



Research Article

DEPRESSION, ANXIETY AND STRESS AMONG MEDICAL STUDENTS AND JUNIOR DOCTORS - A CROSS SECTIONAL STUDY IN A MEDICAL COLLEGE OF INDIA

Saumik Chakraborty¹, Sharmistha Bhattacharjee¹, Abhijit Mukherjee¹ and Kaushik Ishore^{2*}

¹Department of Community Medicine, Tripura Medical College, Hapania, Agartala, Tripura (West), 799014

²Department of Community Medicine, North Bengal Medical College

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ABSTRACT

Background: Presence of psychological morbidity in the form of anxiety, stress and depression among medical students has been reported from different parts of the world including India using various scientifically approved scales. Most of these studies focus on undergraduate medical students. Data on the psychological morbidities among internees, house staffs and post graduate trainees are lacking despite comprising a significant section of the student population in a medical college. **Objectives:** To assess depression, anxiety and stress and their epidemiological correlates among medical students and junior doctors of a rural medical college of Darjeeling district.

Materials and methods: A descriptive epidemiological study with cross sectional design was carried out among the medical students in North Bengal Medical College, Darjeeling, West Bengal in 2016. Ethical clearance was obtained from the Institutional Ethics Committee. Data were collected using the validated Depression, Anxiety & Stress Scale (DASS 21) with additional questions on certain epidemiological correlates. Data were entered in Microsoft Excel data analysed using IBM SPSS 20 and presented using the principles of descriptive and inferential statistics.

Results: A total of 678 medical students participated in the study. Overall proportion of anxiety stress and depression among the study subjects were 52.4%, 31.9% and 45.3% respectively. Female gender, current professional status, tobacco use, residing in the hostels, English as the medium of instruction, students without any worry and not feeling overburdened by the syllabus were identified as predictors significantly associated with anxiety, stress or depression.

Conclusion: The study revealed that a large proportion of medical students were suffering from anxiety, stress or depression. It requires urgent attention and availability of student counselling and other services to curb these morbidities. Further studies need to be carried out to find out other unseen precipitating factors.

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INTRODUCTION

Since long, medicine has been considered a highly desirable profession in the Indian society because of its economic security and future establishment. However, the stream is also recognized as a stressful profession which can have an undesirable effect on students' physical as well as psychological well being. Several studies across the world reported various factors like vast syllabus, academic pressure, dissatisfaction with their own education, concern about the future, pressure from the parents and so on as responsible for the wide prevalence of the psychological problems among medical students¹⁻⁴.

In our society, mental health of students do not merit enough attention⁵ and medical students are no exception.⁶ Social stigma, lack of support from family or peers, unavailability and inadequate infrastructure for treatment and counselling have been found to be some of the reasons⁵ for not seeking professional help⁷. Harmful consequences of these disorders include sleep deprivation, lack of concentration, impaired attention & decision making capability, poor academics & performance of clinical duties, low tolerance levels, conflict with self & others, drop out from the course, substance abuse, welcoming of other non-communicable diseases and ultimately reduced productivity in future⁸⁻¹². Grave consequence in the form of the suicidal tendencies among medical students having stress is also noticed.¹³⁻¹⁵

*Corresponding author: Kaushik Ishore

Department of Community Medicine, North Bengal Medical College

Studies have been conducted in different parts of the world including India using various scientifically approved scales to measure psychological morbidity like the DASS 21 (Depression, Anxiety, Stress Scale 21), Beck Depression Anxiety inventory, MSSQ (Medical Student Stress Questionnaire) etc. for assessment of anxiety, stress and depression among medical students¹⁻⁴. A study conducted among medical undergraduate students in a premier medical institution of Odisha (eastern India) using DASS 21 scale, Iqbal *et al* reported that more than half of the respondents were affected by depression (51.3%), anxiety (66.9%) and stress (53%).¹ A similar study from Alfaisal University in Riyadh, Saudi Arabia by Kulsoom *et al* also reported a high prevalence of depression, anxiety and stress (43%, 63%, and 41%, respectively) among the medical students before examination which decreased substantially following the mid term examinations (to 30%, 47%, and 30%, respectively)¹⁶.

