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Prevalence of Depression, Anxiety during Covid-19 Pandemic among Adolescents of Bangalore North- A Cross-Sectional Study

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ABSTRACT

Background: Adolescence is a critical and formative period in which individuals begin their transition from childhood to adulthood and the presence of psychiatric disorders such as depression and anxiety at this stage of life is a matter of concern. Half of all mental health conditions start at 14 years of age, but most cases are undetected and untreated. **Objectives:** To assess the prevalence of depression and anxiety among adolescents and to assess the factors associated with depression and anxiety among adolescents. **Methods**: Data were collected from a sample of 620 adolescents of ages 14 to 16 years studying through the multistage cluster sampling method. Depression, Anxiety and Stress Scale-21, a pre-tested questionnaire for sociodemographic details were used. Statistical analysis was done using SPSS 20 version. Pearson's chi-square test and logistic regression were applied to find the association between categorical variables where appropriate. **Conclusion**: Out of 620 adolescents, 64.5% were female and 35.5% were male, 41.3% of the study population were 14 years old, 43.1% of 15 years old and 15.6% were 16 years old respectively. Prevalence of depression and anxiety among adolescents were found to be 50.32% and 62.74% respectively. Depression and play hours outside the house were significantly associated; anxiety and age, duration in present school, number of people at home, working people in the family were found to be statistically associated.

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INTRODUCTION

Adolescence is a critical and formative period in which individuals begin their transition from childhood to adulthood. One in six people is aged 10-19 years globally [(1)]. Depression and anxiety are recognized as common, serious disorders and are affecting adolescents and the student population to a large extent [(2)]. Mental health conditions account for 16% of the global burden of diseases and injury in people aged between 10-19 years. Half of all mental health conditions start at 14 years of age but most cases are undetected and untreated [(1)].

Globally, depression is the 4th leading cause of illness and disability among 15-19 years of age and the 15th leading cause of illness and disability among 10-14 years of age. Anxiety is the 9th leading cause of illness for adolescents aged 15-19 years and the 6th for 10–14-year aged adolescents[(3)]. WHO reports that 2.6 million young people die each year and about 20% of adolescents experience mental health problems[(4)].

In developing countries, the prevalence of the mental disorder among adolescent attending primary health care facilities range between 12%-29%. Earlier studies reported that prevalence rates of psychiatric disorders among Indian children is ranging from 2.6%-35.6% [(5)].The prevalence rates of individual disorders like depression, anxiety, and stress are growing among adolescents[(5)].

The novel coronavirus disease (COVID-19) has been declared by WHO as an international public health emergency. Countries all over the world implemented nationwide lockdowns with the hope of flattening the epidemic curve. Around the world, this has led to the closure

of schools in over 150 countries affecting the education of nearly one billion children. Pandemic has presented many challenges to students, parents, and educators. It has the potential to lead to short and long-term psychological morbidity among adolescents [6].Hence, there is a need for early identification of depression and anxiety that can prevent many psychiatric disorders at the early stage. So, this study was carried out to assess the prevalence of depression and anxiety among adolescents in Bangalore city.

MATERIALS AND METHODS

This cross-sectional study was carried out in high schools in Bangalore urban district, Karnataka. The study population consists of school-going adolescents aged between 14-16 years (8 to 10 divisions) from August- November 2021. The total sample size calculated is 620.

Sampling method: A multistage sampling design was used to select schools. The Department of Education for administrative purposes divided schools into three divisions, North, South, and Bangalore rural. Further, the North, South, and Rural divisions are divided into four, and five subdivisions four subdivisions. Bangalore urban North division was chosen purposively and in the first stage of sampling, Bangalore urban North one subdivision was randomly chosen using the lottery method. In the second stage of sampling, one cluster of government schools out of 12 clusters and one cluster of aided school out of 14 clusters and one cluster of Private (unaided) schools out of 17 clusters was chosen by simple random sampling technique. In the third stage, from each selected cluster (1- 2) number of schools were visited till the quota of 100 students in government, 200 students in aid, and 300 students in private schools was obtained. Total sample collected were- 105 students from a government school, 205 students from aided school, and 310 students from unaided schools.

