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Research Article

Study of Correlation between Depressive and Somatization Scores, Sociodemographic Factors Influencing them in various Subgroups of Depression

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Abstract: A tendency to seek treatment for medically unexplained physical complaints is frequently associated with depression; this tendency to experience and communicate psychological distress in the form of physical symptoms has been termed as "somatisation". The aim was to study correlation between depression (MADRS) and somtisation (BSI) scores, socio-demographic factors influencing depression and somatization scores in various subgroups of depression. This is a cross sectional study conducted in outpatient department at government general hospital. Subjects were categorized in to three subgroups of depression as per ICD-10. All the subjects were administrated MADRS and BSI scales to study severity of depression and nature of somatization. The results obtained were analyzed statistically. In this study, from the correlation coefficient it is observed that BSI and MADRS are negatively correlated in each group. Somatic symptoms were larger with major depression and level of depression influences somatisation. Similarly socio-demographic factors like age, female sex, education, marital status and place of living will influence somatisation.BSI and MADRS are related to each other and it is possible to predict one from the other. Large scale community based studies are required in Indian context to establish the nature of somatization in depression.
Keywords: Depressive group, Dysthymia, MAD, Somatisation, Socio-demogrphicfactors, MADRS and BSI.

INTRODUCTION

Depressive disorders differ considerably in clinical manifestation between individuals. It is widely acknowledged that additional and atypical symptoms must be taken into account though ICD 10 [1] defines standard criteria for the diagnosis of a depressive episode. Individual expression of depression varies between patients based on various factors. Somatic symptoms are of particular importance which sometimes may predominate the patients' subjective perception of his or her condition. This tendency to experience and communicate psychological distress in the form of physical symptoms and to seek medical help has been termed as "somatisation". The tendency to experience and communicate distress in somatic rather than a psychological mode is wide spread in our societies [2].

The depressed mood may also influence cognition in the direction of augmented perception of bodily sensations their interpretation in terms of physical illness. Adoption studies suggests that certain stresses in early home environment are associated with somatisation in adult life[3] while culture and subculture influence in the rate by which emotional distress is expressed as somatic complaints [2, 4].

Somatisation disorder constitutes a major portion of morbidity both in medical and psychiatric practice although very little systematic work has been done in this area. A positive association between somatisation and depressive disorders has been documented by clinical and epidemiological studies [5]. Patients believe and expect somatic complaints to be received more sympathetically than emotional problems. Functional somatic symptoms may occur after losses and stressful life events [6]. Somatic symptoms seem to cover up the primary depressive nature of the illness and have been referred it as masked depression and latent depressive effect [7].

Investigators especially in India explained the somatic symptoms by stating that they have no other language at their disposal except the somatic language [8]. It has been asserted that patients from developing countries "somatise" their depression, whereas patients in the western world "psychologise" depression [9, 10]. The phenomenon of presentation of psychological distress in the form of physical symptoms is well

recognized and has been reported from all over the world, more commonly from non-western countries [11]. Numerous studies in India, China and Africa have confirmed the high rate of somatic presentation among non-western countries [9, 12-15]. In a cross cultural study of depression it was found anxiety, insomnia, somatic symptoms and depressed mood were more common in Indian than Australian patients [16]. In another study using DSM II found that majority suffering from dysthymia and anxiety disorders. A transcultural study compared the symptomology between India and USA patients shows increased tendency of Indian patients to bring out their somatic symptoms in the fore-ground. Ethnicity is one of the determining factors in somatization[17]. The relationship of stigma to both depression and somatisation were studied to test the hypothesis that stigma is positively related to depressive symptoms and negatively related to somatoform symptoms [18]. Women have consistently been shown to report greater numbers of physical symptoms [19]. Somatisation in woman differed in various ethnic groups [20]. Approximately two thirds of patients with depression in primary care present with somatic symptoms [21]. High prevalence and association of somatic symptoms in patients with MDD was noted [22]. Somatic symptoms are very common in depressed Puerto Rican patients and have a significant impact on the antidepressant effectiveness. The prevalence of somatisation and co-morbid depression in primary care patients in Saudi Arabia is similar to U.S. and worldwide [23]. Somatic symptoms attributed to medical illness may actually be caused by depression [24]. Patients with major depression often present with pain or other physical symptoms in addition to psychological symptoms [25]. Somatic complaints are highly associated with depression and anxiety and rarely associated with their underlying medical diseases [26]. The present study was conducted to establish the correlation between depressive and somatisation scores, though some association is found in previous study [27]

