Original Article

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Quick Response Code:

Website: www.jehp.net

DOI: 10.4103/jehp.jehp_1680_22

# Study of test anxiety amongst undergraduate medical students from the state of Gujarat

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Received: 24-11-2022
Accepted: 10-02-2023
Published: 29-09-2023

**Abstract:**

**BACKGROUND:** Test anxiety is physiological and behavioral response that accompanies concerns about possible negative consequences of failure on an exam. Undergraduate medical students had their academics disrupted during COVID-19 pandemic. This study was done to assess levels of test anxiety among undergraduate medical students, its variance in relation to demography, COVID-19 pandemic, learning experiences, and individual factors.

**MATERIALS AND METHODS:** Online questionnaire-based survey was done among undergraduate medical students from medical schools of Gujarat. Students from 1st, 2nd, and 3rd years who were about to appear in final exams from March to June 2021 and were asked to enroll on the survey. Apart from demography, COVID-19-related factors, learning experiences during lockdown, 10-item Westside test anxiety (WTA) scale was used to assess test anxiety levels and Kessler Psychological distress (K10) scale was used to assess level of psychological distress.

**RESULTS:** Total of 370 students participated. Mean WTA Score was 3.15 ± 1; 60.2% of the respondents had moderate or higher levels of test anxiety. On bivariate analysis, WTA score was found significantly associated with year of study, coming from vernacular medium, various lockdown-related issues (poor internet connection, family financial problem, lack of information, worry about future), various learning experiences (self-rated proficiency with computers, feeling ill prepared for exams, feeling ill prepared for practical), and K10 score. Of these associations with K10 score, coming from vernacular medium and feeling ill-prepared for exams were maintained on multiple-linear regression.

**CONCLUSIONS:** Vernacular medium of study during high school was found associated with test anxiety among medical students and can be a potential area of intervention. There may be merit in using WTA scale as a surrogate marker for distress in medical students.

**Keywords:**

COVID-19 factors, medical schools, psychological distress, test anxiety, vernacular medium, Westside test anxiety

## Introduction

Anxiety is defined as "Feeling of apprehension caused by anticipation of danger, which may be internal or external."[1] Test anxiety is defined as "the set of phenomenological, physiological and behavioral responses that accompany concern about possible negative consequences or failure on an exam or similar evaluative situation."[2] Test anxiety has three components namely cognitive, affective, and behavioral.[3] Even though examination is an essential aspect of the assessment of course outcomes, it can be stressful. Too much emphasis placed on results of examinations and the physical and emotional burden can lead to distress and suicidal ideations. Previous Indian studies on test anxiety among medical students during pre-COVID-19 period have found a prevalence ranging from 46% to 82%.[4-6]



**How to cite this article:** Patel R, Varma J, Phatak A, Nimbalkar SM. Study of test anxiety amongst undergraduate medical students from the state of Gujarat. J Edu Health Promot 2023;12:325.

Disruptions due to COVID-19 may have placed an additional burden on the students. This is substantiated by empirical evidence. A survey conducted among the students of our university (n = 330 out of possible 1300) during the COVID-19 lockdown period by some of the members from the present study, showed a 40% prevalence of likely mental disorder, using the K10 psychological distress scale.[7]

There is a need to study the test anxiety among medical students and the impact of COVID-19 pandemic-related factors on text anxiety. This study was done with the aim to understand the prevalence of and factors associated with test anxiety among undergraduate medical students especially and association with COVID-19 pandemic-related experiences.

## Materials and Methods

### Study design and setting

A cross-sectional survey was conducted in medical colleges of Gujarat.

### Study participants and sampling

Study was conducted among medical students from First, Second, and Third years of the MBBS program students, who were about to appear in final exams from March to June 2021. Students were approached using social media groups and were asked to fill anonymous online questionnaire.