Study tool: We used a pre-validated DASS-21 questionnaire to assess depression and anxiety symptoms. The DASS 21 is a 21-item self-report questionnaire designed to measure the severity of a range of symptoms common to depression, anxiety, and stress. In completing the DASS, the individual is required to indicate the presence of a symptom over the previous week. Each item is scored from 0 to 3, and based on the total scores, depression, anxiety, and stress are categorized as normal, mild, moderate, severe, and extremely severe types respectively.

Data collection: Before the study, permission was taken from the Block Education Officer and each Institution. The study participants were informed about the purpose and procedure of the study and their oral consent was taken and were assured about confidentiality. The questionnaire was administered by hand and was requested to fill them and were collected in their respective institution respectively. The questionnaire was pilot tested on a similar age group of students of about 60 students of one school, which was not part of the study.

Statistical analysis: SPSS 20 version was used to analyse data. The prevalence of depression, anxiety, and stress was estimated. Associated socio-demographic factors were computed along with a 95% confidence interval, Pearson's chi-square test and logistic regression were applied, and results were considered statistically significant wherever $P \leq 0.05$.

RESULTS

In the present study, out of 620 adolescents, 64.5% were female and 35.5% were male, 41.3% of the study population were 14 years old, 43.1% of 15 years old and 15.6% were 16 years old respectively. Government school-going adolescents comprised of 17.3%, 36.3% were studying in aided school and 46.5% adolescents were studying in unaided school. The majority of adolescents (78.9%) were having nuclear family and 21.2% of adolescents had joint families (**Table 01**). The prevalence of depression and anxiety among adolescents was found to be 50.32% and 62.74% respectively (**Figure 1 a, b**). Among depression, the majority type of depression seen among adolescents was mild depression (23.9%) and 49.7% of adolescents were not suffering from any kind of depression. Moderate anxiety (31.5) was seen as a common type of anxiety among the adolescents and 37.3% of adolescents were not having any anxiety issues. (**Table 01**).

According to **Table 02**, Depression was significantly associated with play hours of adolescents outside the home (p= 0.004), in the present study. 49.2% of females and 50.5% of males were not having any kind of depression. Among females, 25.8% suffered from mild depression, 18.8% suffered from moderate depression and 6.2% had severe depression. Among male adolescents, 20.5% were having mild depression, 19.1% had moderate depression and 6.2% had severe depression. None of the sociodemographic variables were significantly associated with depression, as p >0.05.

According to **Table 03**, Anxiety was higher among the higher age group and was statistically significant (p=0.045). It was also associated with the duration of adolescence in the current school, as anxiety was increasing with an increase in the years of stay in the current school respectively (p=0.00). Anxiety was statistically significant with working people in the adolescent's family (p=0.043), and it showed higher anxiety among adolescents with both parents were working when compared to adolescents with single parents were working. Anxiety was higher among adolescents who had less than four people in their home when compared to adolescents who had more than four people at home and association was found (p=0.041).

According to **Table 04**, it was seen that adolescents who belong to joint families were 1.51 times more likely to suffer from depression when compared to adolescents who belonged to nuclear families. Adolescents who played outside the home for one to two hours were 1.49 times more likely to

have depression when compared to adolescents who played for less than one hour outside the house daily. Adolescents who indulged in screentime for less than four hours per day for academic purposes were 1.56 times more prone to suffer from depression compared to adolescents who indulged in screentime for more than four hours daily. These situations can be due to the covid-19 pandemic.

In the study, **Table 05** shows that Anxiety was 1.83 times more likely to occur among adolescents who study in government schools when compared to adolescents who study in unaided schools. Adolescents who belonged to joint families were 1.58 times more likely to suffer from anxiety issues when compared to adolescents who belonged to nuclear families. Adolescents who played outside the home for more than one hour were 1.57 times more likely to suffer from anxiety when compared to adolescents who played for less than one hour daily outside the home. Adolescents who indulged in screentime for non-academic purposes for less than four hours daily had 63% fewer anxiety issues when compared to adolescents with more than four hours of screentime per day.

