



A STUDY TO ASSESS THE PREVALENCE OF DEPRESSION, ANXIETY AND STRESS AMONG UNDERGRADUATE MEDICAL STUDENTS ACROSS THE STATE OF MAHARASHTRA, INDIA

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ABSTRACT

Background: Considerable degree and severity of psychological morbidity has been reported among medical students and they tend to have greater psychological distress than the general population. Presence of psychological morbidity in undergraduate medical students has been reported from various countries across the world. However there are very few Indian studies documenting the same and even lesser studies aiming at understanding the causes.

Objectives: To determine the prevalence and severity of Depression, Anxiety and Stress among undergraduate medical students across medical colleges in Maharashtra and identify the causative factors responsible for the same so that suitable preventive measures can be suggested to tackle them.

Methods: Observational, Cross-Sectional, Online Questionnaire Based Study was conducted with a sample of 1300 undergraduate medical students. The data obtained was entered using Microsoft Excel 2013 and analyzed using SPSS 16.0 Software. The Pearson chi square correlation test was used to find out the association of the personal and socio-demographic factors with the levels of depression, anxiety and stress amongst the respondents.

Results: Amongst the total respondents, the prevalence of depression, anxiety and stress was found to be 54.64%, 66.11% and 34.46% respectively. Many factors were found to have a statistically significant correlation with these levels of psychological illnesses.

Interpretation and Conclusion: There is a very high prevalence and intensity of depression, anxiety and stress among undergraduate medical students which needs to be looked into and effectively dealt with on an urgent basis. The strong association of these levels with many of the socio-demographic and personal characteristics of the students will help us highlight the factors responsible for them and suggest strategies to deal with them effectively at a personal and institutional level.

KEYWORDS : Anxiety, Depression, Maharashtra, Stress, Undergraduate medical students.

The importance of mental health has been recognized by World Health Organisation (WHO) since its origin, and is reflected in the definition of health in the WHO Constitution as "not merely the absence of disease or infirmity", but rather, "a state of complete physical, mental and social well-being" [1]. The World Health Organisation defines depression as a common mental disorder, characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, feelings of tiredness and poor concentration [2]. Stress is any uncomfortable "emotional experience accompanied by predictable biochemical, physiological and behavioural changes" [3]. Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure, as defined by the American Psychological Association [4]. Today, mental health issues are a major public health concern due to their high prevalence rates, difficulties in detection, treatment and their tendency to become chronic. Also, a large proportion of students experiencing mental health problems are reluctant to open up due to the associated social stigma, considering it a sign of weakness and incompetence. As a result, many suffer in silence without seeking help [5].

Medical education has known to impose a significant psychological stress on undergraduate students [6]. Considerable degree and severity of psychological morbidity has been reported among medical students ranging from anxiety, stress and interpersonal problems to severe depression and suicidal ideation amongst other psychiatric disorders [7-12] and they tend to have greater psychological distress than the general population [10]. The goal of medical education is to graduate knowledgeable, skilful and professional physicians and the current medical school curriculum has been designed accordingly. However, certain aspects of training may have unintended detrimental effects on students' mental health [13]. Numerous factors such as the ever increasing study load, long course duration, long college hours, repetitive examinations, competitive environment, difficulty in time management and

expectations from society have proven to be responsible for the high prevalence and intensity of physical and psychological morbidity amongst medical students [14]. With such a hectic schedule, it becomes difficult to find time for hobbies, exercise and relaxation. Lack of sound sleep, irregular and unhealthy food habits and unsatisfactory hostel stay further contribute to this [15]. Adding to this unending list are the government's ever changing academic policies, rising instances of violence against doctors and the tough competition for admissions in Postgraduate courses. [16].

Depression, anxiety and stress affect students both professionally and personally. On a personal level, this distress may lead to substance abuse, disturbed relationships, health deterioration, decline in physical vigour and suicidal ideation. Professional consequences include decline in academic performance, empathy and quality of patient care. There may also be a high incidence of medical errors, deterioration of interpersonal relations with colleagues and faculty members, ultimately affecting the integrity of the medical profession. [17]. Previous studies have reported a considerable degree of depression, anxiety and stress among undergraduate medical students and these levels are found to be significantly higher compared to students from other streams [18]. A study conducted in Bangalore, a city in India shows that 32.9% of surveyed students suffered from stress, 46.7% from anxiety and 33.7% from depression in varying degrees of severity [19].

