Cross-sectional Study

Ambiguity tolerance among medical students and its relationship with personality and participation in the mentoring program: A cross-sectional study

Amin Nakhostin-Ansari [a,b], Nastaran Maghbouli [a,c,*], Monir Shayestefar [d]

[a] Mentoring Office, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
[b] Sports Medicine Research Center, Neuroscience Institute, Tehran University of Medical Sciences, Tehran, Iran
[c] Physical Medicine and Rehabilitation Department, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran
[d] Cellular and Molecular Research Center, School of Advanced Technologies in Medicine, Iran University of Medical Sciences, Tehran, Iran

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ABSTRACT

Background: Low ambiguity tolerance (AT) can lead to burnout and impact medical students' quality of life. Interventions are effective in increasing tolerance in ambiguous situations. Mentors can be facilitators in ambiguous situations. We aimed to determine the AT among Tehran University of medical sciences (TUMS) medical students and assess its relation with personality traits and mentor-seeking behavior.

Methods: A cross-sectional study was designed. We used Budner AT questionnaire and the Ten Item Personality Inventory in our study. Questionnaires were sent to 350 randomly selected TUMS medical students in different years of education. Two hundred six students completed the questionnaires. The response rate was 58.85%.

Results: The mean AT score was 59.77 among TUMS medical students. No significant difference was seen between different genders and students with different marital statuses. Also, AT was constant among students at different years at medical school and at different education levels (P > 0.05). Students who had participated in the mentoring program were significantly more intolerant of novel situations (P = 0.01). However, they did not have significantly different scores in other subscales of AT scale and its total score than those who had not participated in the mentoring program (P > 0.05).

Conclusion: Medical students are more intolerant of ambiguity at TUMS than medical students abroad, and there should be interventions to help them cope in ambiguous situations. Mentoring programs may also be considered for future interventions as participants who participate in the program are less tolerant of ambiguity in novel situations.

1. Introduction

Budner defined Ambiguity Tolerance (AT) as "the tendency to perceive ambiguous situations as desirable." An individual who is intolerant of ambiguity will be more likely to interpret ambiguous situations as a threat source [1]. An individual's perceived complexity, novelty, or insolubility in ambiguous situations can result in reactions such as phenomenological submission (PS), phenomenological denial (PD), operative submission (OS), and operative denial (OD) [1]. Studies showed associations between AT and some aspects of the personality, such as extraversion, agreeableness, and openness to change [2,3].

Medical practice's complex and uncertain nature can cause medical students psychological distress, especially in students with low AT [4,5].

Medical students face ambiguity and uncertainty by involving in new academic situations, clinical decision-making, and odds patient-doctor relationships during training [6,7]. There are several studies on medical students' AT in the United States (US) using Budner's AT scale. Studies by Budner et al. and Deforge et al. conducted in 1962 and 1989, respectively, indicated a decrease in medical students AT during this time [1,8]. Regarding cognitive outcomes of AT, studies showed the potential role of AT in affecting students' attitudes toward patients and clinical practice [9]. For example, higher AT among medical students has resulted in better emotional outcomes, including less burnout, more resilience, and better quality of life [10,11].

Despite Budner's hypothesis declaring that AT is a fixed trait [1], it has been shown that interventions can increase AT among medical students [12]. Studies have shown the efficacy of interventions that

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Abbreviations

AT	Ambiguity Tolerance
PS	Phenomenological submission
PD	Phenomenological denial
OS	Operative submission
OD	Operative denial
TIPI	Ten Item Personality Inventory

specifically aimed to control reactions in ambiguous situations in different groups of people [13–15]. Moreover, mentors have been introduced to be important facilitators who can help medical students in having more balanced reactions in ambiguous situations [16,17].

Given together, AT is one of the factors affecting medical students' decision-making process and professional carrier in different aspects, but there is little data available on AT among Iranian medical students. So, We aimed to assess TUMS medical students' AT. We also assessed AT association with personality traits as well as mentor-seeking behavior.

2. Methods

2.1. Design

We designed a cross-sectional study in order to evaluate the AT among TUMS medical students. The study was conducted as a part of the mentoring office's annual evaluation, from August to November 2019. The ethical committee of Tehran University of Medical Sciences approved the study (No:92-02-76). This work has been reported in line with the STROCSS criteria [18]. This study was also registered to the www.research registry.com (unique identifying code: researchregistry6444).

