ISSN: 2091-2986
DOI Prefix: 10.3126/ijssm
International Journal of Social Sciences and Management

Research Article

Prevalence and Associated Factors of Depression among Diabetes Patients in Selected Hospital at Pokhara, Kaski

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Article Information

Received: 13 June 2021
Revised version received: 15 July 2021
Accepted: 19 July 2021
Published: 29 July 2021

Cite this article as:
S. Gautam and N. Shrestha (2021) Int. J. Soc. Sc. Manage. 8(3): 426-432.
DOI: 10.3126/ijssm.v8i3.38524

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Peer reviewed under authority of IJSSM

Abstract

Although in recent decades depression and diabetes patients are increasing the numbers and proportions worldwide. Eighty percent of individuals with Type 2 diabetes mellitus (T2DM) dwell in low- and middle-income countries. The real crisis of depression and diabetes, where it exists, is the personal crisis of day-by day. The objectives of this study is to determine the prevalence and associates factors of depression among diabetic patients in selected hospital in Nepal**.** A cross sectional study was conducted at tertiary center of Pokhara, Kaski .Study participants identified with type 2 diabetes mellitus (n=330) .Blood pressure, anthropometrics (height, weight and hip circumference) and glycated hemoglobin (HbA1c) were collected, a semi-structured interview was utilized to obtain information on socio-demographic and Beck Depression Inventory (BDI) was used as a tool to assess depressive symptoms among patients with type 2 diabetes mellitus .Logistic regression was used to investigate the associate factors of depression with diabetes patients. Majority (68.2%) of the respondents had no depression with diabetes, 16.7% of respondents having moderate, 12.4% having mild and few (2.7%) had severe depression with diabetes. Depression was significantly associated with Marital status (p=0.014), Educational status (0.016), Occupational status (p=0.003) and Drinking alcohol(p=0.020). The prevalence of depression with Diabetes in this study was 31.8%.

Keywords: Depression; Prevalence; Associated Factors; Glycated hemoglobin; Beck Depression Inventory.

Introduction

ype 2 diabetes is defined as a condition when cells cannot use blood sugar efficiently to meet the body's needs due to insufficient production of insulin by Pancreases. Depression is a mood disorder in which one feel so low that things previously enjoyed, no longer hold that same joy. Type 2 diabetes mellitus (T2DM) and depression are major public health issues. Diabetes mellitus (DM) is a common chronic medical disorder with serious medical and financial outcomes. Worldwide, more than 365 million people are estimated to have T2DM, and almost 300 million people have major depression. Both these disorders are projected to be among the five leading causes of disease burden by

2030 (Tabák et *al.*, 2014). Between 2010 and 2030, there will be 69% increase in number of diabetic patients in developing nations and a 20% increase in developed countries (Shaw *et al*., 2010).

Depression is common among diabetes and is associated with poor results. Both diabetes and depression are related with premature morbidity and mortality, and when these conditions exist together, the risk of developing co-morbidities, complications, patient suffering and related cost increases. Depression can be seen as a modifiable independent risk factor for the development of T2DM and for progression of complications from either type 1 or type 2 diabetes (Williams *et al*., 2006). The recognition and addresal of this association can have significant implications for prevention and treatment of these disorders (Shaw *et al*., 2010). Eighty percent of individuals with T2DM dwell in low and middle-income countries. Nowadays, depression and diabetes patients are increasing the numbers and proportions worldwide. Depression and diabetic population should not be seen as a crisis. The real crisis of depression and diabetes, where it exists, is the personal crisis of day-by-day existence (Mendenhall *et al*., 2014). Government of Nepal has focused on prevention of non-communicable disease like diabetes. So, this study aims to find out the prevalence and associated factors of depression among type 2 diabetic patients in selected hospitals and to determine association of depression with selected demographic variables, clinical factors and glycemic control.

Yet much of the research around depression among people with diabetes has been conducted in high-income countries. This study adds to the constrained data available on the prevalence of depression in diabetes from Nepal. It has special relevance for Nepal, having high prevalence of both these disorders (Ramachandran *et al*., 2014; Kroenke *et al*., 2001).

Methods

This was a hospital based descriptive, cross-sectional study. Population consisted of type-2 diabetic patients attending tertiary centers (Gandaki Medical College, Pokhara, Nepal) which is 550 bedded multi-disciplinary teaching hospital. The inclusion criteria for this study were as follows:

1. All patient with at least three months of diagnosed type II diabetes and no chronic medical illness before detection of diabetes 2. Pregnant women, patients with no psychiatric or family history of depression or mental illness.3. Those aged 20 years and above and capable of independent communication and giving informed verbal consent.