### Data collection tool and technique

Based on our prior understanding of the factors that could have impacted students during the pandemic and factors evaluated in previous studies on text anxiety among medical students a study questionnaire was developed.[4-7] The questionnaire was pretested among medical students and face validity was judged by the study team members which include a Psychiatrist, Pediatrician, and a medical student. The study questionnaire included a) socio-demographic factors, b) COVID-19 pandemic related factors, c) learning experiences during pandemic and beyond, d) individual factors, and e) test anxiety scale. Socio-demographic data included age, gender, years of study, coming from a vernacular or English medium, passing from a state or central board. COVID-19 pandemic-related factors included access to internet connection for online classes, did family face any financial problems, lack of right information, significant worry about the future, significant worry about contracting COVID-19 infection and boredom due to being cut-off from campus and friends. Learning experiences during lockdown included support from teachers for transition to online learning, self-rating of proficiency in computer skills for online learning, perception about adequacy of practical training after physical classes started, self-rating of preparedness for written exam, and self-rating of preparedness for practical exam. Individual factors such included sleeping habits, physical activity, and level of psychological distress using K10 scale [Kessler Psychological distress scale].[8] It is a 10-item questionnaire intended to yield a global measure of distress based on questions about anxiety and depressive symptoms that a person has experienced in the most recent 4-week period. Test anxiety was the main outcome variable for the study and was measured using Westside test anxiety (WTA) scale.[9] It is a brief, ten-item instrument designed to identify students with anxiety impairments who could benefit from an anxiety-reduction intervention. The scale items cover self-assessed anxiety impairment and cognition which can impair performance. This scale was chosen as it is specifically designed to assess anxiety related to appearance in test which may be a subset of stress faced by students.

### Ethical considerations

Study was done after approval from the Institutional Ethics Committee vide letter no 54/2021 dated 17/02/2021. As it was an anonymous study, waiver of informed consent was granted by the ethics committee.

### Analysis

Collected data was analyzed JAMOVI, version 1.1.9 (JAMOVI project, Sydney, Australia).[10] Descriptive statistics would be calculated for various variables. Test anxiety score was the main outcome variable. Variance in the same was tested with other study variables using appropriate statistical tests.

## Results

A total of 369 students participated in the survey from various medical colleges in Gujarat. The mean age of the participants was 20.4 (SD 1.34, Range 18-25). Study participants included 60.4% females (n = 223). Students from all 4 levels of the course participated in the survey. Majority of the participants studied in English medium in high school 71% (n = 262) and passed their high school from the state board 72.4% (n = 267). Demographic data for the study population is shown in Table 1.

The Westside test anxiety scale was used in this study to measure the level of test anxiety. The population distribution of WTA scores is shown in Table 1. The mean WTA score was 3.15 (SD 1.0) out of a range of 1.0 to 5.0 and 60.2% (n = 222) of the participants reported moderate or higher levels of test anxiety. Female medical students had a trend toward higher test anxiety score (mean 3.21, SD 0.92) compared to male medical students (mean 3.06, SD 1.11), but this difference was not statistically significant ($P = 0.15$). The K10 scale was used to measure

**Table 1: Demographic data of the study population and distribution of Westside Test Anxiety score and K10 distress score (*n*=369)**

| Variable | Characteristic | *n* (%) |
|---|---|---|
| Gender | Male | 146 (39.6) |
| | Female | 223 (60.4) |
| Year | 1st year | 39 (10.6) |
| | 2nd year | 108 (29.3) |
| | 3rd Part I | 124 (33.6) |
| | 3rd Part II | 98 (26.6) |
| Medium in High School | English | 262 (71.0) |
| | Vernacular/Gujarati | 107 (29.0) |
| Board in High School | State board | 267 (72.4) |
| | Central board | 102 (27.6) |
| Westside Test Anxiety score | Low (1.0-1.9) | 53 (14.4) |
| | Normal (2.0-2.4) | 45 (12.2) |
| | High normal (2.5-2.9) | 49 (13.3) |
| | Moderately high (3.0-3.4) | 69 (18.7) |
| | High (3.5-3.9) | 60 (16.3) |
| | Extremely high (4.0-5.0) | 93 (25.2) |
| K10 distress score | Likely well | 121 (32.9) |
| | Mild mental disorder | 73 (19.8) |
| | Moderate mental disorder | 52 (14.1) |
| | Severe mental disorder | 123 (33.3) |

the level of psychological distress. The population distribution of K10 scores is shown in Table 1. The mean K10 distress score was 24.4. Sixty-seven percent (n = 248) of the study participants screened positive for mental disorder at the time of the study based on K10 score.

