

PREVALENCE AND IMPACT OF STRESS AND DEPRESSION IN ADULTS WITH DIABETES - A SURVEY

Preety Rajesh¹, Karthik Ganesh Mohanraj², Manjari Chaudhary³

¹*Saveetha Dental College and Hospital Saveetha Institute of Medical and Technical Sciences
Saveetha University Chennai, India*

²*Assistant Professor, Department of Anatomy Saveetha Dental College and Hospital Saveetha Institute of
Medical and Technical Sciences
Saveetha University Chennai, India*

³*Senior Lecturer, Department of Oral medicine and Radiology Saveetha Dental College and Hospital
Saveetha Institute of Medical and Technical Sciences
Saveetha University Chennai, India*

[¹151701033.sdc@gmail.com](mailto:151701033.sdc@gmail.com)

[²karthikm.sdc@saveetha.com](mailto:karthikm.sdc@saveetha.com)

[³manjaric.sdc@saveetha.com](mailto:manjaric.sdc@saveetha.com)

ABSTRACT

Depression occurrence is found to be three times higher in people with diabetes mellitus. Sometimes the majority of the cases with depression are under diagnosed. According to the International diabetes federation, diabetes is the largest global health emergency of the 21st century. A questionnaire was created with a set of ten questions related to diabetic patients and depression. 100 random participants of the age 25-50 years took the survey and a random sampling method was done. More than half the participants are well aware that depression is common in adults with diabetes (57.5%). 71.3% think that diabetic patients are more anxious than a normal person, 54.5% are aware that using antidepressants in diabetic adults can be risky, 51% think that diabetes can be under diagnosed during treatment and 70% are aware that glucose metabolism will be altered if the diabetic patient is under depression or stress. Awareness about diabetic patients who could possibly be dealing with stress and depression was created.

KEY WORDS: Anxiety; depression; diabetes; disorders; glucose metabolism; stress

INTRODUCTION

In 2015, the prevalence of diabetes worldwide was one in eleven adults and impaired glucose metabolism was one in fifteen adults. These numbers are expected to increase in the urban population, leading to more medical and economical challenges (Mota *e t al.*, 2016). Depression is a very common and serious medical condition with a lifetime of prevalence, estimated to be 11% in low income countries to 15% in high income countries

(Bromet *e t al.*, 2011). The risks of having mental health problems is about 50% which leads to a drop in employment, wages and productivity of the individual (Wang *e t al.*, 2013). Depression and stress are known to be the 4th cause while diabetes is the 8th cause of disability adjusted life years (DALYS) in developed countries (Raison, Capuron and Miller, 2006). Diabetes is a disorder related to mood that reunites

several other symptoms together which can alter the function of an individual (Grey, Whittemore and Tamborlane, 2002). Depression disturbs the emotion, cognition and behaviours (Chen *et al.*, 2016).

According to DSM-5, the diagnostic criteria for a major stress and depressive disorder consist of a core symptom and at least in any of these symptoms., such as fatigue, feeling guilty, suicidal thoughts, weight loss and concentration problems and even insomnia lasting for 2 weeks. Depression could be described as the first episode that could be mild, moderate or severe and without or without psychotic features.

There is evidence that prevalence of depression is increased moderately in pre-diabetic patients and previously diabetic diagnosed patients compared to normal glucose metabolism individuals (Chen *e t al.*, 2016). The prevalence of depression could be upto three times higher in type 1 diabetes and thrice as high in people with type 2 diabetes compared to the general population (Roy and Lloyd, 2012). Stress and anxiety occurs in 40% of patients with type 1 diabetes or type 2 (Grigsby *e t al.*, 2002). This worsens prognosis and increases non compliances to medical treatment (Gonzalez *e t al.*, 2008) and quality of life (Baumeister *e t al.*, 2011). Prolonged impact can lead to development of associated disorders and syndromes (Kannan and Thenmozhi, 2016). They can sometimes affect the venous flow in the brain (Choudhari and Thenmozhi, 2016) (Hafeez and Thenmozhi, 2016). If ignored, prolonged depression can cause problems related to thyroid function as they are also associated with diabetes and can lead to obesity as well (Samuel and Thenmozhi, 2015; Menon and Thenmozhi, 2016).

