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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии
საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებშიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman (Кириллица)**, для текста на грузинском языке следует использовать **AcadNusx**. Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи.** Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - <http://www.spinesurgery.ru/files/publish.pdf> и http://www.nlm.nih.gov/bsd/uniform_requirements.html. В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректур авторам не высылаются, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or computer-printed on a single side of standard typing paper, with the left margin of 3 centimeters width, and 1.5 spacing between the lines, typeface - **Times New Roman (Cyrillic)**, print size - 12 (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf

In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

**Articles that Fail to Meet the Aforementioned
Requirements are not Assigned to be Reviewed.**

ავტორთა საყურადღებო!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე, დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx**. შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემავსებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრაფიის ფოტოსურათები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შედეგების ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფხიხლებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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PSYCHOLOGICAL WELL-BEING AMONG MEDICAL STUDENTS AT FIVE UNIVERSITIES IN TBILISI, GEORGIA: A CROSS-SECTIONAL STUDY OF PERCEIVED STRESS, ANXIETY, AND SLEEP QUALITY

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Abstract.

Aim of study: Medical students carry a heavier psychological burden than the general student population, and data from Georgia and the South Caucasus region are scarce. The present study aimed to describe levels of perceived stress, anxiety, and sleep disturbance among medical students at five universities in Tbilisi, Georgia, and to compare these outcomes across years of undergraduate medical training.

Material and methods: A cross-sectional observational study enrolled 300 medical students from five universities, all located in Tbilisi, Georgia, using stratified purposive sampling rather than random selection ($n = 60$ per institution; $n = 50$ per year of study). Data were collected face-to-face during March–April 2026 using the English-language versions of three validated self-report instruments: the Perceived Stress Scale (PSS-10), the Generalized Anxiety Disorder scale (GAD-7), and the Pittsburgh Sleep Quality Index (PSQI). Analyses included Pearson correlations, independent-samples t -tests, and one-way analysis of variance (ANOVA) with Tukey post-hoc comparisons. Ethics approval was obtained from the Research Development and Support Department of Georgian American University (No. #ethc-00012026).

Results: The mean PSS-10 score was 26.20 ($SD = 8.19$); 96.3% of students fell in the moderate-to-high stress range. The mean GAD-7 score was 13.45 ($SD = 5.72$); 73.7% met criteria for moderate-to-severe anxiety. A total of 58.0% reported fairly or very bad sleep quality. All three outcomes were significantly intercorrelated: PSS-10 vs. GAD-7 ($r = 0.736$, $P < 0.001$); PSS-10 vs. PSQI disturbance ($r = 0.561$, $P < 0.001$). Senior students (years 4–6) reported significantly higher stress than junior students (years 1–3): $t(298) = -5.379$, $P < 0.001$, Cohen's $d = 0.62$. One-way ANOVA showed higher scores in successive years of study: $F(5,294) = 8.220$, $P < 0.001$, $\eta^2 = 0.123$, with the highest mean in year 6 (29.84).

Conclusions: Psychological distress was highly prevalent in this sample, and stress scores were higher in later years of study. Year 3, when students move from preclinical to clinical training, marked the point at which scores began to rise. Because the sample was purposive and limited to Tbilisi, the findings should not be generalized to all medical students in Georgia. Within these limits, the results support routine mental health screening and stronger support services at the participating universities.

Key words. Medical students, perceived stress, anxiety, sleep quality, psychological well-being, cross-sectional study, Georgia, PSS-10, GAD-7, PSQI.

Introduction.

Medical education is widely recognized as one of the most psychologically demanding academic pathways. Systematic

reviews and meta-analyses consistently document that medical students experience significantly higher rates of depression, anxiety, and stress than age-matched peers in the general population [1-3]. The pooled global prevalence of anxiety among medical students exceeds 40%, with depression approaching similar levels [4,5]. A meta-analysis of 132,068 students from over 30 countries reported pooled anxiety and depression prevalences of 45% and 48%, respectively, during the COVID-19 pandemic [5,6], and pre-pandemic estimates were similarly elevated [1,3].

The psychological burden of medical education is not static across training years. A six-year longitudinal study demonstrated progressive accumulation of stress with critical inflection points at the entry to clinical training [7]. The shift from preclinical to clinical years exposes students to patient suffering, mortality, and increased professional responsibility, creating a transition shock that sharply intensifies psychological load [8]. More recent longitudinal evidence confirms this trajectory, with stress and exhaustion escalating during examination periods [9] and mood and burnout worsening progressively between years 1 and 3 [10].