2.2. Context

TUMS medical doctorate (MD) program takes seven years to complete. It consists of 4 phases: basic sciences (2.5 years), the physiopathology of diseases (1 year), clerkship (2 years), and internship (1.5 years). TUMS mentoring program is designed to help medical students get well oriented at the start of their education as a medical student. Students who are volunteers can participate in the mentoring program. One senior student (mentor) assigns to two or three students (mentees) and in the course of 6–12 months to help them in the challenges they face during the first few months of their education.

2.3. Participants

Our inclusion criteria were being Iranian and studying medicine at TUMS. We sent the questionnaire to 350 students who were eligible to participate in the study. We used the G*Power 3.1.9.7 software to calculate the sample size [19,20]. A sample of 231 students would be enough considering $\alpha = 0.05$, $\beta = 0.2$, effect size = 0.25, and seven groups of students in different education years. As there were about 200 students in each year of the MD program, we randomly selected 50 students from each year and sent them the questionnaire. A total of 350 questionnaires were sent to the students considering the possible dropouts.

The questionnaire was designated as a Google form. We sent a message, including the link to the questionnaire and explanations on study goals and objects. The students were asked to open the link and complete the questionnaire if they were interested in participating in the study. If the students were not interested in participating in the study, they could ignore the message. Two weeks after sending the questionnaire to students, reminders were sent to them. Finally, 206 participated

in the study and completed the questionnaires. The response rate was 58.85%.

3. Experiments

3.1. AT scale

Budner developed a 16-item scale to assess AT in 1962 [1]. Half of the items are positively-worded, and the other half is negatively-worded. Each item is scored on the 7-point Likert scale in which on positively-worded items, 7 indicates strong agreement, 6 indicates moderate agreement, 5 indicates slight agreement, 4 indicates omission, 3 indicates slight disagreement, 2 indicates moderate disagreement, and 1 indicates strong disagreement. On the negatively-worded items, the scoring is reverse. The total score is calculated by the sum of all items' scores. Higher scores indicate more intolerance of ambiguity. The questionnaire assesses the AT in insoluble (3 items), complex (9 items), and novel (4 items) situations. The questionnaire also assesses the type of response in ambiguous situations, including PD (4 items), PS (7 items), OD (1 item), and OS (4 items). Budner's scale is a moderately reliable tool to assess AT among medical students [21]. We used the Persian version of the Budner's scale in our study.

3.2. Ten Item Personality Inventory (TIPI)

Gosling et al. designed TIPI to assess five major personality domains, including Extraversion, Agreeableness, Conscientiousness, Emotional Stability, and openness to experience [22]. It consists of 10 items, and Two items evaluate each personality. All items are scored on a 7-point Likert scale. In half of the items, 1 indicates strong disagreement, 2 indicates moderate disagreement, 3 indicates little disagreement, 4 indicates neither agreement nor disagreement, 5 indicates little agreement, 6 indicates moderate agreement, and 7 indicates strong agreement. For the other half of the items, the scoring system is reverse. The score of each domain is the sum of the two related items. We used the Persian version of TIPI, a reliable and valid tool to assess Iranian people's personality [23], to assess participants' personality.

3.3. Demographic questionnaire

We also included questions on participants' gender, marital status, living place, the year they entered the university, participation in the TUMS mentoring program as a mentee (Yes/No question), their source of information during the education (professors, mentors or other students), , satisfaction from their education course (Yes/No question), and the current grade point average (GPA) which is calculated out of 20.

3.4. Data analysis

As the reliability and validity of Persian Budner's AT scale were not evaluated before, we used the Cronbach's alpha coefficient to evaluate its' internal consistency. We interpreted Cronbach's alpha ≥ 0.9 as excellent, ≥ 0.8 as good, ≥ 0.7 as acceptable, ≥ 0.6 as questionable, ≥ 0.5 as poor, and <0.5 as unacceptable [24]. Kaiser-Meyer-Olkin (KMO) test and Bartlett's Test of Sphericity were used to evaluate Budner's scale's construct validity. KMO test examines the data proportionality, and Bartlett's test evaluates the homogeneity of data for factor analysis. Then extraction of the factors using principal components analysis was performed.

