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PHYSICAL AND PSYCHOLOGICAL DETERMINANTS OF DIABETES ASSOCIATED DEPRESSION AMONG PATIENTS RECEIVING ORAL HYPOGLYCEMIC AGENTS A VERSUS INSULIN REGIMEN

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ABSTRACT

Study was cocuted to assess the physical and psychological determinants of diabetes associated depression with respect to their medication It was a Observational , Cross sectional survey was done using patient health questionnaire (PHQ-9) under ICMR-STS scheme to screen for depression assessment among patients of type diabetes mellitus receiving oral hypoglycaemic agents with or without insulin injection . Self prepared and validated questionnaire was used to know the psychological determinants and misconnects of diabetes among our patients. Our study results showed physical determinants including female sex {(P<0.05) PHQ 9 (9.12) } , higher glycoslated hemoglobin values {(P<0.05) (PHQ9- 9.61 }and co morbidity{(P <0.001) (PHQ9 – 10.79)} is significantly associated with depression among diabetic population. Psychological determinants includes initiation of insulin, fear of self injection which is seen among 35.8 % of insulin takers with PHQ-9 score of 9.81 and our study showed only less number diabetes patients uses less painless insulin delivering devices (15.7%) and diabetes education available to very few patients (13.6%). Diabetes education, screening for unsaid depression, development of cost effective and painless insulin delivery devices is still under achieved goal of diabetes management.

KEYWORDS: Diabetes associated depression, insulin acceptance, needle phobia , diabetes education, oral **hypoglycaemic agents.**

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INTRODUCTION

In the era of epidemiologic transition, there is an upsurge of diabetes prevalence and its related complications[1] Uncontrolled diabetes patients are prone to high morbidity, poor quality of life and decreased life expectancy . One of the most common but less noticed factor for unsuccessful management of diabetes is depression among diabetes population. Seventy million of world diabetes population is expected to live in India by 2025 and about 25 – 40 % percent of diabetes patients is likely to have major or minor depression. Few studies concluded that uncontrolled diabetic patients are having more score of depression and poor treatment adherence which again hampers glycemic contro[2,3] .Whenever depression is not too trivial among diabetics, they often neglect other health related illness like hypertension, dyslipdemia and succumb to complications like stroke , cardiac failure etc [4,5,6.] . Our patients are expected to suffer more from diabetes associated depression due to poor socio economic status, illiteracy, inaccessibility to health care service at certain area[7,8,] [9.10,11]ncreased prevalence of diabetes related complications, need of insulin , needle phobia (or more precisely called trypanaophobia) and less focus on diabetes education also escalates our proportion of diabetes associated depression[12] [,13]. Unlike western scenario, determinants of diabetes associated depression in Indo – Asian continent is under explored. This study was designed to find physical and psychological determinants of diabetes associated depression from patients attending our tertiary care hospital.

MATERIALS AND METHODS

Study Questionnaire

Depression assessment was done using Patient Health Questionnaire 9 which is validated and standard questionnaire , used to assess diabetes associated depression by various researchers and proven to be credential. This questionnaire has overall accuracy of 85% , sensitivity 75 % and specificity 90 % . Self prepared validated questionnaire used to assess psychological determinants and to know the mode of insulin use, and diabetes counseling.

Sample size determination

Sample size was determined by assuming the average prevalence of depression among diabetes patients,0.28, power 80 % and alpha error 5% and rounded off with respect to study duration. Consecutive two hundred and fifty patients were included for the study using convenient sampling method

Inclusion criteria

1. Patient with Type II diabetes mellitus receiving oral hypoglycemic agents or single or multiple insulin injections
2. Patients with aforesaid diabetes treatment and also receiving treatment for one or more of the following diabetes related conditions like hypertension or dyslipidemia or neuropathy or sexual dysfunction or diabetic foot .
3. Patients who are willing to participate in our study and ready to sign informed consent after reading patient information sheet in their own language

Exclusion criteria

1. Patients already diagnosed to have acute complication of diabetes like hyperglycemic emergencies or hypoglycemia
2. Patient with already established endogenous major or minor depressive illness before the occurrence of diabetes mellitus.
3. Type I or juvenile diabetes receiving sole insulin management alone