Perceived stress, anxiety, and sleep quality are closely linked and reinforce one another. Elevated perceived stress, as captured by the PSS-10 [11], activates cognitive appraisal mechanisms that chronically sustain anxiety symptoms [12]. Anxiety, in turn, disrupts sleep through hyperarousal and ruminative thought processes consistent with Harvey's cognitive model of insomnia [13]. Poor sleep further impairs prefrontal cortex function, reducing emotional regulation and amplifying perceived threat [14], closing a self-reinforcing cycle. Cross-sectional evidence confirms significant positive correlations among all three outcomes in diverse medical student populations [15].

Georgia and the South Caucasus remain largely absent from this international evidence base. Following integration into the Bologna Process, Georgian medical education has expanded substantially, enrolling both domestic and international students. Yet institutional mental health infrastructure has not developed at the same pace. Prior single-institution research documented high rates of insomnia among students at Tbilisi State Medical University [16], but multicenter data are lacking. Multicenter studies from comparable non-Western, lower-middle-income settings show that psychological burden in such contexts often exceeds estimates from high-income countries [17,18]. The present study recruited 300 students across five Tbilisi-based institutions. Two hypotheses were pre-specified: H1, that perceived stress would correlate significantly with anxiety and poorer sleep; and H2, that senior students (years 4–6) would report significantly higher stress than junior students (years 1–3).

Materials and Methods.

Ethics approval:

This study was approved by the Research Development and Support Department of Georgian American University (Approval No. #ethc-00012026, granted February 2026), in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants. No personally identifiable information was recorded.

Study design and setting:

A cross-sectional observational study was conducted at five medical universities during March–April 2026, within the active teaching semester and before the main examination period. All five institutions are located in Tbilisi, so the study covers the capital only and does not represent other regions of Georgia.

Participants:

Eligibility required current enrolment in an undergraduate medical programme. Students on academic leave, repeating a year, or in graduate-only pathways were excluded. A total of 300 medical students were recruited using stratified purposive sampling, not random sampling ($n = 60$ per institution; $n = 50$ per year of study). Within each stratum, students who were present and willing to take part were enrolled until the quota was filled. Five trained data collectors administered the questionnaire face-to-face. The demographic section of the questionnaire recorded sex, institution, and year of study only; age, nationality, local or international student status, marital status, and year-specific academic workload were not collected, and this is addressed in the Limitations.

Measures:

Perceived Stress Scale (PSS-10). A 10-item self-report measure of perceived stress over the preceding month [11]. Scores of 0–13 = low; 14–26 = moderate; 27–40 = high stress. Cronbach's $\alpha = 0.886$.

Generalized Anxiety Disorder Scale (GAD-7). A seven-item validated instrument for generalized anxiety disorder [19–

21]. Cut-points at 5, 10, and 15 for mild, moderate, and severe anxiety. Cronbach's $\alpha = 0.916$.

Pittsburgh Sleep Quality Index (PSQI). A 19-item measure of sleep quality and disturbance over the preceding month [22]. The sleep disturbance subscale and the global subjective sleep quality item were used. Cronbach's $\alpha = 0.903$.

Instrument language. All three instruments were administered in their original English versions, since English is the language of instruction in the participating programmes. Georgian translations formally validated for this population were not available at the time of data collection; the implications of this are discussed in the Limitations.

Statistical analysis:

All analyses were performed using IBM SPSS Statistics version 29.0. Pearson correlations tested associations between PSS-10, GAD-7, and PSQI (H1). An independent-samples t-test compared PSS-10 scores between junior (years 1–3) and senior (years 4–6) groups (H2). One-way ANOVA with Tukey HSD post-hoc examined year-by-year differences. For all independent-samples t-tests, Levene's test for equality of variances was used to check the homogeneity-of-variance assumption; where this assumption was violated, the Welch-corrected t-test with adjusted degrees of freedom was reported instead of the pooled-variance t-test. Statistical significance was set at $P < 0.05$. Effect sizes are reported as Cohen's d and partial eta-squared (η^2).

Results.

Sample characteristics:

The sample comprised 300 students: 51.7% female ($n = 155$) and 48.3% male ($n = 145$). Each institution contributed 60 participants; each year of study contributed 50 (Table 1). No other demographic variables were recorded.

