

A Study of Risk of Depression in Adolescent School Going Children

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Abstract

Background: Depression is a significant global health concern with increasing prevalence among adolescents. Depression negatively impacts academic performance, attendance, and engagement in school activities. Investigating the link between depression and academic outcomes among school-going adolescents can provide insights into the educational implications and potential long-term consequences of depressive symptoms. Understanding the risk of depression is essential for identifying gaps in mental health service accessibility and availability for adolescents. This can inform strategies to improve access to appropriate mental health care and reduce the treatment gap. Diverse cultural and social norms can influence the experience, expression, and management of depressive symptoms among adolescents. Examining how familial and societal factors contribute to the risk of depression in this age group is important for tailoring interventions. Depression often coexists with other health conditions, and untreated depression during adolescence can have long-term consequences, including increased risk of substance abuse, self-harm, and chronic mental health issues. Hence, understanding the risk of depression is crucial for comprehensive healthcare planning.

Objectives: To study the proportion of risk of depression, the severity of risk of depression and the various socioeconomic factors with relevance to risk of depression in adolescent school going children. **Method:** Cross-sectional Descriptive study. Adolescent students studying in Standards 8th to 10th of a Secondary School in Sangli Miraj Kupwad Corporation. A Secondary School was selected by Simple Random Sampling from a list of schools in the corporation. Written consent from the school Principal was obtained. Informed assent from children and consent from parents/guardians was also obtained, ensuring confidentiality of responses. Data was collected using a proforma, including epidemiological, medical, family, personal, scholastic, and socioeconomic history, along with physical and anthropometric examinations. A self-administered questionnaire based on the Patient Health Questionnaire for adolescent population (PHQ-9A) was provided to assess the severity of risk of depression.

Results: Out of 193 students, 174 students were included in the study. Out of the 174 assessed, 57 (32.75%) students were found to be at risk of depression. Students in the age group of **13.06 to 15 years** were at higher risk of depression (**p value=0.02**). 91 male students and 83 female students were studied, 35 (42.16%) of females were found to be at risk of depression (**p value=0.05**) and **females** were found to be at **2.287 times more risk of depression** than males (**p=0.0181**). 40 (22.98%) students had mild risk of depression while 4 (2.29%) had severe risk of depression. Loss of appetite (22.98%) (**p value=0.012**), Binge eating (18.39%) (**p value=0.033**) and excessive lethargy (37.93%) (**p value<0.001**) were some of the most common symptoms associated with risk of depression. Psychiatric disorders in family (9.19%) (**p value=0.024**), addiction in family (20.11%) (**p value=0.001**) and separation of parents (6.32%) (**p value<0.001**) had a significant association with risk of depression. Bullying in

school (16.67%) (**p value=0.001**) and recent fall in scholastic performance (21.26%) ($p=0.008$) are seen in adolescents with risk of depression. **Conclusion:** Several factors such as loss of appetite, binge eating, excessive lethargy, psychiatric disorders in family, addiction in family, separation of parents, bullying in school and recent fall in scholastic performance showed statistical significance (p -values <0.05), suggesting a significant association with the risk of depression. Females were found to be at more risk of depression than males. **Key words:** Depression, adolescent, females, risk, PHQ-9A.

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Introduction

Depression in adolescent school-going children is a serious mental health concern that can have long-term consequences on their mental health and academic performance. Adolescence is a critical period in human development, marked by significant physical, social, and emotional changes ^[1]. These changes can be stressful and overwhelming and may contribute to the development of depression in school-going children.

Depression is a complex and multifaceted mental health disorder that can manifest in different ways depending on the individual. In adolescent school-going children, depression may present as persistent sadness, irritability, loss of interest in activities, changes in appetite and sleep patterns, fatigue, and difficulty in concentrating ^[2,3]. These symptoms can be difficult to recognize, as they may be mistaken for normal teenage moodiness or hormonal changes. Adolescent school-going children are particularly vulnerable to depression due to the many challenges they face during this period of their lives. These challenges include academic pressure, peer pressure, social and cultural expectations, family conflicts, and hormonal changes ^[4]. Additionally, adolescents may lack the emotional maturity and coping skills to handle these challenges effectively, which can contribute to the development of depression.

