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RESEARCH ARTICLE

"ASSESSMENT OF MAGNITUDE AND RISK CORRELATES OF DEPRESSION & ANXIETY SYMPTOMS AMONG SCHOOL GOING ADOLESCENTS IN MUMBAI SUBURBAN AREA, INDIA"

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Abstract

Introduction: In India, Depression & anxiety symptoms are considered Diseases of adulthood. Just like other non-communicable diseases, mental disorders are emerging as Hidden killers, it is important to screen these diseases since adolescence.

Objectives: to assess the magnitude of depression & anxiety symptoms and their risk factors.

Methods: A cross-sectional study was conducted among 175 adolescents enrolled in 8^{th} – 10^{th} standards in private school of Mumbai suburban area using the modified PHQ-9 & GAD-7; binary logistic regression was applied to find significant risk correlates.

Results: Mean age was 13.95±0.97years and 53.1 % were females. Depression was found in 24 % anxiety symptoms in 23% adolescents. On logistic regression, depression and anxiety symptoms was associated with female gender [OR: 3.072 & OR: 2.925] family members ≤ 5 [OR: 2.182 & OR: 1.502] and not willing to come to school [OR: 6.43 & OR: 5.42].

Conclusion: The level of depression & anxiety symptoms was higher among female gender, having family member ≤ 5 & those who were not willing to come to school. Less fights with parents, no failure in examinations, ability to cope up with academics, having normal sleep pattern, never faced teasing & bullying by fellow students had lower chances of having depression & anxiety symptoms.Anxiety and depression are major public health problems among adolescents. The high burden estimated in our study highlights the need for immediate action to support school going adolescents.

Introduction:-

"The mind is everything. What you think you become." – Buddha.

Just as physical fitness helps our bodies to stay strong, mental fitness helps us to achieve and sustain a state of good mental health.[1]We enjoy our life and environment and the people in it when we are mentally stable &healthy. Mental health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community.[2]Mental health is a one of the basic human

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rights &throughout our lives, multiple individual, social and structural determinants play vital role to protect or undermine our mental health. Unfavourable conditions which also includes social, economic, geopolitical, and environmental circumstances like poverty, violence, industrialization, inequality, and environmental deprivation increases people's risk of experiencing mental health conditions.[2]

In 2019, 1 in every 8 peopleor 970 million people around the world were living with a mental disorder, with anxiety and depressive disorders the most common,301 million people were living with an anxiety disorder including 58 million children and adolescents.[3]Excessive fear, worry and related behavioural disturbances may lead to anxiety disorders. These symptoms are severe enough to result in significant distress or impairment in functioning& 280 million people were living with depression, which includes 23 million children and adolescents.[3] Depression is not just usual mood fluctuations and emotional responses to challenges which we face in our day-to-day life.

Similarly in 2020, COVID-19 pandemic just hit our lives &the number of people living with anxiety and depressive disorders rose significantly, in just a year 26% and 28% increase respectively happened in anxiety and major depressive disorders.[3]Though effective prevention and treatment options are being made available by the government, most people with mental disorders do not have access to effective care or hesitate to avail the benefits due the stigma & discrimination which Indian society carries with it.According to WHO, the burden of mental health problems in India is 2443 disability-adjusted life years (DALYs) per 100 00 population; the age-adjusted suicide rate per 100 000 population is 21.1.[2]The economic loss due to mental health conditions between 2012-2030, is estimated at USD 1.03 trillion.[2] According to the latest survey by India's National Institute of Mental Health and Neurosciences (NIMHANS),150 million Indians need mental health care services, but fewer than 30 million are seeking care.[4]Globally, it is estimated that 1 in 7 (14%) 10–19-year-olds experience mental health conditions, yet these remain largely unrecognized and untreated.[5]The most crucial period in life can be considered to be Adolescencefor developing social and emotional habits important for mental well-being, adopting healthy sleep patterns, being physically active regularly, developing coping, problem-solving skills. Mental health is a major issue for adolescents, up to half of all mental health conditions start before the age of 14.[6] Poor mental health is the leading cause of disability in young people, and accounts for a large proportion of the global disease burden during adolescence&Suicide is the third leading cause of death in 15-19-year-olds & it has long-term impacts.[7]Adolescent depression not only affects emotional, social functioning but is a proven risk factor for school absenteeism, scholastic underachievement, substance abuse and suicidal behaviour.[8]

