

Prevalence of Depression and Anxiety Symptoms among Type 2 diabetes Patients in Selected Sub-County Hospitals in Murang'a County, Kenya

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Abstract

Type 2 diabetes mellitus is a chronic disease that needs long-term management, and it may lead to the development of mental disorders such as depression and anxiety. The main objective of this study was to establish the prevalence of depression and anxiety among Type 2 diabetes (T2DM) patients in two selected Sub-County Hospitals in Murang'a County, Kenya. Prevalence of depression and anxiety symptoms was also determined by use of frequency across various socio-demographic characteristics such as age, gender, religion, occupation, education level and marital status. This study involved male and female patients aged 30-70 years attending follow up clinics at least three months before commencement of the study. Purposive sampling method was used to select participants of the study (n=161) who were then screened for depression and anxiety symptoms. A self-administered questionnaire was used to collect data on sociodemographic characteristics. Screening for depression and anxiety symptoms was done using self-administered Beck Depression Inventory (BDI-II) and Beck Anxiety Inventory respectively. The prevalence of depression and anxiety in this study was 85.1% and 95.7% respectively. This study recommended routine screening for depression and anxiety symptoms in clinical setting among people with T2DM. This may be crucial in making appropriate referrals, early detection, proper diagnosis, treatment, and recommendations.

Keywords: Prevalence, depression, anxiety, type 2 diabetes mellitus

Introduction and Background

T2DM is a chronic disease that needs long-term management for the patients to manage and control their blood sugar levels and prevents unnecessary complications (American Diabetes Federation, 2010). According to Socialstyrelsen (2015) and World Health Organization (2016) findings that T2DM is a lifestyle disease which could be prevented by managing the risk factors. Undesirably, T2DM has no physical indicator and as a result people are often diagnosed late and

thus, they miss the best time for treatment (WHO, 2016). Diabetes mellitus is on rise, and it was established that it was the sixth leading cause of death both in developed and developing countries (WHO, 2017). T2DM is the most prevalent type of diabetes mellitus at 90% to 95% of the cases internationally (ADA, 2013).

People with T2DM usually experience many complications such as retinopathy, neuropathy, heart diseases, renal failure, and diabetes nephropathy if blood sugar levels are not well managed (Centre for Disease Control and Prevention, 2015; Levey & Coresh, 2012; Shehab, AL-Jarallah & Abdella, 2015). As evidenced by the International Diabetes Federation (2015), T2DM is expensive to treat. Additionally, its complications drain family income since a lot of money is used on diabetes drugs, diet, testing blood sugar level, hospitalization, and attending follow-up clinics (Oladeji & Gureje, 2013). Persons with diabetes mellitus experience many comorbidities such as hypertension, dyslipidaemia as well as heart problems (Dagogo-Jack, 2012). The comorbidities together with stressful emotions associated with the diagnosis of diabetes mellitus have been linked with the development of depression and anxiety symptoms (Gonzalez, Eshitt, & Schneider, 2011; Yekta, Pourali & Yavarian, 2010).

Internationally, 4.4% of the world population, which is more than 300 million individuals, suffers from depression while 3.6% suffer from anxiety, which is comparable to 264 million persons (WHO, 2016). According to American Psychological Association (2013), depression is a mental illness that affect individuals negatively by affecting how they think, feel, and behave. The lifetime prevalence for both disorders is far greater, with rates increasing as high as 20.8% for depression and 33.7% for anxiety (Bandelow & Michaelis, 2015). Individuals with diabetes mellitus are said to be prone to depression and anxiety, and as a result are likely not to follow treatment regime such as medication as well as self-care. Hence, managing their blood sugar level might be a problem (Kaur, Ariaratinam, Krishnapillai & China, 2013).

Chlebowy et al., (2018) reported that 11% of persons with diabetes mellitus had met the criteria for major depression disorder. Prior studies reported that depression affects up to 40% of people with diabetes mellitus (Golden et al., 2017; Mushtame, Gulati, Hossain & Azmi, 2016; Rajput, Gehlawat, Gehlan, Gupta & Rajput, 2016). Even though the prevalence of depression is on the rise among people with diabetes mellitus particularly type 2 diabetes, it is usually not diagnosed early enough to warrant early treatment (Hunter et al., 2018).