Aims and Objectives

The present study was conducted to look at the correlation between depressive and somatisation scores in depression. An effort was also made to look into the sociodemographic factors influencing depressive and somatisation scores in various subgroups of depression. The tools used were a socio-demographic proforma, short clinical history and ICD 10 for diagnosis, Montgomery Asberg depression Rating Scale [28] to asses depressive cognition and Bradford Somatic Inventory [29] to evaluate somatisation of depressive affect

Hypothesis

The study started with the hypothesis, that there is no significant differences in the tendency of somatisation among different depressive groups and no significant influence of socio demographic variables on somatisation in depressed patients.

MATERIALS AND METHODS

The present study was conducted in the outpatient department of psychiatry at government general hospital, Tirupathi, Andhra Pradesh, India. Inclusion criteria were subjects between 15 to 55 years of age and either sex, subjects who were diagnosed as suffering from the depression falling into either depressive episode or dysthymia or mixed anxiety depressive disorder. Exclusion criteria were subjects below 15 years and above 55 years of age, subjects suffering from significant physical illness and any associated long standing organic illness which is likely to contribute for somatization, schizophrenia, personality disorder, substance abuse. Subjects suffering from depression established by ICD-10 were recruited into three groups. Mainly three subgroups have been taken up for the study which were common in general hospital psychiatry: (a) Depressive episode with somatic symptoms, (b) Dysthymia, (c) Mixed anxiety depressive disorder. After taking informed consent the patients were administered the questionnaires. Socio demographic data was collected using a semi structured intake proforma. All the subjects were administered Montgomery Asberg Depression Rating Scale (MADRS) to study severity of depression in them and Bradford somatic Inventory (BSI) to study somatisation scores. The data so collected was analyzed. Relationship between score was studied with help of simple correlation and regression analysis and generalized linear model have been used to estimate the influence of demographic variables on BSI and MADRS.

RESULTS

Relationship between BSI and MADRS scores: The relationship between BSI and MADRS scores are studied with help of correlation co-efficient the following results are obtained.

Table 1: Relationship between BSI and MADRS scores

Group	N	R
Depressive episode with somatic symptoms	152	-0.728*
Dysthymia	57	-0.643*
Mixed anxiety depressive disorder	53	-0.834*
Over all	262	-0.748*

From the correlation co-efficient it can be observed that BSI and MADRS are negatively correlated in each group as well as overall sample. It means a hike in one score leads to a fall in the other

score. From the overall sample it is possible to arrive at a formula that predicts the most likely BSI value given the MADRS score and vice-versa. Simple Regression model gives the following formulae.

BSI = 81.68-1.179* (MADRS) MADRS - 50.34-0.475*(BSI)

From the formula it follows that, one MADRS score increases by one point, the BSI will on average decrease by 1.179. Similarly an increase in BSI by one point causes an average decrease in MADRS by 0.475.

Thus BSI and MADRS are related to each and it is possible to predict one from the other. This is in contrary to the previous study where in functional somatic complaints are more prevalent with higher severity of depression [30].

Somatic symptoms were larger with major depression than mild depressive episodes, suggesting that the level of depression influences somatisation [31].There is evidence for the association of depression and somatisation, and depressed patients have scored consistently more on somatisation than non-depressed patients [6].

In the following section the effect of various Socio-Demographic variables on BSI and MADRS scores are studied with help of multiple regression Analysis. The primary objective is to assess the extent of contribution made by each variable and its effect on BSI as well as MADRS.