Mental health problems such as Anxiety &Depressionstart emerging in late childhood and early adolescence if get neglected can often continue into adulthood. 67% students are clueless about these common mental health problems, found in a survey. [9]So, in this study, an attempt was made to assess the magnitude of depression & anxiety symptoms and risk factors among school-going adolescents.

Material & Methods:-

Study design & setting:

A cross-sectional study was carried out among adolescents enrolled in 8^{th} – 10^{th} standard in private schoolofMumbaisuburban area.

Sample size & sampling design:

Considering the estimated frequency of mental disorder among adolescents globally, that is more than 13 per cent [10] , usingn $\geq \frac{Z^2 \times p \times q}{e^2}$

Here, n= numberofsamples;z= 1.96(95%confidencelevel);p= prevalenceestimate (0.13);q= (1-p);e = marginoferror (0.05),

175 considered as sample population in this study with the following:

Inclusion criteria

1. Students in the age group of 12–16 years.
2. Students who were studying in the same school for more than 6 months.

Exclusion criteria

1. Students screened with the same tool before.
2. Ill and non-assenting Students.
3. Whose responses had more than one missing values.
4. Students with any physical illness.

Study Questionnaire-

A predesigned and pretested structured questionnaire was used to collect data from the study participants by interview technique for the sociodemographic information and personalcharacteristics such as Age, Gender, class in which they are studying, Daily screen time, self-satisfaction& parent satisfaction with scholastic performance, and family characteristics like numbers of family members, numberof siblings, birth order of participant, frequent fights with family members (inter-personal conflicts)and occupation of parents. Questionnaire was assessed by independent experts after which the tool pre-tested on 20 students which were not involved in this study.Cronbach alpha was estimated to be 0.81 which suggested good internal consistency for the questionnaire. Suggested modifications were done before initiation of thedata collection.

Data collection-

After approval from Institute Ethics Committee (IEC), necessary consent from school authorities was obtained. Following Helsinki Declaration, the participants were given option to be a part of the study or not. The purpose of the study was individually explained, including the research questions. Assurance was given that their non-participation&refusal, orwithdrawal at any stage will not influence their scholastic environment and were ensured about the confidentiality of data. Thus,assent was obtained from the individual participant prior to the study and data was collected during 4 days of School Health Camp in November 2022. Depression among study participants was measured using the modified Patient Health Questionnaire-9 (PHQ-9) and anxiety symptoms using Generalised anxiety disorder assessment (GAD-7).

Measures:-

Independent variables-

Sociodemographic&Personal factors such as Age, gender, grade, address & Birth order.

Family factors such as socioeconomic status, total number of family members,frequent fights with parents, room sharing with family members, recent loss of family member.

School factors:

Classmate relations and teacher–classmate relations were also assessed based on the student's self-rating about their relationships with classmates and teachers. Academic performance was captured by a single item. (Responses were coded as 'Yes' 'No').

Main outcome measures –

PHQ-9: [11]- It is a nine-item screening tool and is calculated by assigning scores of 0, 1, 2, and 3 to the responses of 'not at all', 'several days', 'more than half the days', and 'nearly every day' respectively, and ranges from 0 to 27. Students with Zero score were ruled out from the study. The student who had a PHQ-9 total score of more than 4 were classified as mentally depressed; among these, those having scored 5–9 was labelled as having mild, 10–14 as moderate, 15–19 as moderately severe, and 20–27 as severe mental depression.The PHQ-9 has been used with adolescents in India and showed acceptable internal consistency (Cronbach's $\alpha = 0{\cdot}83$). It is not only a screening tool but also can be used to estimate severity**.** In this study, an elevated score was defined as a total score of 10 or higher. This scale has been validated for use in adolescents.

