

## Frequency of Degree of Depression in Relation to the Duration of Diabetes Mellitus in a Tertiary Care Hospital in Patients Aged 20-55 Years

Hira Muzaffar<sup>1</sup>, Jamal Ara<sup>2</sup>, Syeda Wajiha Anwar<sup>3</sup>, Quratulain Saleem<sup>4</sup>

### Abstract

**Objective:** To determine the frequency of depression and the relation of duration of diabetes with degree of depression.

**Methods:** A cross-sectional study was carried out at Abbasi Shaheed Hospital, North Nazimabad, Karachi, Pakistan. The duration of the study was six months from December 2017 to May 2018. It comprised of male and female patients between the age brackets of 20-55 years of age who had been pre-diagnosed with diabetes for at least 5 years and were currently not on any anti-depressants and did not have history of any other psychiatric illness. Demographic data including the age, sex, education level, marital status, occupation and religious belief of the participants along with the duration of diabetes for each individual was recorded. The ICD-10 major depression inventory was translated into Urdu and validated in the same institution before this study was conducted and was administered during face-to-face interviews. ICD here refers to the International Classification of Diseases (ICD) which is the international standard diagnostic tool for epidemiology, health management and clinical purposes. A minimum score of 4 or 5 in two of the first three items plus a score of at least 3 on two or three of the last seven items means that the person is mildly depressed and as the score increases so does the severity of depression.

**Results:** Of the 378 people who were assessed 216 (57.1%) were depressed. Data analysis showed that out of the 216 depressed patients, 25.7% had mild, 26.2% had moderate, 4.2% had severe and 1.3% had major depression. On performing chi-square test there was a relation between the increase in duration of diabetes and the degree of depression.

**Conclusion:** Results of our sample show that a higher degree of depression is related to a longer duration of diabetes.

**Keywords:** Pakistan, diabetes mellitus, depression, comorbidity.

**IRB:** Approved by Ethical and Scientific Review Committee. Karachi Medical and Dental College. Dated

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### Introduction

The English physician Thomas Willis, M.D., first documented the interaction between psychiatric illness and diabetes mellitus in the late 17<sup>th</sup> century. Mind-body unity and the effect of psycho-

logical factors on the course of the medical condition is the essence of psychosomatic medicine. The exact mechanism underlying depression as a co-morbid of diabetes mellitus (DM) is yet unknown.

The prevalence of diabetes has been increasing consistently for the past three decades and is projected to continue rising. Type 2 diabetes mellitus (T2DM) is a group of metabolic diseases that pose a serious challenge to the government and to the society. International Diabetes Federation (IDF) reports that the prevalence of diabetes mellitus has reached epidemic levels worldwide. The World Health Organization estimates that about 300 million people will suffer from diabetes by year 2025<sup>1</sup>.

<sup>1,3</sup> Final Year MBBS student, Karachi Medical and Dental College

<sup>2</sup> Department of Medicine, Abbasi Shaheed Hospital

<sup>4</sup> Department of Community Medicine, Karachi Medical and Dental College

**Correspondence:** Hira Muzaffar  
Final Year MBBS Student,  
Karachi Medical and Dental College  
Email: hiramuzaffer9@gmail.com

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Not only international but also national practitioners have dedicated their time in the recent past to evaluate the degree of prevalence of diabetes in Pakistan; prevalence of diabetes is high in Pakistan ranging from 7.6 to 11%<sup>2</sup>. Pakistan with a population of 184.35 million is the 6th most populous country in the World<sup>3</sup>. Although current national data regarding prevalence of diabetes in Pakistan are lacking, previous national diabetes surveys of Pakistan by Diabetes Association of Pakistan (DAP) and WHO showed an overall prevalence of diabetes as 11.47%<sup>4</sup>.