Although anxiety is least researched in comparison with depression, Jacka et al., (2010) reported that anxiety disorders are also related complications of diabetes mellitus. Smith et al., (2013) observed that anxiety is underestimated and not screened in comparison to depression in T2DM patients. Furthermore, anxiety symptoms appear to destroy the metabolic procedures thus increasing the complications in persons with diabetes mellitus (Bickett & Tapp, 2016). People with T2DM have elevated symptoms of depression and anxiety due to complications of diabetes mellitus and this may affect day to day management of the disease, a situation that may require serious lifestyle adjustments (Van Houtum et al., 2015; Sartorius, 2018). This study aimed at establishing the prevalence of depression and anxiety symptoms among T2DM patients. By addressing psychological challenges of T2DM patients, this may possibly lead to improved individual self-care behaviors including managing and controlling blood sugar level. It may also lead to reduced mortality and morbidity rates and hence improved quality of life.

Methodology

This study used quantitative method of data collection. The study involved male and female patients in Kigumo, and Kandara Sub-County Hospitals aged between 30 and 70 years old. The inclusion criteria were individuals who had to be people with T2DM diagnosed by a healthcare provider and had a medical file at the diabetic clinic. In addition, included were T2DM patients who had been attending follow up clinics for three months prior to commencement of the study. The sample size was calculated using the Casagrande, Pike and Smith (1978) formula where 161 patients with T2DM were screened for depression and anxiety symptoms.

Data was collected using self-administered questionnaire that was used to capture sociodemographic characteristics of the study population. The study participants were further screened for depression using Beck Depression Inventory, second edition (BDI-II) while Beck Anxiety Inventory (BAI) was used to assess anxiety levels. BDI-II has 21 statements which reflect on persons' mental, emotional, and somatic component of depression (Grothe et al., 2005; Kneipp, Kairalla, Stacciarini & Pereira, 2009). The total scores range from 0-63 in which 0-13 indicates a normal or minimal level of depression, 14-19 mild, 20-29 moderate and 30-63 severe (Wu et al., 2013). In this study, a cutoff of 14 points and above was used. Prior studies conducted among diabetes patients used similar BDI-II score of ≥ 14 which signifies the presence of mild symptoms of depression (David, Dobrea & Sucala, 2012; Tovote et al., 2017; Zurita-Cruz et al.,

2018). This is consistent with Wang and Gorenstein (2013) who established that a cutoff of ≥ 14 is appropriate for adults with depressive symptoms in a medical context. The cronbach's alpha for BDI-II among people with diabetes mellitus was found to be 0.91 (Deassalegn, Yemataw & Atinkut, 2018).

Anxiety symptoms were measured using BAI which was developed to assess the difference between behavioral, emotional, and physiological symptoms of individuals with anxiety (Beck & Steer, 1990). BAI comprises of 21 statements. In terms of rating the levels of anxiety, 0 represents not at all, 1 mildly but it did not bother me at all, 2 represent moderately but it was not pleasant at times and 3 indicates severely and it bothers me so much. The scores of 0-9 are normal, 10-19 mild, 20-29 moderate and 30-63 severe anxiety (Julian, 2011; Wu et al., 2013). A cutoff of 10 points and above signifying the presence of mild anxiety was adopted for this study. BAI was found to have a good psychometric property in assessing for anxiety in both adolescents as well as adults (APA, 2014; Beck & Steer, 1990). Its cronbach's alpha ranges from .92 to .94 for adults (APA, 2014; Beck & Steer, 1990). In Kenya, BAI was used to test levels of anxiety among diploma students in a nursing college and was found to be reliable and valid (Muriungi & Ndeti, 2013).