GAD-7: [12]- This is seven items screening tool for anxiety. The whole scale scoreranges from 0 to 21 and cut-off scores for mild, moderate, and severe anxiety symptoms are 5, 10 and 15 respectively. Sensitivity as well as specificity exceedat the cut-off score of 10.In this study, anxiety symptoms were considered positive over total score of 10 or higher.

Statistical analysis

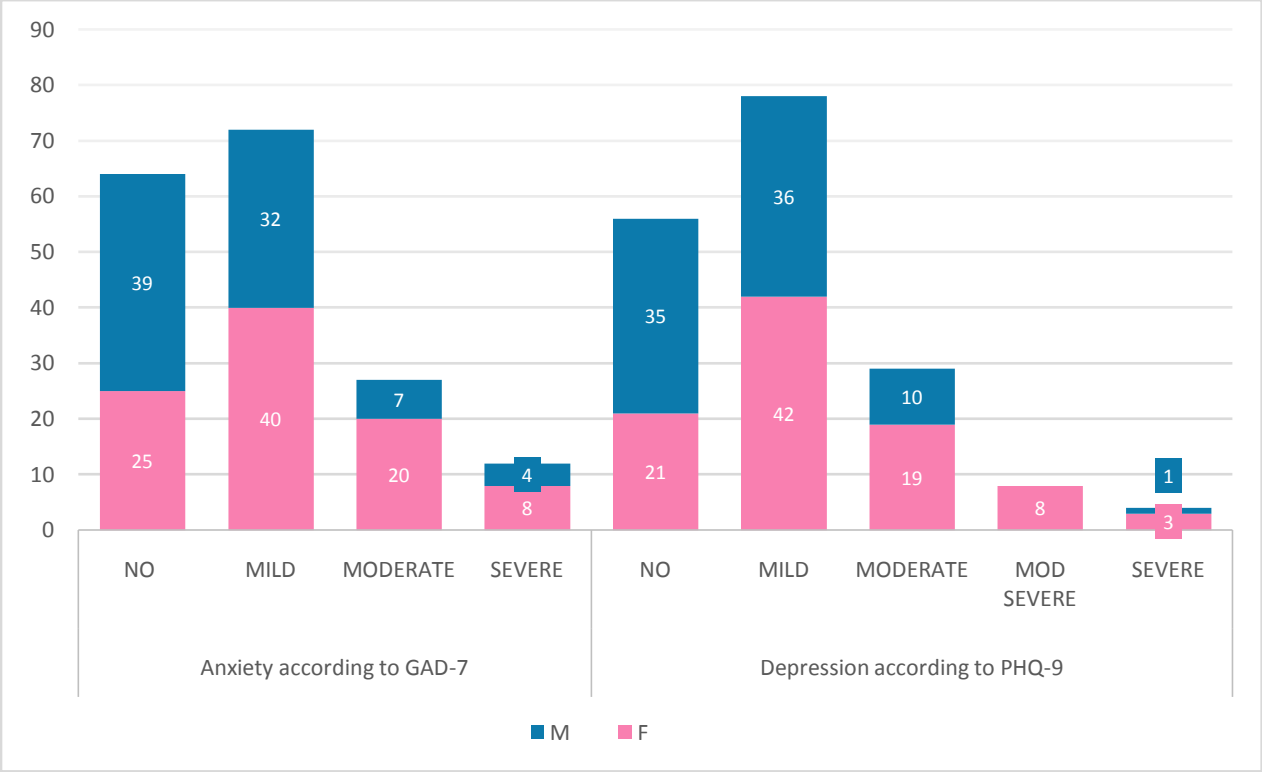
Data was analysed using Microsoft Excel 2010 for data entry, editing, and sorting. Finally, an excel file including all variables was imported into SPSS softwareversion 25. Descriptive statistics (e.g., frequencies, percentages, means,

standard deviation, etc.) and Fisher exact test and chi-square test used for univariate data analysis. Logistic regression was performed, yielding odds ratios and their 95% confidence intervals, to examine associations between dependent and independent variables. The association of variables was considered statistically significant on p-value less than 0.05.

