



# COVID-19 and Depression: Prevalence and Risk Factors in Youth from Maharashtra, India

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## Abstract

The COVID-19 pandemic and the ensuing lockdown have been a seismic shock for youth in India, elevating their risk of mental health problems like depression. This cross-sectional study sought to measure the point prevalence levels of depression in university students (ages 19–25 years) from Maharashtra, India, during the peak of the first wave of the pandemic and lockdown, through an online opt-in survey. The BDI-II was self-administered by 783 respondents (males = 243; females = 540). Results indicated overall mild levels of depression (mean BDI = 16.48) and high point prevalence, with 51.8% ( $n = 406$ ) of the population being symptomatic, of which 16.3% had severe, 17.9% had moderate, and 17.8% had mild levels of depression. No association was found with age, gender, educational level of participants, period of hostel stay, education, and occupational level of parents. Overall percentages of symptomatic women were higher, suggesting the gendered effects of the pandemic. This study explored the symptomatology of depression wherein “sadness,” “changes in sleep patterns,” and “concentration difficulties” emerged as the most commonly experienced symptoms. Symptom expression was found to vary with intensity and gender. Symptomatic men experienced significantly more cognitive symptoms like self-criticalness, punishment feelings, thoughts about past failures, and changes in sleep patterns, while symptomatic women felt significantly high “loss of energy.” No significant gender differences were seen in the experience of cognitive-affective symptoms. Possible reasons are discussed. Further exploration of the experiences of youth is essential to understand the full gamut of the pandemic’s impact on them.

**Keywords** Depression · Youth · India · Pandemic · Lockdown · Maharashtra

Depression in youth is one of the most commonly diagnosed mental health disorders in primary care practice the world over, with a global lifetime prevalence of 15 to 20% (Kaur

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et al., 2014), and has been declared a priority mental health disorder by the World Health Organization (WHO). Depression occurring during this life stage is associated with various physiological and psychological comorbidities (irritable bowel syndrome, pain, cancers, osteoporosis, substance abuse, anxiety, truancy, risk-taking behaviors, self-harm) that have a ripple effect on several important biopsychosocial aspects of the growing adolescent's life. In India, depression is the leading non-fatal disease burden on youth and the primary disruptor of their development, education, and growth. It is the primary source of disability-adjusted life years (DALYs), contributing to challenging economic consequences for self and family (Arvind et al., 2019; Sagar et al., 2020).

A significant precipitating factor in the etiology of depression is repeated exposure to stressful life events (Yang et al., 2015). In the aftermath of the COVID-19 pandemic, which hit the world in November 2019, several countries of the world adopted strict lockdowns, quarantine measures, and norms for social distancing. In India, a nationwide lockdown was introduced on 24<sup>th</sup> March 2020. While different sections of society experienced the crisis differently, for young people particularly, this has been a period of chaos and tumult. The pandemic-induced lockdown disrupted academic activities and outcomes, occupational opportunities, physical and psychological safety, income stability, socialization practices, individual freedom, and lifestyle habits (Lianhmingthangi et al., 2020; Özdin & Özdin, 2020; Salari et al., 2020). Social isolation, increased screen time, falling academic confidence and performance, heightened future uncertainty, overwork, gaming addiction, poor sleep quality, parental anxiety, increased family violence, and home confinement were some of the reported effects of the pandemic on Indian youth (Jacob et al., 2020; John & John, 2021; Patra & Patro, 2020). The cascading effect of this sustained health crisis is expected to exacerbate problems like depression and anxiety, particularly among those in a developmentally sensitive period (Courtney et al., 2020; Porter et al., 2021).

In India, despite the growing disease burden of depression on youth, systematic national and state-level data related to it are limited and often riddled with discrepancies (Arvind et al., 2019; Grover et al., 2010). The NMHS survey (2016), one of the most elaborate and detailed analyses of mental health indicators of the Indian population based on information from 12 geographically and culturally diverse states, found a point prevalence rate of 2.6% for depressive disorders among youth. Independent studies from different states have found much higher prevalence rates ranging from 40% in Chandigarh, 47.9% in New Delhi, and 49.2% in Patna, Bihar, to 52.9% in Rohtak, Haryana, and 71.3% in Bhopal (Madhya Pradesh) (Kumar et al., 2019; Malik et al., 2015; Singh et al., 2017). Similar variations were seen in studies from South India as well, with prevalence rates ranging from 39% in rural Karnataka and 43% in North Kerala to 57.6% in urban Mangalore (Shaikh et al., 2018; Hanspal et al., 2019; Pandian et al., 2017; Shelke et al., 2015; Urmila et al., 2017). Indian studies exploring risk factors associated with depression also report inconsistent findings, with some studies finding linkages with socio-demographic factors like age, feminine gender, adverse life events, literacy rates, academic stress, and occupation of one or both parents (Hanspal et al., 2019; Lodha et al., 2016; Shaikh et al., 2018), while others find contrasting or no linkages between depression and such contextual factors (Mohanraj & Subbaiah, 2010; Rezvan & D'Souza, 2017; Shaikh et al., 2018; Shelke et al., 2015).

