THE ASSOCIATION BETWEEN DEPRESSION, ANXIETY AND SOCIODEMOGRAPHIC FACTORS IN TYPE 2 DIABETIC PATIENTS FROM SELECTED HOSPITALS IN KENYA

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ABSTRACT

Type 2 diabetes mellitus is commonly comorbid with depression as well as anxiety and their coexistence has been linked with more negative health outcomes. Sociodemographic characteristics contribute to the prevalence of depression and anxiety in patients with diabetes. Given the high incidence of diabetes mellitus cases in Kenya, this study sought to assess for a correlation between socio-demographic characteristics and depression and anxiety among people with type 2 diabetes in selected hospitals in Kenya. Study tools utilized were Beck Depression Inventory (BDI-II), Beck Anxiety Inventory (BAI) and socio-demographic questionnaire. Participants were 161 type 2 diabetes (T2DM) patients aged between 30-70 years old. Bivariate analysis found no significant association between depression or anxiety and age, gender, marital status and level of education. However, there was a statistically significant association between depression and religious denomination (P=0.005) but not between anxiety and religious denomination (p=0.682). Logistic regression revealed that Roman Catholics were about 5 times less likely to have depression compared to patients who were Protestants (OR=5.143, 95% CI: 1.506-17.568; P=0.009).

Key words: Religion; depression, anxiety; factors; 2 diabetes mellitus

INTRODUCTION AND BACKGROUND

Diabetes mellitus is a global problem that impacts a person's physical, social and mental health (Kalra et al., 2018). The International Diabetes Federation (2019) reported that one in eleven individuals aged between 20-79 (463 million) had Type 2 diabetes mellitus (T2DM) in 2019 with

the number expected to rise to 700 million in 2045. This has been associated with old age, unhealthy eating habits, being overweight, economic development and sedentary lifestyles (Zheng et al., 2018).

Diabetes complications and emotional reactions following a diabetes diagnosis have been linked to the emergence of depression and anxiety in people with diabetes (Gonzalez et al., 2011; Yekta et al., 2010).When chronic disease such as diabetes mellitus are not perceived as a collective problem, the person affected may evaluate the diagnosis negatively and engage in negative coping approaches (Berg & Upchurch, 2007; Jackson et al., 2015; Gamavel & Revenson, 2015; Revenson et al., 2016).Individuals with diabetes mellitus are two to three times more likely than the general population to experience depressive disorders (Semenkorich et al., 2015; Sing et al., 2015). This has been linked to reduced self-care (Shrestha et al., 2020)with increased likelihood of developing diabetes complication (Alzoubi et al., 2018; Khaledi et al., 2019; Kreider, 2017). They may find it difficult to exercise and adhere to nutrition plans (Brown et al., 2016) due to lack of motivation to take care of themselves (Lewko et al., 2012). However, half or more of patients with T2DM live with undetected and untreated depression (Haghighatdoost & Azadbakht, 2013; Singh et al., 2015).

Individuals with T2DM are more likely than those without diabetes to experience clinical and sub-clinical symptoms of anxiety (Bicket &Tapp, 2016). Chronic physical and medical problems like diabetes and its complications are associated with anxiety and its symptoms (Goldbacher & Matthews, 2007; Khuwaje et al., 2010). Having diabetes, extensive daily management and lifestyle modification as well as concerns about complications is connected to higher levels of anxiety and discomfort (Fisher et al., 2016; Pouwer, 2009; Young-Hyman et al., 2016); Van Houtum et al., 2015; Sartorius, 2018). According to research though, anxiety among diabetics receives less attention than depression (Smith et al., 2013).