The number and percent of the participants in each demographic group or educational status were calculated. Mean, and Standard Deviation (SD) of AT total score was calculated in each subgroup. Kolmogorov–Smirnov test was used to determine whether the AT total score was distributed normally or not. As AT total scores were not distributed normally ($P < 0.001$), we used Kruskal-Wallis analysis to determine

whether there are significant differences between different subgroups or not. Mean, and SD of GPA was also calculated, and the Pearson correlation test was used to assess whether there is a significant relation between AT and GPA or not. We also used the Pearson correlation test to assess the relationship between each personality domain and AT total score and its subscales. We considered P < 0.01 as the level of significance. We used SPSS 22.0 for Windows (SPSS Inc., Chicago, IL, USA) for data analysis.

4. Results

In total, 206 medical students participated in the study. Eighty-four (41%) students were female, and 122 (59%) were male. Seventy-nine (38%), 22 (10%), 48 (23%), and 57 (28%) students were in basic sciences, the physiopathology of diseases, clerkship, and internship stages of their education, respectively. The demographic characteristics and educational status of the participants have been shown in Table 1.

The Consistency reliability was in an acceptable range for AT total score and all domains scores (Cronbach's alpha >0.7), except PS (Cronbach's alpha = 0.564). Considering that the Cronbach's alpha coefficient was more than 0.7, we can say that the instrument has reliable internal consistency (see Table 2). The KMO value was calculated as 0.724, which shows the appropriateness of sample size for factor analysis, and Bartlett's sphericity test became significant at the significance error of 0.05 (p < 0.001), indicating the homogeneity of the data for factor analysis testing. After factors extraction, six factors extracted, as shown in Table 3.

The mean score of insolubility subscale was 11.29 ± 2.36; complexity subscale was 33.56 ± 3.84; novelty subscale was 14.91 ± 2.56; PD was 14.97 ± 2.56; PS was 25.39 ± 3.76; OD was 4.70 ± 1.21; OS was 14.68 ± 2.34; and total AT 59.77 ± 5.39.

Results of the Kruskal-Wallis analysis have been shown in Table 1, which determines whether there is a significant difference between different demographic or educational groups in AT or any of its subscales scores or not. The mean GPA of the participants was 17.21 (SD = 1.21). There was no significant correlation between GPA and AT total score (P = 0.161).

Table 4 shows the mean difference of AT subscales between students with and without a mentor. Mean novelty score was significantly higher in students who had a mentor (mean = 16.05, SD = 2.53) compared to those who had not (Mean = 14.91, SD = 2.56) (P = 0.01). There was no other significant difference in total AT scores and its subscales in students with and without a mentor (P < 0.01).

Extraversion personality had negative weak correlations with complexity (r = −0.23, P = 0.001), PS (r = −0.179, P = 0.01), and total AT score (r = −0.179, P = 0.01). Emotional stability had negative weak correlations with complexity (r = −0.197, P = 0.005) and OS (r = −0.203, P = 0.003). Openness to experiences had negative weak correlations with complexity (r = −0.247, P < 0.001) and PS (r = −0.259, P < 0.001). It also had positive weak correlations with insolubility r = 0.275, P < 0.001) and PD (r = 0.265, P < 0.001). Conscientouness and areeableness did not have any significant correlation with total AT score or its subscales (P > 0.01).

5. Discussion

In this study, we evaluated the AT status of TUMS medical students in association with personality traits, educational status, participation in the mentoring program, and demographic characteristics. This is the first study of its kind in Iranian medical students.

There are several studies on medical students' AT using Budner's scale in the U.S [1,8,21,25,26]. There was a decreasing trend in the tolerance of ambiguity in the medical students in these years when comparing these studies' results [1,8,21]. Mangione and Liou's studies were conducted more recently, in 2018 and 2019, respectively. Further decrease in medical students' AT in these studies was seen [25,26],

Table 1
Demographic and educational characteristics of participants and their AT scores.