Result:-

In our study, we included 175 study participants of 190 eligible adolescents following the assenting process and complete filling of questionnaire. After excluding refused assent and with incomplete responses, the response rate was 92.1%. Study participants age ranged from 12 to 16 years; mean age being 13.95 years (standard deviation: 0.97). In total study participants 53.1% were females. 67.5% participants were from Upper Middle socioeconomic class as per the latest Modified Kuppuswamy Scale.[13] 60% participants were from Nuclear & rest from extended joint family. 21.7% participants were having working mother & 99.4% were having working father.

Figure 1:- Distribution & Severity of depression & Anxiety symptoms among school going adolescent girls and boys. (n =175).

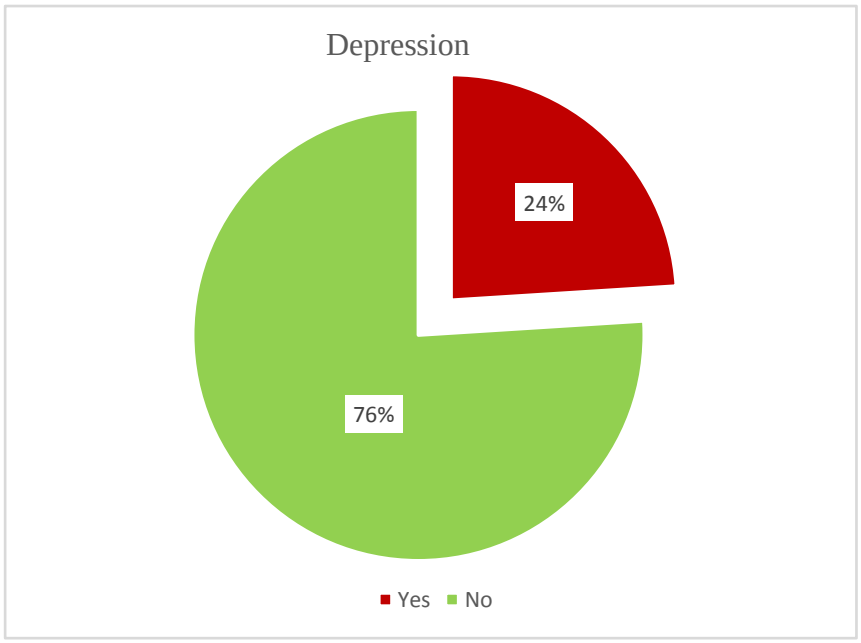


We found the total prevalence of depression among school going adolescents was 24%.[

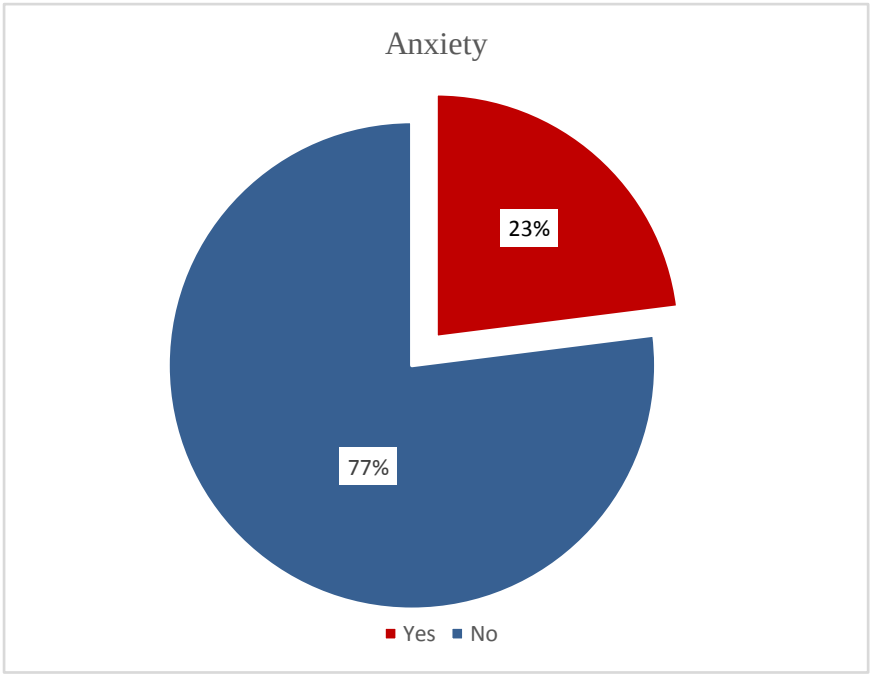
Figure 3:- Prevalence (%) of Depression& Anxiety Symptoms among school going adolescent.
PHQ-9 score ≥10 was considered positive.
]According to PHQ-9 classification, out of 175 study participants, 44.6 percent had mild depression, 16.6 percent had moderate depression, 4.6 percent had moderately severe depression and 2.2 percent had severe depression.[