With regards to sociodemographic, studies demonstrate a relationship between depression as well as anxiety in T2DM patients' age (OR=1.8; 95% CI:1.3-2.2), gender (OR=3.4; 95% CI: 2.0-3.9), having a low education level (OR=3.4; 95% CI: 2.2-5.4 and OR= 2.2.7; 95% CI: 2.0-3.9) according to the PHQ-9 and WHO-9 findings respectively(Roy& Lioyd, 2012). A positive correlation has been noted between depression rates and factors such as advanced older age, those with less level of education, marital status and employment status (Assil & Zeidan, 2013; Sayin et al., 2019). Additionally, several studies have associated low education level with depression in persons with diabetes (Arambewela et al., 2019; Joshi et al., 2015; Sweileh et al., 2014). However, some research found no correlation between depression in patients with diabetes and female gender, age, place of residence, educational attainment, ethnicity, occupation and having low income (Agbir et al., 2010; Naranjo et al., 2011; Raval et al., 2010).According to

studies, depression is correlated with age in T2DM patients, with older age being associated with a higher risk (Joshi, et al., 2015; Khuwaja et al., 2010; Roy et al., 2012).

In regards to gender, studies have shown that men had lower levels of depression and anxiety (Kautz-Willer et al., 2016; Siddiqui et al., 2013) and females were twice as likely as males to exhibit depression(Deischinger et al., 2020). Data drawn from research involving diabetic patients from various nations showed that females with T2DM had higher rates of depression (Alonso-moran et al., 2014; Mikaliukstiene et al., 2014; Patriche et al., 2015). Regarding marital status, Akpalu et al. (2018) found that married participants had a decreased chance of developing depression compared to unmarried participants. Being single (OR=3.206; P=0.25) was statistically associated with development of depression in a cross-sectional study carried out by Elmahalli (2015). Additionally, people with diabetes who practice their religion reportedly fewer depressive symptoms (Amadi et al., 2016; Berardi et al., 2016) and those who regularly attend church services report less issues with mental health (Schieman et al., 2013; Van de Velde et al., 2017).

In Kenya, the prevalence of diabetes was 3.3% in 2011 (IDF, 2017), and the Kenya Ministry of Health reports that 9.42% of all lifestyle illnesses involve T2DM cases (MOH, 2015). The purpose of this study was to determine the sociodemographic characteristics associated with depressive and anxiety symptoms among people with T2DM.

Procedure and Method

The researcher obtained relevant approvals from the School of Applied Human Sciences (SAHS) and the Ethics Research Board (ERB) at Daystar University as well as the National Commission for Science, Technology and Innovation (NACOSTI). Other relevant approvals were obtained from the Ministry of Health in Murang'a County, Sub-County offices, Kigumo and Kandara Sub-County Hospitals.

Participants

The present study involved men and women with T2DM aged between 30-70 years old. Inclusion criteria was people with T2DM who had attended at least one medical check-up in selected Sub-County Hospitals in Murang'a County Kenya in the preceding three months. A total of 161 patients met the inclusion criteria for the study. Participating in the study was voluntary. Privacy and confidentiality was highly obtained during data collection, coding, and analysis. The data gathered was kept in a secure place, patient's names did not appear anywhere on the evaluation instruments and each patient was assigned a special code prior to data entry.

Procedure

With the required authorizations in place, the researcher attended diabetic follow up clinics in the selected Sub-County Hospitals weekly for nine consecutive weeks in order to recruit participants. During the recruitment days, the researcher met with T2DM patients and explained the objective, purpose and benefits of the study. Those who had met the inclusion criteria and consented to participate in the study signed the informed consent form. They then filled out the data collection questionnaires.

Data collection Instruments

The sociodemographic questionnaire collected information on patient's age, gender, religion, occupation, education level and marital status.

BDI-II whose scores range from 0-63, was used to screen for symptoms of depression. Scores of 0-13 portray minimal depression, 4-18 mild depression, 20-28 moderate depression and 29-63 severe depression (Wu et al., 2013). A BDI-II cut-off of ≥ 14 was used based on precedence among diabetic patients (David et al., 2012; Tovote et al., 2017; Zurita-Cruz et al., 2018). The use of BDI-II among people with diabetes has been validated by Cronbach's alpha scores of 0.82 and above (Bak et al., 2017; Deassalegn et al., 2018).