The sociodemographic questionnaire, BDI-II and BAI were administered to the study participants after approvals from School of Human and Social Sciences (SHSS), Ethics Review Board (ERB), Daystar University and National Commission for Science, Technology, and Innovation (NACOSTI). Clearance was also sought from the Ministry of health, Murang'a County, Education office, and from Kigumo and Kandara Sub-County Hospital management. The researcher then booked an appointment with the help of medical superintendent and nurses in charge of diabetic clinics to meet with individuals who had been diagnosed with T2DM for at least three months before commencement of the study. Recruitment procedure was done from 5th October until 1st December 2020 when the required sample was achieved. On the first and consecutive days of screening, the T2DM patients sat at the diabetic clinic where the screening was done. Data gathered from questionnaires, BDI-II and BAI was double checked for completeness, and precision before leaving the healthcare Centres. It was then coded, cleaned, and double entered by the researcher before being analyzed using Statistical Package for Social Sciences (SPSS) version 21. Moreover, the prevalence of depression and anxiety symptoms was

computed to estimate the prevalence at the 95% confidence interval. A $P < 0.05$ was considered statistically significant.

Results

Table 1: Prevalence of Depression and Anxiety among Respondents

Variables	n	Percentage (%)	95% CI
Overall Prevalence of Depression	161	85.1% (137)	91.25-98.23
Overall Prevalence of Anxiety	161	95.7% (154)	78.64-90.21

As shown in Table 1, 161 patients with type 2 diabetes mellitus were screened for depression and anxiety. This study established that the prevalence of depression was at 85.1% (95% CI: 78.64%-90.21%) while anxiety was at 95.7% (95% CI: 91.25%-98.23%) among T2DM patients in Kigumo and Kandara Sub-County Hospitals. Both depression and anxiety prevalence appeared quite high although this seemed comparable with other studies.

Table 2: Distribution of the Prevalence of Depression and Anxiety in Relation to Sociodemographic Characteristics

Variable	Anxiety (N=161) n, (%)	Pvalue	Depression (N=161) n, (%)	Pvalue
Age				
30 – 39 years (n=12)	12 (100.0%)	0.559	12 (100.0%)	0.307
40 – 49 years(n=28)	28 (100.0%)		25 (89.3%)	
50 – 59 years(n=44)	41 (93.2%)		37 (84.1%)	
Above 60 years(n=77)	73 (94.8%)		63 (81.8%)	
Gender				
Female(n=131)	126 (96.2%)	0.490	112 (85.5%)	0.764
Male(n=30)	28 (93.3%)		25 (83.3%)	
Religion				
Protestants(n=98)	94 (95.9%)	0.872	84 (85.7%)	0.003*
Roman Catholic(n=50)	48 (96.0%)		46 (92.0%)	
Others(n=13)	12 (92.3%)		7 (53.8%)	
Occupation				
Farmer(n=136)	132 (97.1%)	0.041*	117 (86.0%)	0.437
Business & Employed(n=25)	22 (88.0%)		20 (80.0%)	
Education levels				
Below primary(n=13)	13 (100.0%)	0.104	11 (84.6%)	0.915
Primary(n=109)	106 (97.2%)		92 (84.4%)	
Post-primary(n=39)	35 (89.7%)		34 (87.2%)	
Marital status				
Married(n=123)	117 (95.1%)	0.552	103 (83.7%)	0.058
Separated & Single(n=38)	37 (97.4%)		4(89.5%)	

As presented in Table 3, analysis showed that the prevalence of depression and anxiety disaggregated by key sociodemographic characteristics. For instance, the study found that all the respondents between ages 30-39 had 100% prevalence in both depression and anxiety. The respondents between 40-49 years had a prevalence of 89.3% while the prevalence of anxiety was at 100.0%. The respondents aged 50-59 registered a depression prevalence of 84.1% while anxiety was at 93.2%. Moreover, the respondents aged 60 years and above recorded a depression prevalence of 81.8% and anxiety prevalence was at 94.8%. These results implied that younger T2DM patients were more prone to depression and anxiety than the older ones although the statistical difference was found not statistically significant as indicated by a P-value of 0.559 and 0.307, respectively.