Analysis of BSI

In order to study the effect of various factors on BSI a stepwise multiple linear regression model has been fitted to the data. The factors used are age, sex, and maritalstatus, education, place and socio-economic status. The regression procedure is run with the help of SPSS for each of the three groups of patients and the results are presented below.

Table 2: Group- Depressive episode: Dependent Variable: BSI

Factor	Regression Coefficients		Standardized Coefficients	t value	Sig.	Correlation Coefficient	% variation explained
	B	Std. Error	Beta				
(Constant)	41.386	4.334		9.548	0.000		
Place	-5.975	1.671	-0.279	-3.576	0.000	-0.376	10.471
Education	5.495	1.867	0.234	2.943	0.004	0.398	9.291
Sex	5.284	1.536	0.247	3.440	0.001	0.289	7.144
Model $R^2 = 0.269$		**F** = 18.15 p = 0.00001		Percentage variation explained **= 26.9**			

It follows that in the depressive episode group the major determinants of BSI are education, place and sex and the other variables have been excluded by the regression procedure. The model could explain only 26.9% of variation in BSI attributable to education, place and sex. From the last column it can be seen that the major determinant of BSI is place followed by the other two.

Since the variables used in the regression model are categorical instead of measurements, there will be difficulty in interpreting their effect on BSI. To overcome this, a Generalized Linear Model (GLM) has been used to test the effect of the selected factors on BSI. The processing was done with SPSS under the module "Univariate GLM" and the results are presented below.

Table 3: Group-Depressive episode: Dependent variable: BSI

Factor	Estimated Marginal Mean BSI		Estimated Marginal Effect	T	Sig.
	Level	Mean			
Place	Rural	51.581	5.975	3.576	0.000
	Urban	45.606			
Sex	Male	45.951	-5.284	-3.440	0.001
	Female	51.236			
Education	Literates	45.846	-5.495	-2.943	0.004
	Illiterates	51.341			

From the above table it follows that the Estimated Marginal Effect of place is 5.975 followed by sex and education. It follows from the above discussion that between rural and urban the rural subjects have scored high while females scored higher than male subjects. Also the Illiterate subjects are found to score higher than their literate counterparts.

Table-4: Group- Dysthymia: Dependent variable: BSI

Factor	Regression Coefficients		Standardized Coefficients	t value	Sig.	Correlation Coefficient	% variation explained
	B	Std. Error	Beta				
(Constant)	45.702	1.335		34.224	0.000		
Education	5.744	0.821	0.628	6.994	0.000	0.695	43.640
Sex	2.396	0.666	0.323	3.599	0.001	0.452	14.617
Model $R^2 = 0.583$		**F = 37.68** p = 0.0001		Percentage variation explained = **58.3**			

For this group of patients the following results are obtained

The major determinants of BSI for this group are Education and Sex which together could explain about 58.3% of BSI. Between these two factors, Education had a higher contribution.

Table 5: Group- Dysthymia: Dependent variable: BSI

Factor	Estimated Marginal Mean BSI		Estimated Marginal Effect	X	Sig.
	Level	Mean			
Education	Literates	55.039	-5.744	-6.994	0.000
	Illiterates	60.783			
Sex	Male	56.713	-2.396	-3.599	0.001
	Female	59.109			

The effect of education is higher than sex in explaining the BSI of Dysthymia group and illiterates have scored higher than literates while females scored higher than males.

Group MAD: The stepwise regression analysis has selected the variables education, sex, place and socio economic status as relatively more important than the others. The following table shows the statistical results.