According to the World Health Organization (WHO), depression is the leading cause of disability worldwide among adolescents aged 10 to 19 years ^[5]. Depression can negatively affect academic performance, including attendance, concentration, and motivation. This can result in poor grades, lower graduation rates, and limited opportunities for higher education. Depression in adolescence has been associated with a range of long-term consequences, including a higher risk of developing chronic mental health conditions, substance abuse, and suicidal ideation and attempts ^[6,7]. Also, there is often a stigma associated with mental health issues, which can lead to a lack of understanding and support from peers, teachers, and parents. This can make it difficult for adolescents to seek help or access treatment.

There are many risk factors that can increase the likelihood of depression in adolescent school-going children. These include a family history of depression or other mental health disorders, chronic stress or trauma, substance abuse, bullying, and social isolation ^[8]. Identifying these risk

factors early can help to prevent or mitigate the development of depression in school-going children. Understanding the risk factors and early signs of depression in school-going adolescents is essential for effective prevention and early intervention. This can help reduce the long-term impact of depression and improve overall mental health outcomes ^[9,10].

Effective treatment for depression in adolescent school-going children typically involves a combination of psychotherapy and medication. Cognitive-behavioural therapy (CBT) is a commonly used psychotherapy approach that helps individuals identify and challenge negative thought patterns and behaviours. Medications such as selective serotonin reuptake inhibitors (SSRIs) can also be effective in reducing symptoms of depression in school-going children ^[11].

Overall, studying risk of depression in school-going adolescent children is important for understanding its impact on academic and social development, identifying risk factors and early signs, and developing effective prevention and intervention strategies.

Need of the study: Despite the high prevalence and serious consequences of depression in adolescent school-going children, there is still much to be learned about the causes, risk factors, and effective treatments for this condition. This research paper aims to focus on identifying risk of depression in adolescent population. The findings of this paper help early intervention and thereby improve the health outcomes of school going adolescent children.

Methods

Study design and setting

A cross-sectional descriptive study was carried out among adolescent children studying in standards 8th-10th in a secondary school in Sangli Miraj Kupwad Corporation.

Study Objectives

To study the proportion of risk of depression, the severity of risk of depression and the various socioeconomic factors with relevance to risk of depression in adolescent school going children.

Study Population

Adolescent students studying in Standards 8th to 10th of a Secondary School in Sangli Miraj Kupwad Corporation.

Adolescent age group is defined as age group of 10 to 19 years. However, in the Indian context and considering the sensibilities of the Indian population, it was decided to include the students from standards 8th, 9th, and 10th.

Inclusion criteria

Adolescent students studying in Standards 8th to 10th of a Secondary School in Sangli Miraj Kupwad Corporation.

Exclusion criteria

Adolescent students not assenting to filling the questionnaire, parents not consenting to the study, incomplete Questionnaires and children with chronic systemic diseases or neurological disorders were excluded from the study.

Sample size

A sample size of 165 students was estimated considering 40.8% prevalence as reported by Jaysree K *et al.* [6] in adolescents with 99% confidence interval, and absolute precision level of 0.1. A total of 174 students were assessed thus fulfilling the sample size criteria.

Sampling Technique

Cluster Random Sampling was used. List of all schools in Sangli Miraj Kupwad area was availed from Corporation. One school was randomly selected by simple random sampling. The administrative authorities of the school were approached for permission to conduct the study, and once the permission was granted, the school was selected for the study. However, if the permission were to be rejected, another school would have been selected randomly.

Detailed Research Plan

This Cross sectional study was conducted in a Secondary School in Sangli Miraj Kupwad Corporation. Children studying in 8th to 10th standards were enrolled in this study. Written Consent was obtained from the Principal of the selected school to conduct this study prior to starting the study. Informed assent was taken from the children before conducting the study after explaining them the purpose of study and that their individual responses will be kept confidential. Also, informed consent was taken from the parents or guardians of every enrolled adolescent student. Study data was collected by taking detailed history of every student including their epidemiological characteristics, symptoms like eating disorders, weight loss or gain, sleep disorders and past history, birth history, detailed family history of chronic illnesses,

psychiatric disorders, recent loss of a family member, addiction, family fights, etc. personal and scholastic history and socioeconomic history to look for any factors contributing to increasing risk of depression. This was followed by Anthropometric and physical examination to look for any clinical markers of risk of depression and were noted in the proforma. Anthropometric data was documented and classified appropriately using IAP growth charts for the given age group. Once, the above was duly completed, every enrolled adolescent student was provided a self-administered questionnaire based on the Patient Health Questionnaire for adolescent populations. The questionnaire was distributed amongst the children who have assented to the study. Confidentiality and anonymity was ensured. The following scoring system was used to assess the severity of risk of depression.