With respect to gender differences, females had a higher prevalence of depression at 85.5% and anxiety at 96.2% as compared to males who had depression prevalence of 83.3% and anxiety was at 93.3%. However, the statistical analysis did not reveal a statistically significant difference between gender, that is, ($p=0.764$) and ($p=0.490$) for depression and anxiety, respectively. Regarding respondents' religious affiliation, the study findings showed the prevalence of depression among Roman Catholic was 92.0% compared to 85.7% of protestants and 53.8% of other religious denominations. From the findings, the prevalence of anxiety among Roman Catholics was at 96.0%, protestants at 95.9% and for followers of other denominations at 92.3%. No statistically significant difference was found between the participants religion and anxiety prevalence ($p=0.827$). However, there was statistically significant difference between religion and the prevalence of depression ($p=0.003$).

Regarding respondents' occupation, majority indicated that they were farmers out of whom 86.0% had depression and 97.1% had anxiety. Among those who reported to be either in business or employed, 80.0% had depression while 88.0% had anxiety. The study established that there was no statistically significant difference between respondents' occupations and the prevalence of depression ($p=0.437$). However, the difference between occupation and the prevalence of anxiety was statistically significant ($p=0.041$).

In terms of respondents' level of education, 84.6% who had acquired below primary education had depression while 100.0% had anxiety. Among those who had acquired primary education, 84.4% had depression whereas 97.2% had anxiety. The respondents who had attained post-primary education exhibited depression at 87.2% and anxiety at 89.7%. The differences in distributions of respondent's education level and the prevalence of depression ($p=0.915$) and anxiety symptoms ($p=0.104$) were statistically insignificant. The study also found that in reference to respondents' marital status, the prevalence of depression was at 89.5% while anxiety was at 97.4% among those who indicated they were separated and single. Regarding the married respondents, the prevalence of depression was 83.7% and anxiety 95.1%. The statistical difference was not statistically significant between distribution of marital status and symptoms of depression ($p=0.386$) and anxiety ($p=0.553$).

Discussion

The study sought to determine the prevalence of depression and anxiety symptoms among type 2 diabetes patients in selected Sub-County Hospitals in Murang'a County. In this study, the prevalence of depression symptoms was 85.1% while prevalence of anxiety was 95.7%. The high prevalence of depression and anxiety in this study could be justified by COVID-19 pandemic, which was an unexpected risk for individuals with pre-existing conditions such as diabetes mellitus. The COVID-19 updates were aired through social media, radio stations and televisions. The updates indicated that people with underlying conditions such as diabetes mellitus were at a greater risk of getting the pandemic. This could have triggered their thoughts and emotions leading to their exhibiting higher levels of depression and anxiety symptoms. Moreover, the use of different assessment tools and different cut-off scores for depression and anxiety could have contributed to high rates of depression and anxiety as well. The current study was done in a hospital setting hence the T2DM patients were recruited from the weekly diabetic clinic.

Although the prevalence of depression in this study was high, it was slightly lower compared to a study carried out in Muhimbili National Hospital in Dar es Salaam, that reported the prevalence of depression at 87% (Khan, Lutale & Moledina, 2019). The study done in Muhimbili used a larger sample of 353 patients compared with the current study. Similarly, the symptoms of depression were screened using PHQ-9 while the patients aged between 41 and 60 years. The Muhimbili study was carried out in the main referral and teaching hospital, while the current study was done in a Sub-County Hospitals. Consequently, there was a difference in sample sizes hence, differences in prevalence. Furthermore, Muhimbili study included all the patients with diabetes mellitus showing that some participants might have had type 1 diabetes though majority had T2DM.

Consistent with the prevalence of depression in the current study, a descriptive cross-sectional study conducted in Rwanda recorded a prevalence of depression at 83.8% (Mukeshimana & Chironda, 2019). Another cross-sectional study done in Hunoi, Vietnam, reported a prevalence rate of depression at 79.4%, which was slightly lower compared to the findings of this study (Vu et al., 2018). Still in 2016, a cross-sectional study conducted in Tabuk city in Saudi Arabia that involved 221 T2DM patients reported depression prevalence at 77.8%. Among those who had depression, 32.1%, 25.8% and 19.9% had mild, moderate, and severe, respectively (Al-Atawi et

al., 2016). That study involved T2DM patients aged 18 and above and the Arabic version of the PHQ-9 was used to screen for depression. However, it was observed that the response rate was at 61% and this could have affected the prevalence rate as well.

