

## Prevalence of depression in suburban college students of Kolkata, West Bengal and its relation with BMI and percentage of body fat

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### ABSTRACT

Depression can be expressed as a typical mental state with a feelings of unpleasantness. Major Depressive Disorder (MDD) is the type of depression characterized by low mood and temperament. Presence of depression is a common phenomenon in college students though most of them unaware of that and do not discuss about depression. The present study was aimed to find out the prevalence of depression in college students in a suburban area.. Ninety-nine college going students, both male and female were studied in a suburban area near Kolkata for their depression level and its relation with Body mass Index (BMI) and Body fat %. 40.4 % students both male and female were normal whereas 60.6 % were depressed at different levels. But male students were less depressive than women when compared in between. 46.15 % male and 34.04 % female were in normal level. 34.04 % female students were with mild depression whereas that of male students was 23.08 %. 14.89 % female and 13.46 % male students were at borderline but 10.64 % female were at moderate level in compare to 13.46 % moderate depression in male students. Severe depression level were observed in both male and females students but in less percent which were 2.13 % and 3.085% for female and male students. Extreme depression was observed in female students only (4.26 %). Average 22.3 kg/m<sup>2</sup> BMI was observed for the female students and that of male students was 21.7 kg/m<sup>2</sup>. Female students possessed an average fat % of 34.3, which was 21.7 for the male students in average. When depression score was correlated with BMI, a very poor negative correlation was observed ( $r = -0.04$ , non-significant) which was reflected in a very poor negative relationship with body fat % ( $r = -0.10$ , non-significant). Thus, the study revealed that depression did not have linear co-relationship with BMI and fat %.

**Keywords:** Depression, MDD, BMI, Fat %, Beck

**D**epression is a typical mental state in which someone becomes sad and faces a feeling of unpleasantness. According to American Psychiatric Association, depression (Major Depressive Disorder) is a common and serious medical illness that negatively affects someone's feeling and its act. Major depressive disorder (MDD), also known as depression, is

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a mental disorder characterized by at least two weeks of low mood that is present across most situations.

Depression among college students is extremely prevalent across the world. College students are a special group who are in a critical transitory period of life where they enter into adulthood after adolescence. This can be one of the most stressful times in a person's life. Trying to fit in new environment, maintain good grades and plan for the future often caused anxiety and depression for most of the students (Dyrbye et al 2006, Eller et al 2006, Ovuga et al 2006, Reavley and Jorm 2010, Buchanan 2012, Castaldelli-Maia 2012, Ibrahim et al 2012, Mahmoud et al 2012, Ibrahim et al 2013, Hope et al 2014, Asante et al 2015, Othieno et al 2015, Mayer et al 2016,). In developing countries 10%-14% individuals were suffering with anxiety and depression (Khan et al 2007, Gadit and Mugford 2009). Among these countries India, Pakistan had higher prevalence of depression because of social hardships, academic pressure and carrier compulsion (Husain et al. 2007).

There were various factors responsible for depression. One of them probably morphological characteristics like BMI where body weight and relative height played an important role. Various studies reported two different opinions of either no relationship between obesity and depression (Faubel 1989, Friedman 1995) or obese people had a higher risk of depression in future (Roberts et al 2000, 2002, Dong et al 2004, Brownell et al 2005, Puhl and Brownell 2006, Blaine 2008, Revah-Levy et al (2011) . There was one more opinion which stated that obese people were less depressed (Palinkas et al 1996, Stewart and Brook 1983). Thus, inconsistent findings could not establish a consistent theory whether depression influence BMI or BMI influence depression but some other thoughts believed that obesity and depression might be the same illness with different appearance (Rosmond 2004). Thus the relation between obesity and depression could be influenced by other various factors like socio-economic status, level of depression, level of obesity, family history of depression , sex etc .