Very few similar studies have been done for medical students in other parts of India, and almost all of them have been conducted at institutional or university levels. This is the first study of its kind; undertaken for evaluating the prevalence and severity of Depression, Anxiety and Stress among undergraduate medical students across all medical colleges in Maharashtra and finding out its association with the socio-demographic, personal characteristics and life-style of the students so that suitable preventive measures can be suggested to tackle them at a personal and institutional level.

Methods

1. Study design: Observational, Cross-Sectional, Online Questionnaire Based Study

2. Duration of study: 2 months

3. Place of study: All medical colleges across the state of Maharashtra, India

4. Sample size and method of sampling:

The total number of seats in the undergraduate medical course of MBBS in Maharashtra (Government and Private medical colleges) is around 6,245, thus, there are a total of nearly 25,000 undergraduate medical students in Maharashtra. With a Confidence Level of 95% we chose a sample size of 1,300 students with a Confidence Interval of 2.65%

5. Inclusion criteria:

Undergraduate students of MBBS course studying in medical colleges of Maharashtra, India

6. Exclusion criteria:

- Postgraduate medical students and Registered Medical Practitioners
- Students of Paramedical courses
- Any student not consenting to participate in the study
- Students with previously diagnosed depression or psychiatric ailments

7. Tools used:

- A self-designed questionnaire to gather information about the socio-demographic and personal characteristics, general schedule, daily activities and life style of the respondents.

The questions were designed after conducting a pilot study amongst a few students wherein they were asked about the factors which they felt were directly or indirectly responsible for the high rate and degree of depression, anxiety and stress in medical students. The questionnaire includes Multiple Choice Questions; Yes/No type Questions, Likert Scale questions and Personal Opinion Questions. No question was mandatory for the respondent to answer. Complete confidentiality was assured and maintained. The questionnaire was validated by faculty members from the Departments of Psychiatry, Clinical Pharmacology and Pharmacology of the institute.

- Depression Anxiety Stress Scale (DASS-21)

DASS-21 is a previously validated and standardized 21-item questionnaire which includes three self-report scales designed to measure the negative emotional states of depression, anxiety and stress. Each of these three scales contains 14 items, which has been divided into subscales of 2-5 items with similar content. The Depression scale assesses dysphoria, devaluation of life, hopelessness, self-deprecation, lack of interest / involvement, anhedonia and inertia. The Anxiety scale assesses situational anxiety, skeletal muscle effects and subjective experience of anxious affect. The Stress scale is sensitive to levels of chronic non-specific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset/agitated, irritable/over-reactive and impatient. Respondents are asked to use 3-point severity/frequency scales to rate the extent to which they have experienced each state over the past week [20].

- Kuppaswamy's socioeconomic classification scale for urban population [21].
- GB Prasad's socioeconomic classification scale for rural population [21].

The study was conducted with the help of a Google document. We emailed a copy of our survey questionnaire, the Institutional Ethics Committee's approval and a request letter to conduct the survey to

the Deans of all the medical colleges in the state of Maharashtra. On receiving their permission, we dispatched the link of the online survey to the students of the concerned medical college using social media applications and other similar modes. The students were able to access the questionnaire only after consenting to participate in the study after reading the Informed Consent Document. The first 1300 responses were considered for further statistical analysis.

8. Ethical considerations: The study was submitted to and approved by the Institutional Ethics Committee. The research participants were allowed to access and answer the survey questionnaire only after consenting to participate in the study after reading the Informed Consent Document. At no point during the study was the research participant asked to reveal his/her identity. Complete anonymity was assured and maintained.