Another study conducted in Iman Khomeini that involved 184 persons with T2DM aged 22 and 78 reported a depression prevalence of 70.7% and anxiety prevalence at 69.6% (Palizgir, Bakhtiari & Esteghamati, 2013). The result illustrates that the prevalence of depression and anxiety in Iman Khomeini study was slightly lower compared to the findings of this study probably due to different settings (Palizgir, Bakhtiari & Esteghamati, 2013). Although, there were more males who had no symptoms of depression and anxiety compared with females in this study, the results showed that females were more prone to exhibiting mild, moderate and severe symptoms of depression and anxiety. This may explain the differences in Iman Khomeini study and current study. Moreover, the prevalence of depression was greater in younger patients as compared to older patients ($p=0.036$) and being male or female, age and occupation status was linked with anxiety which is not the case in the current study. In Sues Canal University, a cross-sectional study that involved 300 individuals with T2DM reported depression prevalence at 69.0% although anxiety was not measured (Ismail et al., 2019).

Contrary to the findings of this study, other studies reported lower prevalence of depression and anxiety. A descriptive study done in Kenyatta National Hospital that involved 102 persons with diabetes mellitus aged 18 and above drawn from both medical wards and outpatient clinics. The study established that the prevalence of depression was at 61.3% and that of anxiety was at 68.8% (Nzau, 2017). The Kenyatta Hospital study used mixed methods to collect data where depression and anxiety were common among diabetic patients who were hospitalized. In a study conducted in Kisii Teaching and Referral Hospital where 202 patients were screened for depression, anxiety, and stress, the results showed that 41.1%, 64.9% and 49% of the participants had depression, anxiety, and stress, respectively (Obuya, 2017). In Nablus in Palestine, the prevalence of depression was 40.2% (Sweileh, Abu-Hadeed, Al-Jabi & Zyoud, 2014). Contrary to these findings, a cross-sectional study conducted in Lebanon reported the lowest prevalence rate at 28.8% (Ahmadih et al., 2018) compared to prior studies done in Suez Canal University Hospital, Kenyatta National Hospital, Kisii and Saudi Arabia. Based on reviewed literature, the higher or lower rates of depression and anxiety symptoms could be explained by different

psychological tools used, context/setting, different cut-off scores and patients' sociodemographic characteristics.

The analysis on prevalence of depression and anxiety in relation to sociodemographic characteristics was computed. The findings of this study revealed that younger people aged between 30-39 years at 100.0% exhibited more symptoms of depression compared to those aged 60 and above who recorded at 81.8%. Regarding anxiety, all participants aged 30-39 and 40-49 years had anxiety prevalence at 100.0%. This is compared with participants aged between 50-59 years who had prevalence of anxiety at 93.2%. From this findings, younger people exhibited higher levels of depression as well as anxiety. However, statistical analysis showed that the age of the respondents and the prevalence of depression ($p=0.559$) and anxiety ($p=0.307$) was statistically insignificant. Contrary to this study's findings, a study done by Mukeshimana and Chironda (2019) found that there was statistically significant difference between age and depression ($P=0.01$). From that study's finding, being older was associated with greater rate of depression. The risk of depression was greater in patients aged between 31 and 40 years compared to those aged between 21 and 30 years old. Further, analysis showed that the risk of getting depression was greater among patients aged between 41 and 50 years (Mukeshimana & Chironda, 2019).

In reference to gender differences, the current study established that females had slightly higher levels of depression 85.5% compared to males 83.3%. In addition, the prevalence of anxiety in females was at 96.2% compared with males at 93.3%. The analysis showed that there was no statistically significant difference between gender and the prevalence of depression ($p=0.764$) and anxiety ($p=0.490$). In contrast to this study's finding, a study done in Rwanda reported that there was statistically significance difference between gender and depression as shown by a $p=0.02$ (Mukeshimana and Chironda, 2019). Equally, a study done in Bangladesh that involved 417 T2DM patients reported that the prevalence of depression was three times higher in women compared to male (Roy et al., 2012). The PHQ-9 was 3.4 while WHO-5 questionnaires it was 2.7 greater or 2.0-3.9 in female compared to that of male at 95% confidence interval (Roy et al., 2012). This also agrees with Chaudhry, Mishra, Parminder and Mishra (2010) study that reported that females had higher percentage of symptoms of depression and anxiety compared to males.