In addition to being risk factors for cognitive decline as individual diseases, diabetes and depression according to studies are independent risk factors for each other. Depression is a major psychiatric illness often under reported because of associated social stigma and reluctance of individuals in our society to accept the fact that they are depressed as compared to healthy individuals. Depression is number 4 on the global burden of diseases and is expected to rank second by the year 2020<sup>4</sup>. Major depression is the second leading cause of disability-adjusted life years (DALYs) lost in women and the 10th leading cause of DALYs in men<sup>5</sup>. Local data on depression is not available for recent years due to the lack of physician's interest and the social stigma associated with the diagnosis of a psychiatric illness. In addition to being risk factors for cognitive decline as individual diseases, diabetes and depression according to studies are independent risk factors for each other. Depression is a major psychiatric illness often under-reported because of associated social stigma and reluctance of individuals in our society to accept the fact that they are depressed as compared to healthy individuals. Type 2 diabetes mellitus (T2DM) patients are two times more likely to develop depression than the general population<sup>6</sup>. Local data does exist, but is more limited and has variable figures. One local study conducted at Civil Hospital, Karachi using the Beck Depression Inventory (BDI) scale concluded that a strong correlation exists between depression and chronic diseases especially anaemia and diabetes<sup>7</sup>. In addition to this other local studies stated that 14.7% of type 2 diabetes patients from rural area had depression<sup>8</sup> and a frequency of 43.5% in an urban population<sup>9</sup>.

The cause and effect association between the two diseases is not clear, as we do not know whether the presence of depression increases the risk of diabetes or vice versa. In view of these sta-

tistics and the lack of local data available we decided to conduct this study owing to the need of time and the responsibility of practitioners to assess the frequency of the co-morbid conditions so that we can improve our health care provision and conduct further researches to reduce the DALYs as a result of depression. The objective of our study is to evaluate the frequency of depression among diabetic patients visiting the Medicine Unit 1 at Abbasi Shaheed Hospital Karachi and to determine the relation of duration of diabetes with the degree of depression.

### Materials and Methods

A descriptive cross-sectional study was carried out at a tertiary care centre (Abbasi Shaheed Hospital) after acquiring due consent from the diabetic patients visiting the department of medicine. After taking an ethical approval from the Ethical and Scientific Review Committee of Karachi Medical and Dental College (ESRC), we conducted the study that included a total of 400 patients who had pre-diagnosed diabetes for 5 years or more. All the patients included in the study were between 20 to 55 years of age and the sample size was of 378 patients this was calculated with a 95% confidence interval and a 5% margin of error. Patients with the history of any psychiatric illness or those who were already on any anti-depressive or antipsychotic medications were excluded from the study.

The major ICD-10 depression inventory was employed to assess the degree of depression in diabetics; this included a checklist (inventory) of 11 questions regarding how the patient felt in the past two weeks. ICD here refers to the International Classification of Diseases (ICD) which is the international standard diagnostic tool for epidemiology, health management and clinical purposes. A minimum score of 4 or 5 in two of the first three items plus a score of at least 3 on two or three of the last seven items means that person is mildly depressed and as the score increases so does the severity of depression.

We underwent a back to back translation and used the validated questionnaire. The translated version was used before in other studies as well<sup>10</sup>. Before conducting this study, a pilot study was run to ensure the cultural validation for our setting based on the information collected and it included 40 participants who were not included in the current study, they belonged to the same background and had similar ethnicities and life styles. On acquiring repro-

ducible results we proceeded to conduct the cross-sectional study using this questionnaire. Using the ICD-10 scale ensured, we were utilizing the gold standard<sup>10</sup> and minimizing our chances of error.

When using the scale to diagnose depression according to ICD-10, there are the following possibilities; mild depression: a score of 4 or 5 in two of the first three items plus a score of at least 3 on two or three of the last seven items. Moderate depression: a score of 4 or 5 in two or three of the first three items plus a score of at least 3 on four of the last seven items. Severe depression: a score of 4 or 5 in all of the first three items plus a score of at least 3 on five or more of the last seven items. Major depression: the number of items is reduced to nine, as item 4 is part of item 5. Include whichever of the two items has the highest score (item 4 or 5). A score on at least five items is required, to be scored as follows: the score on the first three items must be at least 4, and on the other items at least 3. Either item 1 or 2 must have a score of 4 or 5. The age, gender, marital status, profession and religion were the demographic factors filled in the patients information form. These questions were straight forward except when enquiring about the profession we also added a clause regarding how the environment of their work place makes them feel providing them with only 2 options which were "good" or "bad" and if they could mention the single most important factor that made them feel this way. The other field we questioned was regarding ones religion, we ensured these questions were directed to the participants' belief in any supreme authority or not and whether this belief helped them cope up with situations in their daily lives. These questions required no detailed discussion avoiding any chances of bias from the interviewer or the participant. To ensure that the answers for the ICD-10 inventory were not affected by the questions pertaining to demographic details, we chose to ask the patients questions regarding their demography after we administered the questionnaire this helped us avoid any bias in the answers the patient provided us with.