Study procedure

Questionnaire was read out by investigator to the diabetic patients who finished their consultation from our diabetology clinic for routine assessment and their patient's response was marked. Anthopometry assessment was carried out on the study day. Body height was measured using stadiometer , height (to the nearest 0.1 cm) was taken. A digital scale, with an accuracy of ± 100 g, was used to measure body weight (BW). The readings were repeated three times and the mean was calculated .The waist circumference (WC) was measured in a horizontal plane, midway between the inferior margin of the ribs and the superior border of the iliac crest. Body mass index (BMI) (kg/ m^2) was calculated by dividing weight (in kilograms) by the square of height (in meters). Blood pressure as recorded by the physician during the visit was noted. Diagnosis and treatment profile for hypertension, dyslipidemia , neuropathy , diabetic ulcer , sexual dysfunction was obtained from the patients clinical record , if they have diagnosed to have and being treated for those conditions . Laboratory values of fasting blood sugar, post prandial blood sugar measurement was done on the day of assessment. Glycoslated haemoglobin values and lipid profile values were obtained from patients who had been investigated within ninety days preceding the study day.

Statistical Analysis

Statistical analysis was carried out statistical package for social sciences (SPSS Version 17) software . Chi square test and independent't' test used to assess the variables (determinants) and association of physical variables with diabetes associated depression. .

RESULTS

250 patients enrolled for our study, number of males were 113 (45.2 %) and 137 (54.8 %)females . Mean duration of diabetes is 11.6 years and HbA1c 8.9. The most common co morbidity present in our study population was hypertension 54 %, followed by dysplidemia 48.2 % , 11.5 % percent of cases diagnosed to have neuropathy without foot ulcer (6 %) and with foot ulcer (5.5 %) . Total prevalence of depression in our study among diabetics is 41.1% (Males- 19.2% , Females 21.9 %).The total of patients found to have minor depression were 22.3 & and 18.8 % falls under major depression category according to PHQ-9 questionnaire with average score of 8.6 for minor depression and 11.9 for major depression. Female sex ,

educated patients , patients with lower income (less than 5000 per month) increased body mass index , higher glycoslated haemoglobin level , patients using insulin and patients not following insulin even after physician advice , diabetes patients with co morbidity showed significant association with depression scores which is shown in table 2 Fear of insulin need, needle phobia, and fear of complications including renal failure are the predominant psychological factors affect our populations. PHQ 9 score is higher among patients using insulin self injection and less among patients using pen devices.Patient attended diabetes education /counselling shows less depression PHQ-9 score 8.9 than those non attended patients PHQ-9-11.01. Impact of psychological determinants and diabetes education is shown in table 3 and 4 respectively.

Table 1
Baseline Characteristics of study population and related parameters

S. No	Baseline Characteristics	Overall patients	Number of Males	Number of Females
1	Age (in years)	66.2 ± 9.8	59.01± 4.5	64 .02 ± 3.4
2	Duration of diabetes (in years)	11.6 ± 2.1	10.8 ±3.4	9.8 ±2.3
3	Body mass index (Kg/m^2)	25.1 ± 1.4	25.7± 1.78	24.3±0.76
3	Literacy Rate	63.%	66.26%	60.01 %
4	Residence , Urban Vs Rural	Urban 54.4 % Rural 45.6%	52.1 % 47.9 %	50.98 % 49.02%
4	HbA1c value	8.9 ± 0.9	8.2± 1.2	9.7 ±1.1
5	Diagnosed With Hypertension	135 (54 %)	61	74
6	Diagnosed With Dyslipdemia	123(48.2)	67	66
7	Neuropathy without ulcer	15(6%)	7	8
8	Neuropathy with ulcer	13(5.5)	9	4

Values are expressed as mean±Standard deviation. Patient diagnosed to have hypertension by physician in accordance with Joint National committee -9 recommendations with SBP> 140 99mmHg and DBP 90 mmHg and dyslipidemia is diagnosed as per ACC/AHA guidelines –LDL-C .100mg/dl ,TG> 150mg/dl and HDL –C < 40 mg/dl for women and < gomg/dl for men . ACC-American college of cardiology . AHA-American Heart Association .HDL-C High density lipoprotein LDL-C-Low density lipoprotein cholesterol TG-Triglycerides . SBP-Systolic blood pressure . DBP- diastolic blood pressure