Variations, as mentioned above, have been previously reported in studies from India and elsewhere in the world (Ayuso-Mateos et al., 2001; Grover et al., 2010) and have been attributed to diversity in population, plurality in contexts, characteristics of samples, and variations in operationalization, methodological, and sampling techniques (Arvind et al.,

2019; Grover et al., 2010). Existing inconsistencies in findings from Indian youth point to the fact that data collected from various states may not be sufficiently representational of the youth of the entire country. Instead, it may be more useful and precise to gather area-specific data to arrive at prevalence rates for a particular socio-demographic, geographical context. Real-time data becomes particularly relevant during the current COVID-19 pandemic as the impact of the pandemic is predicted to depend on factors such as the stage of the pandemic, age, and personality characteristics of the individual and contextual factors, like socioeconomic strata and gender (Courtney et al., 2020).

The current study was part of a larger doctoral study to explore the association between depression and differentiation of self in youth. After receiving ethical clearance from the review board, data collection was carried out in November 2020, at the peak of the COVID-19 pandemic when the national lockdown was in place in India. This study can fill the gap in literature by providing information regarding prevalence rates of depression in Maharashtra at the peak of the first wave of the pandemic, when youth were under lockdown conditions and following COVID norms for about 6 months.

Symptom clusters in depression fall along a wide range of cognitive-affective (sadness, pessimism, loss of interest, and suicidal ideation) and somatic (changes in appetite, loss of energy, changes in sleep patterns, loss of interest in sex, fatigue, and physical discomfort) dimensions (Al-Turkait & Ohaeri, 2010). The experience of these symptoms and their management are mediated by various factors like age, geography, social, and cultural contexts. The nature of symptoms experienced by young people has predictive value in the early diagnosis of clinical depression and requires deeper exploration (Dardas et al., 2016). Very few studies have reported the symptom profile of depression among Indian youth, and most of the data is based on clinical samples and collected retrospectively. Due to this, we know very little about symptom expression of depression in non-clinical university students. Since data for this study was collected during the lockdown period, when educational institutions and offices were functioning through online modes, the nature of symptoms that youth were experiencing at this time and significant patterns that emerge will offer greater insight into their experience of depression during this period. Evidence-based data emerging from such studies can help policymakers, mental health professionals, educators, and parents develop plans, programs, and strategies to mitigate the burden of depression among youth.

## Methodology

### Definition of “Youth”

“Youth” is a term of great plasticity. The WHO defines youth as people between the ages of 15 and 24 years, while the National Youth Policy of India (2003) refers to individuals between 15 and 35 years as “youth.” Arnett (2000) identified the period between 18 and 25 years as “emerging adulthood” when several key transitions are made by the individual. These years of an individual’s life are crucial because they are highly volitional and facilitate identity exploration in the areas of love, work, and worldviews. In this paper, the term “youth” refers to individuals between 19 and 25 years of age.

## Maharashtra

The sample for this paper is drawn from Maharashtra, which also consists of the port city of Mumbai (capital city of Maharashtra) as well as the districts of Thane and Pune. The state has a literacy rate of 77.3% and attracts a large number of students from all over India and the world, making many of its universities and colleges culturally and linguistically varied.

## Sampling

This cross-sectional survey was conducted in colleges across various universities in Maharashtra during the month of November 2020, when the national lockdown was in place in Maharashtra due to the COVID-19 pandemic. At this time, colleges and universities were holding classes online and social interactions were severely curtailed. An internet-based survey was conducted using convenient snowball sampling. Youth aged 19–25 years who were registered in colleges across Maharashtra for any full-time course and had access to a stable internet connection were eligible to participate in the study and self-administer the questionnaire. Participants were sent the voluntary opt-in online form through several student groups using social media platforms. The survey was set up such that it was mandatory to answer all questions and only one response was allowed. The final sample of the study consisted of 783 participants. There were no incomplete responses.

## Ethical Considerations

Adherence to ethical guidelines is vital when carrying out research in the area of mental health issues because of diagnostic issues, associated myths, stigma, biases, and paucity of treatment options in India (Jain et al., 2017). Ethical approval for the study was obtained from the Institutional Review Board of the Tata Institute of Social Sciences, Mumbai. The objectives and possible uses of the study were shared with participants before they consented to participate. Participants were also provided with a care packet containing information about depression, symptoms, self-care, and details regarding how to access mental health care from professionals, if required. The online form allowed participants to proceed to the questionnaire only after they had accessed the care packet and provided consent to participate in the study. Participant details were anonymized to ensure confidentiality. No personal identifiers were disclosed anywhere during the analysis of data.

