lastly about 4.1% of total patients were over 90 years of age (Table 2). Out of these, maximum stress was found in adults i.e., 75% of patients aged 80-90 years were stressed. Second highest percentage was amongst teenagers, the age group of under 20 years where 70% of diabetic patients showed stress. Third in line were 70-80 years old, out of whom 60% were emotionally consumed because of the disease. 50% of both 20-30 years and those over 90 years were stressed, equally. In decreasing order, 45.45%, 44.11% and 42.85% of 40-50, 50-6- and 30-40 years old respectively, were under stress (Table 3).

A significant (2 tailed) co-relation was found between age and stress with a p-value of 0.799 (Table 4).

Number of Co-morbidities: We divided this into 5; beginning from no comorbidity (0), one co-morbidity found (1), two co-morbidities (3), three co-morbidities (4) and lastly four co-morbidities (5). Only 3.6% out of total population were suffering from more than 4 medical illnesses while majority (48.6%) were found to have no other disease and only diabetes. There were 21%, 15.2% and 11.6% of our subjects suffering from one, two and three comorbidities, respectively (Table 2). Level of stress was reported 68.75% of patients who had three co-morbidities along with diabetes and 60% in those who had four comorbidities. Surprisingly, least percentage of patients (42.85%) reporting stress had 2 co-morbidities while 49.2% of the ones who had no other concomitant disease were suffering from psychological issues owing to diabetes. 51.7% of patients who had one co-morbidity also exhibited stress levels (Table 3).

P-value of 0.496 which is significant for co-relation of stress and number of comorbidities was deduced (Table 5).

Table 1: Frequency of variables (Gender & Socio-economic status)

		Frequency	Percent	Valid Percent	Cumulative Percent
Gender	Unspecified	4	2.8%	2.8%	2.8%
	Female	60	42.6%	42.6%	45.4%
	Male	77	54.6%	54.6%	100.0%
	Total	141	100.0%	100.0%	
Socio-economic status	Unspecified	3	2.1%	2.1%	2.1%
	High	13	9.2%	9.2%	11.3%
	Low	3	2.1%	2.1%	13.5%
	Medium	122	86.5%	86.5%	100.0%
	Total	141	100.0%	100.0%	

Table 2: Frequency of variables (Age group & Number of Co-morbidities)

		Frequency	Percent	Valid Percent	Cumulative Percent
Age Group (Years)	Unspecified	3	2.1%	2.1%	2.1%
	<20	10	7.1%	7.1%	9.2%
	20-30	40	28.4%	28.4%	37.6%
	31-40	7	5.0%	5.0%	42.6%
	41-50	22	15.6%	15.6%	58.2%
	51-60	34	24.1%	24.1%	82.3%
	61-70	15	10.6%	10.6%	92.9%
	71-80	8	5.7%	5.7%	98.6%
	>80	2	1.4%	1.4%	100.0%
	Total	141	100.0%	100.0%	-
No of comorbidities	0	67	47.5%	48.6%	48.6%
	1	29	20.6%	21.0%	69.6%
	2	21	14.9%	15.2%	84.8%
	3	16	11.3%	11.6%	96.4%
	4	5	3.5%	3.6%	100.0%
	Total	138	97.9%	100.0%	-

Table 3: Frequency of Stress among various Groups of Population

			Patient's Mental Health		Total
		Unspecified	Stressed	Unstressed	
Gender	Unspecified	3	0	1	4
	Female	0	36	24	60
	Male	0	35	42	77
	Total	3	71	67	141
Age Group (Years)	<20	-	7	3	10
	20-30	-	20	20	40
	31-40	-	3	4	7
	41-50	-	10	12	22
	51-60	-	15	19	34
	61-70	-	9	6	15
	71-80	-	6	2	8
	>80	-	1	1	2
	Total		71	67	138
Socio- economic Status	Unspecified	3	0	0	3
	High	0	7	6	13
	Low	0	1	2	3
	Medium	0	63	59	122
	Total	3	71	67	141
No of Comorbidities	0	-	33	34	67
	1	-	15	14	29
	2	-	9	12	21
	3	-	11	5	16
	4	-	3	2	5
Total			71	67	138

Table 4: Correlation between Age group and Total PAID Scores

		Total PAID Score	Age Group
Total PAID Score	Pearson Correlation	1	-0.022
	Sig. (2-tailed)	-	0.799
	Total	138	138
Age Group	Pearson Correlation	-0.022	1
	Sig. (2-tailed)	0.799	-
	Total	138	138

Table 5: Correlation between No of Co-morbidities and Total PAID Scores

		Total PAID Score	No. of Comorbidities
Total PAID Score	Pearson Correlation	1	0.058
	Sig. (2-tailed)	-	0.496
	Total	138	138
No of Comorbidities	Pearson Correlation	0.058	1
	Sig. (2-tailed)	0.496	-
	Total	138	138

DISCUSSION

According to International Diabetes Federation, one of the most challenging problems of 21st century is going to be diabetes. Diabetes is a multi-faceted disease with a lot of factors that need to be taken under consideration when physicians work towards controlling it. With every 6th person suffering from it and world population on the rise, it is of utmost importance that doctors manage this disease not just by controlling the glycemic index or the HbA1C, but also give due importance to psychosocial aspects of it. Family, friends and health care workers along with the nation's policy makers and economists all play a vital role in helping a diabetic patient lead a life as normal as it can get.[15]

As evident in our results, patients belonging to high and middle class feel more stressed because of their disease. It is understandable as medicines and insulin and laboratory tests that must be done at every follow up need a separate budget in middle-class households where food is at times scare. It is the duty of the government to provide relief, insurance or free of cost health facilities to those suffering from chronic illness to at least ease the fiscal burden that consumes them. As for the high-class, they are a competitive breed. While they are educated, they are immensely upset with anything that becomes a hurdle while they are trying to speed up and ace everything in life.