With respect to respondents' religious affiliations, this study found that the prevalence of depression among Roman Catholic was 92.0%, followed by protestants at 85.7% and then the followers of other denominations who recorded depression at 53.8%. This study's finding showed that there was a statistically significant difference between religion and the prevalence of depression as depicted by $p=0.003$. Other studies established that religion was associated with the lower levels of depressive and anxiety symptoms (Koenig, King & Carson, 2012; Bonelli & Koenig, 2013). This has been retaliated by Amadi et al., (2016), who found that the patients who had religious beliefs had reduced depressive symptoms compared to those without. This may probably be so because of healthy themes, emotional care, and significant help that religious conviction may provide (Amadi et al., 2016). The prevalence of anxiety among the Roman Catholic participants was 96.0%, protestants 95.9% and others at 92.3%. The difference between religion and the prevalence of anxiety was statistically insignificant ($p=0.827$).

In reference to educational level, participants who had acquired post-primary education level recorded depression level at 87.2% compared with those who had achieved below primary education level 84.6% and primary level at 84.4%. Although respondents who had achieved post-primary level of education had slightly higher percentage of depression, education level was not found to be statistically significant in relation to depression $p=0.915$. These finding agrees with those of Mushtaque, Gulati, Hossain and Azmi (2016) who found that education background did not seem to influence the prevalence of depression significantly as depicted by $p=0.935$. This study also established that respondents who had achieved below primary education level anxiety prevalence of 100.0% as compared to those who had attained primary level because they had a prevalence of 97.2% and those who were at post-primary level, had a prevalence of 89.7%. These results revealed that even though anxiety was more prevalent among respondents who had acquired below primary education, the level of education was not found to be statistically significant with the prevalence of anxiety ($p=0.104$).

Regarding marital status, the participants who revealed that they were either single or separated had depressive symptoms at 89.5% compared to those who were married at 83.7%. Furthermore, the prevalence of anxiety among singles and separated was at 97.4% in comparison with 95.1% for married participants. This study established that the difference between marital status and the prevalence of depression ($p=0.386$) and anxiety ($p=0.553$) was not statistically significant. This

is contrary to the findings of a study done in Saudi Arabia that revealed that unmarried respondents were at a higher risk of having symptoms of depression (OR=3.206; P=0.25), (Elmahalli, 2015). Consistent with the findings of this study, a descriptive cross-sectional study done by Alsumry, Alghelani and Jaju (2021) reported that there was no significant difference regarding age ($p=0.056$), gender ($p=0.79$), education level ($p=0.92$), marital status ($p=0.11$) and the prevalence of depression.

Conclusion

This study found that T2DM patients in selected Sub-County Hospitals exhibited symptoms of depression and anxiety. Participants' occupation was found to be significantly associated with anxiety levels while religion was significantly associated with symptoms of depression. Socio-demographic factors such as age, gender, education level and marital status did not seem to have any significant influence on the prevalence of depression and anxiety symptoms. The presence of depression and anxiety symptoms may interfere with diabetic medical treatment and self-care for patients with T2DM. Due to high prevalence of depression and anxiety symptoms among T2DM patients in Sub-County Hospitals, it is recommended that screening for depression and anxiety symptoms be an integral part of routine check in healthcare settings. This would ensure symptoms are detected early enough, treated and managed. This may also prevent medical complications that may be worsened by symptoms of depression and anxiety. Moreover, incorporating psychological interventions in the clinical management of T2DM in Kenyan context would help in improving mental health in people with T2DM. Based on these results, medical practitioners and psychologists need to create awareness to the society on how mental health problems can be detected and managed among patients of T2DM. These findings can also inform policy makers in the Ministry of Health to allocate funds for prevention and management of physical and mental health of this population.

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