Systematic factors including growth hormones and nutrition and physical activity are major factors in determining the level of depression and diabetes (Keerthana and Thenmozhi, 2016; Pratha and Thenmozhi, 2016). People tend to use modes of distraction to keep themselves from feeling less stressed, like mobile phones for a long duration, which in turn can sometimes increase stress and strain eyes too (Sriram, Yuvaraj and Others, 2015; Thejeswar and Thenmozhi, 2015). Depressive symptoms have shown that association has worsened blood glucose levels and diabetic complications such as coronary heart disease (Grigsby *e t al.*, 2002). There is a lot of evidence that significant functional, fiscal, and psychological costs are associated with depression in patients with diabetes. Several studies have documented decreased adherence to diet, exercise, and medication regimens associated with depression among adults with diabetes. Medical costs associated with moderate to severe levels of depression have also been found to be 51-86% higher than among patients reporting low levels of depression (Groot *e t al.*, 2001). Patients with diabetes and depression have been found to have 4.5 times higher medical expenditures than patients with diabetes alone. Patients with comorbid depression also have higher ambulatory care use and fill more prescriptions (Clouse *e t al.*, 2003).

The aim of this study was to determine the impact and association of stress and depression in diabetic adults and create awareness regarding it.

MATERIALS AND METHODS

The study was done in an online setting among the population of chennai. The study got approved by the institutional review board. Two reviewers were involved in this study, the primary investigator and the guide. The sample size included 100 participants and were selected by random sampling.

Randomisation including all available data is done to minimise the sampling bias. Pre tested questionnaire is the internal validity and homogenisation and replication of the experiment and cross verification with the

existing studies is the external validity. The set of questionnaires included name, age, occupation, questions on depression and anxiety as well as diabetic patient related questions. This was then circulated to the participants through an online forum. The results were obtained and tabulated and represented in the form of pie charts. Results were imported to SPSS software version 23.0 for statistical analysis. Descriptive statistics with frequency distribution was the statistical test done keeping age, gender and diabetic related problems as dependent variables and height, weight, BMI as independent variables. Correlation analysis used was Chi square test and end results were statistically analyzed.

RESULTS AND DISCUSSION

In this study it is observed that the participants belonged to the age group between 25-65 years (fig1). 55% were females and 45% were males (fig 2). 61.5% are in business, 35.9% work for the government and 59.4% are unemployed (fig 3). 53% are aware that depression is prevalent among diabetic patients (fig 4), 72% think that diabetic patients are more anxious than a normal person (fig 5), 55% are aware that using antidepressants in diabetic adults is risky (fig 6), 34% are not aware of the synergistic effects of depression in diabetic patients (fig 7). 52% think that diabetes can be under diagnosed (fig 8) and 71.7% think that the glucose metabolism can be altered in a diabetic patient with stress and depression (fig 9). Figure 10 shows the association between gender and awareness about depression in diabetic patients with p value 0.024 which is significant, figure 11 shows the association between age and awareness on anxiety among diabetic patients with p value 0.079 which is not statistically significant, figure 12 shows the association between age and use of antidepressants in diabetic patients with p value 0.059 which is significant and figure 13 shows the association between gender and awareness about underdiagnosis of depression in diabetic patients with p value 0.015 which is significant.

In 2015, two different reviewers showed three possible directions for the association of diabetes and depression (Berge and Riise, 2015) (Subashri and Thenmozhi, 2016) : both diseases might have common etiology, diabetes increasing the prevalence for future depression and depression increasing risk for future diabetes (Moulton, Pickup and Ismail, 2015). The median age of onset of depression can be as early as the 20s (Nandhini, Babu and Mohanraj, 2018). Type 1 appears in childhood or early adulthood while type 2 occurs in mid adulthood demanding diet and lifestyle modifications, oral medications or insulin injections (Kessler *e t al.*, 2007) (Krishna, Nivesh Krishna and Yuvaraj Babu, 2016).

Recent studies show that there are not many common genetic factors to account for the positive association between and diabetes (Scherrer *e t al.*, 2011). However different environmental factors may activate common pathways that can trigger depression and diabetes (Agardh *e t al.*, 2011). The other common factors for DM2 and depression are poor sleep, lack of physical exercise, diet (Seppan *e t al.*, 2018) (Nandhini, Babu and Mohanraj, 2018). A recent epidemiological study showed that depression was more prevalent in people with diabetes, regardless of the fact that they are diagnosed or under diagnosed (Kyrou and Tsigos, 2009) (Krishna, Nivesh Krishna and Yuvaraj Babu, 2016). The same study showed that stress and anxiety was only prevalent in patients who were aware of their health and diabetes (Meurs *e t al.*, 2016) (Seppan *e t al.*, 2018). Hypothetically depression could be increased by antidepressants (Bartoli *e t al.*, 2016) (Sekar *e t al.*, 2019).