The duration of the study was 6 months which began from October 2017 and ended in February 2018, data collection and entry required 2 months on average and this was followed by data analysis. SPSS version 25 was used for data entry and analysis and we formulated a null hypothesis for this study which stated that the duration of diabetes is not related to the degree of depression. The

hypothesis was tested using the Chi-square test to assess the relationship between the two variables. The level of significance for the test was set at 0.05.

## Results

The total data collected was for 400 patients but after excluding the missing data for various variables the final set of data was analysed for 378 patients (Fig. 1). The study included 163 males and 215 females. The age range of the participants was between 25 to 35 years of age and majority of the participants were between 45-55 years of age.

The results of the study indicates that the duration of diabetes is related to the degree of depression (Fig. 2). The data analysis showed that as the duration of diabetes increased the degree of depression also increased. The bar chart (Fig. 2) shows that diabetics with a history of 5 years of diabetes were 77 in number and most of these patients didn't have depression and 11 out of 77 who were positive for depression mostly had mild depression. As the duration of diabetes increased we observe that the frequency of patients suffering from a greater degree of depression increased and there were lesser patients with no or mild depression. This effect can most evidently be seen in the bars showing depression in patients suffering from diabetes since 6, 7 and 8 years; we see that the number of patients suffering from moderate depression increased significantly and the percentage of patients with no depression decreased.

Our results also reflected that overall out of 378 people who were assessed 216 were positive for depression and 162 had no depression. We analysed this data to assess the percentage of depressed participants of each gender and found out that amongst the 215 female participants 119 were depressed, whereas out of the 163 males 97 were diagnosed with depression.

Further data manipulation showed that out of the 216 patients who showed positive, 25.7% had mild depression, 26.2% had moderate depression, 4.2% had severe depression and merely 1.3% of the participants suffered from major depression (Fig. 3). We also assessed the probable effect of marital status on depression; these showed that out of 309 married candidates 181 had depression, out of these 181 people 80 had mild depression, 84 had moderated depression, 13 had severe depression and 4 suffered from major depression. Our sample included 55 unmarried participants out of which 27

had no depression, 15 had mild depression, 10 had moderate depression, 2 suffered from severe depression and only 1 had major depression. The data for divorcees and widowed people was limited and showed that 2 out of the 3 divorcees were depressed and 6 out of the 11 widowed individuals were suffering from depression, 4 out of these 6 had moderate depression and 2 had mild depression. Moreover, we ran tests to assess any relation that might exist between religion and depression, our results showed that out of 343 people who had any religion, 191 were depressed and 152 had no depression. In addition to this, out of the 35 atheists, 25 had depression.

## Discussion

This study to the best of our knowledge is the only recent study done in Pakistan with its use of ICD-10 depression inventory to grade the degree of depression rather than just diagnosing the presence of depression. The gold standard for diagnosing depression is the structural clinical interview that uses Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria for illness<sup>11</sup>. As this is a difficult and time-consuming task for physicians who do not have specialized psychiatric training, a number of scales are available for use in research and everyday clinical practice. These scales include depression subscale of the Hospital Anxiety and Depression Scale (HADS-D, Hopkins Symptom Checklist, Beck Depression Inventory (BDI) and the Patient Health Questionnaire-9 (PHQ-9). The ICD-10 depression inventory is a tool similar to PHQ-9, it includes a set of 11 questions that can be scored, these scores are used to assess the degree of depression and is a scale suggested by the WHO, which is easy to administer by the clinicians in a busy outpatient department of a tertiary care hospital.