Figure 1] Similarly we found the total prevalence of anxiety symptoms among school going adolescents was 23%. [Figure 3]According to GAD-7 classification, out of 175 study participants, 41.1 percent had mild anxiety symptoms, 15.4 percent had moderate anxiety symptoms, and 6.9 percent had severe anxiety symptoms. The level of depression among the participants' having anxiety was 70.7 %, as compared to 29.3% among without the anxiety. This difference was found to be statistically significant (P < 0.001).

Figure 3:- Prevalence (%) of Depression& Anxiety Symptoms among school going adolescent.
PHQ-9 score ≥10 was considered positive.



GAD-7 score ≥10 was considered positive.



On univariate analysis, level of depression & anxiety symptoms was higher among females, who got frequent scolding from parents & disturbed sleep pattern and the differences were found to be statistically significant, having family members ≤ 5 was statistically significant with level of depression. Frequent fights with parents, willingness to come to school, failure in examination, inability to cope up with academics and teasing/bullying by fellow students were found to be statistically significant with level of depression & anxiety symptoms.[

Table 1] Birth order of study participants, occupation of parents, addiction in parents, room sharing with family members, loss of family member in recent times, level of education, having romantic relationship, rejection in romantic relationship were not statistically associated with the depression or anxiety symptoms of study participants on univariate analysis.

Table 1:- Distribution of variablesand association with depression and anxiety among school going adolescent. (n=175).