Table 2
Physical determinants of diabetes associated depression

S No	Positive Determinant factors	Odds ratio (95% CI)	P value	PHQ-9 score	Depression category
1	Females	1.14(1.02-1.34)	0.05	9.12	Major
2	Literacy	1.67(1.21-1.89)	0.032	7.95	Minor
3	Income (less than 5000 per month)	1.33 (1.11-1.78)	0.021	8.32	Minor
4	BMI > 25kg /m^2	1.32(1.02-1.56)	0.05	7.81	Minor
5	Use of daily oral hypogylcemic drugs	1.12(1.09-1.38)	0.05	6.81	Minor
5	HbA1c	1.12(1.01-1.24)	0.023	9.61	Major
6	Use of insulin	1.22(1.12 -142)	0.001	10.09	Major
7	Not using insulin despite the need	1.56 (1.22-1.78)	0.001	9.80	Major
8	Co morbidity	1.44 (114 -1.78)	< 0.001	10.79	Major

P *0.05 P ** 0.001 compared with overall major and minor depression PHQ-9 score
PHQ9 score 5-9 Minor depression , PHQ9 score 10-14 major depression

Table 3
Psychological determinants of diabetes associated depression

S.NO	Answers given by the patient , Most worrying thought about diabetes (No of patients answered)	Average PHQ-9 score	Depression category
1	Lifelong treatment (189)	9.01	Major
2	Not to forget insulin (97)	10.32	Major
3	Insulin injection pain (83)	9.81	Major
4	Fear of renal failure (113)	6.90	Minor
5	Fear of diabetes affecting offspring (143)	7.31	Minor
6	Fear of hypoglycaemia (76)	7.71	Minor
7	Health related cost (82)	7.86	Minor
8	Having high blood pressure(89)	9.20	Major
9	Non healing ulcer (16)	9.61	Major
10	Constant pruritus (22)	7.22	Minor
11	Lack of sleep (56)	7.37	Minor

DISCUSSION

Our study focused on predominant determinants diabetes associated depression. The total prevalence of depression among diabetes population is 41.1 % which corresponds with other few other studies [13]. The postulated biological reasons for higher prevalence of depression among diabetes are decreased tryptophan level and less synthesis of serotonin in brain, altered activity of monoamine oxidase enzyme in brain [14] . Unique part of our study is that we made an attempt to sub categorize the physical and psychological determinants for their association with diabetes associated depression. The significant fact of this result is diabetes patients even without physical complications but with disturbed thoughts related to diabetes adds more score on depression scale and eventually skewed towards major depression score. Common physical determinant we found in our study is the presence of co morbid conditions mainly hypertension, dyslipdemia and diabetic foot. These co morbid conditions adds health cost and total pill intake, affects patient

compliance and results in depression;,However our study results also showed female preponderance of diabetes associated depression and positive correlation with higher glycoslated haemoglobin value , insulin use in contrast with study reported by Ani Bhansali et al in 2010[15] . Our suggestions to manage anxiety and depression among diabetes patients include all the diabetes patients with or without ominous physical complication must need a preliminary depression assessment. In Indian scenario only less number patients had diabetes education at least once which is reflected in our study finding too. There are favourable reports that well structured diabetes education by trained counsellors improves patents treatment adherence and well being and alleviates the diabetes related depression[18] .Other measures includes Common Behavioural therapy and medications like Selective serotonin reuptake inhibitors can be prescribed under psychiatrist opinion[16,17,18]

CONCLUSION

Depression screening should be routine procedure for diabetes patients and must for patients with uncontrolled diabetes. Diabetes education by well trained educators should be given even at primary health care level. Cost effective, painless insulin delivering devices is still an unmet need for many diabetes patients in developing countries. Ethics committee approval- Obtained from Institutional Ethics Committee IEC no -(ECR/724/Inst/TN/2015)

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CONFLICTS OF INTEREST

Conflict of interest declared none.

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