The ICD-10 inventory is one of the many tools that can be used to screen patients for depression. To measure outcome the sum of the ten items is used. A higher score signifies a higher degree of depression. We chose the ICD-10 because it a reliable tool that is recommended by the WHO and is easy to administer by medical students, general medical practitioners, it does not in any way replace the necessity of a complete psychiatric consult but it definitely provides the clinician with deeper insight to the patients problems and allows them to convince patients to get professional psychiatric help.

Our results show that 57% of the diabetic population was depressed and this result is very similar to a recent study carried out in Peshawar, which reported depression being 60% in their sample, this study used the BDI (Beck Depression Inventory)<sup>12</sup>. Although not mentioned by the authors, a higher rate can be explained by the geographical location of the city, this study which was conducted in Peshawar, a city with multiple sources of psychological trauma that the population is continually exposed to. Similarly, our study which was conducted at Abbasi Shaheed Hospital Karachi, which is a tertiary care hospital in a fast-paced urban city, showed that most of the diabetics had depression. This can probably be explained with the law and order situation declining on an alarming rate, coupled with a comparatively costly lifestyle of an urban city. All these factors collectively present as potential culprits for the high depression percentage in patients. Contrary to this, a study that was conducted in Bagh showed that 51% of the diabetics were depressed. The authors commented that this was probably because Bagh is a relatively peaceful city the residents of which are not subjected to continuous psychological trauma unlike the citizens of Karachi and Peshawar<sup>13</sup>.

Taking into consideration our sample, we tried to analyse if the marital status of the patients had an effect on the presence or absence of depression, and we found out that it indeed did. Although 309 participants were married, 180 had depression and this can be reasoned by the responsibilities that come along with families. Our sample included 55 unmarried individuals and the results showed that 28 out of these 55 individuals were depressed while 27 were not depressed. Our study included 3 divorcees out of which 2 had depression. Females were more likely to be depressed in our study, this can be explained by the societal and family pressures that most women face. We tried interviewing our candidates about their profession, and most women usually helped in house activities which included a lot of physical work and constant criticism, which in our opinion has a negative influence on the mental health of these individuals. Similar results regarding females having more depression than males have been reported earlier as well<sup>13</sup>. The latter could also be because our cohort included more female participants than males.

Our results showed that the degree of depression in diabetics did increase with the duration of