Scoring based on the Patient Health Questionnaire: Modified for Teens (PHQ-9A)

To use the PHQ-9 to obtain a total score and assess depressive severity:

- Add up the numbers endorsed for questions 1-9 and obtain a total score.
- See Table below:

Total Score	Risk of Depression Severity
0-4	No or minimal risk of depression
5-9	Mild risk of depression
10-14	Moderate risk of depression
15-19	Moderately severe risk of depression
20-27	Severe risk of depression

For purposes of this study, a score of more than 4 was considered to be positive for risk of depression.

Data collected from the aforementioned self-administered questionnaire was entered into Microsoft Excel and was used to compute the risk of depression in the study population. Data was analyzed and appropriate statistical methods were applied.

The list of the children who were found to be at the risk of depression was given to the head of the institution and those children were counselled with their parents with the help of an adolescent child specialist. Further intervention was suggested wherever needed.

Ethical Consideration

The study protocol was reviewed and approved by the institutional review and ethics committee (IEC/533/23). Written consent was obtained from the principal of the selected school in an urban area of Sangli Miraj Kupwad Corporation. Parents were given a brief description of the study and signed consent of the parents was obtained one day prior to the study. In each standard being studied, informed assent was obtained from each adolescent student participating in the study and informed consents were obtained from their parents or guardians. Responses of the study were kept confidential.

Results

Table No. 1: Table showing Frequency of risk of Depression

	Total no. of students assessed	Students having risk of depression
Number of students	174	57
Percentage of students	100	32.75

Table No. 2: Table showing Frequency of risk of Depression according to age

Age (Years)	Total No. of students assessed	Students having risk of depression (%)	P value
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12-13.06 years	46	20 (43.47)	0.02
13.06-15 years	89	30 (33.7)	
15-16.06 years	39	7 (17.94)	

Table No. 3A: Table showing Frequency of risk of depression according to gender

Gender	No. of students assessed	Students having risk of depression (%)	P value
Male	91	22 (24.18)	0.05
Female	83	35 (42.16)	

Table 3B: Univariate analysis of the gender and risk of depression

Gender	Total	Risk				Unadjusted OR (95% CI)
		Present		Absent		
		N= 57	%	N= 117	%	
Females	83	35	42.17	48	57.83	2.287 (1.196- 4.373)
Males	91	22	24.18	69	75.82	Reference

It was found that females were at risk of depression 2.287 times more than males ($p= 0.0181$).

Table No. 4: Table showing Severity of risk of depression in adolescent children

Risk of Depression Severity	Total No.	Percentage of students
Minimal/No risk of depression	117	67.25
Mild risk of depression	40	22.98
Moderate risk of depression	11	6.33
Moderately Severe risk of depression	2	1.15
Severe risk of depression	4	2.29

Table No. 5: Table showing Severity of Risk of Depression according to Gender

Risk of Depression Severity	Male	Female
Minimal / No risk of depression	69	48
Mild risk of depression	18	22
Moderate risk of depression	3	8
Moderately Severe risk of depression	0	2
Severe risk of Depression	1	3

Table No. 6: Table showing Severity of risk of Depression according to age group

Risk of Depression Severity	12-13.06 years	13.06-15 years	15-16.06 years
Minimal/No risk of depression	26	59	32
Mild risk of depression	14	24	2
Moderate risk of depression	4	5	2
Moderately Severe risk of depression	1	0	1
Severe risk of Depression	1	1	2