Table 6: Group-Mixed anxiety depressive disorder: Dependent variable: BSI

Factor	Regression Coefficients		Standardized Coefficients	t value	Sig.	Correl-ation Coefficient	% variation explained
	B	Std. Error	Beta				
(Constant)	43.606	0.913		47.738	0.000		
Education	8.903	0.495	0.476	17.993	0.000	0.770	36.636
Sex	5.409	0.311	0.427	17.370	0.000	0.578	24.692
Place	-4.948	0.405	-0.352	-12.208	0.000	-0.616	21.678
SES	-2.938	0.383	-0.232	-7.673	0.000	-0.620	14.357
Model R^2 - 0.974		F = 442.88 p = 0.0001		Percentage variation explained = 97.4			

SES: Socioeconomic status

While the linear model chosen could explain about 97% of BSI in terms of the three variables, the percentage contribution is about 37% due to education and about 25% due to sex followed by the other two.

Table 7: Group-Mixed anxiety depressive disorder : Dependent variable: BSI

Factor	Estimated Marginal Mean BSI		Estimated Marginal Effect	t value	Sig.
	Level	Mean			o
Education	LITERATES	48.794	-8.903	-17.993	0.000
	ILLITERATES	57.697			
Sex	MALE	50.541	-5.409	-17.370	0.000
	FEMALE	55.950			
Place	RURAL	55.719	4.948	12.208	0.000
	URBAN	50.771			
SES	LOW	54.714	2.938	7.673	0.000
	MIDDLE	51.777			

SES: Socioeconomic status

It follows that education has the highest effect on BSI while SES shows the least difference in BSI.

ANALYSIS OF MADRS

Group- Depressive episode with somatic symptoms

Dependent Variable: MADRS

Table-8:Group- DEPRESSIVE EPISODE: Dependent variable: MADRS

Factor	Regression Coefficients		Standardized Coefficients	t value	Sig.	Correlation Coefficient	% variation explained
	B	Std. Error	Beta				
(Constant)	36.786	1.798		20.458	**0.000**		
Education	-5.629	0.775	-0.469	-7.266	**0.000**	-0.633	■29.673
Place	2.966	0.693	0.271	4.281	**0.000**	0.467	12.672
Sex	-2.906	0.637	-0.266	-4.559	**0.000**	-0.352	9.380
Model R^2 = 0.517<		F = 52.85 **p = 0.00001**		Percentage variation explained = 51.73			

It follows that in the depressive episode group the major determinants of MADRS are education, place and sex and the other variables have been excluded by the regression procedure. The model could explain 51.7% of variation in MADRS attributable to education, place and sex.

Since the variables used in the regression model are categorical instead of measurements, there will be difficulty in interpreting their effect on MADRS. To overcome this, a Generalized Linear Model (GLM) has been used to test the effect of the selected factors on MADRS. The processing was done with SPSS under the module Univariate GLM and the results are presented below.

Table-9: Group- Depressive episode: Dependent variable: MADRS

Factor	Estimated Marginal Mean BSI		Estimated Marginal Effect	t value	Sig.
	Level	Mean			
Education	Literates	31.248	5.629	7.266	0.000
	Illiterates	25.619			
Place	Rural	26.950	-2.966	-4.281	0.000
	Urban	29.917			
Sex	Male	29.886	2.906	4.559	0.000
	Female	26.981			

From the above table it follows that the Estimated Marginal Effect of education is 5.629 followed by place and sex.

It follows from the above discussion that between rural and urban the rural subjects have scored high while females scored higher than male subjects. Also the illiterate subjects are found to score higher than their literate counterparts.

Group- Dysthymia

For this group of patients the following results are obtained.

Table-10:Group- Dysthymia : Dependent variable: MADRS

Factor	Regression Coefficients		Standardized Coefficients	t value	Sig.	Correlation Coefficient	% variation explained
	B	Std. Error	Beta				
(Constant)	21.931	1.191		18.409	0.000		
Sex	-2.539	0.540	-0.508	-4.704	0.000	-0.514	26.108
SES	1.799	0.597	0.326	3.015	0.004	0.334	10.891
Model R^2 = 0.370		F=15.86 P=0.001		Percentage variation explained = 37.0			

The major determinants of MADRS for this group are sex and socio economic status, which together could explain about 37% of MADRS. Between these two factors, sex had a higher contribution. The estimated marginal mean of MADRS and the marginal effect are shown in the following table and the effects are graphically displayed below.