DISCUSSIONS

The consequences of not addressing adolescent mental health conditions extend into adulthood, impairing both physical and mental health and limiting opportunities to lead fulfilling lives as adults. Very few studies were carried out about mental health issues among adolescents in Bangalore. Hence there is a need for early identification of depression and anxiety that can prevent many psychiatric disorders at the early stage.

The prevalence of depression and anxiety among adolescents in the present study was 50.32%, 62.74%, respectively. Mild depression (23.9%), moderate anxiety (31.5%) was commonly seen among adolescents and extremely severe depression was very less (2.7%). Like this study results, a study conducted by Raman Kumar Sandal et al, among adolescents of Chandigarh reported that prevalence of depression, anxiety was 65.53%, 80.85% respectively and extremely severe depression was very less (3%) [(5)].In another study by Salelkar SS et al, the prevalence of depression was 58%, the prevalence of anxiety was 58% among school-going adolescents of Bagdogra [(4)].A study conducted among adolescents in Delhi by Ashok Kumar et al reported the overall prevalence of depression, anxiety to be 47.9%, 65.3% respectively. Most of the students suffered from mild depression, moderate anxiety which is like our study results[(7)].

It was seen that adolescents who played outside the home for longer hours were more depressed when compared to adolescents who played outside for fewer hours. The reason here might be because of the covid-19 situation as the restrictions and exposure might have frightened the adolescents. Though there was no association between other sociodemographic and risk factors with depression, it was found that females had a higher prevalence of depression. As the age and level of education of the adolescents increased, the prevalence of depression increased. Adolescents who belonged to the joint family had more depression when compared to adolescents who belonged to nuclear families. Upper and upper-middle-class adolescents had an increased prevalence of depression when compared to adolescents who belonged to lower-middle, upper-lower, and lower socioeconomic classes. According to Salelkar SS et al study, depression was higher among upper and upper-middle class (54.5%) adolescents, though was not statistically significant, which is like our current study [(7)].A study conducted by H. Verma et all, showed similar results where the prevalence of depression was more among females when compared to male adolescents [(8)].

Although there was no association found between anxiety and gender, level of education, socioeconomic status, type of family, number of close friends, it was found that anxiety was higher among females, increased as the education level increased, high among upper and upper-middle-class adolescents, joint families and those who had a smaller number of friends. A study conducted by Prateek Yadav et al among adolescents showed a significant association between age and anxiety (p=0.012), where anxiety increased with an increase in the age group of adolescents. It was also seen that anxiety was associated significantly with students' duration in school. But in contrast to our study, here it was found that anxiety decreased with an increased number of years spent in school. It also showed that anxiety was significantly associated with the presence or lack of close friends among adolescents[(9)]. According to a study by Salelkar SS et al, the prevalence of mental morbidities was higher among adolescents whose parents were working, and also the prevalence of depression, anxiety, and stress was higher among adolescents who had more number people at their home, anxiety (54.9%) was higher among adolescents who belonged to an upper and upper-middle-class family, but they were not significantly associated [(4)].A study conducted by K. Jayashree et al among adolescents of the urban area of South India, showed that non-nuclear family type students had higher levels of anxiety, though not significantly associated [(10)].

The strengths of the study were: the sample size was adequate and validated questionnaire- DASS-21 was used for identification of depression, anxiety, and stress. The limitations of the study were: As the study is done during covid-19, the results may not be valid for comparison at a later period as it may vary largely. Another limitation was that there was difficulty in understanding some questions by the respondents.

CONCLUSION

The prevalence of depression and anxiety among adolescents was found to be 50.32%, 62.74% respectively. Most commonly, mild depression (23.9%), moderate anxiety

(31.5%) was observed among these adolescents. Depression and play hours outside the home were significantly associated. Anxiety and age, duration of adolescents in present school, number of people at home, working people in the family were significantly associated. Depression and anxiety were found high in female adolescents when compared to males, increased as the age and level of education increased. All seemed to be high among adolescents who belonged to the joint family when compared to the nuclear family, who studied in government schools, who were not involved in any extracurricular activities before or during the covid-19 period.