Table no 7: Table showing symptomatology in children with risk of depression

Symptoms	No. of Students (%)	P value
Loss of appetite	40 (22.98)	0.012
Excessive/ Binge eating	32 (18.39)	0.033
Recent loss of weight	17 (9.77)	0.068
Recent gain in weight	24 (13.79)	0.259
Excessive sleepiness	66 (37.93)	0.05
Sleeplessness/ Insomnia	18 (10.34)	0.07
Excessive lethargy	66 (37.93)	<0.001
Loss of interest in previously pleasurable activity	47 (27.01)	0.02

Table no 8: Table showing past history in children with risk of depression

Past History	No. of students (%)	P value
Previous history of hospitalization	73 (41.95)	0.155
Previous history of any diagnosed psychiatric disorder	1 (0.57)	0.974
Previous history of any major surgery	23 (13.21)	0.425
Previous history of experiencing any traumatic event	28 (16.09)	0.788

Table no 9: Table showing family history in children with risk of depression

Familial factors	No. of students (%)	P value
Chronic physical illness in family	104 (59.77)	0.45
Psychiatric disorder in family	16 (9.19)	0.024
Recent death of a family member/parent	60 (34.49)	0.924
Addiction in family member	35 (20.11)	0.001
Frequent fights in family	28 (16.09)	0.018
Separation of parents	11 (6.32)	<0.001

Table no.10: Table showing Personal history in children with risk of depression

Personal history	No. of students (%)	P value
Change in menstrual cycle	16 (9.19)	0.009
Recent fall in scholastic performance	37 (21.26)	0.008
Bullying in school	29 (16.67)	0.001
Addiction	0	-
Frequent Punishment at home/school	14 (8.04)	0.22
Participation in extra-curricular activities/ sports	149 (85.63)	0.067

Table no.11: Table showing birth order in children with risk of depression

Birth order	No. of students (%)	Students with depression (%)	P value
First	98 (56.32)	34 (34.69)	0.068
Second	65 (37.35)	20 (30.7)	
Third or above	11 (6.33)	3 (27.27)	

Table no 12: Table showing family type in children with risk of depression

Family type	No of students (%)	Students with depression (%)	P value
Joint	62 (35.63)	15 (24.19)	0.428
Nuclear	112 (64.37)	42 (37.5)	

Table no 13: Table showing Socioeconomic Classification in children with risk of depression**(According to Kuppuswamy Classification 2023)**

SEC	No of students (%)	Students with depression (%)	P value
I	35 (20.11)	7 (20)	0.197
II	104 (59.77)	34 (32.69)	
III	33 (18.97)	16 (48.48)	
IV	1 (1.15)	0 (0)	

Table no 14: Table showing BMI in children with risk of depression

BMI	No. of students (%)	Students with depression (%)	P value
Normal	117 (67.24)	39 (33.33)	0.016
Overweight	32 (18.39)	11 (34.37)	
Obesity	20 (11.49)	5 (25)	
Underweight	5 (2.87)	2 (40)	

Table no 15: Table showing Clinical signs in children with risk of depression

Clinical signs	No. of students (%)	Students with risk of depression (%)	P value
None	113 (64.94)	30 (26.54)	0.168
Pallor	38 (21.83)	17 (44.73)	
White lines on nails	8 (4.59)	5 (62.5)	
Knuckle pigmentation	14 (8.04)	5 (35.71)	
Hypo pigmented patch around mouth	1 (0.85)	0 (0)	

-193 students were studying from standards 8th to 10th in the selected school. Out of the 193 students, 174 were assessed in our study. 57 students amongst the 174 students had a risk of depression which 32.75% of the study participants as seen in Table 1.

-Students assessed were in the age group between 12 years to 16 and half years, out of them, students between 13 and half years to 15 years were at the most risk of depression (p value 0.02) as seen in Table 2.

-While majority of students assessed were males with 91 out of 174 students, females seem to be more prone to risk of depression (p value =0.05) as per Table 3A. It was found that females were at risk of depression 2.287 times more than males (p= 0.0181) as seen in Table 3B. It was also observed that females had more severe forms of risk of depression compared to males as per Table 5.