## Materials and Methods

The dependent variable of this study was depression, and it was measured using the Beck Depression Inventory-II (BDI-II), one of the most frequently used self-report measures of syndrome depression. The BDI-II (Beck et al., 1996) is a revised version of the original tool and consists of 21 questions assessing cognitive, affective, and somatic symptoms of depression as experienced in the last 2 weeks. On a non-clinical population, a single administration of the BDI-II in the absence of other diagnostic assessments may not indicate clinically diagnosable disorders, but scores may still be used to screen for probable cases of depressive symptoms as operationalized in the fourth

edition of the Diagnostic and Statistical Manual (DSM)-IV (Wang & Gorenstein, 2013). The scale is easy to administer and has high content and construct validity and shows concurrent validity with other measures like the MMPI (Minnesota Multiphasic Personality Inventory) and the Hamilton Depression Rating Scale. It has been used in several Indian studies to measure the levels of depression in Indian adolescents (Win et al., 2019), thereby demonstrating its cross-cultural compatibility with the target population. The scale has an internal consistency of 0.9 and high test–retest reliability. Although some studies indicate different scores for symptom categories depending on whether the sample is drawn from a clinical or non-clinical population, the current study used the recommended cut-off scores of the original scale to classify participants into minimal (0–13), mild (14–19), moderate (20–28), and severe (29–63) intensities of depression (Beck et al., 1988). Existing factor models and item content of the BDI-II draw a distinction between cognitive-affective symptoms of depression (items 1–14: sadness, pessimism, past failure, loss of pleasure, guilty feelings, punishment feelings, self-dislike, self-criticalness, suicidal ideation, crying, agitation, loss of interest, indecisiveness, worthlessness) and somatic symptoms (items 15–21: loss of energy, sleep problems, irritability, appetite problems, concentration, fatigue, loss of interest in sex). Socio-demographic data were collected from participants, as indicated in Table 1.

Data were analyzed using SPSS version 21.0. Socio-demographic characteristics and prevalence of depressive symptoms were represented using descriptive statistics. Associations between prevalence and related aggravating factors were analyzed using the Chi-square test of independence. Statistical analyses were carried out at a *P*-value of <0.05 or a 95% confidence interval. In order to analyze the pattern of symptoms of depression, scores of individual items were extracted. A score of “1” or above on any item was considered to indicate the presence of the symptom. The percentage of people with symptoms was calculated to determine the prevalence of the symptom.

Data for this study was collected online. There exists evidence that online research may sometimes not yield valid data if seriousness checks are not incorporated into the questionnaire (Aust et al., 2013; Ward & Pond, 2015). In this study, the form was designed to prevent non-responses and ensure single responses wherever applicable. Difficult to understand words were explained in brackets within the question to help participants answer questions appropriately. However, there were no seriousness checks incorporated, which may call to question the validity of responses. Before analysis, the

**Table 1** Socio-demographic data collected from participants

Gender	Male, Female
Highest level of education	Professional, Post-graduation, Graduation, Higher Secondary (Grade 11 & 12), Secondary School (Grade 10)
Birth position	Single, Youngest, Oldest, Somewhere in the middle
Nature of family	Staying alone, With both parents, With father, With mother, Separated parents, Parents and extended family, Extended family, Stepparents
Relationship status	Single, In a casual relationship, In a committed relationship
Having stayed in a hostel facility	Yes, No
Period of stay in hostel	Number of months
Educational level of each parent	Schooling, Graduate, Post-graduate
Occupation of each parent	Self-employed, Employed, Unemployed, Retired (in case of mothers, Homemaker)

data were checked for similar, extreme, or neutral responses across questions. No such records were found.

## Results

### Participant Profile

A total of 788 youth responded to the survey. Three participants opted not to complete the survey and were not included in the analysis. Two participants mentioned their gender as “Other” from the available options of “Male,” “Female,” and “Other.” Due to the lack of representativeness of the sample who identified themselves as “Other” ( $n=2$ ), their data were not included in the analyses. The final data for analysis included 783 youth who fell into the “Male” or “Female” gender categories. It was seen that 31% ( $n=243$ ) of the participants were identified as male, and 69% ( $n=540$ ) were female. The mean age of the sample was 20.77 years. Findings related to socio-demographic features of the sample are presented in Table 2.