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Table 1. Characteristics of the study population and prevalence of depression and anxiety

Variables		**n**	**%**
Gender	Female	400	64.5
	Male	220	35.5
Age	14 years	256	41.3
	15 years	267	43.1
	16 years	97	15.6
Level of education	8th standard	102	16.5
	9th standard	237	38.2
	10th standard	281	45.3
Type of school	Government	107	17.3
	Aided	225	36.3
	Unaided	288	46.5
	one	132	21.3

Number of children at home	two	382	61.6
	More than two	106	17.1
Type of family	Nuclear	489	78.9
	Joint family	131	21.1
Number of people at home	Less than four	420	67.7
	More than four	220	32.3
Socioeconomic status	Less than lower middle	194	31.3
	More than lower middle	426	68.7
Play hours outside the home	Less than one hour	322	51.9
	One to two hours	231	37.3
	More than two hours	67	10.8
Working people in the family	Single parent	291	46.9
	Both parents	329	53.1
Duration of stay in school	Less than a year	123	19.8
	One to three years	271	43.7
	More than three years	226	36.5
Hours of sleep	Less than eight	465	75
	More than eight	155	25
Screentime for academic purpose	Less than four hours	477	76.9
	More than four hours	143	23.1
Screentime for non-academic purpose	Less than four hours	581	93.7
	More than four hours	39	6.3
Extracurricular activities before covid-19	Involved	331	53.4
	Not involved	289	46.6
Extracurricular activities during covid-19	Involved	312	50.3
	Not involved	308	49.7
Number of close friends	Less than five	297	47.9
	Five to ten	158	25.5
	More than ten	165	26.6

Variables	**Depression**		**Anxiety**	
	n	**%**	**n**	**%**
Normal	308	49.7	231	37.3
Mild	148	23.9	72	11.6
Moderate	117	18.9	195	31.5
Severe	30	4.8	46	7.4
Extremely severe	17	2.7	76	12.3
Prevalence	**50.32**		**62.74**	