A strong association between depression in patients in their forties with orally treated diabetes was found and compared to patients in their seventies (Berge *et al.*, 2015). On the contrary, insulin therapy in elderly

with diabetes led to improvement of depressive symptoms and did not affect the health related quality of life of those patients (Oliveira *e t al.*, 2015) (Johnson *e t al.*, 2020).

The limitations of this study includes: Less sample size, single centred study, does not represent ethnic groups

Future scope of this study includes: Study for large population, awareness of depression and stress in diabetic adults.

CONCLUSION

The present study highlighted the association and impact of stress and depression in diabetic adults and a basic awareness was created among the population. Since diabetes is a serious disease around the world and streaming high every year with an enormous increase in percentage of occurrence and severity. Also the study may serve as an eye opener for adolescents on juvenile diabetes too. Hence proper care should be taken in this regard for a healthy life.

AUTHOR CONTRIBUTIONS R. Preety

Author contributed in the conception, design, acquisition of data, analysis and interpretation of data, literature review, critical review, materials and writer.

Dr. Karthik Ganesh Mohanraj

Author contributed in drafting the article and revising it critically for important and intellectual content, author made contribution to final approval of the submitted version of the manuscript and supervision.

Dr. Manjari

Author made formatting and other alignment corrections and supervision.

CONFLICT OF INTEREST

None declared

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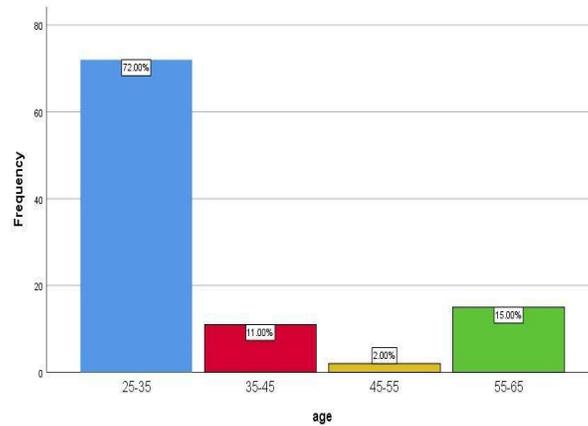


Figure 1 : Graph showing the frequency distribution of age groups of the participants. X axis represents age of the participants and Y axis represents number of participants. 72% belong to the age group 25-35 years, 11% belong to 35-45 years, 2% belong to 45-60 years and 15% belong to 55-60 years. N=100.

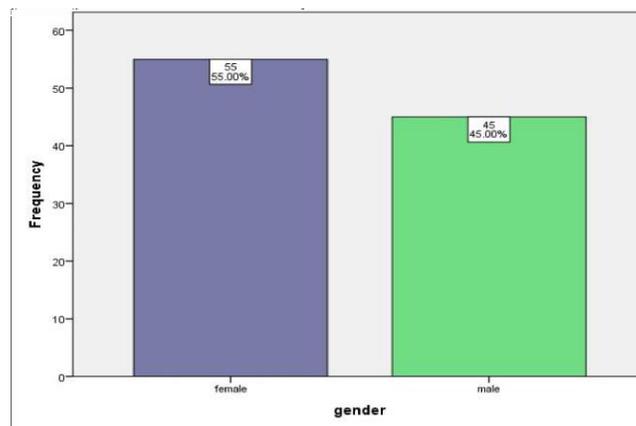


Figure 2 : Bar diagram showing frequency distribution of gender. X axis represents gender and Y axis represents number of the participants. 55% are females and 45% are males. N=100.