9. Statistical Analysis:

The data obtained was entered using Microsoft Excel 2013 and analyzed using SPSS 16.0 software. The DASS scoring system was used to categorize the respondents according to the severity of depression, anxiety or stress levels. The Pearson chi square correlation test was used to find out the association of the personal and socio-demographic factors with these levels. Graphs were prepared using Microsoft Excel 2013

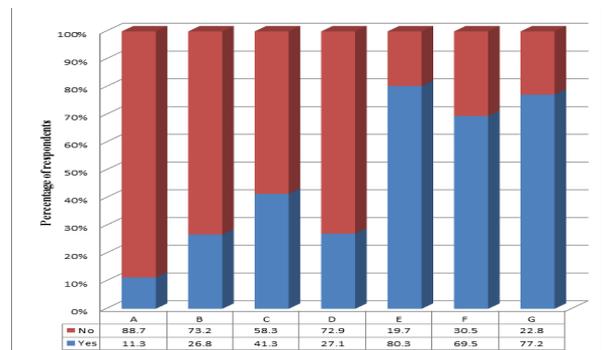
Results

Table 1: Severity distribution of DASS scores among undergraduate medical students (n=1300)

Subscale	Normal	Mild	Moderate	Severe	Extremely severe
Depression	364	226	339	282	89
Anxiety	308	133	460	293	106
Stress	608	244	235	152	61

Table 1 shows the number of the survey respondents lying in the categories: Normal, Mild, Moderate, Severe and Very severe Depression, Anxiety and Stress. Amongst the 1300 responses, for statistical convenience, those falling within the subscale of Normal and Mild were considered as 'Not Depressed/Anxious/Stressed' while those falling under the subscale of Moderate, Severe and Very severe were considered as 'Depressed/Anxious/Stressed' [Table 2]. Of the total respondents, the prevalence of depression, anxiety and stress was found to be 54.64%, 66.11% and 34.46% respectively. A staggering 35.80% and 30.20% of the surveyed students reported to have experienced a beginning and increase, respectively in stress related issues after joining MBBS course. Despite such a high prevalence of psychological morbidity in medical students, the survey revealed that only 11% of respondents had consulted a psychiatrist for the same [Graph 1] and only 27% of the undergraduate medical students knew if their college had a system/counseling unit which they could approach if they felt stressed, depressed or anxious [Graph 1].

Graph 1: Responses of the students to survey questions



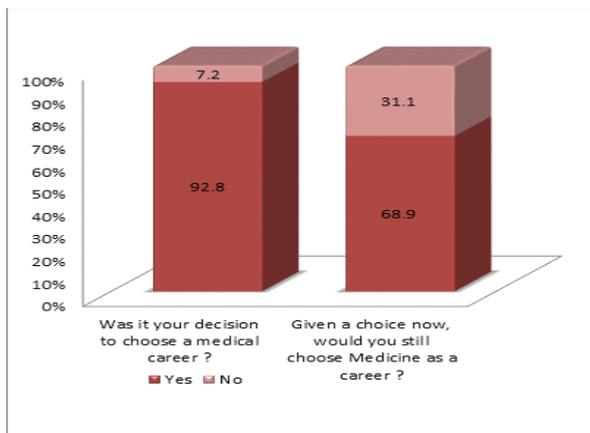
A) Have you ever consulted a psychological counsellor after entering MBBS?

- B) Are you aware of any system in your college / hospital to tackle stress/ depression in students?
- C) Do the Government's ever changing academic policies have a negative impact on you?
- D) Have you ever faced bullying by your seniors?
- E) Do you find it difficult to manage your time?
- F) Do repetitive exams make you anxious?
- G) Do you feel that your peers are academically better than you?

The rising levels of psychological morbidity in undergraduate medical students is also reflected in Graph 2 which shows a considerable percentage of respondents who, given a choice now, would opt to back out from the medical profession and rather choose another course.

Table 2 depicts the socio-demographic correlates of depression, anxiety and stress with the corresponding strength of association. The levels of depression, anxiety and stress were found to be significantly associated with the year of study; the students of 2nd year of MBBS reported a lesser severity for each of the parameters (depression, anxiety and stress) than those studying in 1st year but the prevalence was seen to rise amongst students of successive academic years of MBBS. The levels were also seen to be higher in students of government medical colleges than private medical colleges and in those staying in hostels as compared to those staying at their own house. The students taking admission through open category were found to be more affected than those taking admission through reserved category. The levels of depression, anxiety and stress were also significantly greater in students who had completed their primary schooling from a vernacular medium school as opposed to those from English medium schools. A statistically significant association was also found between the mental ill-health of their students and their scores in the 12th standard board examinations [Table 2].

Graph 2: Responses of the students with respect to their opting for a career in the field of Medical Health Sciences



The graph denotes a fall in the number of students willing to continue the course of MBBS after beginning it as compared to their willingness before joining.