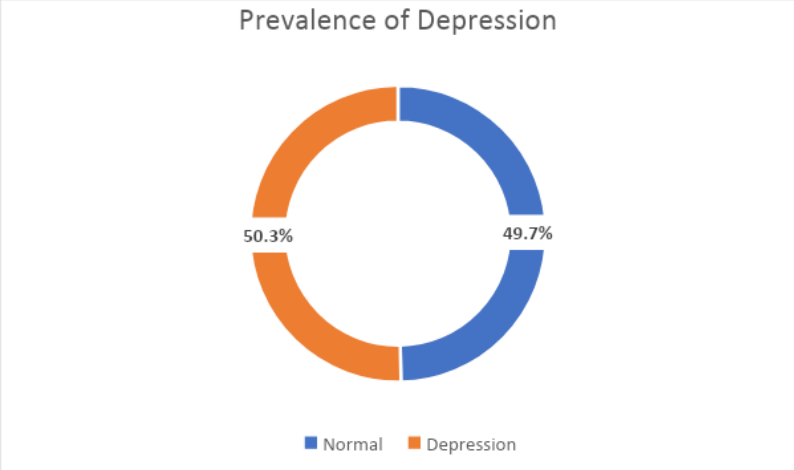

Figure 1 a. Prevalence of Depression

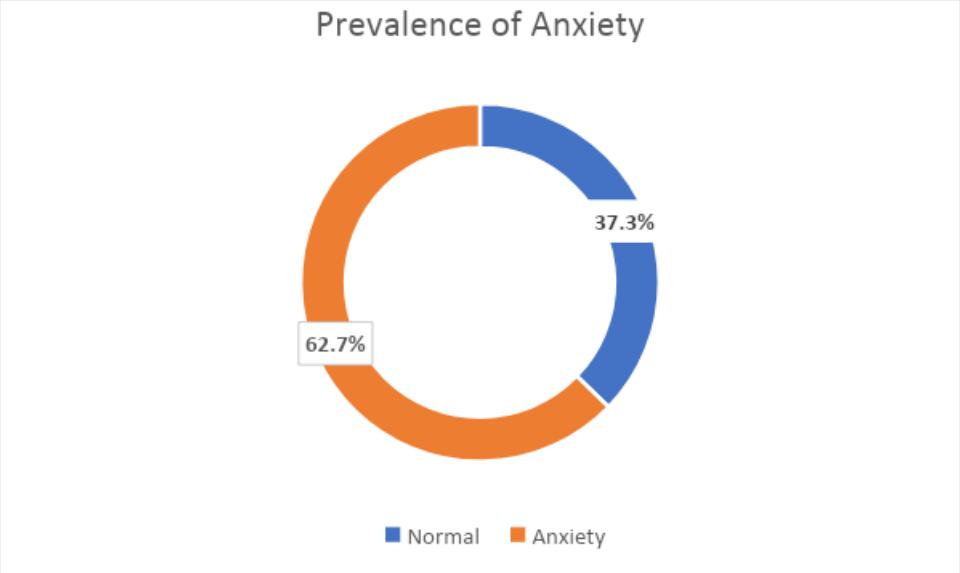

Figure 1 b. Prevalence of Anxiety

Table 02. Association of Sociodemographic variables and other risk factors with Depression

Variables		Depression								Chi-square	P-value
		Normal		Mild		Moderate		Severe			
		n	%	n	%	n	%	n	%		
Gender	Female	197	49.2	103	25.8	75	18.8	25	6.2	4.351	0.226
	Male	111	50.5	45	20.5	42	19.1	22	10		
Age	14 years	129	50.4	61	23.8	50	19.5	16	6.2	5.299	0.506
	15 years	138	51.7	63	23.6	43	16.1	23	8.6		
	16 years	41	42.3	24	24.7	24	24.7	8	8.2		
Level of Education	8th	48	47.1	23	22.5	23	22.5	8	7.8	6.454	0.374
	9th	124	52.3	59	24.9	43	18.1	11	4.6		
	10th	136	48.4	66	23.5	51	18.1	28	10		
Type of school	Government	45	42.1	31	29	23	21.5	8	7.5	7.353	0.289
	Aided	122	54.2	53	23.6	38	16.9	12	5.3		
	Unaided	141	49	64	22.2	56	19.4	27	9.4		
Type of family	Nuclear	256	52.4	110	22.5	86	17.6	37	7.6	7.191	0.066
	Joint	52	39.7	38	29	31	23.7	10	7.6		
Socioeconomic class	Less than lower middle	105	54.1	37	19.1	37	19.1	15	7.7	3.862	0.277
	More than lower middle	203	47.7	111	26.1	80	18.8	32	7.5		
Duration in the present school	Less than a year	62	50.4	30	24.4	23	18.7	8	6.5	8.750	0.188
	One to three years	126	46.5	77	28.4	51	18.8	17	6.3		
	More than three years	120	53.1	41	18.1	43	19	22	9.7		
Number of children at home	One	56	42.4	35	26.5	34	25.8	7	5.3	9.272	0.159
	Two	201	52.6	85	22.3	63	16.5	33	8.6		
	More than two	51	48.1	28	26.4	20	18.9	7	6.6		
Number of people at home	Less than four	219	52.1	92	21.9	78	18.6	31	7.4	3.832	0.280
	More than four	89	44.5	56	28	39	19.5	16	8		
Play hours outside the home	Less than one hour	176	54.7	66	20.5	56	17.4	24	7.5	**19.314**	**0.004**
	One to two hours	102	44.2	64	27.7	53	22.9	12	5.2		
	More than two hours	30	44.8	18	26.9	8	11.9	11	16.4		
Working people in the family	Single parent	158	54.3	65	22.3	44	15.1	24	8.2	7.305	0.063
	Both parents	150	44.6	83	25.2	73	22.2	23	7		