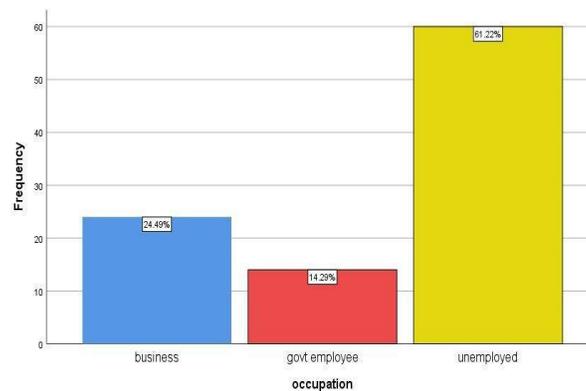


Figure 3: Bar diagram showing frequency distribution of the occupations. X axis represents occupation and Y axis represents number of participants. 61.54% are in business, 35.90% are government employees and 2.56% are unemployed. N = 100.

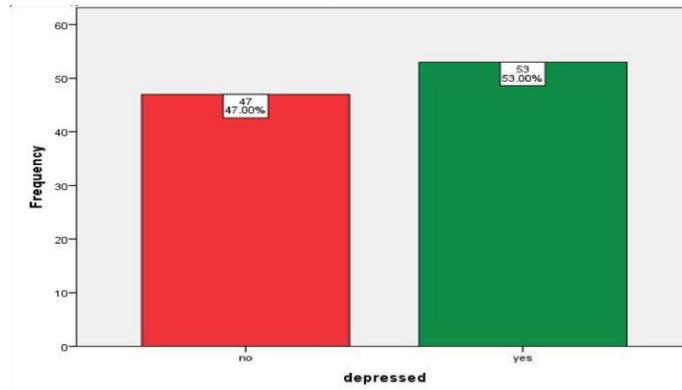


Figure 4: Bar diagram showing frequency distribution of responses of participants for “Do you think depression is common among diabetic patients”. X axis represents the number of responses of participants. Y axis represents the number of participants. 47% answered no (red colour) and 53% answered yes (green colour). N = 100.

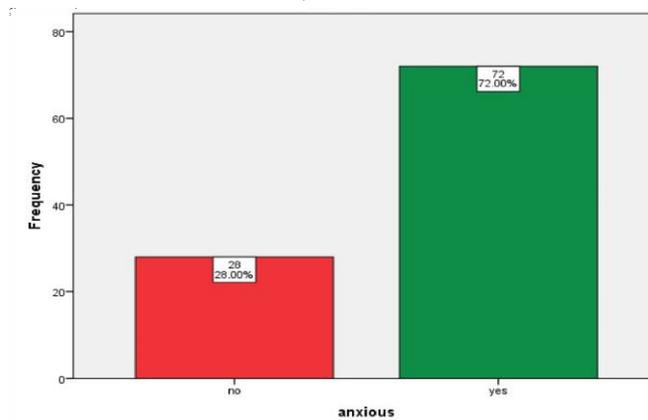


Figure 5 : Bar diagram showing frequency distribution of responses of participants for “Do you think a diabetic patient is more anxious than a normal person?” X axis represents the number of responses. Y axis represents the number of participants. 28% answered no (red) and 72% answered yes (green). N = 100.

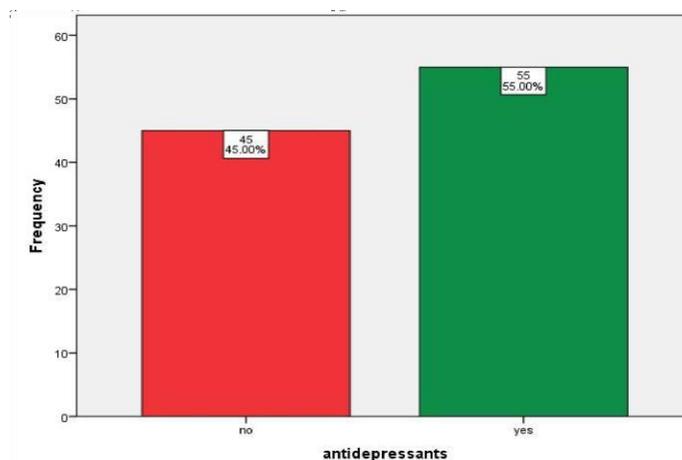


Figure 6 : Bar diagram showing frequency distribution of responses of participants for “Do you think usage of antidepressants among diabetic patients is risky?” X axis represents the responses. Y axis represents the number of participants. 45% responded no (red) and 55% responded yes (green). N = 100.