Table 2 also depicts the correlation of depression, anxiety and stress and the personal characteristics of the respondents with the corresponding strength of association. The students who claimed to exercise frequently, persuade their hobbies regularly or participate in extracurricular activities showed to have much lower levels of depression, anxiety and stress than those who didn't. The levels were also found to be strongly associated with the duration and quality of sleep which the students had; both being significantly lower in students facing psychological issues. Another important finding of this study was the high prevalence and frequency of alcohol consumption and smoking in those facing depression, anxiety or any stressor in their life. A significant 52% of respondents also claim that the ever changing academic policies of the

Government have a negative impact on them [Graph 1]. A considerable number of students face bullying by seniors in the form of ragging which may also hamper their psychological health [Graph 1].

The heavy burden of a vast syllabus on medical students makes it extremely difficult to manage their time well. Repetitive examinations, extreme competition and peer pressure due to limited number of postgraduate seats in the country also take a toll on the students' mental health [Graph 1]

Living outside ones comfort zone and away from the family, in a completely new environment and locality, does affect the students, especially during their first few weeks at hostel [22]. Our results show that the quality of hostel facilities, accommodation and food do significantly impact the mental health of the hostel boarders. The levels of depression, anxiety and stress were also found to correlate significantly with the frequency of their home visits [Table 2]

Discussion

This study highlights the fact that Indian medical students are no exception to the general tendency of a very high prevalence and intensity of depression, anxiety and stress among undergraduate medical students. This needs to be effectively dealt with on an urgent basis. The positive correlation of the prevalence of psychological illnesses with many of the socio-demographic and life-style characteristics of the students will help us highlight the factors responsible and suggest strategies to deal with them effectively at a personal and institutional level.

This study has not only confirmed but also fortified the general impression that there is considerable amount of psychological morbidity amongst undergraduate medical students. The results are more severe as compared to the studies conducted in other geographical regions in India [23]. There is an evident rise in emotional disturbances perceived by the students as they enter and navigate through this journey of MBBS. Despite the high levels psychological problems faced by the students, very few eventually accepted it and sought the help of a psychiatrist to deal with the same. The society perceives these issues as signs of weakness and incompetence. This social taboo associated with psychiatric disorders may be the reason why the students hesitate to open up about these issues to their parents, colleagues or teachers; choosing to suffer silently instead. In spite of there being several studies documenting the adverse effects of MBBS on the students' mental health, steps to tackle them have seldom been taken. A significant percentage (73.2%) of the respondents were unaware about the presence of any psychological counselling unit or any other mechanism / system to tackle emotional disturbances in students in their respective colleges; although on further investigation, majority of the colleges did claim to have such systems and many other facilities available for the students to seek help and comfort for their psychosocial well-being. This goes to show that although there might be steps and interventions taken by the administration in this regard, the gap between them and the needy students has not yet been effectively bridged.

Prevalence of mood disorders was not found to be significantly different in either of the sexes or age group. The levels of depression, stress and anxiety amongst medical students also varies with the academic year. A huge jump from the junior college to a professional college is intimidating for many. A new environment, new colleagues, and for some, even a new city or state is tough to adapt to, along with the vast first year subjects to be covered in less than a year. The chaotic atmosphere of the hospital premises and the cadaveric dissection too could seem to be daunting at the beginning of the first year. Those from outside the city have another aspect to deal with – the hostel. A hostel is not simply a place for living but a center of education. Students learn as much as from their friends at hostel as they do from their lectures in college. It enriches the understanding of the curriculum through analytical discussion among the students living in the hostels, and may contribute to the

development of their personality and character. However, students living in hostels may face many difficulties and hurdles such as staying away from family, financial crunch, issues related to adjustment with roommates, distress, alterations in their eating and sleep habits, etc [22]. These could be few of the reasons contributing to the greater prevalence of depression, anxiety and stress in them.

A good boarding facility in the campus with good infrastructure and a hygienic atmosphere could make remarkable difference to a student who has just come out of his comfort zone i.e. his/her house to a completely alien place for such a long period. A spacious, non crowded room, availability of clean washroom with abundant water supply, an access to refreshment with healthy food can certainly make one comfortable and surely help him/her to get adjusted to this new environment with less anxiety and stress. In our study, we have observed that there is a strong association between the prevalence of depression, anxiety, stress with participation in extracurricular activities. So developing a good sports complex and gymnasium for the students can surely improve their mental and physical health. It can also help strengthen the bond among students and improve their emotional quotient.