Variables		**Total n=175**	**Depression**		**p value**	**Anxiety**		**p value**
			Yes (PHQ-9 score ≥ 10)	**No**		**Yes (GAD-7 score≥ 10)**	**No**	
		n (%)	**n (%)**	**n (%)**		**n (%)**	**n (%)**	
Age of the participant	**<14**	60 (34.3)	13(31.7)	47 (35.1)	0.851	16 (40)	44 (32.6)	0.24
	≥14	115(65.7)	28(68.3)	87 (64.9)		24 (60)	91 (67.4)	
Gender	**Female**	93(53.1)	30 (73.2)	63 (47)	**0.004**	29 (72.5)	64 (47.4)	**0.004**
	Male	82(46.9)	11 (26.8)	71 (53)		11 (27.5)	71 (52.6)	
Total number of family members	**≤5**	115(65.7)	32 (78)	83 (61.9)	**0.041**	29 (72.5)	86 (63.7)	0.2
	>5	60(34.3)	9 (22)	51 (38.1)		11 (27.5)	49 (36.3)	
Studying in class	**8th**	59(33.7)	12 (29.3)	47 (35.1)	0.119	15 (37.5)	44 (32.6)	0.827
	9th	58(33.1)	10 (24.4)	48 (35.8)		12 (30)	46 (34.1)	
	10th	58(33.1)	19 (46.3)	39 (29.1)		13 (32.5)	45 (33.3)	
Frequent fights with parents	**Yes**	25(14.3)	16 (39)	9 (6.7)	**<0.001**	14 (35)	11 (8.1)	**<0.001**
	No	150(85.7)	25 (61)	125 (93.3)		26 (65)	124 (91.1)	
Likes to come to school	**Yes**	151(86)	27 (65.9)	124 (92.5)	**<0.001**	27 (67.3)	124 (91.9)	**<0.001**
	No	24(13.7)	14 (34.1)	10 (7.5)		13 (32.5)	11 (8.1)	
Self-satisfaction with academic performance	**Yes**	72(41.1)	13 (31.7)	59 (44)	0.11	11 (27.5)	61 (42.5)	0.03
	No	103(58.9)	28 (68.3)	75 (56)		29 (72.5)	74 (57.5)	
Failed in Examination	**Yes**	40(22.9)	14 (34.1)	26 (19.4)	**0.04**	13 (32.5)	27 (20)	**0.07**
	No	135(77.1)	27 (65.9)	108 (80.6)		27 (67.5)	108 (80)	
Inability to cope up with academics	**Yes**	39(22.3)	19 (46.3)	20 (14.9)	**<0.001**	18 (45)	21 (15.6)	**<0.001**
	No	136(77.7)	22 (53.7)	114 (85.1)		22 (55)	114 (84.4)	
Disturbed sleep pattern recently	**Yes**	49(28)	27 (65.9)	22 (16.4)	**<0.001**	24 (60)	25 (18.5)	**<0.001**
	No	126(72)	14 (34.1)	112 (83.6)		16 (40)	110 (81.5)	
Teasing & bullying by fellow students	**Yes**	25(14.3)	15 (36.6)	10 (7.5)	**<0.001**	13 (32.5)	12 (8.9)	**<0.001**
	No	150(85.7)	26 (63.4)	124 (92.5)		27 (67.5)	123 (91.1)	
Frequent	**Yes**	114(65.1)	32 (78)	82 (61.2)	**0.03**	31 (77.5)	83 (61.5)	**0.04**

scolding from parents	**No**	61(34.9)	9 (22)	52 (38.8)		9 (22.5)	52 (38.5)	
Rejection in romantic relationship	**Yes**	20(11.4)	8 (19.5)	12 (9)	0.062	9 (22.5)	11 (8.1)	**0.017**
	No	155(88.6)	33 (80.5)	122 (91)		31 (77.5)	124 (91.9)	

***Correlation of quantitative variables with GAD-7 and PHQ-9A for adolescents.*

**Fisher exact test used for all cells except for cells with any value less than 5 in which case chi square test with Yates correction used.*

Table 2 depicts binary logistic regression of variables having p value < 0.05 and their relationship with depression & anxiety symptoms among study participants. Females tend to have 3 times more chance of having depression and anxiety symptoms as compared to males. Participants with family members ≤5 had twice the higher chances of having depression & 1.5 times more chances of having anxiety symptoms as compared to having family members >5. Participants not willing to come to school had 6 times more chances of having depression & 5 times more chances of having anxiety symptoms as compared to those who are willing to come to school. Those with less fights with parents, never failed in examinations, had ability to cope up with academics, normal sleep pattern, never faced teasing & bullying by fellow students had lower chances of having depression &anxiety symptoms.

Table 2:- Binary logistic Regression analyses of factors associated with depression and anxiety among school going adolescent.

Variables		**Depression**			**Anxiety**		
		OR	**CI (95%)**	**p value**	**OR**	**CI (95%)**	**p value**
Gender	**Female**	3.074	1.42-6.63	0.004	2.925	1.35-6.32	0.004
	Male	1			1		
Total number of family members	**≤5**	2.185	0.96-4.96	0.042	1.502	0.69-3.269	0.02
	>5	1			1		
Frequent fights with parents	**Yes**	1	0.04-0.28	<0.001	1	0.07-0.403	<0.001
	No	0.113			0.165		
Likes to come to school	**Yes**	1	2.5-16.00	<0.001	1	2.19-13.41	<0.001
	No	6.43			5.42		
Failed in Examination	**Yes**	1	0.21-1.00	0.04	1	0.24-1.138	0.07
	No	0.464			0.519		
Inability to cope up with academics	**Yes**	1	0.09-0.44	<0.001	1	0.103-0.49	<0.001
	No	0.203			0.225		
Disturbed sleep pattern recently	**Yes**	1	0.05-0.22	<0.001	1	0070-0.32	<0.001
	No	0.102			0.152		
Teasing & bullying by fellow students	**Yes**	1	0.06-0.34	<0.001	1	0.08-0.493	<0.001
	No	0.14			0.203		
Frequent scolding from parents	**Yes**	1	0.19-1.00	0.03	1	0.20-1.051	0.04
	No	0.444			0.463		
Rejection in romantic relationship	**Yes**	1	0.40-0.67	0.062	1	0.11-0.802	0.017
	No	0.406			0.306		