BAI was used to screen for anxiety symptoms with score ranges of 0-63. It contains 21 statements and respondents indicate how much they have been bothered by each of the anxiety symptoms in the preceding month. Scores of 0-9 indicated normal or minimal anxiety level, 10-18 mild anxiety, 19-28 moderate anxiety while 29-63 indicated severe anxiety symptoms (Julian, 2011; Wu et al., 2013). A BAI cut-off score of ≥ 10 was used (Hoyer et al., 2000). The Cronbach alpha scores for BAI ranges from .92 to .94 for adults and thus BAI has been found to be valid and reliable in assessing anxiety among adolescents and adults (APA, 2014; Beck & Steer, 1990).

Data analysis

Bivariate analysis was utilized to analyze several factors both across and within the groups in order to determine the association between depression and anxiety symptoms. The Pearson's chi-square (x^2) test, t-tests and one-way ANOVA were used. Binary logistic regression was used to determine the characteristics that significantly increased the risk of depression and anxiety symptoms. To determine the degree of the correlation between independent and different dependent (Outcome) variables, beta coefficients with associated 95% Confidence Intervals (CI) were used. A p=0.05 was chosen as the threshold for statistical significance across all analyses.

RESULTS

Sociodemographic factors of T2DM patients

Table 1 displays the sociodemographic characteristics of 161 study participants 47.83% were patients between 60-70 years, with women making up (81.37%) of the sample. When it came to marital status, and occupation, married participants made up the majority (76.40%) and farmers constituted (84.47%) respectively. Analysis of education level revealed that most of the participants had only acquired primary level of education (67.7%) while 60.87% of the participants reported that they were Protestants.

Table 1: Socio-demographic Characteristics of Study Participants

Variable	Total (n=161)	
	n	%
Age		
30-39 years	12	7.45
40-4 9years	28	17.39
50-59 years	44	27.33
Above 60 years	77	47.83
Gender		
Male	30	18.63
Female	131	81.37
Marital Status		
Separated & single	38	23.60
Married	123	76.40
Occupation		
Farmer	136	84.47
Business & employed	25	15.53
Education Level		
Below Primary	13	8.1
Primary	109	67.7
Post-primary	39	24.2
Religious denomination		
Protestants	98	60.87
Roman Catholic	50	31.06
Others	13	8.07

Table 2:Prevalence of Depression and Anxiety Symptoms

Variable	n	Depression (%)	n	Anxiety (%)
Age				
30-39 years	12	7.8	12	8.76
40-4 9years	28	18.2	25	18.25
50-59 years	41	26.6	37	27.01
60-70 years	73	47.4	63	45.98
Gender				
Male	25	18.25	28	18.18
Female	112	81.75	126	81.82
Marital Status				
Married	103	75.18	117	75.97
Separated &single	34	24.82	37	24.03
Occupation				
Farmer	117	85.40	132	85.71
Business & employed	20	14.60	22	14.29
Education level				
Below primary	11	8.03	13	8.44
Primary	92	67.15	106	68.83
Post-primary	34	24.82	35	22.73
Religious denomination				
Protestants	84	61.31	94	61.04
Roman Catholic	46	33.58	48	31.17
Others	7	5.11	12	7.79

As represented in table 2, most of the participants 47.40 % (73) exhibiting depression and anxiety 45.98% (63) were aged between 60 and 70 years. Data on the gender of the participants showed that 81.75% (112) and 81.82 (126) of females presented with depressive and anxiety symptoms respectively. Of marital status, depression and anxiety was more common among married people 75.18% (103) and 75.97 (117) respectively. For occupation, farmers represented the majority 85.40% (117) of the participants with depressive symptoms and anxiety symptoms 85.71% (132).Depression and anxiety was also more common in those who only held a primary school education at 67.15 % (92) and 68.83 (106) respectively. Finally, with regards to religious denominations, depression and anxiety was more common among protestants at 61.31% (84) and 61.04% (94) respectively.