Non probability consecutive sampling method was used to select diabetic patients from selected Hospital. Sample size was calculated based on 30 % prevalence of depression among diabetic patients in 2011.

Here, $n=z^2pq/d^2$

Ethical clearance was taken from institutional ethical review committee of Gandaki medical College. After obtaining informed verbal consent from participants, data were collected by the research team. Structured, pre-tested questionnaire was administered by the interviewers to collect information on socio-demographic characteristics, disease variables and behavioral characteristics. Blood pressure, anthropometrics (height, weight, waist and hip circumference) and glycated hemoglobin (HbA_{1c}) was measured at the time of interview.

The Beck Depression Inventory (BDI) was used as a tool to assess depressive symptoms among patients with type 2 diabetes mellitus. Pre-testing of the questionnaire was performed to gather information about understandability, time consumed by each question, consistency among related variables and acceptability. After reviewing the outcome of pre-testing, changes were incorporated accordingly.

The data were analyzed using the Statistical Package for social Science (SPSS) version 20. Data checking was done to detect any coding errors, illogical or missing values**.** Descriptive statistics like frequency, percentage, mean and standard deviation was used to describe the characteristics of collected data. Pearson Chi-square test was used to find out the association between two categorical variables. To assess the association between depression and different explanatory variables, logistic regression was performed. The significant level was set at $p<0.05$.

Results

Table 1 reveals majority (66.1%) of the respondents were between age of 40-64 years, more than half 59.1% being female. Most (82.1%) were Hindu and 86.4% were married, 46.7% were illiterate, 35.2% were housewife. Almost equal (50.9%) in urban area, most (67.6%) had single family type with almost half (49.4%) having family members from 5-10 members. Most of the participants (38.2%) had monthly family income between NRs. 10000-20000 while most of the participants (41.5%) had monthly family expenditure less than NRs. 10000.Majority (51.2%) had diabetes for 2 to 5 years, oral hypoglycemic drug was used by 79.7% of the patients while 20.3 % were on insulin. Majority (80.7%) were compliant to treatment, 17.9% had family history of diabetes, 60.3% of the participants never smoked while majority (64.5%) never drank alcohol, 67.9% of the patient had history of hypertension. Majority of the patients (47.3%) were overweight.

Table 1: Socio-demographic information of the participants (n=320)

Variables		Frequency	Percent
Age (years)	20-39	17	5.2
	40-64	218	66.1
	65+	95	28.7
Sex	Male	135	40.9
	Female	195	59.1
Religion	Hindu	271	82.1
	Buddhist	53	16.1
	Christian	4	1.2
	Muslim	2	0.6
Marital Status	Married	285	86.4
	Unmarried	35	10.6
	Divorced/Separated/ Widow/widower	10	3.0
Education	Illiterate	154	46.7
	Primary level	71	21.5
	Secondary level	55	16.7
	Higher secondary level	18	5.5
	Bachelors	19	5.5
	Masters	13	3.9
Occupation	Unemployed	31	9.4
	Agriculture	52	15.8
	Daily wages	27	8.2
	Business	35	10.6
	Service	64	19.4
	Housewife	116	35.2
	Others	5	1.5
Residence	Rural	162	49.1
	Urban	168	50.9
Type of family	Single	223	67.6
	Joint	107	32.4
Number of family members	1-4	255	48.6
	5-10	259	49.4
	>10	11	2.0
Monthly family income (NRs.)	≤10000	54	16.4
	10001-20000	126	38.2
	20001-30000	92	27.9
	30001-40000	32	9.7
	40001-50000	11	3.3
	>50000	15	4.5
Monthly family expenditure (NRs.)	≤10000	137	41.5
	10001-20000	123	37.3
	20001-30000	50	15.2
	30001-40000	7	2.1
	40001-50000	4	1.2
	>50000	9	3.0
Duration of Diabetes	<2 years	68	20.6
	2-5 years	169	51.2
	6-10 years	74	22.4
	11-15 years	13	3.9
Treatment Modalities of Diabetes	>15 years	6	1.8
	Oral Hypoglycemic Drugs	263	79.7
Compliance to treatment	Insulin	67	20.3
	Yes	267	80.9
Family History of Diabetes	No	63	19.1
	Yes	59	17.9