- 40 (22.98%) of students have loss of appetite (p value 0.012), 32 (18.39%) of students have complaints of excessive or binge eating (p value 0.033), 66 (37.93%) of students have excessive sleepiness (p value 0.05), 66 (37.93%) of students have excessive lethargy (p value <0.001), 47 (27.01%) of students have loss of interest in previously pleasurable activities (p value 0.02) making these the most common possible symptoms causing a risk of depression as per Table 7.

-Family factors like history of psychiatric disorders in family (p value 0.024), addiction in family members (p value 0.001), frequent fights amongst family members (p value 0.018) and separation of parents (p value <0.001) have significant influence on causing risk of depression amongst school going adolescent children as per Table 9.

-Change in menstrual cycle (p value 0.009), recent fall in scholastic performance (p value 0.008) and bullying (p value 0.001) are the most significant personal factors influencing the risk of depression as seen in Table 10.

-Birth order, type of family and socioeconomic class do not seem to have any significant association with the risk of depression in the study as seen in Tables 11, 12 and 13.

-Change in BMI seem to have a significant association with risk of depression (p value 0.016). Extremes of BMI i.e., Underweight and Obese are more prone to have a risk of depression as seen in Table 14.

-Pallor is the most common clinical sign seen amongst the adolescent children assessed with 38 (21.83%) of students having it. However, none of the clinical signs seem to have a significant association with the risk of depression (p value 0.168) as per Table 15.

Discussion

Navigating the complex landscape of adolescence is a challenging journey, especially within the school environment where young minds encounter various stressors. Among the most pressing concerns is the prevalence of depression among school-going adolescents. This mental health issue significantly impacts their academic performance, social interactions, and overall well-being. Academic pressures, social dynamics, and personal changes converge, often leading to the onset of depression. Understanding the nuances and dynamics of this issue is crucial in implementing effective support systems within educational settings to nurture mental health and well-being in our young individuals.

Some meta-analysis like the one done by Kamath *et al.* [8] in 2021 finds the range of point prevalence in most school based studies on risk of depression to be between 3% to 68% with most individual studies reporting prevalence of >40% [4]. In our study, 57 students out of 174 have risk of depression which amounts to 32.75% of the study population. It is slightly lower than Chauhan *et al.* [12] with a point prevalence of 38% which was also done using the PHQ-9A questionnaire. A similar study using PHQ-9A questionnaire by Kaur *et al.* [13] had a lower prevalence of 16.5%.

Our study found that the age group of 13 and half to 15 years are more prone to risk of depression (p value= 0.02). However, studies like Bharati *et al.* [9], Kumar *et al.* [14] and Nagendra *et al.* [15] show that depression among adolescents increases with age especially from 15 to 18 years. While study by Shukla *et al.* [7] supports our study findings with mid adolescent age group being more prone to depression, albeit study by Jayshree *et al.* [6] found no association of age with increase in risk of depression.

The present study found that female adolescent students were more prone to risk of depression compared to their male counterparts (p value=0.05) and after univariate analysis between gender and risk of depression females were found to be at 2.287 times higher risk of depression. This is in line with several similar studies like Bharati *et al.* [9], Jha *et al.* [3], Jayshree *et al.* [6], Kumar *et al.* [14], Sandal *et al.* [16], Rama *et al.* [17] and Mohanraj *et al.* [18] where all of them suggested that female adolescents are at higher risk of depression. However, Nagendra *et al.* [15], on the contrary found risk of depression to be more prevalent amongst male adolescents. Jeelani *et al.* [1] which used the PHQ-9A questionnaire for assessment like our study too concluded that the mean score was higher in females.

In our study, 67.25% students had minimal or no risk of depression, 22.98% had mild risk of depression, 6.33% had moderate risk of depression, 1.15% had moderately severe risk of depression while 2.29% had severe risk of depression. It slightly varies from the study conducted by Bharati *et al.* [9] using PHQ-9A questionnaire where they found 48.81% with minimal or no risk, 32.34% with mild risk, 14.32% with moderate risk, 3.94% with moderately severe and 0.6% with severe risk of depression. A study by Anjum *et al.* [19] conducted in Bangladesh showed 32.5% with mild risk of depression, 20.6% with moderate risk of

depression, 10.9% with moderately severe risk of depression and 5.1% with severe risk of depression. Though when it came to association of gender with severity of risk of depression, like our study where female adolescents seem to develop more severe forms of risk of depression with 9.63% having moderate risk, 2.4% having moderately severe risk and 3.61% having severe risk of depression similar to the findings of Bharati *et al.*^[9].