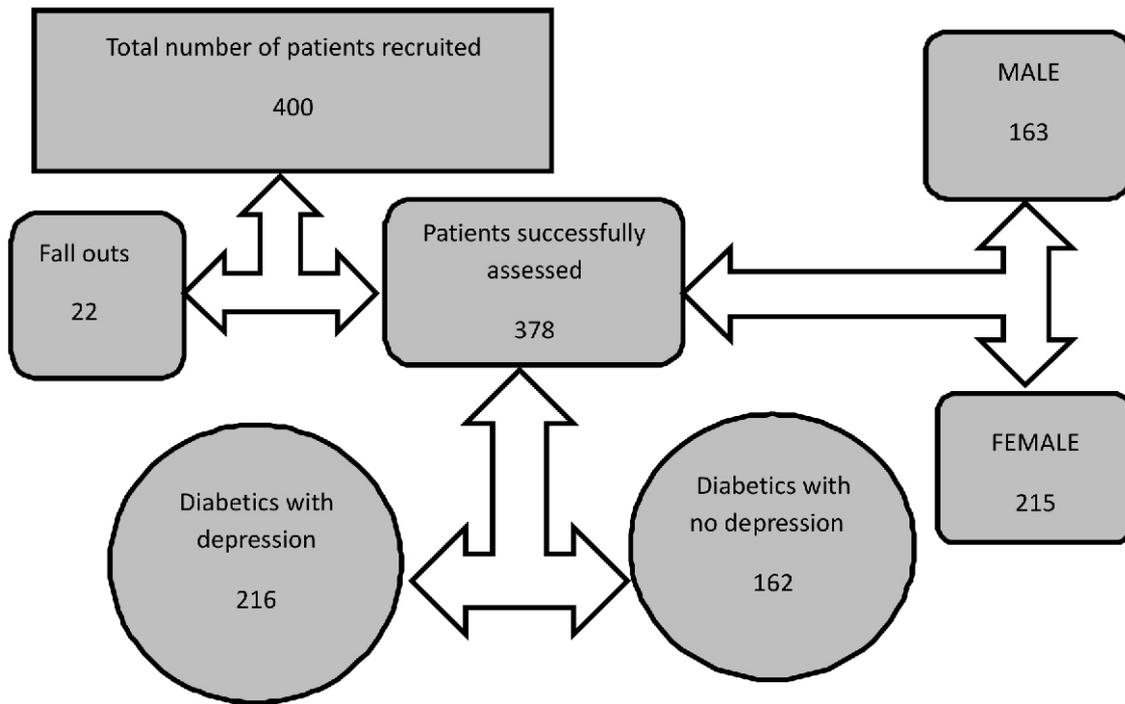


Fig. 1. The flowchart shows the total number of patients recruited and analysed.

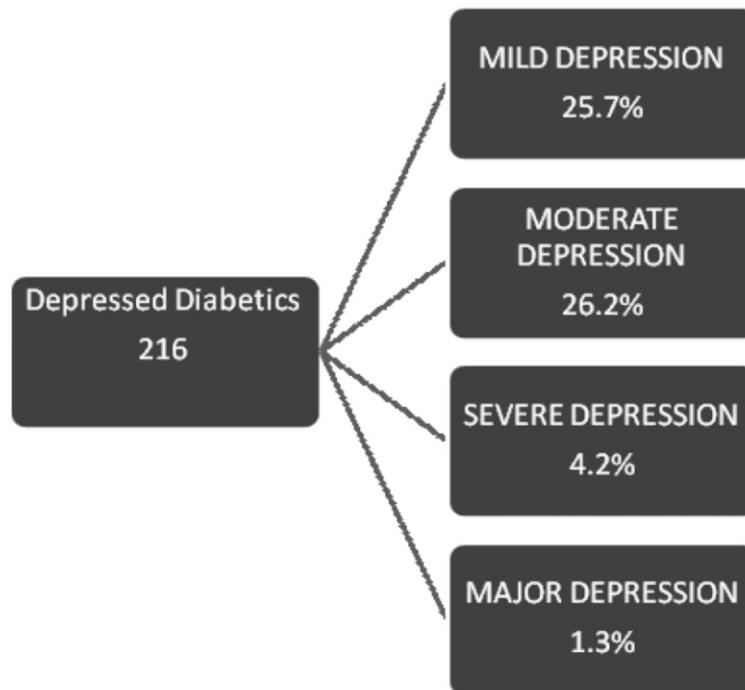


Fig. 2. Reflecting the percentages of various degrees of depression in the depressed diabetics

