ASSESSMENT OF NUTRITIONAL STATUS IN MAJOR PSYCHIATRIC DISORDERS OF A TERTIARY CARE HOSPITAL

Subhendu Datta¹, Rumi Gayen², Indranil Chakraborty³

¹RMO cum Clinical Tutor, Department of Psychiatry, College of Medicine and Sagore Datta Hospital, Kolkata, West Bengal, India.

²Assistant Professor, Department of Biochemistry, College of Medicine and Sagore Datta Hospital, Kolkata, West Bengal, India.

³Professor and HOD, Department of Biochemistry, College of Medicine and Sagore Datta Hospital, Kolkata, West Bengal, India.

ABSTRACT

BACKGROUND

There was substantial evidence to support the relationship between overweight, obesity and medical conditions, but little was known about their relationships to psychiatric disorders.^[1] Clinical observations had suggested possible relationship between obesity and depression.^[2] Being overweight or obese and having increased psychiatric symptoms had been explained by some literatures,^[3,4] whereas other literatures failed to document direct associations between obesity and depression.^[5,6]

Our aim was to identify relationship between major psychiatric disorders and nutritional status with the help of anthropometry and a few biochemical parameters.

MATERIALS AND METHODS

It was a cross-sectional study. 67 women and 29 men reporting to the Outpatient Department of Psychiatry, College of Medicine and Sagore Datta Hospital, a tertiary care centre in West Bengal, India. Patients were diagnosed by the psychiatrist according to International Classification of Diseases-10 (ICD-10) guidelines. Assessment of the nutritional status of the respondents consisted of anthropometric measurements and examination of few biochemical parameters.

RESULTS

Mean age of men and women was 40.78 yrs. (SD ± 12.93) and 41.28 yrs. (SD ± 11.93) respectively. Mean Body Mass Index (BMI) of anxiety (22.33 ± 3.95) and psychotic patients (21.05 ± 3.4) were normal except mood disorder (23.17 ± 4.21) patients. Mean concentration of Total Cholesterol (TC) is highest in mood disorder (178.20 ± 41.12) followed by anxiety (166.26 ± 26.59) and lowest in psychosis (149.63 ± 25.86). In mood disorders patient's mean BMI, Body Fat percentage (BF%), Central Skin Fold Thickness (CSFT) and Peripheral Skin Fold Thickness (PSFT) was higher in women than men and it was statistically significant.

CONCLUSION

Major psychiatric disorders were common in normal BMI people.

KEY WORDS

Anthropometry, Nutrition, Major Psychiatric Disorders.

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BACKGROUND

It had been a scientific focus of debate for 50 years over whether mood disorders and obesity were related.^[7-9] Some studies described increased risk of depression among the obese, others showed decreased risk of depression among the obese, not only that others documented no effect of obesity on risk for depression.^[10] Analysis of First National Health and Nutrition Examination Survey (NHANES I) also showed the relative body weight was poorly related to elevated depression score in women than in men.^[4] Another study found no relationship between obesity and mental health functioning.^[11]

A study showed that more severely depressed women at baseline had greater subsequent risk to become overweight, but in that study author did not address whether obesity increased risk for depression and they also noted women between 38 - 54 years' age group there was no association of obesity with anxiety, phobias and depression.^[12] In contrast, de Wit et al in their meta-analysis of 17 community-based cross-sectional studies confirmed that depression was associated with an increased risk of being obese.^[13] A systemic review and meta-analysis showed longitudinal bidirectional association between depression and obesity.^[14] In anxiety disorders its relationship with obesity was modest, inconsistent and inadequate for other psychiatric conditions.^[15]

The purpose of this study was to explore the relationship between nutrition and major psychiatric disorders, mainly in psychotic disorders, anxiety disorders and mood disorders. Our hypothesis was that the nutritional status of the individual had little relationship with the major psychiatric disorders. Our aim was to identify relationship of major psychiatric disorders and nutritional status, which had been assessed with the help of anthropometry and a few biochemical parameters.

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Corresponding Author:

Dr. Rumi Gayen,

Sree Krishna Apartment,

2nd Floor, Flat No. E-1,

187/1, Bose Para Garia,

Kolkata-700084,

West Bengal, India.