Table 3: Relationship between Depression, Anxiety and Sociodemographic Characteristics

	No Anxiety	Anxiety	χ^2 statistics &p-value	No Depression	Depression	χ^2 statistics &p-value
Age						
30 – 39 years	0 (0%)	12 (100.0%)	1.769;	0 (0%)	12 (100.0%)	2.706;
40 – 49 years	0 (0%)	28 (100.0%)	p=0.590	3 (10.7%)	25 (89.3%)	p=0.428
50 – 59 years	3 (6.8%)	41 (93.2%)		7 (15.9%)	37 (84.1%)	
Above 60 years	4 (5.2%)	73 (94.8%)		14 (18.2%)	63 (81.8%)	
Gender						
Female	5 (3.8%)	126 (96.2%)	4.77;	19 (14.5%)	112 (85.5%)	0.090;
Male	2 (6.7%)	28 (93.3%)	p=0.490	5 (16.7%)	25 (83.3%)	p=0.764
Occupation						
Farmer	4 (2.9%)	132 (97.1%)	4.167;	19 (14.0%)	117 (86.0%)	0.605;
Business & Employed	3 (12.0%)	22 (88.0%)	p=0.076	5 (20.0%)	20 (80.0%)	p=0.540
Religion						
Protestants	4 (4.1%)	94 (95.9%)	0.977;	14 (14.3%)	84 (85.7%)	**9.565;**
Roman Catholic	2 (4.0%)	48 (96.0%)	p=0.682	4 (8.0%)	46 (92.0%)	**p=0.005**
Others	1 (7.7%)	12 (92.3%)		6 (46.2%)	7 (53.8%)	
Education levels						
Below primary	0 (0.0%)	13 (100.0%)	3.526;	2 (15.4%)	11 (84.6%)	0.240;
Primary	3 (2.8%)	106 (97.2%)	p=0.157	17 (15.6%)	92 (84.4%)	p=0.937
Post-primary	4 (10.3%)	35 (89.7%)		5 (12.8%)	34 (87.2%)	
Marital status						
Married	6 (4.9%)	117 (95.1%)	0.352;	20 (16.3%)	103 (83.7%)	0.752;
Separated & Single	1 (2.6%)	37 (97.4%)	p=0.688	4 (10.5%)	34 (89.5%)	p=0.448

Between the ages of The age of 30-39, 100% (12) of participants had symptoms of anxiety, while between the ages of 40-49, 100% (28) of individuals had symptoms of anxiety and 89.3% (25) had symptoms of depression. Among individuals 50 to 59 years old, 84.1% (37) had depression and 93.2% (41) had anxiety. According to the study's findings, depression affected 81.8% (63) and anxiety 94.8% (73) of participants aged 60 and over.

Regarding gender, females had 85.5. % (112) prevalence of depression whereas males had 83.3% (25). Similarly, 96.2% (126) of females and 93.3% (28) of males reported having anxiety symptoms. Based on these findings, it was noted that female participants had slightly higher percentages of depression and anxiety than males. Farmers made up the majority of the participants and 97.1% (132) had anxiety symptoms compared to 88.0% (22) of those who were

working or in business. The study also found that 86.0% (117) of farmers reported having depression compared to 80.0% (20) of those who said they were in business or employed. In terms of marital status, participants who disclosed that they were either divorced or single had a depression prevalence at 89.5% (34) and anxiety prevalence at 97.4% (37). This contrasts with married participants who had depression rate of 83.7% (103) and anxiety 95.1% (117). Farmers made up the majority in this study and the percentage of those who had anxiety was found to be 97.1% (132) compared to 88.0% (22) of those who were working or in business. The study also established that 86.0% (117) of farmers reported having depression compared to 80.0% (20) of those who said they were in business or employed.

With regards to religion, participants who were Roman Catholics 96.0% (48) had anxiety while 92.0% (46) had depression. Those who were protestants 85.7% (84) had depression and 95.9% (94) had anxiety. The participants who followed other religious affiliations 53.8% (7) presented with depression and 92.3% (12) had anxiety. The results showed that individuals with post-primary education had a slightly high percentage of depressive symptoms 87.2% (34) compared to those with lower level of education 84.6% (11) and those with primary education 84.4% (92). Additionally, the study's findings on participant education levels revealed that 100% (13) of participants with lower level academic credentials and 97.2% (106) of those who had completed the primary level of education had anxiety symptoms. Participants with post-primary education had slightly lower percentage of anxiety level 89.7% (35).