Bivariate analysis of WTA score with various study variables is shown in Table 2. On bivariate analysis, WTA score was found significantly associated with year of study, coming from vernacular medium, various lockdown-related issues (poor internet connection, family financial problem, lack of information, worry about future), various learning experiences (self-rated proficiency with computers, not feeling prepared for exams, not feeling prepared for practical). Post-hoc analysis was done for years in MBBS, feeling prepared for exams and feeling prepared for practical using Games-Howell post-hoc test. Second year MBBS students had significantly higher test-anxiety compared to students from 3rd MBBS Part-I ($P$ = 0.016). Test anxiety score was significantly higher in those feeling not prepared for exams compared to those feeling somewhat and well prepared ($P$ < 0.001 respectively), whereas those feeling somewhat prepared for exams were not significantly different from those feeling well prepared for exams in rating of their test anxiety ($P$ = 0.159). Test anxiety score was significantly higher in those feeling not prepared for practical compared to those feeling somewhat prepared for practical ($P$ = 0.001), whereas it was not significantly different among those feeling not prepared and well prepared for practical ($P$ = 0.07) and those feeling somewhat prepared and well prepared for practical ($P$ = 1.0). On correlation analysis, K10 score was significantly and positively correlated with WTA score (r = 0.495, $P$ =<0.001).

Multiple linear regression (MLR) analysis was conducted, using variables showing a significant relationship with Westside text anxiety score on bivariate analysis. The model [Table 3] was statistically significant (F = 12.1; $P$ < 0.001) and explained 29.6% of the variance in test anxiety scores. Associations with K10 score, coming from vernacular medium and feeling not prepared for exams were maintained on multiple-linear regression.

## Discussion

Envisioning the potential impact of COVID-19 pandemic on academics this study was done when in-person academics restarted at medical colleges in Gujarat. The study aimed to assess test anxiety among undergraduate medical students.

### Prevalence

We found that about 60% of the respondents on this survey had moderate or higher levels of test anxiety. This finding is consistent with previous studies on test anxiety among medical students done in the non-COVID-19 period, which have reported a prevalence ranging from 46% to 82%.[4-6] Mean test anxiety score of 3.15 (SD 1.0) [moderately high] was comparable with mean test anxiety (3.0) among students from physiotherapy in Mumbai, Western India.[11] A study done at a medical college in eastern Gujarat, reported that 50% students faced parental pressure during exams, 44% felt that the course was too extensive and 53% felt that the examination was too long.[4] to the student done in eastern India found that among all the factors studied test anxiety was the determining factor in differentiating honors candidates showing better performance compared to non-honors candidates.[5] Too much emphasis placed on results of examinations and the physical and emotional burden could have led to further distress among the vulnerable students.

### Demographic factors and test-anxiety

Previous Indian studies have reported higher preponderance of test anxiety among female medical students.[4-6] Such preponderance has also been demonstrated among school age going girls.[12] While these findings may point toward greater susceptibility for anxiety disorders in female gender, such preponderance was not demonstrated in our study. This could probably be explained by high prevalence of mental distress among respondents at the time of the study based on the findings that a) 77% of the respondents were screened positive on K10 distress scale b) K10 score was significantly and positively correlated with WTA

