EXTENDED ABSTRACT

Title of the paper:

Exploring the Prevalence and Correlates of Depressive Symptoms among Adolescents in India

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1. INTRODUCTION

Depression is one of the most common mental disorders worldwide with a prevalence of around 3.8% affecting 280 million people (Institute of Health Metrics and Evaluation, n.d.). Recent data indicate a declining trend in the age at which individuals first experience depression (Dattani, 2022). In India alone, around 45.7 million people in India are affected by depressive disorders (Sagar et al., 2020). Although comparable national-level estimates for children and adolescents are lacking, the most reliable available data suggest that nearly 9.8 million individuals aged 13-17 years had a clinical mental health condition, with depression being the most frequently identified (Gururaj et al., 2016). As the country with the world's largest adolescent population, safeguarding their mental health is immensely critical for the country and the global community. While numerous studies have identified individual corelates of depression, only a subset of studies assess these associations within multivariate frameworks.

The present study, therefore, aims to estimate the prevalence of depressive symptoms using a nationally representative sample of adolescents, 15-19 years of age. The study will further investigate the factors associated with the risk of suffering from depressive symptoms with an emphasis on examining the role of individual and family characteristics and lifestyle indicators.

2. METHODOLOGY

2.1 Data

The study utilized data from a nationally representative cross-sectional survey, the Comprehensive National Nutrition Survey (CNNS) 2016-18, conducted by the Ministry of Health and Family Welfare (MoHFW), Government of India with support from UNICEF. Conducted between 2016-2018, the survey primarily aimed at assessing food and nutrition parameters among children and adolescents between ages 1 and 19 years. Additionally, information on mental health was also gathered for screening and early detection of depressive symptoms for participants aged 10-19 years. This paper is restricted to 17,442 individuals aged 15-19 years. Further details about the survey methodology are reported elsewhere.

2.2 Methods

Depression: The outcome measure, depression, was assessed through the depression scale of the Patient Health Questionnaire, commonly called the PHQ-9. Participants recorded their frequency of experiencing depressive symptoms (captured through nine questions) over a period of the past two weeks prior to the survey. The response categories ranged from 0 to 3 on a four-point scale ranging from 'not at all' to 'nearly every day'. A depression score was computed by summing the scores, resulting in a total score of 0-27 and then divided into five categories based on increasing severity as per the convention by Spitzer et al. (1999). In the present study, an individual with PHQ-9 score of 5 and above was considered as having depressive symptoms.

Independent Variables: Adolescents' age, gender, schooling status, work status, future job aspiration, household wealth quintile, childhood exposure to theft or violence, place of residence, sibling composition, marital status, parent(s)' morbidity and parent(s) survival status, consumption of alcohol, use of tobacco products and weekly physical activity were included as independent variables.

The analytical sample is described using descriptive statistics, highlighting its distribution across above-mentioned independent variables. Overall prevalence of depressive symptoms was estimated. The Chi-square test of independence was used to determine if there was a significant association between the categorical variables and levels of depression. Further, multiple regression analysis was carried out to examine the adjusted effects of associated

factors. The covariates which were observed to be significantly associated in chi-square test were used for the regression analysis.

3. KEY FINDINGS

The mean score on PHQ-9 was 2.52 with a standard deviation of 3.48 that is indicative of minimal depressive symptoms among the sampled population. An analysis by severity levels showed that 15% of the adolescents had mild depressive symptoms while five percent had moderate to severe depressive symptoms (Table 2).

The multiple regression analysis showed that the predictors of depressive symptoms that were positively correlated included: (i) age (β = 0.081, *p*= 0.000); (ii) being female (β = 0.661, *p*= 0.000); (iii) being unmarried and expecting to get married relatively later– in more than 10 years from the survey for males and in more than 5 years for females in reference to those who had little idea about the expected time of their marriage (β =0.530, *p*=0.000 for males and β =0.519, *p*=0.000 for females); (iv) spending 15 hours or more weekly on physical activity (β =0.243, *p*=0.005); (v) consuming alcohol (β =0.540, *p*=0.002); (vi) having at least one parent with some morbidity (β =0.885, *p*=0.000) (vii) having lost at least one parent (β =0.200, *p*=0.027) and having been exposed to theft or violence (β =2.161, *p*=0.000). The negatively predicting factors of depression score were: (i) having a sibling (ii) having dropped out of school (β =-0.215, *p*=0.047); (iii) working for cash or kind (β =-0.377, p=0.000); and (iv) household wealth status (Table 4).

4. DISCUSSION

One in five adolescent reported some form of depression, 15% with low scores on PHQ-9, indicating mild depression. A similar study in Bangladesh estimated higher overall prevalence of depression (24.5%) (Mridha et al., 2021). Other than methodological reasons for wide variations in the prevalence of adolescent depression across studies, social and cultural factors may be important in shaping the mental health of individuals.