Bivariate analysis was performed to find out if there existed a relationship between depression and socio-demographic factors. The dependent variable (depression scores) was not normally distributed (Skewness=0.79; Kurtosis=0.09) as indicated by the Kolmogorov–Smirnov test ( $D(783)=0.098$ ,  $p=0.00$ ). The visual representation of the histogram showed positively skewed data, and the Q-Q plot also did not cluster around the trend line. As the data was not normally distributed, the Kruskal–Wallis test was used to compare means.

### Prevalence

Standard cut-off scores on BDI-II ( $BDI \geq 14$ ) indicated the prevalence of depressive symptoms in 51.8% of the population ( $n=407$ ), consisting of 118 males and 288 females. 17.8% ( $n=139$ ) of the symptomatic population had mild levels, 17.9% ( $n=140$ ) had moderate levels, and 16.3% ( $n=128$ ) had severe levels of depression. The mean BDI score of the sample was 16.48 ( $SD=11.58$ ) (Table 3).

### Descriptive Statistics

Depression was not found to be significantly associated with socio-demographic factors like educational qualifications, nature of family, birth position, relationship status, hostel stay, parental education, or occupational status. Depression was also not significantly associated with gender (Table 4). Although there were more females than males in each of the symptom categories, there were no significant differences in levels of depression ( $p=0.107$ ) between genders.

### Symptomatology

Symptom expression of depression was found to vary with intensity. The top five most commonly experienced *somatic* symptoms across mild, moderate, and severe categories were changes in sleep patterns, difficulties in concentration, loss of energy, changes in

**Table 2** Socio-demographic characteristics of participants

Characteristic	(n)	(%)
<b>Birth position</b>		
Youngest	263	33.6
Single	143	18.3
Middle	68	8.7
Oldest	309	39.5
<b>Level of education</b>		
SSc_10	3	0.4
HSc_12	273	34.9
Graduate	365	46.6
Post-Grad	87	11.1
Professional	55	7.0
<b>Relationship status</b>		
Single	550	70.2
Casual	39	5.0
Committed	194	24.8
<b>Hostel stay period</b>		
0–3 months	509	65
3–12 months	95	12.1
12–24 months	78	10
24–36 months	55	7
36 months+	46	5.9
<b>Father's education &amp; occupation</b>		
FatherSchool	254	32.4
FatherGrad	330	42.1
FatherPostGrad	199	25.4
FatherUnempl	23	2.9
FatherSelfEmp	312	39.8
FatherEmpl	375	47.9
FatherRetired	73	9.3
<b>Mother's education &amp; occupation</b>		
MotherSchool	294	37.5
MotherGrad	327	41.8
MotherPostGrad	162	20.7
MotherUnempl	8	1.0
MotherSelfEmp	91	11.6
MotherEmpl	177	22.6
MotherRetired	16	2.0
MotherHomeMkr	491	62.7

appetite, and tiredness, while the most commonly experienced *cognitive-affective* symptoms were sadness, loss of interest, feelings of guilt, loss of pleasure, and irritability. However, when taking only the moderate and severe categories into consideration, the experience of somatic symptoms like changes in sleep patterns, concentration difficulties, loss of energy, and fatigue surpassed the experience of other cognitive-affective symptoms