Hypothesis 1: Stress, anxiety, sleep, and intercorrelations:

Perceived stress: Mean PSS-10 = 26.20 ($SD = 8.19$). A total of 96.3% fell in the moderate-to-high range: moderate 79.3% ($n = 238$), high 17.0% ($n = 51$) (Table 3).

Table 1. Demographic characteristics of the sample ($N = 300$).

Characteristic	n	%
Institution		
University 1	60	20.0
University 2	60	20.0
University 3	60	20.0
University 4	60	20.0
University 5	60	20.0
Year of study		
Year 1	50	16.7
Year 2	50	16.7
Year 3	50	16.7
Year 4	50	16.7
Year 5	50	16.7
Year 6	50	16.7
Sex		
Female	155	51.7
Male	145	48.3
Total	300	100.0

Note: Stratified purposive sampling fixed equal cell sizes of $n = 60$ per institution and $n = 50$ per year of study (see Limitations).

Table 2. Internal consistency (Cronbach's alpha) of study measures.

Scale	Items (n)	Cronbach's α	Interpretation
PSS-10	10	0.886	Good
GAD-7	7	0.916	Excellent
PSQI sleep disturbance subscale	11	0.903	Excellent

Note: Excellent: $\alpha \geq 0.90$; Good: $\alpha 0.80\text{--}0.89$.

Table 3. PSS-10 stress categories ($N = 300$).

Category	Score range	n	%
Low	0–13	11	3.7
Moderate	14–26	238	79.3
High	27–40	51	17.0
Total		300	100.0

Table 4. GAD-7 anxiety categories ($N = 300$).

Severity	Score range	n	%
Minimal	0–4	30	10.0
Mild	5–9	49	16.3
Moderate	10–14	72	24.0
Severe	15–21	149	49.7
Total		300	100.0

Table 5. PSQI sleep quality ratings ($N = 300$).

Rating	Description	n	%
Very good	No or minor difficulties	27	9.0
Fairly good	Occasional difficulties	99	33.0
Fairly bad	Frequent difficulties	103	34.3
Very bad	Severe difficulties	71	23.7
Total		300	100.0

Table 6. Pearson correlations: PSS-10, GAD-7, PSQI ($N = 300$).

Variable	1. PSS-10	2. GAD-7	3. PSQI disturbance
1. PSS-10	—		
2. GAD-7	0.736*	—	
3. PSQI disturbance	0.561*	0.577*	—

Note: * $P < 0.001$ (two-tailed).

Table 7. t-test: PSS-10 by student group ($N = 300$).

Group	n	Mean	SD	t (df)	P
Junior (years 1–3)	150	23.77	8.02	−5.379 (298)	< 0.001
Senior (years 4–6)	150	28.63	7.65		

Note: Mean difference = 4.87 (95% CI: 3.09–6.65). Cohen's $d = 0.62$.

Table 8. ANOVA with Tukey HSD: PSS-10 by year of study ($N = 300$).

Year	n	Mean	SD	95% CI lower	95% CI upper	Tukey HSD
1	50	22.46	9.15	19.86	25.06	A
2	50	22.44	7.56	20.29	24.59	A
3	50	26.40	6.64	24.51	28.29	A, B
4	50	28.78	7.03	26.78	30.78	B
5	50	27.28	7.88	25.04	29.52	B
6	50	29.84	7.93	27.59	32.09	B

Note: $F(5,294) = 8.220$, $P < 0.001$, $\eta^2 = 0.123$. Groups sharing a letter do not differ significantly.

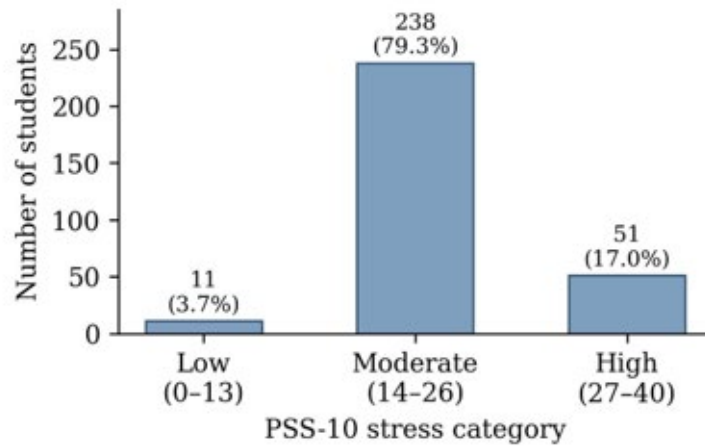


Figure 1. Distribution of PSS-10 perceived stress categories ($N = 300$). Bar chart showing the frequency of students in each category (low: 0–13; moderate: 14–26; high: 27–40).