The study showed that there was no statistically significant difference between participants' ages and depressive symptoms (p=0.428) or anxiety levels (p=0.590). The prevalence of depression and anxiety symptoms also did not differ statistically by gender (p=0.764 and p=0.490), occupation (p=0.540 and p=0.076), education level (p=0.937 and p=0.157) or marital status (p=0.448 and p=0.688), respectively. However, the study found a statistically significant difference between religious denominations and depressive symptoms p=0.005 but not between anxiety symptoms and religious denominations (p=0.682). Logistic regression was done to analyze the relationship between depression and religious denominations as noted in table 4.

Table 4: Logistic Regression Analysis for Religious Denominations and Depression

	No depression	Depression	χ^2 statistics & p-value	OR; 95% CI (p-value)
Religion				
Protestants	14 (14.3%)	84 (85.7%)	9.565;	Reference
Roman catholic	4 (8.0%)	46 (92.0%)	0.005	5.143; 95% CI: 1.506 – 17.568

			(*p*=0.009)
Others	6 (46.2%)	7 (53.8%)	9.857; 95% CI: 2.212 – 43.925
			(*p*=0.003)

Logistic regression revealed a correlation between depression and religion at P=0.005. This revealed that T2DM patients who were Roman Catholics were about 5 times more likely to have depression compared to patients who were Protestants (OR=5.143, 95% CI: 1.506 – 17.568; p=0.009). Similarly, logistic regression analysis revealed that T2DM patients who were followers of other religious denominations were 9 times more likely to have no depression compared to Protestants (OR=95% CI: 2.212-43.925; p=0.003).

DISCUSSIONS

In this study, bivariate analysis showed that sociodemographic factors such as age, gender, marital status, occupation and education level did not significantly affect the prevalence of depression and anxiety in T2DM patients. However, religion was noted to have a significant effect on the prevalence of symptoms of depression at p=0.05.

Literature reviewed displayed a relationship between age and depression prevalence (Joshi et al., 2015; Khuwaja et al., 2012). In three selected hospitals, a study that involved 339 adults aged 21 and above years established that there was a statistically significant link between age and depression p=0.01 (Mukeshimana & Chironda, 2019) as well as between gender and depression p=0.02 (Mukeshimana & Chironda, 2019).Another cross-sectional study involving 400 T2DM patients aged 30-65 years conducted at the National Diabetes Management and Research Centre, Korle Bu Teaching in Accra Ghana, discovered that sociodemographic factors such being female, being single and education attainment are linked with depression (Akpalu et al., 2018). Additionally, a cross-sectional study with 2448 patients with diabetes in Qatar Biobank found that females were more likely than males to experience depressive symptoms (OR=1.819, 95% CI: 1.42-2.33) and patients with higher levels of education had an increased risk of depression (OR=1.351, 95% CI: 1.00-1.82) (Bawadi et al., 2021). In support of this, a study done in Tehran-based Dornian Care Clinic found that the patients with higher levels of education had lower levels of depression (p=0.003) and anxiety (p=0.011) even though there was no association between depression, stress and anxiety and sociodemographic factors including age, marital status (Ahangari et al., 2016). In line with Tehran-based study, there was no statistically significant difference between age of the participants and depressive symptoms p=0.590 and anxiety p=0.428. This was further supported by a descriptive cross-sectional study that involved 427 T2DM patients from 12 government facilities in Muscat, Oman that found no correlation

between depression and sociodemographic characteristics such as age (p=0.056), gender (p=0.79), education level (p=0.92), and marital status (p=0.11) (Alsumry et al., 2021).