**Table 3** Bivariate analysis of socio-demographic characteristics of participants by gender

Factor	Males ( <i>n</i> =243)				Females ( <i>n</i> =540)				Dep proportion	<i>p</i> -val*
	<i>n</i>	%	Mean	SD	<i>n</i>	%	Mean	SD		
<b>Age (yr)</b>										<b>0.27</b>
19	74	30	16.08	10.4	151	28	17.98	11.7	0.57	
20	57	23	14.75	12.3	128	23	17.03	11.5	0.5	
21	46	19	16.65	13.5	84	16	14.58	09.8	0.48	
22	27	11	17.44	13.2	80	15	16.59	11.3	0.57	
23	19	08	14.95	11.4	62	11	16.08	11.4	0.43	
24	13	05	14.38	11.5	25	05	15.16	11.2	0.53	
25	7	03	09.71	04.6	10	02	18.60	12.7	0.41	
<b>Educational qualifications</b>										<b>0.63</b>
SSc (10)	2	0.8	36	2.8	1	0.2	7	–	0.67	
HSc (12)	85	35	15.5	11.3	188	35	17.68	11.7	0.54	
Graduate	116	48	15.5	11.5	249	46	16.77	11.2	0.52	
PG	11	4.5	21.7	19.3	76	14	15.13	10.9	0.49	
Prof	29	12	12.9	9.7	26	4.8	13.54	9.2	0.44	
<b>Nature of family</b>										<b>0.22</b>
Stay-Self	7	2.9	17.7	13.3	9	1.7	19.33	8.82	0.69	
Both Parents	158	65	15.6	11.2	356	66	16.7	11.6	0.49	
Father Only	2	0.8	12.5	13.4	7	1.3	12.14	11.1	0.44	
Mother Only	14	5.8	17.1	12.8	39	7.2	19.38	11.9	0.67	
Separate Parents	1	0.4	9	–	6	1.1	16.83	9.5	0.57	
Parents & Ext Family	41	17	14.6	11.3	92	17	16.91	10.7	0.57	
Ext Family	19	7.8	17.9	16.7	28	5.2	12.82	9.1	0.47	
Stepparents	1	0.4	9	–	3	0.6	10.33	4.0	0.25	
<b>Birth position</b>										<b>0.16</b>
Youngest	88	36	16.1	12.4	175	32	16.9	10.9	0.54	
Single	46	19	15.8	13.3	97	18	15.3	11.9	0.44	
Middle	22	9.0	15.9	12.1	46	8.5	16.3	11.7	0.49	
Oldest	87	36	15.1	10.23	222	41	17.2	11.2	0.44	
<b>Relationship status</b>										<b>0.14</b>
Single	184	76	16.01	11.7	366	68	17.3	11.5	0.54	
Casual	13	5.4	15.4	15.4	26	4.8	16.9	9.7	0.51	
Committed	46	19	14.4	11.1	148	27	15	10.9	0.46	
<b>Hostel stay (in months)</b>										<b>0.73</b>
0–3	175	72	15.6	11.7	331	61	17.4	11.3	0.54	
4–12	21	8.6	16.6	13.7	74	13	14.7	10.5	0.48	
13–24	18	7.4	20.1	15.3	60	11	15.3	12.2	0.49	
25–36	14	5.8	11.3	5.6	41	7.6	15.5	10.9	0.49	
36+	14	5.8	12.9	8.5	32	5.9	18.3	10.9	0.48	
<b>Father education</b>										<b>0.14</b>
School	88	36	14.99	11.7	166	31	18.43	11.3	0.57	
Graduate	98	40	16.6	12.23	232	43	15.85	10.9	0.5	
PG	57	23	15.11	10.9	142	26	16	11.6	0.49	



**Table 3** (continued)

Factor	Males (n=243)				Females (n=540)				Dep proportion	p-val*
	n	%	Mean	SD	n	%	Mean	SD		
<b>Father occupation</b>										<b>0.16</b>
Unemploy	7	2.9	20.7	12	16	3.0	22.3	13.8	0.7	
Self-employed	99	41	15.1	11.8	213	39	16.6	10.9	0.54	
Employed	12	46	15.7	11.3	263	49	16.1	11.4	0.49	
Retired	25	10	16.6	13.8	48	8.9	18.5	11.2	0.56	
<b>Mother education</b>										<b>0.67</b>
School	106	43	15.1	11.8	188	35	17.9	11	0.53	
Graduate	101	42	16.8	11.8	226	42	16.1	11.4	0.52	
PG	36	15	14.1	12	126	23	15.9	11.4	0.49	
<b>Mother occupation</b>										<b>0.16</b>
Unemp	6	2.5	18.1	18.7	2	0.4	4.5	3.5	0.25	
Self-employed	27	11	16.7	10.1	64	12	17.7	10.9	0.57	
Employed	41	17	16.9	12.9	136	25	16.4	11.3	0.55	
Retired	7	2.9	22	16.3	9	1.7	23.4	14.3	0.69	
Homemaker	162	67	14.8	11.3	329	61	16.5	11.2	0.5	

\*p-value calculated between groups BDI < 14 (no depression) and BDI > = 14 (has depression) and does not distinguish between gender

(Table 5). Across symptom categories and across gender, sadness, changes in sleep patterns, and concentration difficulties remained the most commonly reported symptoms and with high intensity. It was seen that 49% of the symptomatic population experienced suicidal thoughts or wishes.

Symptom expression was found to vary with gender (Table 6). Females experienced significantly more somatic symptoms (loss of energy, sleep problems, irritability, appetite problems, concentration, fatigue, loss of interest in sex) than males (p=0.048), though there was no significant difference between genders in the experience of cognitive-affective symptoms.

In participants who were symptomatic (BDI > = 14), symptoms like self-criticalness, punishment feelings, thoughts about past failures, and changes in sleep patterns were significantly more prominent in men, while loss of energy, a somatic symptom, was significantly more prominent in women (Table 7).