Hours of sleep	Less than eight	239	51.4	109	23.4	82	17.6	35	7.5	2.767	0.429
	More than eight	69	44.5	39	25.2	35	22.6	12	7.7		
Screentime for academic purpose	Less than four hours	226	47.4	124	26	92	19.3	35	7.3	6.461	0.091
	More than four hours	82	57.3	24	16.8	25	17.5	12	8.4		
Screentime for non-academic purpose	Less than four hours	287	49.4	141	24.3	108	18.6	45	7.7	1.477	0.687
	More than four hours	21	53.8	7	17.9	9	23.1	2	5.1		
Extracurricular activities before covid-19	Involved	169	51.1	73	22.1	63	19	26	7.9	1.334	0.721
	Not involved	139	48.1	75	26	54	18.7	21	7.3		
Extracurricular activities during covid-19	Involved	158	50.6	68	21.8	62	19.9	24	7.7	1.595	0.661
	Not involved	150	48.7	80	26	55	17.9	23	7.5		
Number of close friends	Less than five	150	50.5	73	24.6	58	19.5	16	5.4	6.084	0.414
	Five to ten	75	47.5	42	26.6	26	16.5	15	9.5		
	More than ten	83	50.3	33	20	33	20	16	9.7		

Table 03. Association of Sociodemographic variables and other risk factors with Anxiety

Variables		**Anxiety**								**Chi square**	**P value**
		Normal		**Mild**		**Moderate**		**Severe**			
		n	**%**	**n**	**%**	**n**	**%**	**n**	**%**		
Gender	Female	141	35.2	46	11.5	133	33.2	80	20	2.451	0.484
	Male	90	40.9	26	11.8	62	28.2	42	19.1		
Age	14 years	99	38.7	28	10.9	92	35.9	37	14.5	**12.871**	**0.045**
	15 years	102	38.2	31	11.6	69	25.8	65	24.3		
	16 years	30	30.9	13	13.4	34	35.1	20	20.6		
Level of Education	8^{th}	41	40.2	9	8.8	40	39.2	12	11.8	10.294	0.113
	9^{th}	90	38	33	13.9	70	29.5	44	18.6		
	10th	100	35.6	30	10.7	85	30.2	66	23.5		
Type of school	Government	25	23.4	14	13.1	42	39.3	26	24.3	12.216	0.057
	Aided	88	39.1	29	12.9	64	28.4	44	19.6		
	Unaided	118	41	29	10.1	89	30.9	52	18.1		
Type of family	Nuclear	192	39.3	53	10.8	148	30.3	96	19.6	4.731	0.193
	Joint	39	29.8	19	14.5	47	35.9	26	19.8		
Socioeconomic class	Less than lower middle	86	44.3	20	10.3	52	26.8	36	18.6	6.322	0.097
	More than lower middle	145	34	52	12.2	143	33.6	86	20.2		
Duration in present school	Less than a year	54	43.9	15	12.2	31	25.2	23	18.7	**25.195**	**0.001**
	One to three years	74	27.3	40	14.8	103	38	54	19.9		
	More than three years	103	45.6	17	7.5	61	27	45	19.9		
Number of children at home	One	44	33.3	17	12.9	49	37.1	22	16.7	5.087	0.533
	Two	150	39.3	45	11.8	112	29.3	75	19.6		
	More than two	37	34.9	10	9.4	34	32.1	25	23.6		
Number of people at home	Less than four	167	39.8	49	11.7	134	31.9	70	16.7	**8.277**	**0.041**
	More than four	64	32	23	11.5	61	30.5	52	26		
Play hours outside home	Less than one hour	132	41	34	10.6	92	28.6	64	19.9	12.136	0.059
	One to two hours	70	30.3	34	14.7	84	36.4	43	18.6		
	More than two hours	29	43.3	4	6	19	28.4	15	22.4		
Working people in family	Single parent	124	42.6	34	11.7	78	26.8	55	18.9	**8.155**	**0.043**
	Both parents	107	32.5	38	11.6	117	35.6	67	20.4		
	Less than eight	176	37.8	55	11.8	147	31.6	87	18.7	1.149	0.765