The study's findings showed that females had prevalence rate of depression at 85.5% and males had 83.3%. Similarly, women had 96.2% prevalence of anxiety while men had 93.3%. The present study established that females had slightly higher percentages fordepression and anxiety than males but difference was not statistically significant as shown by p=0.764 for depression andp=0.490 for anxiety. This is incongruent with a study conducted by Sun et al. (2016) that found a link between being female gender and depressive symptoms.Studies also show that females with T2DM were more likely to experience depression and anxiety (Cols-Sagarra et al., 2016; Chaudhry et al., 2010; Khuwaja et al., 2010; Salinero-Fort et al., 2018). For instance, a study done by Khuwaja et al. (2010) in Parkistan found that depression rate was 43.5% and anxiety at 57.9%. The study also established that a number of factors such as gender, age, hypertension and ischemic heart disease had a relationship with depression. The findings of the current study are very different from that of Karachi, Pakistan for age, occupation, marital status, gender and level of education did not contribute to the development of depression and anxiety symptoms in the present study. This disagree with results from a study done by Asefa et al. (2020) in Mizan-Tepi University Teaching Hospital that recorded a slightly higher percentages of depression in Males at 39.8% and that of females at 31.7%. This inconsistency could be due to different coping strategies used by men and women in different social settings plus different sociocultural roles played by both genders in different cultural backgrounds (Asefa et al., 2020).

A study by Arambewela et al. (2019) done in an outpatient clinic at a tertiary care hospital in Colombo, Sri Lanka found that low education level was significantly linked with the prevalence of depression (OR=1.92, 95% CI: 1.14-3.22; P=0.01). Other factors associated with depression in the same study included living alone due to divorce, being widowed or being single, female gender, and diabetes complications like peripheral neuropathy (Arambewela et al., 2019). Nevertheless, the current study found no statistically significant relationship between marital status and depressive (p=0.448) and anxiety symptoms (p=0.448). Another cross-sectional study at the University hospital of Fuenlabrada in Madrid, Spain was carried out with over 3000 eligible T2DM patients and established that widowers had higher depression rates at 57.1% (95% CI:1.51-7.09) and this was statistically significant at p=0.005 (Calvin et al., 2015).This reveals that living with a chronic disease such as diabetes with all its demands if overwhelming to the patients and it involves their partners (Frank et al., 2012). Thus, lack of supportive gestures, reduced day-to day interactions, lack of caring remarks and attitudes from patients' partners could lead to mental problems causing depression and anxiety symptoms (Lida et al., 2013). Literature demonstrates that the way the spouse react to the patients may affect the adaptation of

disease as well as management of diabetes including engaging in physical activity, taking proper diet and monitoring and controlling blood sugar level (Dimitraki & Karademas, 2014).

A study carried out in Chitwan Medical college in Nepal found that the depression prevalence was 57.8% and anxiety was 49.7% and a strong correlation between anxiety symptoms and sociodemographic factors. This includes the T2DM patients' living circumstances (p=0.001) and level of education (p=0.001). Additionally, there was a significant relationship between depression and age (p=0.045), living situation (p=0.003) and education level (p=0.001) (Sharma et al., 2021). This agrees with an earlier study carried out by Katon et al. (2004), that found that having diabetes and being a woman (OR=2.29; 95% CI: 1.47-3.55), being older (OR=0.9; 95% CI: 0.95-0.98), having a low level of education (OR=1.34; 1.04-1.72) being single (OR=1.41; 1.13-1.77), smoking cigarettes (OR=2.15; 1.56-2.95) and having more comorbidity (OR=3.08; 95% CI: 1.67-5.69) was associated with symptoms of depression in persons with diabetes. In Turkey, a descriptive study that involved 100 participants carried out in Polyclinic for diabetes at Istanbul Okmeydani Training and Research hospital found an average depression score of (M=16.34, SD=8.06). According to this study, depression level was greater in females who had low education level and unemployed (Kucuk et al., 2013). In the present study, being female and having low level of education was not linked with depressive symptoms.

The results of this study showed that occupation of the participants did not have a significant impact on anxiety (p=0.935) and depression levels (p=540). Although, most of the T2DM patients identified themselves as farmers, majority of them testified that they sell their eggs and other farm produce to raise money which they use to purchase highly processed foods leading to poor diets. Accordingly, eating food high in carbohydrates and doing less exercise are two factors contributing to the high rates of T2DM (Arshad et al., 2016). In addition, the emergence of the boda boda transportation industry in the rural areas has also made people inclined to walk. Others avoid manual labor, which might lead to some people being obese from a lack of exercise. Thour et al. (2015) found that people in the rural areas had a three times higher risk of exhibiting depression than people in urban areas. Contrarily, living in an Urban environment raises depression risk compared to persons who live in rural areas, perhaps as a result of differences in socioeconomic and environmental factors between the two contexts (Asefa, 2019).Being in employment according to Salinero-Fort (2018) is a protective factor against depression as an individual may receive a lot of support from colleagues. Thus, lack of employment in itself is a depressing factor and a financial burden imposed by T2DM (Sunny et al., 2019).