E-mail: drrumi77@gmail.com

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MATERIALS AND METHODS

It was a cross-sectional study. The study was carried out at Outpatient's Department (OPD) of Psychiatry and Department of Biochemistry of College of Medicine and Sagore Dutta Hospital, a tertiary care centre in West Bengal, India. The study group comprised of total 96 psychiatric patients including male and female. Patients were recruited at the Outpatient Department of Psychiatry with their first episode of psychiatric morbidity and were diagnosed by the psychiatrist according to ICD-10 guidelines. Next, they were classified into three different groups: Psychotic disorders (n=8), Anxiety disorders (n= 29) and Mood disorders (n= 54).

The purpose of the study was explained to the caregiver of patients and written informed consent was obtained thereafter. The study was approved by the Institutional Ethics Committee.

Measures/ Anthropometric Measurements

Anthropometric measurements of the participants, such as height (cm) was measured using a stadiometer (SECA 213 Stadiometer), weight was measured using a digital weighing machine (SECA 874 U digital scale), biceps, triceps, subscapular and suprailiac skinfold thicknesses were measured using Harpenden Skinfold Caliper (Holtain, UK). All anthropometric evaluations were conducted in accordance with the standard guidelines,^[16] three times in each subject and mean values were obtained. All skin fold thicknesses were measured to the nearest of 1 mm and the mean of three readings was recorded at each site. Central (sum of subscapular and suprailiac) and peripheral skin fold thicknesses (sum of biceps and triceps) were also calculated. The sum of all skin fold thicknesses was used for the calculation of percentage body fat (BF%) using the standard equation.^[17] The equation for the calculation of BF% from skin fold thicknesses had been validated in Asian Indians.^[18] Body Mass Index (BMI) was calculated as weight in kilograms divided by height in meter squared (kg/m²).

The modified classification of BMI for Asian Indian populations was used in this study to define overweight (23-24.99 kg/m²) and obesity (> 25 kg/m²).^[19] BF% > 25% in males and > 30% in females was set as the upper limit.^[20]

Biochemical Analysis

Fasting blood glucose, Triglyceride (TG), Total Cholesterol (TC), High Density Lipoprotein-Cholesterol (HDL-C) and Low Density Lipoprotein-Cholesterol (LDL-C) concentrations were determined with kits by Erba Mannheim XL System Pack, EM 360 Transasia Autoanalyzer (Germany), in the Department of Biochemistry at College of Medicine and Sagore Dutta Hospital, which is included in Grade "A" category by Erba Mannheim Quality Assurance System (Germany).

Statistics

Data were entered in a Microsoft Excel spread sheet. All the entries were double entered checking consistency. Descriptive statistics as mean, standard deviation, Independent t-test, ANOVA, Chi-square were applied to examine difference in anthropometric and biochemical parameters between groups. Normal distribution of numerical variables was determined using the Shapiro-Wilk test.

RESULTS

In this study, total number of men suffering from psychiatric morbidity is 29 and their mean age was 40.78 years (SD $\pm$ 12.93). Total women were 67 and their mean age was 41.28 years (SD $\pm$ 11.93). All the variables studied follow normal distribution (Table I).

As noted in Table 1, BMI was higher among patients with mood disorders followed by anxiety disorders and psychosis. Similarly, Total Cholesterol (TC), High Density Lipoprotein-C (HDL-C) and Low Density Lipoprotein-C (LDL-C) was highest among patients with mood disorders followed by anxiety disorder and lowest in psychotic patients, but difference was not significant ($p > 0.05$). Although, triglyceride level was highest among patients with mood disorders, lowest was noted among patients with anxiety disorders.

As revealed in Table 2, the proportion of patients suffering from mood disorders and anxiety disorders were significantly higher among women than the men in the sample.