Hours of sleep	More than eight	55	35.5	17	11	48	31	35	22.6		
Screentime for academic purpose	Less than four hours	173	36.3	55	11.5	151	31.7	98	20.5	1.375	0.712
	More than four hours	58	40.6	17	11.9	44	30.8	24	16.8		
Screentime for non-academic purpose	Less than four hours	223	38.4	67	11.5	179	30.8	112	19.3	5.150	0.161
	More than four hours	8	20.5	5	12.8	16	41	10	25.6		
Extracurricular activities before covid-19	Involved	132	39.9	35	10.6	97	29.3	67	20.2	3.124	0.373
	Not involved	99	34.3	37	12.8	98	33.9	55	19		
Extracurricular activities during covid-19	Involved	125	40.1	33	10.6	95	30.4	59	18.9	2.296	0.513
	Not involved	106	34.4	39	12.7	100	32.5	63	20.5		
Number of close friends	Less than five	100	33.7	34	11.4	107	36	56	18.9	8.769	0.187
	Five to ten	59	37.3	20	12.7	49	31	30	19		
	More than ten	72	43.6	18	10.9	39	23.6	36	21.8		

Table 04. Multivariate analysis- Depression

Variables		Reference	P value	Odds ratio	95% C. I	
					Lower	Upper
Gender	Female	Male	0.16	1.34	0.88	2.02
Level of Education	9th standard	8th standard	0.59	0.86	0.50	1.48
	10th standard		0.59	1.15	0.67	1.95
Type of school	Government	Unaided	0.93	0.97	0.56	1.68
	Aided		0.06	0.64	0.40	1.02
Number of children at home	Two	One	0.15	1.50	0.85	2.60
	More than two		0.85	0.95	0.60	1.51
Type of family	Joint family	Nuclear	0.05	1.51	0.99	2.31
Socioeconomic status of family	More than lower middle	Less than lower middle	0.06	1.49	0.97	2.29
Play hours outside home	One to two hours	Less than one hour	0.02	1.49	1.04	2.13
	More than two hours		0.13	1.56	0.87	2.82
Hours of sleep	Less than eight	More than eight	0.25	0.79	0.53	1.17
Screentime for academic purpose	Less than four hours	More than four hours	0.03	1.56	1.04	2.35
Screentime for non-academic purpose	Less than four hours	More than four hours	0.70	1.14	0.58	2.24
Involved in extracurricular activities before covid-19	No	Yes	0.65	1.10	0.72	1.69
Involved in extracurricular activities during covid-19	No	Yes	0.91	0.97	0.63	1.49

Table 5. Multivariate analysis- Anxiety

Variables		Reference	P value	Odds ratio	95% C. I	
					Lower	Upper
Gender	Female	Male	0.23	1.29	0.84	1.98
Level of Education	9th standard	8th standard	0.88	1.04	0.60	1.79
	10th standard		0.46	1.22	0.71	2.09
Type of school	Government	Unaided	0.04	1.83	1.00	3.34
	Aided		0.46	0.84	0.52	1.34
Number of children at home	Two		0.20	1.46	0.81	2.65

	More than two	One	0.91	1.02	0.63	1.66
Type of family	Joint family	Nuclear	0.04	1.58	1.01	2.47
Socioeconomic status of family	More than lower middle	Less than lower middle	0.13	1.38	0.90	2.13
Play hours outside home	One to two hours	Less than one hour	0.01	1.57	1.08	2.30
	More than two hours		0.59	0.85	0.46	1.54
Hours of sleep	Less than eight	More than eight	0.41	0.84	0.56	1.26
Screentime for academic purpose	Less than four hours	More than four hours	0.85	1.03	0.68	1.57
Screentime for non-academic purpose	More than four hours	Less than four hours	0.01	0.37	0.16	0.84
Involved in extracurricular activities before covid-19	No	Yes	0.78	1.06	0.68	1.65
Involved in extracurricular activities during covid-19	No	Yes	0.52	1.15	0.74	1.79