Second year has always been known to be the most stress-free phase of MBBS and this is well reflected in the results of this survey too. However, the stressors only scale upwards thereafter. The vast syllabus and clinical postings along with the increased burden of academic performance may have an impact on the mental health of the third year and final year students.

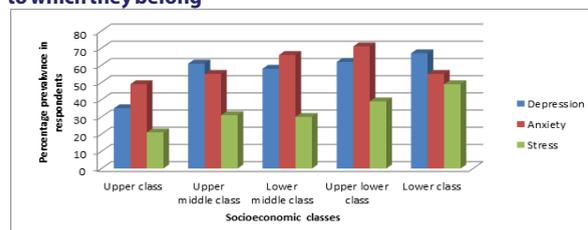
The medical students studying in private medical colleges were found to cope better with the stressors of MBBS than those studying in the public sector. Reasons contributing to this could be due to the better infrastructure, amenities, food and boarding facilities in the private colleges and the higher spending capacity of these students in comparison to their government medical college counterparts.

The presence of mood disorders was also found to be higher in students securing admission through the open category as against those taking admission through the reserved category. The financial support extended to the students of reserved category along with reservation of seats during their educational and professional tenure could play a role in alleviating the burden on them.

There are studies documenting the effect of high self expectations in achievers on their stress levels [24]. This study too shows the prevalence of psychological distress to be more in students having more than 95% of marks at 12th Standard at the time of medical admission as compared to all others. This confirms that students who are high achievers are more under stress which may be as a result of higher parental, peer and self expectations on academic performances [25].

The cost of living has significantly surged in recent times demanding a parallel increase in the spending capacity of the people. As depicted in graph 3, the prevalence of depression and stress were found to be higher in the students who fall in the category of lower socioeconomic class as against those belonging to middle or upper classes of the society.

Graph 3: Association of prevalence of Depression, Stress and Anxiety levels of the respondents with the socioeconomic class to which they belong



All the current registered government and private medical colleges in Maharashtra use English as the main language for educational and official purposes. Also, majority of the medical books are printed in English language and the students are bound to give the University examinations in the same language. This puts a tremendous amount of load on the students who have completed their primary, secondary and higher secondary education from regional vernacular schools and are not well versed in English. They are forced to learn written and spoken English which adds to their problems in the already stressful course of MBBS [Table 2].

The indulgence in smoking cigarettes and alcoholism has been reported with a greater frequency and intensity in medical students [26]. Our study has found this lifestyle of students to be significantly associated with their depression and stress levels. Many students resort to such behaviour so as to find a temporary escape from their stressful lives. This is considered to be a mechanism of coping with the stressors by many.

The government policies regarding medical education are grossly inadequate and unstable, making the course of MBBS even more stressful.

Though the incidences of ragging in medical colleges have drastically declined in recent times, it is still quite prevalent (Graph 1) and is a major threat to students' emotional and physical well being and should be dealt with sternly. A ragging-free environment will definitely promote a healthier junior-senior relation and a relatively stress-free environment conducive to the students' development.

The high prevalence of psychological mood disorders has been reported and known since a long time now; yet very little has been done to counter this issue. Steps should be taken at a personal, administrative and institutional level. Taking out time for pursuing hobbies, exercising regularly, actively participating in extra-curricular activities could be effective in combating the stressors. Possessing a good friend circle and mutual sharing of problems make the student realise that they are not alone in this battle. Institutes too could play an instrumental role in helping the students cope with their stressors. Colleges could hold awareness programmes to teach students healthier eating habits and hold stress rounds after clinical rotations where students can talk about their emotional reactions. Hostel wardens can also help the boarders with hostel-related issues. A psychological counselling unit should be instituted and made accessible for students. Organising frequent seminars, orations, role plays, etc on psycho-educational awareness about mental disorders could go a long way in removing the taboo associated with it, thus encouraging the students to accept and seek help for the same. The health care professionals themselves need to be mentally and physically fit to help others and make a difference to the society at large; hence, this issue of rising psychological morbidities in medical students should be addressed.