**Table 2: Variation in Westside Text Anxiety score according to various study variables**

| Variable | Characteristic | *n* (%) | Mean (SD) | *P* |
|---|---|---|---|---|
| Year in MBBS | 1st year | 39 | 3 (0.917) | 0.021 |
| | 2nd year | 108 | 3.36 (0.957) | |
| | 3rd Part I | 124 | 2.98 (0.985) | |
| | 3rd Part II | 98 | 3.20 (1.062) | |
| Medium of study | English | 262 | 3.03 (0.966) | <0.001 |
| | Gujarati | 107 | 3.45 (1.02) | |
| Good internet connection during lockdown | No | 35 | 3.51 (1.20) | 0.025 |
| | Yes | 334 | 3.11 (0.971) | |
| Financial problems during lockdown | No | 265 | 3.05 (0.988) | 0.002 |
| | Yes | 104 | 3.40 (0.991) | |
| Lack of information during lockdown | No | 214 | 3.01 (1.02) | 0.001 |
| | Yes | 155 | 3.35 (0.935) | |
| Worry about the future during lockdown | No | 94 | 2.78 (0.927) | <0.001 |
| | Yes | 275 | 3.28 (0.994) | |
| Self-rated poor proficiency with computers | Poor | 109 | 3.34 (3.22) | 0.018 |
| | Good | 260 | 3.07 (3.11) | |
| Feeling prepared for exams | No | 144 | 3.53 (0.933) | <0.001 |
| | Somewhat | 152 | 2.99 (0.958) | |
| | Yes | 73 | 2.74 (0.973) | |
| Feeling prepared for practical exams | No | 197 | 3.33 (0.975) | 0.001 |
| | Somewhat | 127 | 2.94 (0.965) | |
| | Yes | 45 | 2.94 (1.071) | |

Only variables found significantly associated are shown

**Table 3: Multiple linear regression for correlates of Westside Test Anxiety score**

| Variable | Beta | 95% CI | *t* | *P* |
|---|---|---|---|---|
| K10 score | 0.04 | 0.03-0.05 | 8.37 | <0.001 |
| Year | | | | |
| Second – First | 0.06 | -0.26-0.37 | 0.36 | 0.71 |
| Third Part I - First | 0.07 | -0.24-0.38 | 0.46 | 0.64 |
| Third Part II – First | -0.03 | -0.35-0.29 | -0.17 | 0.86 |
| Medium | | | | |
| Vernacular – English | 0.31 | 0.11-0.51 | 3.1 | 0.002 |
| Good internet connection during lockdown Yes – No | -0.25 | -0.57-0.07 | 1.54 | 0.12 |
| Financial problems during lockdown Yes - No | 0.09 | -0.11-0.3 | 0.9 | 0.36 |
| Lack of information during lockdown Yes-No | -0.02 | -0.21-0.17 | 0.23 | 0.81 |
| Worry about the future during lockdown Yes-No | 0.18 | -0.03-0.39 | 1.65 | 0.10 |
| Self-rated poor proficiency with computers Good-Poor | 0.02 | -0.18-0.22 | 0.23 | 0.81 |
| Feeling prepared for exams | | | | |
| Somewhat-No | -0.28 | -0.51- -0.05 | 2.45 | 0.01 |
| Yes-No | -0.49 | -0.78- -0.20 | 3.30 | 0.001 |
| Feeling prepared for practical exams | | | | |
| Somewhat-No | -0.08 | -0.3-0.13 | 0.76 | 0.45 |
| Yes-No | -0.03 | -035-0.29 | 0.18 | 0.85 |

score, and 3) association of WTA score with K10 score was maintained on MLR.

On bivariate analysis test anxiety score was found significantly associated with year of study, however, this finding did not hold on MLR. A study among medical students from eastern Gujarat reported no association between test-anxiety and year of study.[4] Other two studies did not evaluate for such association.

Coming from vernacular medium was found to be associated with test anxiety on MLR. Previous study from Gujarat did not find such association, and other studies did not evaluate this.[4-6] Possible explanation could be that those coming from vernacular medium may sometimes be from the less advantaged sections of the society and may have had difficulties in participating in online education as-well-as the advantaged sections of the society. Notwithstanding their socioeconomic status, in our own lived experience and from interaction

with medical students we have learnt that many of the students from vernacular medium of education cope up with the challenge of education in the English medium using the social contact with other students in classroom and outside classroom for clarifying doubts in understanding. This was completely disrupted during COVID-19 when academics shifted to the cloud where the teacher pretty much felt like "talking to a wall" and students had few avenues for socialization. Board in high-school was not found associated with test anxiety.