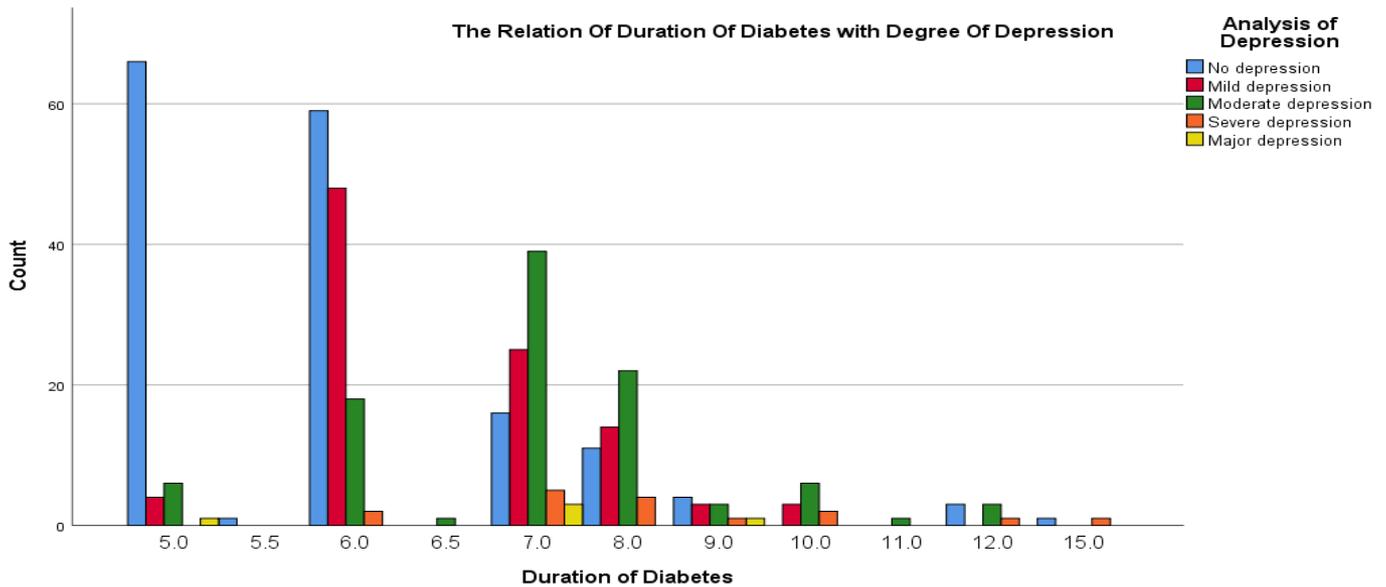


Fig. 2. The relation of duration of diabetes with degree of depression

diabetes as seen in most of the previous studies, although the results of a study conducted in the city of Bagh are a sharp contrast<sup>13</sup>. The study shows that the only factor that predicted depression on multivariate analysis was shorter duration of diabetes and the author suggests that this may be because of an enormous psychological burden at the time of diagnosis, only to be followed by a gradual adaptation by the patients<sup>13</sup>. On the other hand our study supports the idea that an exposure to diabetes mellitus for over 5 years had a negative effect on the mental health of patients and although this study doesn't analyse the bidirectional relationship of diabetes and depression it does in fact reflect upon the idea that the two are strongly related comorbid conditions. Since the World Health Organization estimates that about 300 million people will suffer from diabetes by year 2025<sup>2</sup>, our burden of depression is consequently on continual rise.

Analysing the various degrees of depression for our sample we incur that 25.7% had mild depression, 26.2% had moderate depression, and 4.2% had severe depression and merely 1.3% of the participants suffered from major depression. These results help us conclude that although the increase in duration of diabetes did result in an increase of depressive degree but a very small percentage suffered from severe and major depression. This

information also reflects that even chronic diabetics if screened for diabetes could be effectively treated for depression.

The results of our study helped us evaluate the effect of religion on depression. We often witness that a common remedy suggested for people with low mood levels is asking them to improve their connection with God, this might be true for some but our results showed that out of 343 people who had any religion or belief in God 191 were depressed and 152 had no depression. In addition to this, out of the 35 atheist, 25 had depression and in both cases the individuals did not think that their religious beliefs have anything to do with their low levels of mood and reduced interests in life. We would like add here that the relationship of belief in the existence of a supreme being and depression requires more probing to analyse any relation that may exist between the two variables. Such studies will help clinicians further evaluate treatment strategies and improve our standards of treatment and also aid in getting rid of any misconceptions and myths with respect to religion which might be in the patient's mind.

It is acknowledged that this study could be improved if other variables like maintained blood glucose level of diabetics, obesity, education and

family income could be included to avoid potential bias that may be caused by them. Also, a bias may exist by the mere nature of a cross-sectional study design. It is recommended that further studies must be carried out on a large scale with equal number of male and female candidates at multiple hospitals in the city, this could help us better evaluate the data for different areas of the city. We also suggest to exclude females who are close to their menstrual cycle, as a precautionary measure to avoid any bias caused by hormonal influence during pre-menstrual syndrome.

This study helped us to include a depression screening practice, promoting the idea of mental health being equally important as other diseases of all other systems. This research is a stepping stone on the path of the large amount of work that needs to be done to effectively screen patients with chronic illnesses like diabetes for depression. The WHO recommended that ICD-10 inventory for depression is a clinically approved and tried questionnaire that enables a quick assessment that will ultimately aid in provision of quality health care.

## Conclusion

The results of this study revealed that the degree of depression by ICD-10, major depressive inventory, translated into local language and validated showed a relation to duration of diabetes. The degree of depression in both sexes with diabetes was more than 50%.

## Conflict of Interest

Authors have no conflict of interests and no grant/funding from any organisation.

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