Variables	Psychotic Disorders (n= 8) (Mean $\pm$ SD)	Mood Disorders (n= 54) (Mean $\pm$ SD)	Anxiety Disorders (n= 34) (Mean $\pm$ SD)	F test (P value)
BMI	21.05 $\pm$ 3.40	23.17 $\pm$ 4.21	22.43 $\pm$ 3.95	1.085 (0.342)
TC (mg/dL)	149.63 $\pm$ 25.86	178.20 $\pm$ 41.12	166.26 $\pm$ 26.59	2.81 (0.066)
LDL-C (mg/dL)	83.96 $\pm$ 17.87	106.93 $\pm$ 28.5	99.62 $\pm$ 21.02	2.954 (0.057)
HDL-C (mg/dL)	46 $\pm$ 9.61	51.58 $\pm$ 18.38	49.07 $\pm$ 11.27	0.581 (0.056)
TG (mg/dL)	110.21 $\pm$ 38.69	119.41 $\pm$ 59.1	104.09 $\pm$ 45.15	0.856 (0.428)

Table 1. Distribution of Anthropometric and Biochemical Parameters among Patients of Psychotic, Anxiety and Mood Disorder Patients

SD: Standard Deviation.

Types of Psychiatric Diseases	Cases		Chi-Square (P value)
	Male n (%)	Female n (%)	
Mood disorders (54)	13 (24.1%)	41 (75.9%)	9.241 (0.026)
Anxiety disorders (34)	12 (35.3%)	22 (67.7%)	
Psychotic disorders (8)	04 (50%)	04 (50%)	

Table 2. Distribution of Psychiatric Disorders according to Gender (n= 96)

As noted in Table 3, the mean values of BMI, BF%, CSFT (Central Skin Fold Thickness), PSFT (Peripheral Skin Fold Thickness), TC, LDL-C and glucose was higher in women suffering from psychiatric disorders than their male counterparts.

Among patients with mood disorders (Table 4), women were significantly more likely to have higher BMI, BF%, CSFT and PSFT than male patients ($p < 0.05$). The average serum concentration of TC, LDL-C, HDL-C were also higher among female patients than of male patients, though the difference was not significant ($p > 0.05$).

Variables	Male (n= 29) Mean $\pm$ SD	Female (n= 67) Mean $\pm$ SD
BMI	21.36 $\pm$ 3.32	23.26 $\pm$ 4.26
Age (yrs.)	40.78 $\pm$ 12.93	41.28 $\pm$ 11.93
BF%	22.4 $\pm$ 7.78	33.48 $\pm$ 6.7
CSFT (cm)	29.19 $\pm$ 16.29	43.45 $\pm$ 22.16
PSFT (cm)	18.25 $\pm$ 9.1	29.61 $\pm$ 12.61
Glucose (mg/dL)	98.36 $\pm$ 20.16	105.8 $\pm$ 40.40
TC (mg/dL)	163.93 $\pm$ 40.04	175.30 $\pm$ 34.15
HDL-C (mg/dL)	44.6 $\pm$ 7.76	52.46 $\pm$ 17.30
LDL-C (mg/dL)	99.1 $\pm$ 29.66	103.62 $\pm$ 24.14
TG (mg/dL)	124.27 $\pm$ 61.65	109.58 $\pm$ 52.14
Table 3. Distribution of Anthropometric and Blood Biochemical Data according to Gender		

Parameters	Male (n= 13) Mean $\pm$ SD	Female (n=40) Mean $\pm$ SD	P value
BMI	21.16 $\pm$ 3.30	23.82 $\pm$ 4.3	0.046
BF %	21.53 $\pm$ 7.72	34.41 $\pm$ 6.61	0.001
CSFT (cm)	29.08 $\pm$ 14.16	45.98 $\pm$ 22.87	0.01
PSFT (cm)	17.34 $\pm$ 8.52	31.83 $\pm$ 12.64	0.001
TC (mg/dL)	168.58 $\pm$ 44.64	181.24 $\pm$ 40.09	0.358
HDL-C (mg/dL)	45.08 $\pm$ 9.52	53.63 $\pm$ 20.06	0.162
LDL-C (mg/dL)	102.92 $\pm$ 31.97	107.49 $\pm$ 27.68	0.633
TG (mg/dL)	120.08 $\pm$ 61.42	119.19 $\pm$ 59.19	0.964
Table 4. Distribution of Anthropometric and Blood Biochemical Data in Patients with Mood Disorders			

DISCUSSION

Prevalence of metabolic disturbances in schizophrenia and other psychotic disorders was high.^[21,22] One study had documented glucose intolerance, hyperinsulinaemia and accumulation of visceral fat already exhibited in newly diagnosed psychotic non-obese patients.^[23] Our observation was patients during the first episode of psychosis neither was there abnormal average glucose concentration nor abnormal lipid metabolism, rather all patients had normal BMI.