With regards to religious denominations, there was a statistically significance difference between depressive symptoms and religion as depicted by p=0.005. However, no statistically significant difference was found between anxiety levels and religion p=0.682. This differed from previous

studies that demonstrated that religion is associated with lower levels of both depression and anxiety (Bonelli & Koenig, 2013; Koenig et al. 2012). People who have been diagnosed with diabetes mellitus and have religious beliefs are shown to have decreased depression symptoms as compared to those without religious beliefs (Amadi et al., 2016; Berardi et al., 2016). Studies have revealed that religious beliefs play a crucial role in dealing with unfavorable circumstances and thus make it pertinent to mental health (Mahmoodabad et al., 2016). The results of this study established that T2DM patients who were Roman Catholics were about 5 times less likely to have symptoms of depression as opposed to Protestants. This could be explained by the way Roman Catholic followers are taught and the way pastoral counseling is effected in local churches and parishes including members confessing to a priest which is a buffer against depressive symptoms.

Additionally, followers of Roman Catholics attend churches regularly during the week. Vanderweele et al. (2016) reported that there is a relationship between attending church services for more than once a week and lower rates of suicide and depression levels compared with persons who do not attend church services regularly. Peres et al. (2017) observed that religion is associated with positive emotions, peace as well as improved health. Religion may also help people to have positive emotions such as optimism, generosity as well as improved purpose in life (Koenig et al., 2014; Li et al., 2016). People's commitment to religious beliefs reduces depressive symptoms (Payman & Ryburn, 2010) and reduced mortality is associated with being religious (Chida et al., 2009; Li et al., 2016).Schieman et al. (2013) and Van de Velde et al. (2017) observed that people who attend church services frequently are shown to have decreased mental health problems. This is in line with Koenig et al. (2014) that attending church services often improves the influence of the symptoms of depression and it also offers a social support system. In the same vein, religion may be used by individuals as a coping mechanism which offers social integration and support (Koenig et al., 2014; Li et al., 2016).

Implications of the findings

1. The management of psychological issues that are likely to influence people with T2DM requires screening and psychological solutions in order to improve their quality of life and reduce mortality and morbidity rates.

2. Medical superintendent in charge of the non-communicable diseases, diabetes included, needs to make sure that every primary care facility with diabetes clinics to have support group programs for patients with T2DM patients attending follow-up clinics in that institution. People with T2DM will have the chance to openly discuss their life experiences, disappointments and feelings related to being diagnosed with a chronic

disease which may lessen the likelihood of experiencing symptoms of depression and anxiety.

3. The study results demonstrated a relationship between religion and depression in T2DM patients. This demonstrates the fact that doctors cannot disregard their patients' religious beliefs while providing medical care. The religious life of a T2DM patients and how it affects their mental health are two important coping mechanisms that medical professionals can learn from. Additionally, this study suggests that mental health professionals who work with T2DM patients such as psychologists, psychiatrists and medical doctors try to find a way to incorporate their patient's religious practices and beliefs into treatment because they are a crucial component of their psychological management.

4. The findings indicated that T2DM patients who were Roman Catholics and adherents of other religious groups were less depressed than Christians who identified as protectants. Literature review revealed that regular attendance improves mental wellness and protestant church leaders should devise ways to encourage people to routinely discuss their difficulties in a setting where they feel secure, such as church setting.

Conclusions

The study's results revealed that there was no statistically significant difference between T2DM patients' sociodemographic characteristics such as age, marital status, gender, occupation and education level. Bivariate analysis revealed a statistically significant association between religious affiliations and depression but not with anxiety. Since religion was noted to be a protective factor against depression in patients with T2DM, it may need to be taken into account when developing and implementing the programs for people with T2DM.

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