Of the small number of studies conducted in India, most have been undertaken among undergraduate medical students.¹⁻⁴ Junior doctors like interns, housestaffs and post graduate trainees form a sizeable chunk of the health care professionals. High levels of responsibility coupled with stressful working hours, sleep deprivation, and repeated exposure to emotionally charged situations may lead to psychological stress that can impede their functioning and experience increased psychiatric morbidity.^{17,18}

Consequently present study includes interneers, house staffs and post graduate trainees, in addition to undergraduate students, to explore the extent of anxiety, stress and depression among all students studying in a medical college. The generated epidemiological data will help policy makers in developing strategies and interventions to improve doctor wellbeing and which could potentially have a positive impact upon patient care. Earlier the problems are identified; the earlier these measures can be instituted.

Objectives: To assess depression, anxiety and stress and their epidemiological correlates among medical students and junior doctors of a rural medical college of Darjeeling district.

MATERIALS AND METHODS

A descriptive epidemiological study with cross sectional design was carried out from July 2016 to October 2016 among medical students and junior doctors (interns, house staffs and post graduate trainees) in North Bengal Medical College, Darjeeling, West Bengal.

Data Collection

Participants were explained about the purpose and procedures of the study and their written informed consents were taken prior to data collection. Data were collected using the validated Depression, anxiety and stress scale (DASS 21) questionnaire with additional questions on basic socio-demographic variables (gender, religion, tobacco use, alcohol consumption and current professional status) and certain epidemiological correlates (family member in health related profession, comfortability in English as the medium of instruction, presence of chronic disease, any reason of worry and feelings of being overburdened by the syllabus).

Operationally, regular tobacco use was defined as daily intake of any form of tobacco (both smoking and smokeless) and alcohol consumption as intake of alcohol 3 or more days in a

week. The questionnaires were given to the participants to fill up at their convenience and their responses were collected within the next 7 days.

DASS 21 Scale: It is a self-administered questionnaire consisting of 21 questions designed to measure depression, anxiety and stress. Each of the domains (depression, anxiety and stress) is represented by 7 questions. In completing the DASS, the individual was asked to indicate the presence of a symptom over the last week. Each question was scored from 0 (did not apply to me) to 3 (applied to me very much or most of the time). Scores for depression, anxiety and stress were calculated by summing the scores for the relevant questions in each domain. The individuals were categorized as normal, mild, moderate, severe and extremely severe based on recommended cut-off scores according to DASS 21 scale for each domain¹⁹.

Data analysis: Collected data were checked for consistency & completeness and was entered in Excel (Microsoft Corp). Data was analyzed using IBM SPSS (version 20). It was organized and presented using the principles of descriptive statistics. Binary logistic regression, unpaired t test (for normally distributed data) and Mann Whitney U test (when data were not normally distributed) was applied to test association between anxiety, stress, depression with the epidemiological correlates. Binary logistic regression was applied after clubbing the subcategories (Table no 1) in each of the domain into 2 groups, absent (category normal) and present (category mild, moderate, severe and extremely severe) like depression absent and present (Table no 2 and 3). Gender, religion, tobacco use, alcohol consumption, current professional status, family member in health related profession, comfort ability in English as an instruction medium, presence of chronic disease, any reason of worry and feels overburdened by the syllabus; these were considered as an important predictors or independent variables. On the other hand anxiety, stress, depression (either absent or present) were taken as outcome or dependent variables.

Ethical Issues: Ethical clearance was obtained from the Institutional Ethics Committee. Participants were assured about the confidentiality and anonymity of the information. Following the completion of the DASS 21 assessment, brief feedback was provided to them. Those who scored higher than the cut off score of each of the domain (anxiety, stress and depression) were advised to receive counseling and referred to appropriate facilities for treatment along with the score card.

RESULTS

Background characteristics

Of the 678 medical students that participated in the study; 487 were undergraduate students, 72 were housestaffs/interns and 119 were post graduate trainees. The mean age of the participants was 23.5 ± 4.3 years. Majority of the participants were males (75.7%). Most of the students were staying in hostel (86.6%). A tenth (11.7%) of the students were uncomfortable with English as the instruction medium. Alcohol consumption and tobacco use was noted among 35.3% and 31.9% students respectively.