There has been a recent announcement about the opening of Medical College imparting education in vernacular medium. We believe that students passing out of such institutions may find themselves in a disadvantaged position as several issues may arise including employability, ability to keep up with research and recent advancements which are largely in English language. A better strategy to address the issues of students not well versed in English language would be to provide dedicated language proficiency courses before beginning higher education studies.

### COVID-19-related factors and test anxiety

COVID-19-related experiences like poor internet connection, family financial problem, lack of information, worry about future, and low self-rated proficiency with computers were found to be associated with test anxiety on bivariate analysis but did not retain the association with test anxiety on MLR. Unpublished data from a survey conducted among the students of our university found that poor internet access, boredom and future worries were among the most endorsed concerns. Feedback on the experience of online mode of education found 30.4% students reported that they were either "not at all" or "not really" able to understand the topic or fully engage in online learning.[7] A study from Jordan reported online distance learning and social isolation were major concerns for students during the pandemic.[13] We believe that these COVID-19-related factors could have mediated the feeling of being ill prepared for exams, which was found to retain association with test anxiety on MLR.

While COVID-19-related factors could have led patients to feel ill-prepared for exams, students study skills could also be detrimental to their confidence. Massed practice (i.e. cramming) is a norm among medical students, which is further amplified by the strong motivation created by the recognition format (multiple choice) of both undergraduate and post-graduate entrance examination. However, research in cognitive psychology suggests that such practice only gives a false sense of familiarity.[14] Teaching students to use appropriate study methods (retrieval practice, elaboration, concrete examples, concept maps, dual coding, and interleaving) may help students feel less anxious before tests.[14]

### Individual factors

Seventy-seven percent of the respondents screened positive on K10 distress scale and association of distress with test anxiety was maintained on MLR. Following a cohort of 451 medical students using a before, during and after exam method to measure mental distress and perceived stress, Fritz *et al*. reported exams cause a temporary increase in mental distress and perceived stress around exams (can be considered as a surrogate measure of test anxiety). And, higher mental distress increased the risk of perceived stress during exams.[15] Hence, identification of students early on in the course may help provide targeted intervention such as facilitative curricular aids and constructive feedback and use of positive self-care strategies and avoid the use of negative strategies including drug abuse.[16,17] However, high level of help-seeking stigma exists among medical students about issues that may make them appear inadequate and less intelligent.[18] These elements could be delivered through the mentor-mentee programs. However, preliminary evidence suggests that the current status of mentor-mentee programs in Indian medical schools leave a lot to be desired. A study reported that 59% of the medical students did not receive enough mentoring guidance and about 36% medical students felt that the quality of mentoring guidance could be improved.[19] Thus, there may be merit in using WTA scale as a surrogate marker for distress in medical students to start early intervention for the vulnerable group.

### Limitations and recommendation

The limitations of the study are that the study is based on an open sample hence a response rate cannot be calculated. We have not studied learning strategies used by the students. On MLR, it is noted that only 29.6% of variance in test anxiety is accounted for by the factors studied, hence future studies may benefit by including a qualitative component to explore the various factors related with test anxiety among medical students in Indian settings. Text anxiety should be a concern for institutions and strategies to reduce anxiety need to be devised. Pilot testing them followed by rigorous randomized interventional trials around exams are required to ensure evidence-backed strategies. However, interventions may not be universally applicable but can provide some guidance to other institutions.

## Conclusions

Vernacular medium of study during high school was found associated with test anxiety among medical students and can be a potential area of interventions

such as dedicated language proficiency courses. There may be merit in using WTA scale as a surrogate marker for distress among medical students.

## Acknowledgement

We acknowledge the students who participated in the study and those who helped disseminate the study questionnaire links among various social medical groups for medical students.

## Financial support and sponsorship

Self-funded.

## Conflicts of interest

There are no conflicts of interest.

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