**Table 4** Prevalence rate of depression according to gender

Gender	Severity of depression				Total
	Minimal (0–13)	Mild (14–19)	Moderate (20–28)	Severe (29–63)	
<b>Male</b>	125 (51%)	42 (17%)	38 (16%)	38 (16%)	243 (31%)
Mean	6.65	16.26	23.21	37.13	15.67
<b>Female</b>	252 (47%)	99 (18%)	99 (18%)	90 (17%)	540 (69%)
Mean	7.11	16.74	23.55	35.84	16.68
<b>Total</b>	377 (48%)	141 (18%)	137 (17.5%)	128 (16.3%)	783
Mean	6.96	16.60	23.46	36.22	16.36

**Table 5** Symptom scores according to severity

Mild, moderate & severe levels (BDI > = 14)		Moderate & severe levels (BDI > = 20)	
Symptom	Total %	Symptom	Total %
Changes in sleep patterns	88.9	Sadness	91.3
Sadness	87.2	Changes in sleep patterns	91.3
Concentration difficulties	86.2	Concentration difficulties	89.8
Loss of interest	82.8	Loss of energy	89.4
Loss of energy	81.5	Tiredness & fatigue	89
Tiredness & fatigue	81.3	Loss of interest	86.7
Feelings of guilt	78.8	Agitation	86.7
Loss of pleasure	77.6	Crying	86.4
Changes in appetite	77.6	Feelings of guilt	85.6
Irritability	76.8	Self criticalness	84.5

## Discussion

The current study was a descriptive, cross-sectional survey to assess levels of depression in Indian youth aged 19–25 years, living in the state of Maharashtra, India, 8 months into the COVID-19 lockdown. Since the BDI-II was used, scores indicated feelings of depression in the preceding 2 weeks. The study explored associations with several risk factors like gender, age, qualification of the participant, status of hostel stay, relationship status, parental education, and occupational status. Symptomatology of depression among youth was analyzed.

In the present study, depressive symptoms were found in 51.8% ( $n=406$ ) of the population, the mean BDI score was 16.48 and the median BDI score was 14, which are both in the mild category. This is in line with pre-COVID studies of adolescent depression from rural Pune (in Maharashtra), where the prevalence rate was found to be 54% but is much higher than a study from rural Maharashtra, where the prevalence rate among students of ages 12–18 years was found to be 6.66% (Shaikh et al., 2018; Shelke et al., 2015). Studies of depression from other parts of India have reported wide variations in prevalence rates, ranging from 14.5 to 60%. Hence, although the prevalence is on the higher side, the finding of this study agrees with much of the existing trends from across the country. The mild intensity of depression (mean BDI=16.48; Median=14) found in this study which took place in the middle of the pandemic, is slightly lesser than the moderate level reported by Rehman et al. (2021) in their study of depression in Indian students during the pandemic. Although the complete sequelae of the COVID-19 pandemic may become apparent only after several years, the current study supports existing findings of low to moderate levels of COVID-related distress in adolescents (Magson et al., 2021; Wang et al., 2020).

**Table 6** Symptomatology according to gender (BDI > = 14)

Symptom	Male (mean)	Females (mean)	<i>p</i> -value
Somatic symptoms	8.47	9.02	*0.048
Cognitive affective symptoms	16.74	16.03	0.287

\*Significant at 0.05 level

**Table 7** Symptom presentation according to gender (BDI > = 14)

Symptoms	Males (%)	Females (%)	<i>p</i> -value
Self criticalness	92.10	81.4	*0.015
Punishment feelings	78.9	66.13	*0.020
Past failures	84.2	73.01	*0.026
Changes in sleep patterns	96.05	89.4	*0.04
Loss of energy	84.21	91.5	*0.04

\*Significant at 0.05 level

Fluctuations in perception of the pandemic over time as being less dangerous (data collection took place in November when the first wave was coming to an end) may contribute to lower emotional impact (Terry et al., 2020). Several external and intrinsic factors moderate COVID-related depression in young people and a clearer understanding of the experience of depression during the pandemic requires an inquiry into these factors (Porter et al., 2021; Rehman et al., 2021; Sundarasan et al., 2020; Wang et al., 2020).

While some existing community-based studies have found that adolescent depression is largely of mild (Grover et al., 2019; Lodha et al., 2016) or moderate severity (Kumar et al., 2019; Malik et al., 2015), this study found that the symptomatic percentages of mild (= 18%), moderate (= 17.5%), and severe (= 16.3%) categories were almost comparable. The increased intensity of depression may be explained by the fact that this study was conducted almost 8 months into the lockdown, during which time youth had been in a state of prolonged social disconnect. Biological disasters like COVID-19 give rise to acute (within 2–6 months of the outbreak) and long-term (after 6 months of the outbreak) mental health issues. Although they were young and not considered to be a high-risk group during the first wave of the pandemic, college-going youth experienced sudden and dramatic changes in their daily lives during the lockdown. With their regular schedules disrupted, increasing challenges of online education, demands of household responsibilities, rising uncertainty about examinations and career options, and the compulsion to live with restrictions, youth are at higher risk of developing increased distress during the lockdown (Jacob et al., 2020; Magson et al., 2021). Students in higher education experienced ambiguity with regard to immediate and long-term career prospects. Uncertainty about the future has been directly linked to high levels of depression and anxiety (Beck & Haigh, 2014; Dar et al., 2017; Sundarasan et al., 2020).