Most of the previous studies tried to find out the influence of obesity on depression, but very less studies were on the influence of depression over BMI (Stewart and Brook 1983, Faubel 1989, Friedman 1995, Palinkas et al 1996, Roberts et al 2000, Pine et al 2001, Roberts et al 2002, Goodman and Whitaker 2002, Dong et al 2004, Rosmond 2004, Brownell et al 2005, Puhl and Brownell 2006, Blaine 2008).

Very few studies had been done on the urban college students for their depression level near Kolkata, West Bengal. Sahu et al (2013) worked on Graduate college students of Kolkata for their suicidal ideation and depression. Similarly Basu et al (2016) worked on nursing students in Kolkata Nursing colleges for their depression level. Deb and Chakraborty (2010) worked on school and college students of Kolkata urban areas for their depression traits. Chatterjee and Bandyopadhyay (2015) worked on college students of Kolkata for their depression level. Depression level of medical students of Kolkata were also studied by few researchers (Bhattacharjee et al 2016, Chakraborty et al 2016). Malakar et al (2019) worked Kolkata school students for studying the affect of internet games on depression. Thus very few studies were done on college students of Kolkata and suburban areas of Kolkata.

Hence, the present study was aimed to find out the prevalence of depression in college students and also to find out if there was any linear relationship between depression and BMI or more precisely whether depression was correlated linearly with BMI.

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### **METHODOLOGY**

#### *Studied Area*

The present study was targeted a mixed type of population. The cohort was designed with the students from middle class economic status and a mixed population with mostly all kind of caste categories. To pursue this purpose the Dunlop based colleges had been selected as per convenience. The area was under Belgharia Police station of North 24 pgs. of West Bengal in India. The selected area consists of two colleges which met the study criteria. The selected colleges were Bramhananda Keshab Chandra College and Prasanta Chandra Mahalanabis Mahavidyalaya.

#### *Studied Participants*

The targeted group represented the local middle class society. The age group is from 18 to 21, with a mean age group of 18.9 yr ( $\pm 1.1$ ). The total number of participants were 99 where 47 were female and 52 were male. The students from 2<sup>nd</sup> semester were the targeted population. The whole study was gone through in a classroom environment to maintain the environmental state for the person's mind set up.

#### *Research Ethics*

To pursue the permission for data collection the researchers contacted with the principals from the previously mentioned colleges. The data collection had done only with oral consent of the participant and written documentation as permission from the principal desk.

#### *Data Collection*

**Beck depression Inventory (BDI) test:** Beck Depression Inventory test (BDI) was one of the most widely used Psychometric Tests for measuring the severity of Depression. The test was created by Aaron T. Beck (1961) and later on revised in 1978 as BDI-1A, and then again was revised in 1996 as BDI-II. The Test was a 21 questions of multiple-choice self-report Inventory. There were three versions of the BDI - the original BDI (1961), the revised versions BDI-1A (1978) and BDI-II (1996). In the present study, BDI-II (1996) was used. The BDI-II was designed for individuals aged 13 and over. The test questions were composed of items related to symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss and lack of interest, sleeping, and nutritional status in terms of BMI.

In the present study a set of 21 questions were asked for each individual. For each participant 15 minute period was set for interviewing. Before the tests, participants were asked to take rest in a less noise and less disturbed class room. The interview was taken in a separate room. The set of questions were given to the participants asked them to answer. Each question was explained well before they answer. The answered questions were scored after completion of the interview.

**Anthropometric measurements:** Height and body weight was measured with an Anthropometric Rod (CESCORF, Brazil) and electronic weighing scale (OMRON, India). Skinfold Thickness: Biceps, Triceps, Subscapular and Supraspinale skinfold thicknesses were measured with a Harpenden skinfold caliper (CESCORF, Brazil).

Measurement was done according to the standard method recommended by International Society for the Advancement of Kinanthropometry (ISAK 2011)

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**Data Analysis**

**Body Fat %:** Body fat % was calculated using the equation of Siri (1956). Durnin and Womersley (1974) technique was followed for Body density.

$$\text{Body fat \%} = (495/\text{Body density}) - 450.$$

Body density = 1.1620-0.0630 log (Biceps +Triceps+ Subscapular + Supraspinale) for 17-19yr male.