Demographic or educational status	Subgroup	Numbers (percent)	Mean (SD) AT score	Kruskal-Wallis analysis
Gender	**Female**	84 (41%)	60.25 (5.26)	There was significant difference between males (mean = 4.68) and females (mean = 4.26) in OD score (P = 0.01).
	Male	122 (59%)	59.4 (5.98)	
Marital status	**Married**	24 (12%)	58.16 (7.38)	There was no significant difference between single and married subjects (P > 0.01)
	Single	182 (88%)	59.95 (5.43)	
MD educational level	**Basic sciences**	79 (38%)	60.01 (4.96)	There was no difference between subjects in different levels of education (P > 0.01).
	Physiopathology of diseases	22 (10%)	59.95 (5.53)	
	Clerkship	48 (23%)	60.93 (6.41)	
	Internship	57 (28%)	58.29 (5.94)	
Living place	**With family in private home**	91 (44%)	60.58 (4.63)	There was no significant difference between those who live in home or dormitory (P > 0.01)
	Alone in private home	31 (15%)	58.32 (6.6)	
	Dormitory	84 (41%)	59.36 (6.29)	
Source of information	**Professors**	2 (1%)	60.5 (4.94)	There was no significant difference between those who seek information from different sources (P > 0.01)
	Mentors	22 (10%)	59.59 (3.51)	
	University panels	6 (3%)	63.33 (3.55)	
	Senior students	81 (39%)	59.9 (6.35)	
	Classmates	95 (46%)	59.32 (5.5)	
Satisfied by TUMS medical education system	**No**	83 (40%)	59.06 (5.71)	Those who were satisfied with the educational system had significantly higher PD scores (mean = 15.95) compare to those who were not (mean = 13.81) satisfied (P = 0.007)
	Somehow	100 (49%)	59.66 (5.7)	
	Yes	23 (11%)	62.6 (4.93)	
Years at medical school	**First year**	39 (19%)	59.51 (3.81)	There was no significant different difference across different years of education (P > 0.01)
	Second year	41 (20%)	60.46 (5.81)	
	Third year	23 (11%)	60.39 (5.79)	
	Fourth year	18 (9%)	61.22 (6.55)	
	Firth year	16 (8%)	59.81 (6.11)	
	Sixth year	36 (17%)	58.52 (7.02)	
	Seventh year	33 (16%)	59.18 (5.21)	

Table 2
Internal consistency reliability of ambiguity tolerance scale.

Subscale	Number of items	Cronbach's Alpha
Insolubility	3	0.732
Complexity	9	0.744
Novelty	4	0.752
PD	4	0.771
PS	7	0.564
OD	1	0.711
OS	4	0.703
Total	16	0.781

PS: Phenomenological submission, PD: Phenomenological denial, OS: Operative submission, OD: Operative denial.

especially in Mangione's study in which the mean AT score was 76.12, which is significantly higher in comparison to previous studies as the mean AT score was lower than 55 in all other studies. Medical students were less tolerant of ambiguity in our study than medical students in the mentioned studies, except in Mangione et al. study. Such differences between our findings and previous studies may be attributable to the decreasing trend of AT in medical students. The increasing growth in medical knowledge, dependence on technology in the medical setting, more structured educational setting, and differences in the generations may all be contributed to such differences in medical students' AT as these factors can make students prone to intolerance of ambiguity.

Interventions, courses, and educational systems can affect the AT in medical students ([12,27,28]). For example, case-based learning and

facing ambiguous situations in the pre-clinical stage of medical education may improve medical students' AT [28]. Most courses in Iran's medical education curriculum are lecture-based, especially in the pre-clinical phase, and there are only limited case-based courses in Iran's medical education system, in which students face ambiguous situations. Such differences between Iran and the U.S in the medical doctorate curriculum may be another reason for lower AT in Iranian medical students.

Lower AT is related to less willingness to violate ethical norms [29], less life satisfaction [30], negative affect [30], anxiety [30], worry [31], and less self-efficacy [32]. Also, AT has been related to stress, burnout, and mental health disorders in medical students [33]. As medical students face several ambiguous situations during their education, for example, in their relationship with their professors, during their studies regarding the increasing level of medical knowledge and uncertainties in some diagnostic and treatment approaches, in making the certain diagnosis, planning effective treatment, and following patients' response to treatment [34], intolerance of ambiguity may have negative effects on their education and future carrier. So, there may be a need to design effective interventions and change MD program curricula to increase AT among Iranian medical students. For example, introducing more case-based courses [28], encouraging medical students to engage in beneficial non-educational activities [26], and designing courses on professionalism and patient-doctor relationship in the clinical stages of education may be helpful increasing medical students AT and help them cope better in ambiguous situations [35].