Furthermore, as youth mature and their attachment needs are fulfilled through non-familial sources, they have clear preferences for spending more time with their peers. Enforced social isolation and protracted stay with family were twin prongs of the “seismic social shock” caused by the lockdown that has clear implications for mental health (Garnefsky & Kraaiji, 2009; Magson et al., 2021). At this stage of life, when youth are struggling with identity development, alienation from systemic structures that aid and facilitate identity formation can lead to identity crises, and the individual can feel lost, anxious, and depressed (Andrews, 2016; Commons et al., 2019; Erikson, 1970). The almost equal distribution of participants among mild, moderate, and severe categories may support emerging evidence that pandemic-related stressors exacerbate over time, leading to a corresponding deterioration of mental health indicators (Magson et al., 2021; Octavius et al., 2020).

In addition to life-stage and pandemic factors, methodological issues related to the study may also have contributed to the high point prevalence recorded. Depression studies based on rating scales have generally reported point prevalence greater than 40% when compared to studies based on structured instruments, which report a point prevalence rate of 2–25%.

The findings of this study add weight to existing findings that using a rating scale for a single-stage screening of participants yields higher estimates. A careful assessment of apparent variations in data among states in India needs to be made to get a better understanding of the prevalence of depression among youth in India and results must be interpreted with care (Grover et al., 2019). Standardization of measurement tools, study design, and sample population are imperative for developing nationwide data of mental health indicators before policy decisions are made. The paucity of comparable pre-pandemic data on depression in this population makes it more difficult to delineate the impact of the pandemic and the lockdown accurately.

Assessing for possible risk factors associated with depression, the current study did not find any significant linkages between levels of depression and socio-demographic characteristics such as age, gender, relationship status of participants, birth position, hostel stay, educational status of self and parents, and occupation levels of parents. These findings are inconsistent with the existing association of depression with residency in hostels, belonging to nuclear or joint family systems (Shelke et al., 2015), mothers' education level, and mother's nature of occupation (Lodha et al., 2016). Existing literature has found evidence of the association between female gender and depression before and during the pandemic (Magson et al., 2021; Mishra et al., 2018; Terry et al., 2020; Urmila et al., 2017). Some studies have pointed out possible measurement bias of the BDI to explain females getting higher scores than males, though findings have not been conclusive (de Sá Junior et al., 2019). Contrary to such findings, this study found no significant gender effects, though overall percentages of symptomatic women were slightly more than that of men across mild ( $M=17\%$ ,  $F=18\%$ ), moderate ( $M=16\%$ ,  $F=18\%$ ), and severe ( $M=16\%$ ,  $F=17\%$ ) categories. In their study comparing depression among the youth of Peru, Ethiopia, Vietnam, and India during the pandemic, Porter et al. (2021) found similar results in Indian youth. One reason for variations observed in studies conducted during the pandemic could be the stress-inducing conditions imposed by the pandemic regardless of gender. Alternatively, this finding could support existing evidence that gender effects are more prominent in clinical populations rather than community samples (Compas et al., 1999).

### Symptom Profile of Depression

The BDI measures the somatic and cognitive-affective symptom domains of depression. In this study, substantial heterogeneity was seen in symptom presentation among participants. Across genders, somatic symptoms were significantly more than cognitive-affective symptoms in symptomatic individuals, indicating the important role played by somatic symptoms in the early detection of depression. Somatization is the main reason why patients with depression end up seeking primary care, but it is also the primary cause of undetected depression as it diverts medical attention to other discrete medical conditions (Katon et al., 2004). Hence, there is an urgent need for primary care physicians to assess somatic symptoms with concomitant cognitive-affective symptoms for the early detection of depression in youth. There is growing acceptance of culture as a fundamental factor in the presentation of psychological distress and it has been noted that people in collectivistic cultures have a tendency to somatize distress. People in such cultures commonly present with tiredness, sleep problems, and concentration difficulties when undergoing depression (Ryder et al., 2008). Assessing for depression using the classical Western symptom collection dominated by mood and cognitions may have limited use in such cultural contexts.