Body density = 1.1382-0.0628 log (Biceps +Triceps+ Subscapular + Supraspinale) for 16-19yr female.

Body density = 1.1631-0.0632 log (Biceps +Triceps+ Subscapular + Supraspinale) for 20-29yr male.

Body density = 1.1441-0.0680 log (Biceps +Triceps+ Subscapular + Supraspinale) for 20-29yr female.

**Body Mass Index:** Body Mass Index (BMI) was calculated using the equation where BMI = Weight (kg) / Height (m)<sup>2</sup>.

**Statistical analysis:** Statistical analysis was done using SPSS 16.0. , Excel and www.socialsciencesstatistic.com

**RESULTS**

**Table 1: Descriptive statistics of physical characteristics, depression score, BMI and Fat % of male and female students when considered all in one group (n=99)**

N=99	Age (yr)	Ht (cm)	Wt (kg)	BMI (kg/m <sup>2</sup> )	Fat %	Depression score
mean	18.9	161.5	57.4	22.0	27.7	13.8
SD	1.1	9.5	12.4	4.1	7.5	8.9
min	17	136.8	31.3	12.5	8.3	2
max	23	180.1	91.3	32.8	41.4	44

**Table 2: Descriptive statistics of physical characteristics, BMI, Fat % and depression score of Boys studied in the present study (n=52)**

Boys n=52	Age (yr)	Ht (cm)	Wt (kg)	BMI (kg/m <sup>2</sup> )	Fat %	Depression score
mean	19.1	167.7	61.9	22.0	21.7	12.8
SD	1.3	6.3	11.9	3.7	4.7	8.7
min	17	149	39.6	14.1	8.3	2
max	23	180.1	91.3	31.1	29.7	35

**Table 3: Descriptive Statistics of physical characteristics, BMI, Fat %, and depression score of girls studied in the present study (n=47)**

Girls n=47	Age (yr)	Ht (cm)	Wt (kg)	BMI (kg/m <sup>2</sup> )	Fat %	Depression score
mean	18.7	154.6	53.4	22.3	34.3	14.9
SD	0.9	7.5	12.5	4.7	3.2	9.1
min	17	136.8	31.3	12.5	23.5	3
max	21	172.0	86.3	32.8	41.4	44

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**Table 4: Depression level in male and female students.**

Depression Level	Depression level in Female (n=47)		Depression level in Male (n=52)		Total	
	No.	Percentage (%)	No.	Percentage (%)	No.	Percentage (%)
Normal	16	34.04	24	46.15%	40	40.41
Mild <sup>1</sup>	16	34.04	12	23.08%	28	28.28
Borderline <sup>2</sup>	7	14.89	7	13.46%	14	14.14
Moderate <sup>3</sup>	5	10.64	7	13.46%	12	12.12
Severe <sup>4</sup>	1	2.13	2	3.85%	3	03.03
Extreme <sup>5</sup>	2	4.26	0	0%	2	02.02

<sup>1</sup>Mild: Mild mood disturbance, <sup>2</sup> Borderline: Borderline clinical depression, <sup>3</sup>Moderate: Moderate depression <sup>4</sup>Severe: severe depression, <sup>5</sup>Extreme: Extreme depression.

**Table 5: Mean height, weight, depression score, BMI and body fat percent of male and female students with t value and level of differences in between male and female students.**

Parameter	Female Student Mean n=47	Female Student SD n=52	Male Student Mean	Male Student SD	t value	p value
Age (yr)	18.7	0.9	19.2	1.1	2.02	0.02*
Ht (cm)	154.3	7.5	167.7	6.3	9.44	0.001**
Wt(kg)	53.4	12.5	61.9	11.9	3.48	0.001**
Depression Score	14.9	9.1	12.8	8.7	0.24	0.24
BMI	22.3	4.7	21.7	3.7	0.39	0.35
Fat %	34.3	3.2	21.7	4.7	15.43	0.005**