Moreover, we found no difference between medical students in

Table 3
The ambiguity tolerance Items with Characteristics of Rotated Component Matrix Based on Exploratory Factor Analysis.[1]

Item	Latent variables (factors)						h2 [2]
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	
1	0.303	0.576	0.005	−0.240	0.043	0.093	0.46
2	−0.397	0.469	−0.260	−0.219	0.002	−0.070	0.44
3	−0.209	0.231	0.560	−0.234	0.211	−0.039	0.43
4	−0.047	0.114	0.290	−0.545	0.307	0.384	0.47
5	−0.419	0.308	0.257	−0.043	0.267	−0.367	0.42
6	−0.419	0.308	0.257	−0.043	0.267	−0.367	0.42
7	0.575	0.317	−0.138	0.072	−0.118	0.066	0.45
8	−0.105	−0.201	0.553	0.497	0.143	−0.065	0.57
9	−0.248	0.504	0.234	0.391	−0.106	0.374	0.54
10	0.264	−0.377	0.155	−0.148	0.585	−0.122	0.44
11	−0.221	−0.008	−0.198	0.501	0.429	0.294	0.60
12	0.608	0.050	0.171	0.020	0.059	0.497	0.66
13	0.469	−0.378	0.158	−0.025	−0.083	0.073	0.58
14	0.347	0.449	0.057	0.304	0.108	−0.282	0.48
15	0.365	0.218	−0.304	0.229	0.489	−0.105	0.63
16	0.292	0.120	0.512	0.124	−0.406	−0.171	0.57
Initial eigenvaluesd[3]	1.134	1.315	1.666	1.754	1.846	1.786	1.365
Rotation sums of squares	4.76	4.34	4.87	3.98	3.87	4.23	4.22
Cronbach's[4]	0.788	0.812	0.825	0.789	0.723	0.743	0.801

[1] Extraction method: Principal component analysis, Rotation method: Varimax with Kaiser normalization, Kaiser, Meyer-Olkin measure of sampling adequacy = 0.724, The Bartlett test of Sphericity $x2 = 1156.080$; $P < 0.0001$.
[2] h2 extractions: Final item communalities (row sums of squared loadings).
[3] Eigenvalues: Pre-rotation column sums of squared loadings.
[4] Cronbach's are reported for primary loadings of each factor (bold type).

Table 4
AT subscales scores based on having a mentor.

Participation in the mentoring program	Number of students	Novelty	Complexity	Insolubility	PD*	PS*	OS*	OD*	AT*
Yes	158 (76.7%)	16.05 (2.53)	33.21 (3.55)	10.46 (2.48)	13.98 (2.92)	26.86 (3.46)	14.43 (2.37)	4.44 (1.21)	59.74 (5.81)
No	48 (23.3%)	14.91 (2.56)	33.56 (4.11)	11.29 (2.36)	14.92 (2.45)	25.32 (3.76)	14.68 (2.34)	4.72 (1.21)	59.77 (5.39)
P-value Values are reported as mean (SD)	–	**0.01**	0.498	0.019	0.019	0.021	0.62	0.277	0.751

PS: Phenomenological submission, PD: Phenomenological denial, OS: Operative submission, OD: Operative denial, AT: Ambiguity tolerance.

different education years, which is compatible with previous studies [36,37]. Weissenstein et al. evaluated the AT in a sample of German medical students in 6 different educational years. Medical students' AT was below average in their study, and there was no significant difference between medical students' AT in different educational years [37]. On the other hand, Bruhn et al. reported that nurses' AT had been decreased after graduation [38]. It seems that AT does not significantly change in the constant circumstances, but major changes in the career, such as graduation and experience of independent work, and educational interventions may change students' tolerance of ambiguous situations. As previous studies suggest a decrease in the students' AT after graduation and it can negatively affect their carrier, there should be strategies during students' educational years to prepare them for the future clinical practice where they face more ambiguous situations.

Furthermore, there was no significant difference between males' and females' total AT scores in the current study. Similarly, Lally et al. also found no significant difference between males and females regarding AT [39]. In a similar study on EFL learners in Iran, AT was not significantly different in males and females [40]. On the other hand, males were more tolerant of ambiguity in some studies [41,42], while other studies demonstrated otherwise [8,36]. Different characteristics of genders in different countries and different years may be responsible for such diversity. Differences between countries in terms of availability of educational and working opportunities for both males and females and their expected roles in the community may play a role in different preparation of males and females for ambiguous situations in different countries, leading to differences between genders regarding AT.