Type one diabetic patients would require life-long insulin administration as part of their management.[16] It is very late in their lives that they are advised to switch to anti-diabetic medication.[17] Trypanophobia would lead to some patients not complying to the prescribed injections which often come in daily doses. In order to help these patients, doctors should keep themselves up-to-date with modern medicine. There are injection tips available in sizes which do not hurt as much. The smallest is a 4mm needle available as a pen. Likewise, diabetics also have to regularly check their blood sugar levels. Glucometers are recommended for this and brands available in market come in different depth sizes. Adjusting the depth according to one's need would also help in less pain caused by it.[18]

For type 2 diabetes, ideal management is anti-diabetic drugs for example the traditional Sulfonylureas are widely used as are biguanides (metformin).[12] However, when patients have to take medication before or after meals every day for the rest of their lives, compliance to the medicine becomes a problem. Thus, any physician who prescribes medication must also tend to needs of a patient if they ae having trouble. Another issue to not overlook is adverse effects of the drugs. Weight gain is a common with anti-diabetic drugs except for metformin so patients should be counselled how to deal with side effects if they occur. This includes daily exercise and healthy, balanced diet to watch weight. Gastrointestinal disturbance is also commonly reported so bulk (for example vegetables and ispaghula husk) for constipation and small, frequent meals for nausea and vomiting, as well as a drug called metoclopramide in severe case is advised.[15]

As shown by the results, females are more stressed about their condition as compared to male specie. This could be due to the universal fact that females are more sensitive and are worried sick over trivial issues let alone a complicated health issue. Feeling angry and helpless, and overwhelmed by the disease is common in females. The issue of weight gain in diabetic patients is addressed above but it is obvious that is affects females quite a lot. Same goes with wearing an insulin patch or having hypoglycemic fainting attacks in public which makes females more vulnerable to turning a blind eye to the disease instead and continue to stress about it. They are scared to lose their friends and spouse and children, one way or the other. Low self-esteem and departing from the loved ones are nightmares of many diabetics.

Despite all the advancement in therapeutics, drugs alone cannot control the blood glucose levels or decrease the chances of developing complication of diabetes. Thereof, diabetic diet is advised to a patient by their primary physician or they are referred to nutritionist. But a patient can only be given a certain amount of advice. To practically imply is their job and only a motivated patient can do it. It requires self-control to eat healthy while everyone else at the table are eating as they like.[3] Patients and their care takers have to be informed about different food groups from which meals can be prepared for diabetic patients. Food portions at each meal, switching form white rice and bread to brown and encouraging them to have four to five meals a day does wonders to the long-term diabetic control and leads to good results. Patients naturally feel stressed when they go out to family dinners or holidays, and they need their doctors' and family's support to go on in life.

It is also seen from the research that uneducated people tend to be more stressed. This is because for them to understand the seriousness of the disease and then make a lifestyle of diet control and drugs is a concept yet to be understood. Facilities like gymnasiums and parks are luxuries for uneducated people and they suffer due to their lack of perspective as compared to an educated person for whom this has always been a lifestyle are at least the concept is not new to them. We have also seen how stress levels are greater in elderly. Age is another factor that affects patient's actions for combating health issues.[15] Forgetfulness owing to Alzheimer's, lack of energy and will to keep themselves healthy or age itself having weakened patient's defense systems and made him immune-compromised, leads to uncontrolled diabetes often emerging with complications for example compromised kidneys or eyes or nervous system function. Teenagers are also affected which can be attributed to them having to face a life-long disease. While they should only be worrying about turning in assignments on time, they have an additional burden of daily dosage of medicine.

Similarly, patients having multiple health problems are more stressed as they have to singlehandedly monitor their health ad in more than one disease's context. It is very common to find hypertension or heart disease with diabetes. So, for a patient to have to control high blood pressure with low salt diet and antihypertensive medication or to have low cholesterol diet with anti-anginal medication, on top of diabetic control is immense pressure and sometimes patients crack under it leading to their health being sacrificed. A doctor's contribution is support in this case along with proper medication or intervention, whichever is suitable.

CONCLUSION

From our data and results compiled from it, it is seen that emotional stress levels are present in majority cases of diabetes mellitus. Amongst the subgroups, patients belonging to high and middle socioeconomic status, uneducated, elderly (over 80 years) and adults (20-30 years), female gender and those concomitantly suffering

from other diseases make greater portion of stressed patients. These patients need to be closely observed and be given proper attention while managing them to help them overcome the stress and achieve their goal of a good glycaemic index and fewer complications of diabetes.[14]

LIMITATIONS

This is a single center-based study which reflects on the number of participants and their geographical monotony.

SUGGESTIONS / RECOMMENDATIONS

To assess diabetes stress, there are many scales available. PAID scale should be compared with others for example one popular Diabetes Distress Scale (DDS) which is widely used in clinical practice.

CONFLICT OF INTEREST / DISCLOSURE

The authors declare no conflict of interest.

ACKNOWLEDGEMENTS

We are indebted to Professor Dr. Ayesha Humayun, our mentor, for her continuous motivation and support.

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