Proportion of anxiety, stress and depression: Distribution of the study subjects according to different psychological domains (anxiety, stress and depression) and sub categories (as normal, mild, moderate, severe and extremely severe) under

these domains are shown in Table 1. Overall proportion of anxiety stress and depression among the study subjects was 52.4%, 31.9% and 45.3% respectively. Among the study subjects 38.4% had all the psychological domains eg anxiety, stress and depression (Figure 1).

Table 1 Distribution of study subjects according to subcategories under these psychological traits (n=678)

Anxiety		
Subcategories	Frequency	Percentage
Normal	323	47.6
Mild	129	19.0
Moderate	86	12.7
Severe	61	9.0
Extremely severe	79	11.7
Stress		
Normal	462	68.1
Mild	91	13.4
Moderate	75	11.1
Severe	38	5.6
Extremely severe	12	1.8
Depression		
Normal	371	54.7
Mild	109	16.1
Moderate	123	18.1
Severe	42	6.2
Extremely severe	33	4.9
Total	678	100.0

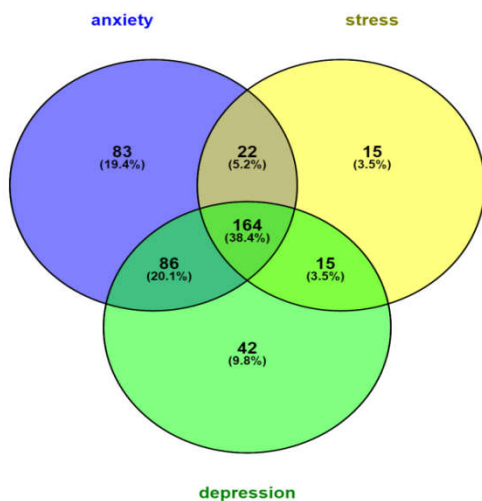


Fig 1 Venn diagram showing proportion of anxiety, stress and depression

Table 2 Anxiety, stress, depression and associated socio-demographic variables (n=678)

Sociodemographic variables	Anxiety (N%)		AOR	Stress (N%)		AOR	Depression (N%)		AOR	Total
	Absent	Present		Absent	Present		Absent	Present		
Gender										
Male	247(48.1)	266(51.9)	1(Referent)	360(70.2)	153(29.8)	1(Referent)	282(55.0)	231(45.0)	1(Referent)	513(100.0)
Female	76(46.1)	89(53.9)	.397(.565,1.254)	102(61.8)	63(38.2)	.021(.408,.930)	89(53.9)	76(46.1)	.418(.572,1.261)	165(100.0)
Religion										
Others [#]	79(39.3)	122(60.7)	1(Referent)	134(66.7)	67(33.3)	1(Referent)	104(51.7)	97(48.3)	1(Referent)	201(100.0)
Hindu	244(51.2)	233(48.8)	.087(.954,2.015)	328(68.8)	149(31.2)	.334(.821,1.789)	267(56.0)	210(44.0)	.398(.811,1.696)	477(100.0)
Place of stay										
Others*	36(39.6)	55(60.4)	1(Referent)	56(61.5)	35(38.5)	1(Referent)	38(41.8)	53(58.2)	1(Referent)	91(100.0)
Hostel	287(48.9)	300(51.1)	.008(1.187,3.154)	406(69.2)	181(30.8)	.084(.395,1.059)	333(56.7)	254(43.3)	.006(1.213,3.084)	587(100.0)
Tobacco use										
Absent	225(48.7)	237(51.3)	1(Referent)	316(68.4)	146(31.6)	1(Referent)	262(56.7)	200(43.3)	1(Referent)	462(100.0)
Present	98(45.4)	118(54.6)	.026(.400,.943)	146(67.6)	70(32.4)	.401(.530,1.289)	109(50.5)	107(49.5)	.058(.440,1.013)	216(100.0)
Alcohol consumption										
Absent	195(44.4)	244(55.6)	1(Referent)	297(67.7)	142(32.3)	1(Referent)	239(54.4)	200(45.6)	1(Referent)	439(100.0)
Present	128(53.6)	111(46.4)	.114(.919,2.211)	165(69.0)	74(31.0)	.823(.602,1.497)	132(55.2)	107(44.8)	.758(.696,1.646)	239(100.0)
Current professional status										
Undergraduate	192(42.0)	265(58.0)	1(Referent)	304(66.5)	153(33.5)	1(Referent)	234(51.2)	223(48.8)	1(Referent)	457(100.0)
Intern / House-staff	52(51.0)	50(49.0)	.000(1.694,4.229)	75(73.5)	27(26.5)	.477(.743,1.889)	67(65.7)	35(34.3)	.079(.955,2.307)	102(100.0)
Post graduate trainee	79(66.4)	40(33.6)	.009(1.205,3.753)	83(69.7)	36(30.3)	.717(.488,1.639)	70(58.8)	49(41.2)	.586(.485,1.506)	119(100.0)
Total	323	355		462	216		371	307		678(100.0)