Gender differences in the prevalence of depressive symptoms were observed with girls having a higher likelihood of depressive symptoms compared to boys. The findings are in congruence with studies in several other Asian countries which found that mental health disorders like depression and stress affected more girls than boys (Ahmed et al., 2014; Mridha et al, 2021). Girls and boys may respond differently to the changing hormone levels or they might have to

deal with different kinds of social pressures – which explains the gender difference in depression prevalence. Relatively higher depression among girls indeed calls for special attention, but depressive symptoms among boys need adequate attention.

Adolescents who were currently in school had a significantly higher risk of depression and this is in agreement with the existing literature reviewed by Mohta et al., 2020. Societal pressure to prove one's academic excellence may be a probable cause of depression among school-going adolescents. More hours of physical activity were observed to be associated with increased risk of depression. However, available literature suggests inverse relationship, contrary to our results (Anjum et al., 2021; Pearce et al., 2022).

A major strength of our study is that it is based on a large and nationally representative sample of adolescent population and therefore, the estimates are robust. However, our findings need to be considered in the light of a few limitations. Self-reporting of depressive symptoms may include some bias in estimates. Also, the cross-sectional nature of the data merely enables us to test for a possible association and not causality.

5. CONCLUSION

The emergence of schooling status as a correlate of depression calls for an aggressive effort to counsel children to handle academic pressure on one hand, and to educate parents to have realistic expectation from their child(ren). Mental health awareness programmes and screening for mental health disorders in school may be a step forward in addressing the mental health issues of adolescents.

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Table 2: Levels of depressive symptoms among respondents aged 15-19 years, India, CNNS 2016-18

	Mean	SD
PHQ-9 Score	2.52	3.48
Severity Levels	**%**	**N**
No depressive symptom	79.9	14,260
Mild depressive symptom	15.0	2,454
Moderate depressive symptom	3.7	512
Moderately-Severe depressive symptom	1.2	175
Severe depressive symptom	0.2	34

Table 4: Regression analysis of PHQ-9 scores and socio-demographic characteristics of respondents 15-19 years, India, CNNS 2016-2018

Background Characteristics			**95% confidence limits**	
	β	**p-value**	**lower limit**	**upper limit**
Age of the respondent	0.081	0.000	0.043	0.119
Sex				
Male (ref)				
Female	0.661	0.000	0.489	0.832
Marital Status and Marriage Uncertainty				
Never married & do not know the expected time(ref)				
Males expected within 10 years	-0.068	0.437	-0.241	0.104
Males expected in more than 10 years	0.538	0.000	0.350	0.725
Females expected within 5 years	0.048	0.646	-0.156	0.252
Females expected in more than 5 years	0.519	0.000	0.354	0.685
Currently Married	-0.217	0.085	-0.463	0.030
Siblings				
No siblings(ref)				
Siblings with age difference < 5 years	-0.332	0.001	-0.535	-0.128
Siblings with age difference >=5 years	-0.437	0.000	-0.666	-0.208
Have siblings but do not know the age difference	0.110	0.623	-0.328	0.547
Schooling status				
Never attended(ref)				
Dropout	-0.215	0.047	-0.427	-0.003
Currently studying	0.073	0.515	-0.146	0.292
Currently working for cash/kind				
Yes(ref)				
No	-0.377	0.000	-0.520	-0.235
Future job aspiration				
No/Don't know(ref)				
Yes	0.019	0.777	-0.114	0.152
Weekly time spent on physical activity				
No activity at all(ref)				
up to 7 hours	-0.069	0.423	-0.239	0.100
8 to 14 hours	-0.045	0.614	-0.222	0.131
15 or above hours	0.243	0.005	0.072	0.413
Consumes alcohol				
No(ref)				
Yes	0.540	0.002	0.192	0.888
Place of residence				
Rural(ref)				
Urban	0.062	0.362	-0.072	0.196
Household wealth quintile				
Poorest(ref)				
Poor	-0.317	0.000	-0.485	-0.149
Middle	-0.537	0.000	-0.704	-0.370
Rich	-0.995	0.000	-1.171	-0.819

Richest	-1.503	0.000	-1.695	-1.311
Either/both parent(s) has/have any morbidity				
No(ref)				
Yes	0.885	0.000	0.744	1.027
Either/both parent(s) is/are dead				
No(ref)				
Yes	0.200	0.027	0.023	0.377
Exposure to theft/violence				
No(ref)				
Yes	2.161	0.000	1.737	2.585
F (26, 17374)	38.54			
Prob > F	0.000			
R -squared	0.0545			
Adjusted R-squared	0.0531			
Root MSE	3.3917			

(ref) reference category