\*p<0.05; \*\*p<0.01

**Table 6: Bivariate Pearson Chi-square test for BMI vs. Sex and depression**

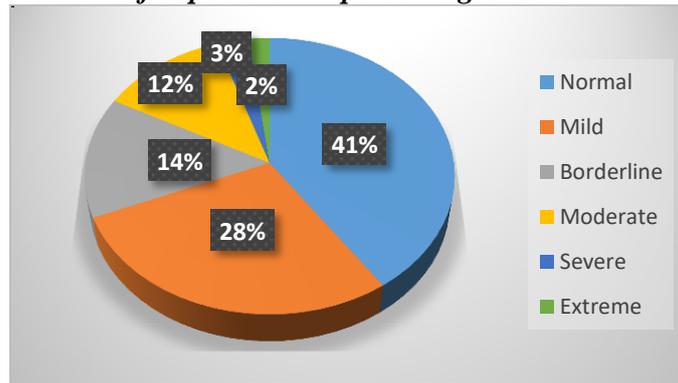
Category		Low BMI	Normal BMI	Higher BMI	p-value	Degree of Freedom
Sex	Female	8	26	13	1.031	2 df
	Male	9	33	10		
Depression	Normal	6	23	11	0.760	
	Depressed	11	36	12		

**Table 7. Bivariate Pearson Chi-square test for Sex vs. depression**

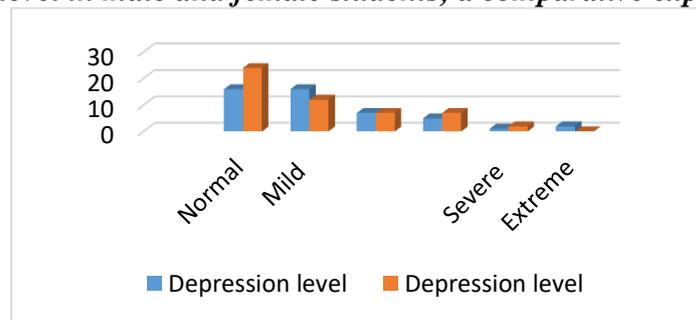
	Female	Male	p-value	Degree of Freedom
Normal	16	24	1.504	1df
Depressed	32	28		

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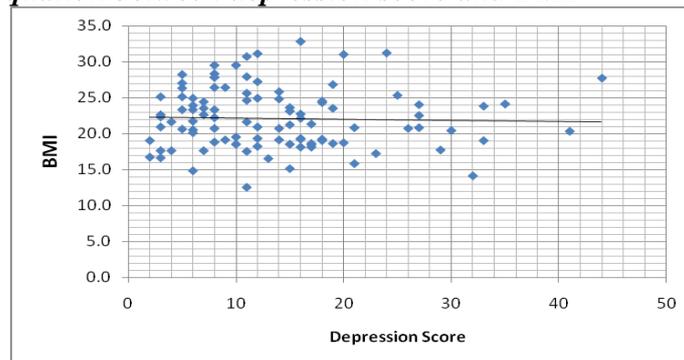
**Fig 1: The Total occurrence of depression in percentage**



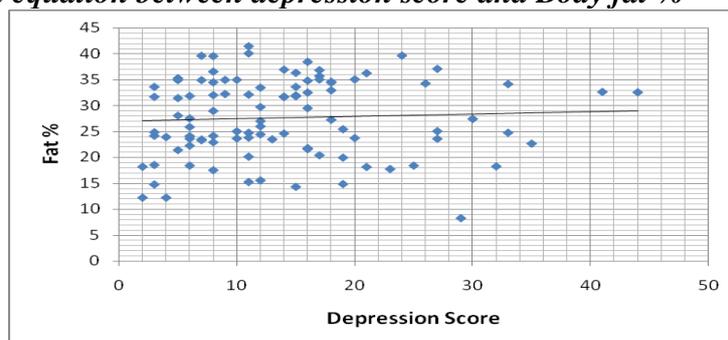
**Fig 2: Depression level in male and female students; a comparative expression**