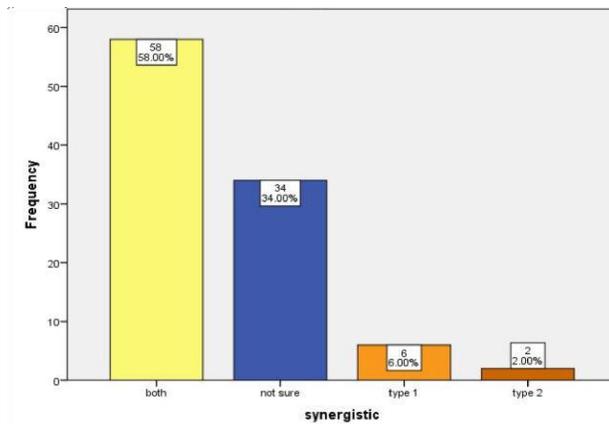


Figure 7: Bar diagram showing frequency distribution of responses of participants for “On which type of diabetes does depression show synergistic effect?” X axis represents the responses. Y axis represents the number of participants. 58% answered both (yellow) 34% answered not sure (blue), 6% answered type 1 (orange) and 2% answered type 2 (dark orange). N = 100

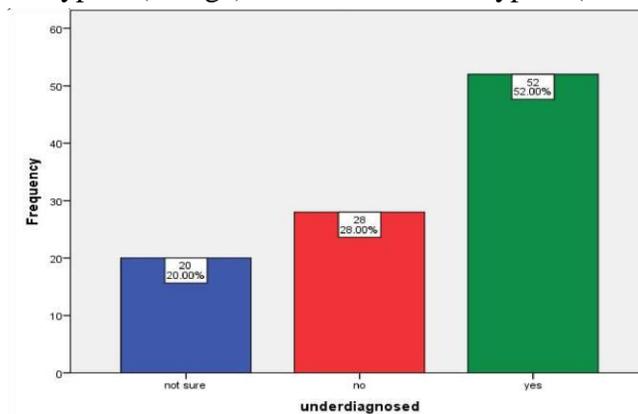


Figure 8: Bar diagram showing frequency distribution of responses of participants for ” Can depression be under diagnosed in diabetic patients?” X axis represents the responses. Y axis represents the number of participants. 20% have answered not sure, 28% (blue) answered no (red) and 52% answered yes (green). N = 100.

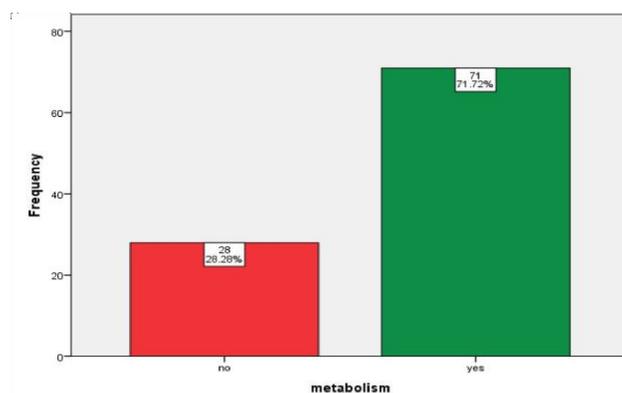


Figure 9 : Bar diagram showing frequency distribution of responses of participants for “Does Glucose metabolism get altered in a diabetic patient with depression?” X axis represents the responses. Y axis represents the number of participants. 28% answered no (red) and 71% answered yes (green). N = 100.

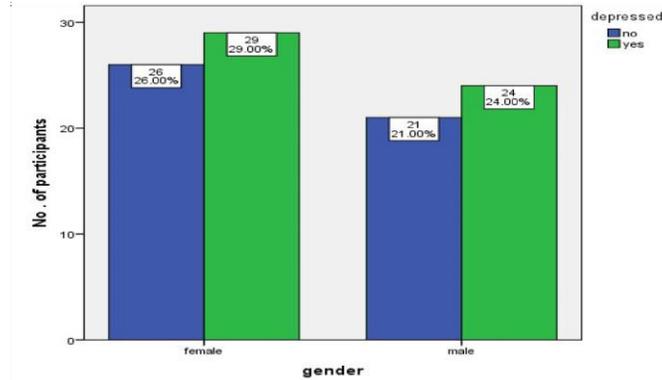


Figure 10: Bar graph showing association between gender and responses on depression being a common condition among adult diabetic patients. X axis represents gender and Y axis represents the number of participants on the awareness about depression in diabetic adults. Blue denotes the response ‘no’ and green denotes ‘yes’. 29% of females are aware about depression in diabetic adults whereas only 24% of males are aware. This indicates that females are more aware than males showing statistically significant. Chi square test showing $p=0.024$ ($p<0.05$) indicating statistically significant.