Excessive sleepiness and excessive lethargy were the most common symptoms associated with risk of depression (p values 0.05 and <0.001 respectively). Other symptoms like loss of appetite, excessive/binge eating and loss of interest in previously pleasurable activities were also significantly associated with risk of depression. Swanson *et al.*^[20] and Hughes *et al.*^[21] also found that excessive and binge eating were associated with higher risk of depression in adolescents while Grasaas *et al.*^[22] found deterioration of sleep quality to be associated with poorer mental and physical health. Past history of illness or trauma seemed to have no significance in our study though Shah *et al.*^[23] in a study in UAE found significant association between history of undergoing medical treatment for physical diseases and risk of depression amongst adolescents.

History of psychiatric disorders in family members, addiction in family members, frequent fights in family and separation of parents seem to have significant association with risk of depression in our study. Shaikh *et al.*^[24] and Mohta *et al.*^[5] found a significant association between history of psychiatric disorders in family with increased risk of depression, Bharati *et al.*^[9] also came to a similar conclusion and found association between mental health of parents and increased risk of depression in adolescents. Mishra *et al.*^[25], Bharati *et al.*^[9] and Jayanthi *et al.*^[26] agree that there is significant link between frequent parental fights or familial discord with adolescent risk of depression.

In our study, change in menstrual cycle, recent fall in scholastic performance and bullying in school has statistically significant association with risk of depression. This is similar to multiple studies conducted in India and worldwide like Pillai *et al.*^[27], Shaikh *et al.*^[24], Singh *et al.*^[28] and Tang *et al.*^[29]. Changes in menstrual cycle also seems to be one of the reasons for higher prevalence of risk of depression in female adolescents.

Birth order seemed to have no association with risk of depression in our study similar to Bharati *et al.*^[9] while Jha *et al.*^[3] noted that risk of depression was lowest amongst the first borns, Mohta *et al.*^[5] and Anjum *et al.*^[19] also reported an increase in prevalence of depression with increasing birth order.

Family type had no association with risk of depression in our study. However, Shukla *et al.*^[7] noted that possibility of depression was higher in adolescent girls belonging to nuclear families while Jha *et al.*^[3] found no association of family structure with depression.

Our study found no significant association of socioeconomic status with risk of depression similar to Shelke *et al.*^[30], Sarkar *et al.*^[11] and Shukla *et al.*^[7] probably nullified by other dominating factors. However, studies like Sandal *et al.*^[16], Mojs E *et al.*^[31], and Chen *et al.*^[32] done in Indian and Asian settings have found significant statistical association between socioeconomic status and risk of depression.

Extremes of BMI, i.e. Obese and underweight were found to have increased risk of development of depression in our study (p value 0.016). This is similar to Tashakori *et al.*^[33] and Revah-Levy *et al.*^[34] but Bharati *et al.*^[9], Hammerton *et al.*^[35] and Lee *et al.*^[36] had no significant association between BMI and risk of depression.

Limitations

Adolescence is a transition period from childhood to adulthood, it might be possible that they may be hesitant to share information leading to desirability bias. This study was conducted in a single school from an urban area hence the sample size was small which can lead to low external validity. Multicentric studies including rural areas can be conducted in the future.

Conclusion

This study was a step towards understanding the mental health status of adolescents in Sangli Miraj Kupwad Corporation, it will help to pave the way for further larger scale studies which can study the adolescent population in depth. School teachers and parents can work as a team to identify the early risk factors for development of depression which can result in timely intervention and prevention of further mental and physical comorbidities associated.

Depression in school-going adolescents is a critical concern, impacting academic performance and overall well-being. Academic pressure, social challenges, and hormonal changes contribute to this issue. Early detection, open dialogue, and a supportive environment are vital. School interventions, mental health education, and accessible counseling services can aid in identifying and addressing depression. Collaboration among educators, parents, and mental health professionals is crucial to create a nurturing environment fostering mental health and resilience in adolescents.

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