In its wide use with various populations, the BDI-II has thrown up gender differences in symptom presentation, but findings have been inconsistent. The current study adds to this inconsistency. “Changes in sleep patterns” and “sadness” emerged as the most commonly experienced symptoms, although the former has been associated more with women and the latter has been associated more with men (Khesht-Masjedi et al., 2017). Although the means of scores for “difficulty in concentration” and “crying” were higher for females, there were no significant differences across gender, which is in contrast to some studies that have found female gender associated with “difficulties in concentration,” “crying,” and rumination (Nolen-Hoeksema, 1987; Sund et al., 2001). The mean scores for “guilty feelings” were higher in men than women, which contradicts the finding that women with depression experience more guilt (Silverstein, 2002). Self-criticalness, punishment feelings, and feelings of being a failure were significantly more prominent in symptomatic men than women, lending credence to existing evidence that depression may be “masked” in men due to gender stereotypes and that masculinity in itself may impact how different men experience symptoms of depression. While some studies have found that women score higher than men on both somatic and cognitive-affective scales, others report that such differences may be sensitive to factors like age and the presence of psychological and physiological symptoms (Delisle et al., 2012; Dessotte et al., 2015; Romans et al., 2007; Silverstein, 2002). The current study found that women experienced significantly more somatic symptoms when compared to men, although there was no significant difference in cognitive-affective symptoms. Such disparity has been attributed to biological factors and social aspects like cultural expectations and division of household work. The period of the lockdown has impacted both genders but when compared to men, women and girls face greater social, economic, and health risks. The increased burden of domestic duties and familial expectations like care for family members generally fall on women in collectivistic societies where gender roles are shaped by entrenched patriarchal norms (Davis & Williamson, 2019; Rivera et al., 2020). Unequal distribution of roles and responsibilities, heightened monitoring and restrictions by family members, reduced personal freedom, increased risks of gender violence, and the perceived inability to challenge gender social norms and disparate power equations could contribute to significant somatic distress in women leading to symptoms like crying, loss of energy, fatigue, and inability to concentrate. Being socially isolated and cut off from supportive social networks and safe spaces due to university closure could add to the vulnerability of women in these cultural contexts, exacerbating somatic symptoms. The interplay of somatic and psychological symptoms has important implications for the personal and professional domains of women’s lives. On the one hand, somatic symptoms lead to diagnoses unrelated to depression, while health conditions, related and unrelated to depression, augment depression scores.

Substantial variations in symptom presentation between genders as reported by this study, along with already existing inconsistencies in this area, indicate insufficient empirical support for gender differences in the symptomatology of depression. There is a need to assess whether depression presents itself all that differently in genders, or whether these differences are rooted in individual differences and contextual conditions. Participants of this study were actively engaged in academic and career-related activities and the lockdown may in part account for their keen awareness of difficulties in concentration, sadness, fatigue, disrupted sleep patterns, and self-criticalness triggered by environmental factors like fear about health, excessive media exposure to information about the pandemic, an excessive amount of time spent online, increased workload, and difficulties associated with non-optimal learning experiences during the pandemic including decreased sleep quality due to increased screen time (Salfi et al., 2021).

## Conclusion

The current study of depression in the youth of Maharashtra found the prevalence rate of depression to be high at 51.8% and found no association with socio-demographic factors like age, birth position, period of hostel stay, gender, and educational qualifications of participants or their parents, some of which were previously found to be associated with depression. Several socio-cultural factors impact the experience and expression of depression and the differential distribution of these factors across the country may account for such variations. This study was conducted during the COVID-19 pandemic, which was a major stressor for the concerned population. The time period of the study, as well as the nature of tools used, could also lead to variations between studies conducted in India. Regardless, these wide variations demonstrate the need for studies to be conducted according to geographic and demographic factors. The generalizability of such findings to the rest of the nation may be somewhat limited given the wide variations that exist between sections of the population. Future studies in this area must be careful to connect findings to the context and methodological factors, even as they try to collate nationwide data.

There have been very few studies in India that have explored the symptoms of depression experienced by the non-clinical youth population. However, a deeper understanding of the cognitive, affective, and somatic symptoms could be valuable in helping adolescents seek professional care before exacerbation of symptoms. Depression in this critical stage of life can have several long-term consequences for the individual, families, and the community as a whole. In the wake of the uncertainties and stress posed by the ongoing pandemic, it is also important to assess the sources of stress for this age group and devise interventions at the individual and systemic levels, including the family, college and university, potential workplaces, and neighborhoods. As the pandemic rages on and with possibilities of such events in the future, data emerging from such studies could identify protective and mitigating factors while offering keys to ensuring mental health and resilience in youth.

**Availability of Data and Material** The data that support the findings of this study are available on request from the corresponding author, Mini Narayanan. The data are not publicly available so as to ensure the privacy of research participants].

## Declarations

**Ethics Approval** Ethical approval for the study was obtained from the Institutional Review Board of the Tata Institute of Social Sciences, Mumbai. The ethical clearance certificate is attached.

**Consent to Participate** Informed consent was obtained from all individual participants included in the study.

**Consent for Publication** The participants have consented to the submission of reports for publication.

**Conflict of Interest** The authors declare no competing interests.

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