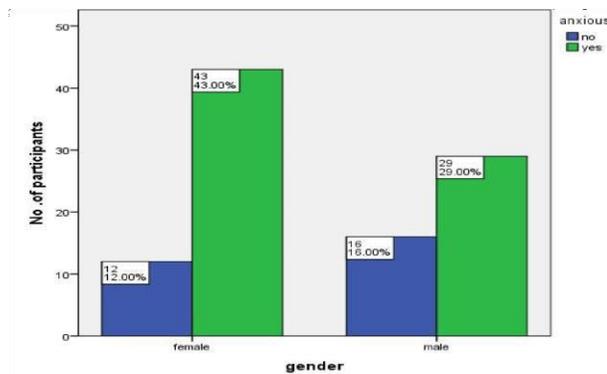


Figure 11 : Bar graph showing association between age and responses for anxiety in diabetic patients. X axis represents gender and Y axis represents the awareness about anxiety in diabetic adults. Blue denotes the responses ‘no’ and green denotes ‘yes’. 43% of females were aware whereas only 29% of males were aware about anxiety in diabetic adults. This indicates that females are more aware than males showing statistically significant. Chi square test was done and $p=0.049$ ($p<0.05$) indicating statistically significant.

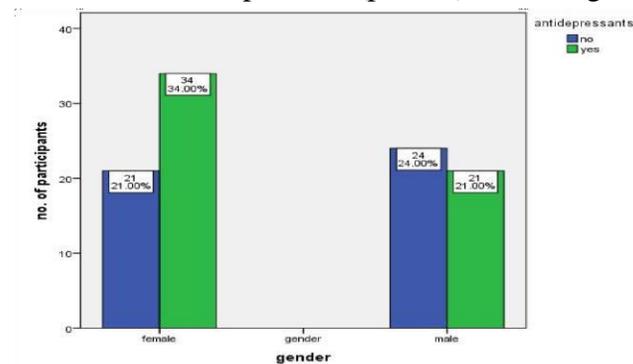


Figure 12 : Bar graph showing association between age and responses on risks of using antidepressants in diabetic patients. X axis represents gender and Y axis represents the awareness about use of antidepressants in diabetic adults. Blue denotes ‘no’ and green denotes ‘yes’. 34% of females were aware about risks of

antidepressants in adults whereas only 21% of males were aware. This indicates that females are more aware than males but it was not statistically significant. Chi square test showing $p = 0.059$ ($p > 0.05$) indicating statistically not significant.

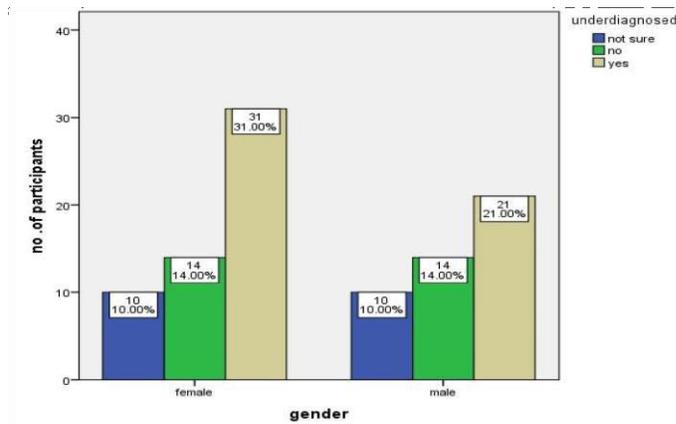


Figure 13 : Bar graph showing association between gender and responses on awareness about depression being under diagnosed in diabetic patients. X axis represents gender and Y axis represents the awareness about depression being under diagnosed in diabetic adults. Blue denotes 'no' and green denotes 'yes' and grey denotes 'not sure'. 31% of females were not sure about the under diagnosis of depression in diabetic adults whereas only 21% of males were not aware of this. This indicates that males are more aware than females showing statistically significant among adult diabetic patients. Chi square test showing $p = 0.015$ ($p < 0.05$) which is statistically significant.