**Fig 3: Regression equation between depression score and BMI**



**Fig 4: Regression equation between depression score and Body fat %**



**DISCUSSION**

52 male and 47 female students were studied for their depression level. At the same time their BMI and body fat % were also measured. Students were from different body type and size

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with wide variety of height, weight and accumulation of body fat. Students were belongs to same local urban area near to the college, resulting similar social environment where they spent most of the time. The average age of the students both male and female was 18.9 ( $\pm 1.1$ ) yr. with a range of 17-23 yr. Average age of the girls was 18.7 yr ( $\pm 0.9$ ) whereas that of the boys was 19.1 yr ( $\pm 1.3$ ). Mean height was 161.5( $\pm 9.5$ ) cm with a range of 136.8-180.1 cm along with average body weight of 57.4 kg with a range between 31.3 to 91.3 kg (Table 1). Obviously the boys were taller than the girls where average height of the boys' was 167.7cm ( $\pm 6.3$ ) and that of the girls was 154.6 cm ( $\pm 7.5$ ). The average Depression score was 13.8 ( $\pm 8.9$ ) with a lowest depression level of 2 and highest depression level of 44 (Table 1. The average depression score of the boys was 12.8 ( $\pm 8.7$ ) whereas that of the girls was 14.9( $\pm 9.1$ ) (Table 5).

34.04% female students and 46.15 % male students were without any depression. 34.04 % female students and 23.08 % male students were in mild depression. Borderline depression were observed in 14.89 % female students whereas it was 13.46 % in male students. 10.64 % female and 13.46 % male students were moderately depressed. Less female and male students were depressed severely (2.13 % female and 2.85% male), but extreme depression was not observed in male students. Only 4.26 % female students were extremely depressed. That was the trait of depression level in female and male students when studied separately (Table 4, Fig 2). But 40.41% male and female students were without depression and in normal state. 28.28 % male and female students were with mild depression, whereas 14.14 % were border line depressed. Moderate depression was observed in 12.12 %, compared to 3.03 % severely depressed. Only 2.02 % were depressed extremely (Table 4 and Fig.1). Thus, a large portion of the students were either normal or mild depressed. This might be due their adaptive capability of environment of social life.

There were various inconsistent findings concerning the influence of obesity on depression or influence of depression on obesity or BMI.

In the present study, no significant relationship was observed in between depression score and BMI (Fig 3). Similarly no significant relationship was observed in between depression and body Fat % (Fig 4). When depression score was correlated with BMI, a very low negative correlation was observed ( $r = -0.04$ , non-significant) which was reflected in a very low negative relationship with body fat % ( $r = -0.10$ , non-significant). The finding of the present study was similar with the findings of the National Health interview on 3000 American adults where depression and BMI were correlated at 0.08 (National Centre for Health Statistics, 2006). Similarly, the national Longitudinal study of adolescent health, a survey of over 20000 youth, found a little correlation of 0.08 for girls and -0.01 for boys between depression and BMI (Needham and Crosnoe, 2005). De Wit et al (2009), observed a non-linear U-shaped relationship between BMI and depression where normal and overweight were less depressed than underweight and obese. As no linear relationship was observed, depression did not affect the person's BMI or person's body fat accumulation.

### CONCLUSION

Thus from the above study it could be concluded that most of the male and female college students of urban area near Kolkata were normal in respect of depression (40.41 %). Some of them were depressed but most of them were mild. (28.28 %). Only a small number of male and female students were depressed either moderate (12.12%), severe (3.03) or extreme (2.02%). There is no significant differences between sexes regarding depression score it was

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also observed that depression did not have any influence on BMI or fat %. Depression was not linearly correlated either with BMI or Fat %.

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***Conflict of Interest***

The author declared no conflict of interests.

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