Table-11: Group- Dysthymia Dependent variable: MADRS

Factor	Estimated Marginal Mean BSI		Estimated Marginal Effect	t value	Sig.
	Level	Mean			
Sex	Male	22.091	2.539	4.704	0.000
	Female	19.551			
SES	Low	19.921	-1.799	-3.015	0.004
	Middle	21.721			

The effect of sex is higher than socio-economic status in explaining the MADRS of Dysthymia group.

Group- MAD

The stepwise regression analysis has selected the variables education, sex, place and SES as relatively more important than the others. The following table shows the statistical results.

Table-12: Group- MAD: Dependent variable: MADRS

Variable	Regression Coefficients		Standardized Coefficients	t value	Sig.	Correlation Coefficient	% variation explained
	B	Std. Error	Beta				
(Constant)	34.867	1.264		27.580	0.000		
Education	-7.260	0.730	-0.681	-9.939	0.000	-0.820	55.797
Sex	-2.500	0.480	-0.346	-5.210	0.000	-0.546	1-8.891
Place	1.297	0.526	0.162	2.464	0.017	0.339	5.486
Model $R^2 = 0.802$			F = 66.05 p = 0.0001	Percentage variation explained - 80.2			

While the linear model chosen could explain about 80.2% of MADRS in terms of the three variables, the percentage contribution is about 56% due to Education and about 19% due to sex followed by the place. The marginal effects and their direction are given in the following table and shown below.

Table-13: Group- MAD: Dependent variable: MADRS

Variable	Estimated Marginal Mean BSI		Estimated Marginal Effect	t value	Sig.
	Level	Mean			
Education	Literates	25.802	7.260	9.939	0.000
	Illiterates	18.541			
Sex	Male	23.421	2.500	5.210	0.000
	Female	20.921			
Place	Rural	21.523	-1.297	-2.464	0.017
	Urban	22.820			
SES	Low	19.92	-1.800	-3.015	0.004
	Middle	21.72			

It follows that education has the highest effect on MADRS followed by Sex and Place. In previous studies female subjects exhibited a higher prevalence of somatic depression but not a higher prevalence of pure depression [32].Women reported a significantly more severe phenotype, with more severe symptoms of depression as compared to men on several self-report scales (i.e., BDI-II, BSI and SF-36) and more symptoms on the BDI-II, but no differences in symptom severity were observed on most observer-rated scales (i.e., MADRS and BAS)[33].

DISCUSSION

In this Indian study the correlation between depressive and somatisation scores were analyzed with help of correlation coefficient it was found that BSI and MADRS are negatively correlated in each group, it is possible to arrive at a formula that predicts the most likely BSI value given the MADRS score and vice-versa.

In this study, female subjects from all the three depressive groups scored higher on BSI, this is in concordance with previous study [19]. Similarly illiterate subjects presented high scores with BSI, this finding is correlates with earlier studies [34]. Majority of the subjects in the study group were from rural background and somatising more than the urban subjects, this findings correlating with previous study by [34-36]. Female gender was a significant predictor of

somatisation only for Caucasians and south/central Americans, in other ethnic groups women and men being comparable. Somatisation was lower in unmarried than in married subjects especially in Caucasians [20]. Significantly Austrian patients scored lower with BSI than Turkish groups [17]. Among three groups, dysthymia group showed high scores of somatisation followed by mixed anxiety group and depressive episode with somatic symptoms.

LIMITATIONS

This is a hospital based study, the sample may not be representative of community population. It is a time bound study and sample size is 262 subjects only with no control group.

CONCLUSIONS

In our study results shows that BSI and MADRS are related to each other and it is possible to predict one from other, from the correlation coefficient it can be observed that BSI and MADRS are negatively correlated in each group, suggesting hike in one score leads to a fall in the other. In the present study females, illeterates, subjects from rural and low socioeconomic background scored higher than their counterparts. In our study, Dysthymia group showed highest level of somatisation followed by MAD and Depressive episode group.

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