Table 1: Socio-demographic information of the participants (n=320)

Variables		Frequency	Percent
Smoking Habit	No	271	82.1
	Never	209	63.3
	Previous smoker	119	36.1
Drinking Alcohol	Yes	02	0.6
	Never	213	64.5
	Previous drinker	111	33.6
History of Hypertension	Yes	06	1.8
	Yes	106	32.1
	No	224	67.9
BMI	Yes	40	12.1
	No	290	87.9
	Underweight	8	2.4
	Normal	92	27.9
	Overweight	156	47.3
	Obese	73	22.0

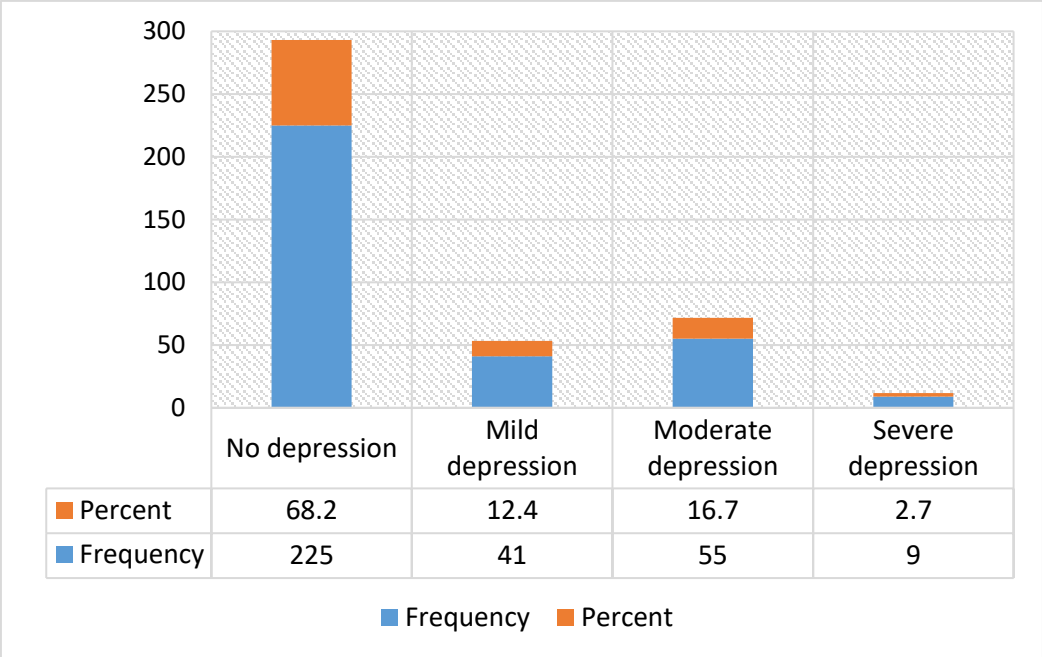

Fig. 1: BDI Scores and their interpretation(n=320)

Fig. 1 reveals 68.8% of the respondents had no depression which is followed by 16.7% of respondents having moderate depression and 12.4% having mild depression. Few (2.7%) had severe depression**.** Table 2 shows statistically significant association of depression range with marital status (p=0.014), Educational status (p=0.016), occupational status (p=0.003) and drinking alcohol (p=0.020). No statistically significant association of depression range with Sex, Religion, Residence, Family type, Duration of diabetes, Treatment modality, Compliance of treatment, Family history of diabetes and HB1Ac. Table 3 shows that low education level BDI-la increase of 0.76, occupational status 0.75 BDI-la score increase smoking habit (β =0.35, df=0.02, p=0.4) as more risk factors for depression. These results indicate that diabetes with a co morbid low education level and known case of hypertension were 0.76 and 1.1 times more likely to suffer from depression. Regarding residence, urban (β=0.58, df=0.03, p=0.7), known case of HTN was (β=1.1, df=0.72, p=0.51).