Being in a completely new and unfamiliar situation is defined as novelty by Budner (1). Medical students who had participated in the mentoring program had significantly higher novelty scores than those who had not participated in the program. Medical students experience a change in the educational environment during the shift from high school to university, which seems to be the main determining factor for their mentoring program participation. As interventions may help students better cope in ambiguous situations and increase their tolerance in ambiguous situations [25,28,43], the mentoring program may be a valuable tool for such interventions. Such experience may be valuable for students as they face similar situations in their future careers, for example, during the shift from pre-clinical to the clinical phase of the education or after graduation.

There was a positive correlation between AT and extraversion in our study. There was also a positive correlation between the complexity subscale and extraversion. A positive correlation between AT and extraversion is compatible with previous studies [2,3]. Studies have shown the association between novelty-seeking behaviors and being extroverted [44]. Regarding the importance of novelty seeking in coping with an ambiguous situation, one can explain the association of extraversion and AT level found in our study.

On the other hand, we found no correlation between openness and AT. Bardi et al. found a positive association between openness and AT, but the association gets weaker in the senior students [30]. Caligiuri [2] and Jach [3] also reported a relation between AT and openness to new experiences in leaders and general people. Although we did not find any correlation between AT and openness, there were relations between openness, complexity, and AT's insolubility subscales. Lauriola et al. also found relations between openness, complexity, and novelty seeking [45]. Openness is consisting of two domains; novelty and intellect [30]. As tolerance of ambiguity in novel situations is one of AT's major components according to Budner's model [1], differences in the participants' intellectual abilities in different studies may be a confounding factor leading to different findings regarding the association between novelty and AT in different studies. Intellectual abilities may also play roles in other aspects of AT, such as complexity and insolubility, which seem to depend on intellectual abilities.

5.1. Limitations and future studies

The response rate was suboptimal in our study, and non-respondents may have different characteristics in terms of AT and personality compared to the respondents. More comprehensive studies with larger sample sizes of students across different years of education are suggested. Also, we only evaluated TUMS medical students, and because of different educational systems and courses in other medical universities, AT may be different in medical students studying in other universities. Future studies in different cities and universities are suggested to evaluate the AT and determine whether our findings are constant in the country or not.

6. Conclusions

Medical students at TUMS are more intolerant of ambiguity in comparison to students studying medicine abroad. As intolerance of ambiguity can affect medical students and practitioners in different aspects of their education and practice, there is a need for interventions and changes in the MD program curriculum to increase medical students' tolerance in ambiguous situations to impact their quality of education and life positively. Also, participants who participated in the mentoring program were less tolerant of ambiguity in novel situations. The mentoring program can be considered for future strategies to increase medical students AT and help them cope in ambiguous situations, especially in novel situations.

Ethical approval

The ethical committee of Tehran University of Medical Sciences approved the study (Ethical code: 92-02-76).

Consent

This study was conducted according to the declaration of Helsinki. This study was conducted using the online platforms, and we sent a message, including the link to the questionnaire and explanations on study goals and objects. The students were asked to open the link and complete the questionnaire if they were interested in participating in the study. If the students were not interested in participating the study they could simply ignore the message.

Author contribution

Conceptualization: NM, ANA; Methodology: ANA, NM; Formal analysis and investigation: NM, ANA, MS; Writing - original draft preparation: ANA, NM; Writing - review and editing: ANA, NM, MS.

Registration of research studies

1. Name of the registry: http://www.researchregistry.com
2. Unique Identifying number or registration ID: researchregistry6444
3. Hyperlink to your specific registration (must be publicly accessible and will be checked): https://www.researchregistry.com/browse-the-registry?_cf_chl_jschl_tk__=8f934707aa 9e27153d1d4d3beff85ee470545ec8-1610452472-0 -AQAYDxQy8lJaOMKB3-nYlUb_uDN-Xzh rQmG9n8FHJoRbQzSOZBi10_2IAt

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#home/registrationdetails/5ffd86b2c22ce8001d21bd77/

Availability of data and materials

The data that support the findings of this study are available from the corresponding author, NM, upon reasonable request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

Amin Nakhostin-Ansari and Nastaran Maghbouli are both mentors in TUMS mentoring office, which may impact them interpreting the results. It should be taken into account that TUMS mentoring office is a student organization, and mentors work there voluntarily. The Mentoring office does NOT pay mentors, and this study was not funded too. Monir Shayestefar have no conflict of interest to declare.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2021.01.068.

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