Others included Muslims and Christians, * Others included residing in own residence or as a paying guest

Factors associated with anxiety, stress and depression: Binary logistic regression showing relationship between outcome variables (anxiety, stress and depression) and the predictors is shown in Table no 2 & 3.

Anxiety: Binary logistic regression [Table no 2] analysis suggests that the odds of suffering from anxiety were significantly lower among post graduate trainees [AOR. 009(1.205, 3.753)], those who were residing in the hostel [.008(1.187,3.154)] and significantly higher among students who used tobacco. [AOR.026 (.400,.943)].Table 3 shows that the odds of suffering from anxiety were significantly lower among the subjects who did not feel overburdened by the syllabus [AOR.000(1.407,2.647)].

Stress: Significantly higher odds of stress was associated with female gender [AOR.021 (.408,.930)]and the participants who were uncomfortable in English as an instruction media [AOR.017(.336, .900)](Table 2 & 3 respectively). The odds of suffering from stress were significantly lower [Table no 3] among students without any worry [AOR .000(1.503,2.973)] and in students who did not feel overburdened by the syllabus [AOR.000(1.325,2.600)].

Depression: Table 2 shows that significantly lower odds of depression was noted among hostel residents [AOR. 006(1.213,3.084)].It was found from Table 3 that significantly lower odds of depression was seen among the students who had no worries [AOR.018(1.068,2.040)] and those who did not feel overburdened by the syllabus [AOR .036(1.022,1.916)] but significantly higher odds of depression was observed among students those were uncomfortable with English as an instruction media [AOR .003(.292,.773)].

Hours spent in different activities

The study participants who were suffering from anxiety among them, mean time spending in internet, outdoor games was higher than the students not suffering from anxiety. Mean hours of sleep was found to be significantly higher among students suffering from anxiety. Mean times spent in study, internet, outdoor games and average hours of sleep was found higher among students suffering from stress compared to students without any stress.

Table 3 Anxiety, stress, depression and other epidemiological correlates (n=678)

Correlates	Anxiety (N%)		AOR	Stress (N%)		AOR	Depression (N%)		AOR	Total
	Absent	Present		Absent	Present		Absent	Present		
Family member in health related profession										
Yes	84(54.2)	71(45.8)	1(Referent)	111(71.6)	44(28.4)	1(Referent)	92(59.4)	63(40.6)	1(Referent)	155(100.0)
No	239(45.7)	284(54.3)	.121(.516,1.081)	351(67.1)	172(32.9)	.433(.563, 1.279)	279(53.3)	244(46.7)	.237(.549,1.160)	523(100.0)
Comfortability in studying English as an instruction media										
Yes	294(49.1)	305(50.9)	1(Referent)	418(69.8)	181(30.2)	1(Referent)	341(56.9)	258(43.1)	1(Referent)	599(100.0)
No	29(36.7)	50(63.3)	.069(.387,1.037)	44(55.7)	35(44.3)	.017(.336, .900)	30(38.0)	49(62.0)	.003(.292, .773)	79(100.0)
Presence of chronic disease[^]										
Yes	17(39.5)	26(60.5)	1(Referent)	28(65.1)	15(34.9)	1(Referent)	19(44.2)	24(55.8)	1(Referent)	43(100.0)
No	306(48.2)	329(51.8)	.142(.850,3.126)	434(68.3)	201(31.7)	.737(.573, 2.199)	352(55.4)	283(44.6)	.165(.830,2.978)	635(100.0)
Any reason of worry[§]										
Yes	110(45.5)	132(54.5)	1(Referent)	138(57.0)	104(43.0)	1(Referent)	116(47.9)	126(52.1)	1(Referent)	242(100.0)
No	213(48.9)	223(51.1)	.697(.771,1.476)	324(74.3)	112(25.7)	.000(1.503,2.973)	255(58.5)	181(41.5)	.018(1.068,2.040)	436(100.0)
Feels overburdened by syllabus										
Yes	108(38.0)	176(62.0)	1(Referent)	169(59.5)	115(40.5)	1(Referent)	140(49.3)	144(50.7)	1(Referent)	284(100.0)
No	215(54.6)	179(45.4)	.000(1.407,2.647)	293(74.4)	101(25.6)	.000(1.325,2.60)	231(58.6)	163(41.4)	.036(1.022,1.916)	394(100.0)
Total	323	355		462	216		371	307		678(100.0)