Binary logistic regression was done for variables that had a p-value of less than 0.05 on univariate analysis.
OR: Odds ratio, CI: Confidence interval

Discussion:-

Mental health is one of the vital parameters for healthy, and productive life in this industrialisedworldwhich is leading us to complex social, cultural, and economic environments with challenges resulting from changing family environments, employment instability and unemployment in households, and in some countries forced displacement& recently due to post pandemic effect. Failing to address adolescent mental health conditions extend to adulthood, impairing both physical and mental health of an individual.Therefore, the current study estimated the prevalence of depression and anxiety symptoms as well as potential associated factors in school going adolescents.

Prevalence of depression & anxiety symptoms-

In the present study prevalence of depression & anxiety symptoms was 24% & 23% respectively. a study conducted by Raja D et al in urban Indian school using PHQ-9 prevalence of clinical depression among school-going children of age group 12–16 years was 8.4%.[14]6.66% of students were screened positive for depression by using KAD scale among adolescents of Maharashtra 2015 in a study conducted by Shelke U et al.[15] A review of Indian studies conducted by Grover et al (2019) suggested the point prevalence of depression/affective disorders ranges from 1.2% to 21% in the clinic-based studies; 3%-68% in school-based studies and 0.1%-6.94% in community studies. There has been only one incidence study from India which estimated the incidence to be 1.6%.[16]In a study conducted by Jeelani A et al (2022) in a Kashmir valley during COVID-19 pandemic, the overall prevalence of depression was 16% and Anxiety was present in 20% of adolescents.[17] Prevalence of depression among adolescents was 20.6% in a study conducted by Mohta A. et al.[18]Prevalence of depression among adolescents in India ranges from 0.5% to as high as 20% in some studies. A study conducted in school students in Mumbai by Karande S. et al 2018, Symptoms of overall anxiety were present in 10.8% (53/493) of the students.[19]

Factors associated to depression & anxiety symptoms-

In present study on logistic regression, females were having 3 times more chances of having depression & 2 times more chances of having anxiety symptoms than males, similar finding were found in the study conducted by Jeelani A et al (2022), Nag K.et al &Bhasin Sk.et al.[17, 20, 21]. Also, there was a significant association between not willing to come to school and family members ≤5 with depression & anxiety symptoms which was not similar with the other studies. Depression and anxiety always remained a significant health problem particularly in adolescence, but an increased prevalence of depression & anxiety posed by this pandemic means that the problem may get graver in coming years. Health systems need to be proactive and scaleup the availability of mental health services particularly in low- and middle-income countries.

Limitations of the Study

The study was cross-sectional in nature, difference in stress during pre-exam, exam and post-exam period were not considered. Carrying out a longitudinal study would overcome this limitation. Recall bias may occur due to use of self-reported questionnaire.For the generalisation of results similar studies should be conducted on large sample from different schools from different areas in Maharashtra.

Conclusion:-

Every one in six individuals in world is an adolescent and large portion of it is suffering from mental illnesses, which may affect their later life& that will create a burden on an earning population of the world. Though adolescent mental health is a very important issue ofour country, it has not yet received any significant attention which requires a limelight. This is a public health issue of great concern andlarge-scale research should be carried out to formulate national-level policies to combat adolescent health issues.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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