The findings of this study are based on self reported information provided by students and some potential for reporting bias may have occurred because of students' interpretation of the questions or simply because of inaccuracies of responses or desire to report their emotions in a certain way. As the survey was conducted online, it may not have reached to all the students of the state and its access could have been limited by the use of electronic social media platforms.

On behalf of all the authors, the corresponding author states that there is no conflict of interest.

Table 2: Association of prevalence of depression, anxiety and stress among medical students socio demographic factors, lifestyle and hostel related – factors of the respondents

Character	Category	Total no. of respondents	Depression			Anxiety			Stress		
			Yes	No	p value	Yes	No	p value	Yes	No	p value
Age	17 – 20 years	761	416	345	0.966	503	258	0.985	262	499	0.976
	> 20 years	539	294	245		356	183		186	353	
Sex	Male	728	398	330	0.964	481	247	0.996	251	477	0.989
	Female	572	312	260		378	194		197	375	
Year of Study	1st year	352	192	160	<0.001*	253	99	0.005*	121	231	0.006*
	2nd year	481	193	288		298	183		140	341	
	3rd minor	232	162	70		143	89		90	142	
	3rd major	235	163	72		165	70		91	144	
College type	Government	958	544	414	0.008*	643	315	0.184	345	613	0.048*
	Private	342	166	176		216	126		103	239	
Residence	Hostel	950	536	414	0.031*	643	307	0.043*	348	602	0.006*
	Home	350	174	176		216	134		100	250	
Category of admission	Open	995	561	434	0.021*	669	326	0.111	365	630	0.002*
	Reserved	305	149	156		190	115		83	222	
Medium of study in school	English	1173	629	544	0.029*	781	392	0.243	362	811	<0.001*
	Other	127	81	46		78	49		86	41	
Score in 12th standard board exams	95% and above	614	361	253	0.004*	399	215	0.431	230	384	0.031*
	< 95%	686	349	337		460	226		218	468	
Alcohol intake	Never	843	440	403	<0.001*	547	296	0.014*	276	567	<0.001*
	Rarely	201	100	101		128	73		62	139	
	Sometimes	193	115	78		131	62		74	119	
	Often	63	55	8		53	10		36	27	
Cigarette smoking	Never	1115	693	522	<0.001*	734	381	0.712	378	737	0.090
	Rarely	55	22	33		34	21		14	41	
	Sometimes	47	34	13		33	14		21	26	
	Often	83	61	22		58	25		35	48	
Exercise frequency	Rarely	225	138	87	0.019*	165	60	0.036*	125	100	<0.001*
	Sometimes	880	478	401		571	309		228	652	
	Often	195	93	102		123	72		95	100	
Pursue hobbies	Rarely	39	28	11	<0.001*	29	10	0.531	22	17	0.011*
	Sometimes	1013	591	422		668	345		346	667	
	Often	248	91	157		162	86		80	168	
Participation in extra-curricular activities	Rarely	698	426	272	<0.001*	441	257	0.057	271	427	0.001*
	Sometimes	401	232	169		277	124		123	278	
	Often	201	52	149		141	80		54	147	
Sharing personal problems with close friends	Yes	855	375	480	<0.001*	579	276	0.069	281	574	0.093
	No	445	335	110		280	165		167	278	
Duration of sleep in 24 hours	< 4 hours	46	38	8	<0.001*	34	12	<0.001*	21	25	<0.001*
	4–6 hours	863	521	342		600	263		377	486	
	> 6 hours	391	151	240		225	166		50	341	
Experienced disturbed sleep	Yes	111	62	49	0.783	92	19	<0.001*	42	69	0.433
	No	1189	648	541		767	422		406	783	
Hostel accommodation#	satisfactory	228	111	117	<0.006*	160	58	0.356	66	162	0.005*
	Not satisfactory	722	425	297		483	239		282	440	
Quality of hostel food#	satisfactory	83	37	46	0.016*	49	34	0.077	33	50	0.536
	Not satisfactory	867	499	368		594	273		315	552	
Frequency of home visits per year#	> 6	233	100	133	<0.001*	150	83	0.035*	50	183	<0.001*
	6-3	516	306	210		342	174		207	309	
	<3	201	130	71		151	50		91	110	

#' = Question asked only to hostel boarders
 *' = p value < 0.005 (significant association)

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