[^]Chronic diseases.g hypertension, bronchial asthma, diabetes mellitus etc
[§]Worries examples included concerned for future& carrier, health, family problems, work load etc

Table 4 Anxiety, stress, depression and hours spending in different activities (n=678)

	Anxiety		p value	Stress		p value	Depression		p value
	Present	Absent		Present	Absent		Present	Absent	
Hours spent in study	4.144 ±2.3083	3.901±2.2283	.504	4.308±2.5634	3.897±2.1125	.098	4.195±2.378	3.889±2.1738	.130
Hours spent on internet	3.600±2.7099	2.972± 2.131	.605	3.644±3.141	2.6277±2.3780	.919	3.598±3.055	2.6902±2.2449	.409
Hours spent in outdoor games	.978±1.1868	.663±.8547	.578	.975±1.3323	.760±.8864	.686	.941±.735	1.1868±.9191	.486
Average hours of sleep	7.462±1.4289	7.198±1.3762	.015	7.391±1.3498	7.311±1.4368	.488	7.360±7.317	1.4641±1.3637	.796

Table no 5 Depression, anxiety and stress among medical students at different settings.

Author	Setting	Sample size	Assessment scale	Depression	Anxiety	Stress
Iqbal <i>et al</i> ¹	Institute of Medical Sciences, Bhubaneswar, Odisha	353 under graduate students	DASS 42	51.3%	66.9%	53%
Kumar <i>et al</i> ²¹	JSS medical college and Mysore Medical College, Karnataka	332 medical students	DASS	37.6%	52.1%	33.7%
Wahed <i>et al</i> ²	Fayoum University, Egypt	442 medical students	DASS 21	60.8%	64.3%	62.4%,
Tabalipa <i>et al</i> ³	Southern State of Santa Catarina, Brazil	346medical students	Beck Depression Anxiety Inventory	35.5%	32.8%	
Melaku <i>et al</i> ⁴	Jimma University, Ethiopia	317 medical students	MSSQ-20			52.4%
Shete <i>et al</i> ²²	Government Medical College, Aurangabad	50 post graduate students	DASS 42	20%	80%	52%

Mean time spent on the internet and outdoor games were higher among participants suffering from depression than the participants without any depression. But none of the differences were found to be statistically significant [Table 4].

DISCUSSION

In absence of timely diagnosis and treatment, mental health problems may lead to various disabilities in education, occupation and finances. These in turn may lead to a diminished quality of life.¹⁶An early and appropriate assessment of these problems to prevent further progression to harmful consequences is therefore very important. In this context, the findings of the present study are discussed and interpreted.

Magnitude of anxiety, stress and depression

Extent of anxiety, stress and depression among the studied subjects of this college was found to be substantially high. Various studies in India and across the world also showed differences in the extent of these problems in different settings using a variety of screening tools. (Table 5). The reasons include methods used for assessment, grading, and cut off used to assess depression and difference in the sample size selected for the study.

Factors associated with anxiety, stress and depression

Gender

Gender is a critical determinant of mental health and mental illness.

According to the American Psychological Association (APA), males and females respond differently to stress, anxiety and depression, both physically and mentally.²³A higher associations of anxiety, stress and depression with female gender have been reported from students in the present study and in other studies on medical students in India and other developing countries.^{1,2,3,21} Higher proportion of presence of these psychological domains among females might be due to over consciousness, peer or family pressure and fear of future prospect.²⁴

Place of stay

Life in hostels provides a unique experience and students who live in hostels are perceived to be socially and emotionally supportive with a strong sense of community and generally tend to be more satisfied.²⁵Sharing of emotions and personal problems among the peers of same age group and peer support may be the reason of less anxiety and depression among the hostel boarders. However a study by Kunwar *et al*²⁶,among medical students in Nepal contradicts the present findings.