Table 2: Association of Depression with Socio-Demographic Characteristics and Diabetes Status (n=320)

Dependent variable	Independent variables	Pearson chi-square value	p- value
Depression Range	Sex	0.685	0.877
	Religion	9.704	0.375
	Marital status	20.760	0.014*
	Educational status	28.941	0.016*
	Occupation	43.144	0.003*
	Residence	11.576	0.072
	Family type	2.906	0.821
	Duration of diabetics	55.268	0.427
	Treatment modality	2.991	0.810
	Compliance of treatment	8.449	0.207
	Family history of diabetics	4.862	0.182
	Smoking	10.095	0.122
	Drinking Alcohol	15.004	0.020*
	History of blood pressure	6.802	0.780
	Drugs of HTN	1.400	0.706
	BMI	5.732	0.100
	Diabetic level	1.170	0.557

Table 3: Multivariable Regression for Depression Symptom

Variable	Predictors total BDI Score	
	OR (95%, CI)	P -value
Sex	0.969 (0.604, 1.555)	0.869
Educational status	0.766 (.634, .925)	.006*
Occupation	0.757(0.614, 0.863)	.00*
Residence (Urban) Residence (Rural)	0.588(.036, 9.578) 0.350(0.021,5.712)	.709 .462
Smoking (Yes) Smoking (No)	357(.022,5.808) 676 (0.41, 11.02)	.469 .789
Drinking Alcohol (Yes) Drinking Alcohol (No)	0.205(.037, 1.150) 0.260(.046, 1.486)	.072 .130
History of HTN (yes) History of HTN (No) Family history of HTN	1.180(0.721,1.931) 0.976(0.302,3.10) 0.715(0.335,1.529)	.511 .968 .387
Marital Status (Yes) Marital Status (No)	1.392(.840, 2.101) 1.245(.765.1.234)	.224 .236

OR: Odd ratio, CI: Confidence interval, *p ≤ 0.05

Discussion

Out of 320 participants in the study, we found 105(31.8%) participants were depressed, this rate is comparable to prevalence of depression (36.6%), as reported in a worldwide meta-analysis of studies among person with diabetes in clinical settings (Ali *et al.*, 2006). The rate is higher than that observed in the United States, where prevalence of depression among persons with diabetes range from 2%-28% (Li *et al.*, 2008). A tertiary hospital-based study conducted in Bangladesh showed 34.8% depression in persons living with diabetes (Rahman *et al.*, 2011). Which is substantially lower than the study done at Karnataka South India where they found 142 (56.8%) were have depression (Shaban *et al.*, 2006). The possible explanation for the difference in the results may include difference in tools used, sample size different cut-off scores employed and socio demographic status.

Depression was found to be related to illiteracy, some past studies have also reported to similar findings (Roy *et al*., 2012). Highly educated people are less likely to be depressed because they can attain better jobs and have greater healthcare resources than less educated people (Lahelma *et al*., 2004). In our sample, unemployed patients with diabetes had statistically significant association (p=0.003) with depression. This finding was similar to the study done at South India (Prasad, 2017). In this study statistically significant association of depression range with marital status (p=0.014), this finding was similar to the finding done at Uttar Pradesh, India (Sharma *et al*., 2019). In this study, no statistically significant association of HBA1c with depression was found, this finding was contradictory to the finding of India (Sharma *et al*., 2019). The present study did not reveal any association between behavioral characteristics of tobacco and alcohol. This finding was similar to the study done by Niraula *et al*. at urban medical Centre in Nepal (Niraula *et al*., 2013). Most other studies have shown an association of these behavior with depression among person living with diabetes (Goldney *et al*., 2004). In this study no statistically significant association of depression range was found with treatment modality, compliance of treatment, family history of diabetes, this finding was similar to the study done by Prasad at South India Prasad, 2017).

Low education level and hypertension was identified as risk factors for depression in this study which was 0.76 and 1.1 times more likely to suffer from depression. This finding is supported by that of previous studies that linked other physical illnesses such as cardiovascular disease to depression (Sharma *et al*., 2019). Although Depression is associated mortality rates in middle income countries are almost 1:3 fold higher than in industrialized nations (Van Dooren *et al*., 2013).

Conclusion

The prevalence of depression with diabetes in this study was 31.8%. Almost one in every three patients with diabetes marital status, educational status, Occupational status and drinking alcohol are statistically significant association of Depression. Education level, Occupational status and Smoking habit are more risk factors for depression. Depression with diabetes has been identified as public health priority in Nepal given the current and predicted burden of all forms of disease within the country. Further research in developing countries will be key, given the rising levels of associated factors and morbidity rates within the region.

Ethical consideration

Ethical clearance was obtained from institutional ethical review committee GMC (Gandaki Medical College), Kaski, Pokhara and written permission from the authority was obtained for data collection. Confidentially was maintained throughout the period and no participants were harmed in the study.

Conflict of Interest

There is no conflict of interest with the present study.

Acknowledgement

Researchers would like to express sincere gratitude to all the respondents.

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