Though obesity was a pathological state and more strongly associated with biological disharmony and undesired health outcome,^[24] but relationship between obesity and psychiatric disorders were still doubtful. Whether depression was predictive of the development of overweight and obesity or overweight and obesity were predictive of the development of depression is a matter of fact to be explored. A meta-analysis confirmed a reciprocal link between depression and obesity.^[14] Our observation was average BMI of mood disorder patients were overweight, not obese. This observation was supported by cross-sectional studies, explained modest relationship between overweight or obesity and any mood disorder or major depressive disorder.^[8,25,26] A handful literature showed that there were associations between overweight or obesity and any anxiety disorder including specific phobia,^[27-29] panic disorder,^[30] Generalised Anxiety Disorder (GAD)^[31] and social phobia.^[32] On the other hand, some literature reported anxiety disorders did not predict development of overweight or obesity at a later stage. Moreover, baseline overweight and obesity did not predict any anxiety disorders during follow-up.^[28,33] Our observation was drug-naïve anxiety disorder patients had their average BMI within the normal intervals.

Our study set a cross-sectional evidence of normal BMI among psychiatric patients and it was seen BMI was higher in mood disorder patients followed by anxiety disorder patients

and lowest in psychotic patients. Partitioning of data according to gender revealed males had normal BMI and females were overweight in mood disorders group and females also had high body fat percentage. Epidemiologic data provided evidences that prevalence of obesity in women and men are different with a greater prevalence in women than in men.^[24] Females were more prone to experience MDD (Major Depressive Disorder) than their male counterpart.^[34] The actual mechanisms of how women and men exhibited different association between depression and obesity were unknown. Difference in biological vulnerability between male and female was one of the possible clarifications to state that sex differential association between obesity and MDD. Sex hormones were also reported to have direct link with depressed mood in women.^[35,36]

In our study, serum cholesterol concentration showed increasing trend depending on the type of psychiatric disorders. Serum cholesterol concentration was lowest in psychosis followed by anxiety and then by mood disorder. However, in all types the serum cholesterol concentration were below the desirable limit as per Adult Treatment Panel III Classification (i.e. < 200 mg/dL).^[37] Total serum cholesterol is a peripheral biomarker in diagnosis and monitoring of psychiatric disorders.^[38] It was commonly observed that in patients suffering from MDD, there was decreased total cholesterol when compared to healthy controls.^[39,40] Studies also claimed a lack of significant association between low serum cholesterol and depression in elderly cohorts.^[41] Other study documented increased serum cholesterol levels in patients with other anxiety disorders.^[42] Many observational studies (including cohort, case-control and cross-sectional studies) and meta-analyses supported a significant relationship between low-serum cholesterol or intake of cholesterol lowering diet or medication, with violent behaviour and severe irritability.^[43] In addition, experimental studies showed an increase in aggressive behaviour in monkeys assigned to low-cholesterol diets.^[44] Increased LDL level was present in mood disorder patients followed by anxiety and psychosis. Our finding corroborating with considerable studies demonstrated that MDD patients exhibit increased LDL.^[44,45] A case control study showed that depressed patients had higher circulating levels of LDL when compared to healthy controls.^[46] GAD is associated with elevated LDL.^[47] Other anxiety disorders are also associated with an increase in LDL and correlating with symptoms severity.^[48] This indicates that the correct levels of cholesterol and LDL are important in diagnosing and preventing mood, anxiety and psychotic disorder patients and there must be an optimum range within which they should lie.

CONCLUSION

Observation of this study is psychiatric illnesses are still common in normal BMI people. They have desirable cholesterol and LDL among the disease group except LDL, which is above optimal level in mood disorder patients. Potential mechanism other than obesity in development of psychiatric illness still remains a challenge and scope of future study.

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