Tobacco and alcohol use

Though tobacco and alcohol have been found to be cyclically related to perceived stress and depression in general population,²⁷there is no consensus regarding their to perceived stress, anxiety and depression among the medical students. While most studies have reported higher scores of anxiety, stress and depression among non-smokers and non-alcoholics¹, Melaku *et al*⁴ reported higher odds of stress among students

who are cigarette smokers and consume alcohol. Students often use these substances as a solution to get rid of the problem. Substance use among medical students is not uncommon and many studies from India and other countries raise the issue²⁸⁻³¹. Gradually harmful consequences start in chronic abusers which provide negative inputs to the students' academic performances and carrier upliftment.

Current professional status

Shete *et al* in their study concluded that a high level of stress exists among postgraduate medical students.²² However, no study till date has tried to look into the reason for the lower odds of anxiety among postgraduates medical students than undergraduates, despite their increased responsibility and a more complex nature of their jobs. We believe that enrolment into a post graduate course following successful qualification in the entrance examination, is perceived as a step ahead towards future settlement and financial self sufficiency leading to a decrease in the levels of anxiety. Further studies comparing the psychological domains between undergraduates, interns/house-staffs and post graduate medical students are necessary to provide a definite answer.

English as an instruction media

In India, English remains the predominant medium for instruction and communication in the medical curriculum. However, proficiency in English is not a pre-requisite for entry into medical schools. A large number of medical students who have been educated in their vernacular language, thus, find it difficult to follow lessons and for the day to day communications in college leading to increased stress among them. Problems with the medium of instruction as a predictor of stress among 1st year undergraduate medical students has also been observed by Shah *et al*³².

Other reasons of worry

Significantly lower odds of stress and depression were found among students with no apparent reasons of worry. A qualitative study among medical students of Pakistan revealed that greater emphasis on attendance and passing tests and time management issues acted as stressor. Additionally, pressures from parents to achieve academic excellence, tensions about future, loss of confidence, mood changes and bullying by peers and teachers were also responsible which led to coping by disengagement, self-distraction and substance use.³³ Similarly, a British study reported the feelings of frustration and powerlessness as the most cause of worry among medical students.³⁴

Feels overburdened by the syllabus

Medical graduates are often overwhelmed by the vast syllabus and this may be intensified by pressure from the peers, inability to fulfil the expectations from the family and presence of worries either personal/professional.³⁵ Present study revealed statistically lower proportion of anxiety, stress and depression among the students who did not feel overburdened by the syllabus. A study conducted by Shah *et al*²⁹ among first year medical undergraduate students reported that the among students diagnosed with stress, more than 50% strongly agreed that the vast content of the syllabus was the reason of their stress.

Stress, anxiety, depression and time spent in different activities

Though statistically not significant, these activities may reflect the mental status of the individual. These activities may be adopted by the sufferers to get relieved from the problems or these features may be the outburst of the problem he/she is suffering from. Time spent more in internet may welcome other upcoming social problems like internet addiction /nomophobia.

CONCLUSION

The study reports a considerable proportion of students was suffering from anxiety, stress and depression and also identified several predictors associated with these psychological morbidities. Difference in proportion was also observed among different tiers of medical education such as undergraduates, interns/house staffs and post graduate trainees. High competitions, inability to cope with the high expectations of parents after joining the course, academic pressure and peer pressure, etc might be the other hidden factors responsible for these problems. There is a need to make the students and also the teachers aware about these three important psychological morbidities and their risk factors, early identification and treatment seeking.

Limitation

The present study is based on the interpretation of the scores obtained from DASS 21 scale, a self-administered questionnaire. There is possibility of intentionally inaccurate responses from the responders also known as social desirability bias.

Recommendations

The medical institutes should adopt periodic screening of the medical students and availability of proper counselling, support and treatment if required should be present. Provision of recreational activities and educational trips may be helpful to some extent. Further it needs prioritisation of the problem and specification of the predictors at different stages of medical education and restructuring of this professional field by higher authorities accordingly.

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