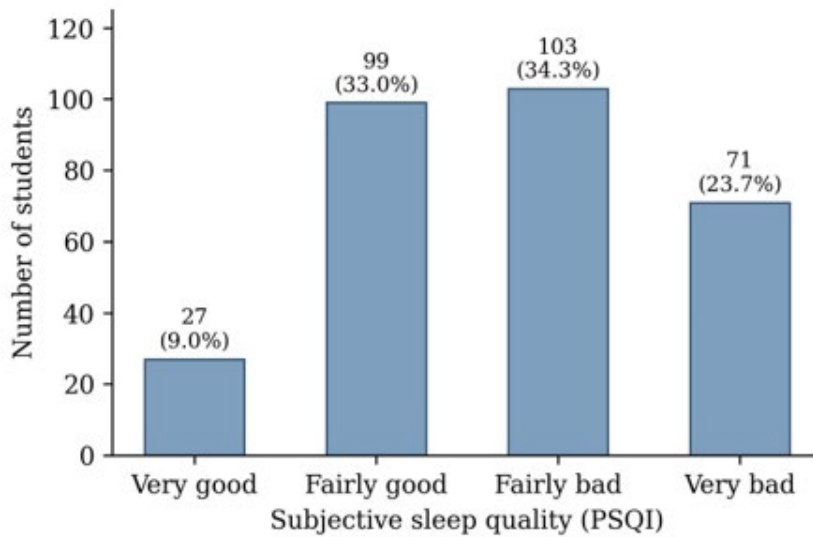


Figure 2. Distribution of PSQI subjective sleep quality ratings ($N = 300$). Bar chart showing the frequency across four categories (very good, fairly good, fairly bad, very bad).

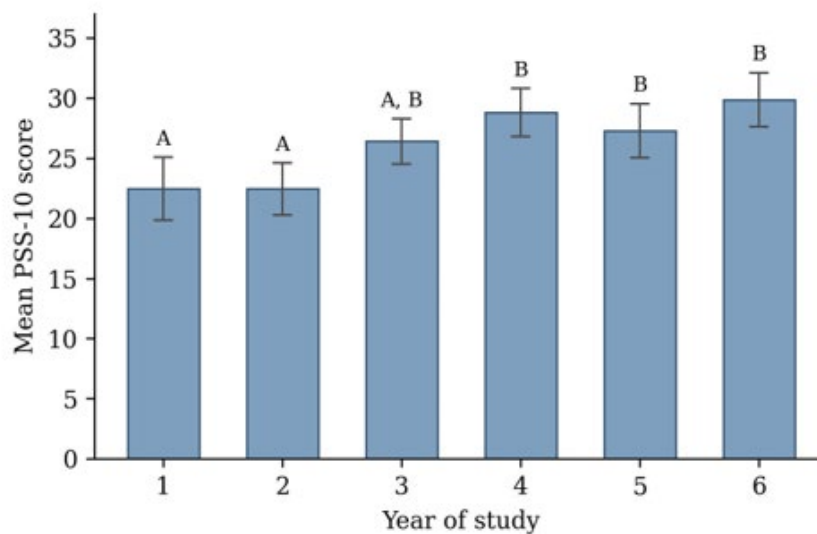


Figure 3. Mean PSS-10 scores by year of study with 95% confidence interval error bars ($N = 300$). ANOVA: $F(5,294) = 8.220$, $P < 0.001$, $\eta^2 = 0.123$. Bars sharing a letter label are not significantly different (Tukey HSD).

Anxiety: Mean GAD-7 = 13.45 (SD = 5.72). A total of 73.7% met criteria for moderate-to-severe anxiety (Table 4).

Sleep quality: A total of 58.0% reported fairly or very bad sleep quality (Table 5).

Correlations: PSS-10 vs. GAD-7: $r = 0.736$ (95% CI: 0.688–0.779, $P < 0.001$); PSS-10 vs. PSQI disturbance: $r = 0.561$ (95% CI: 0.490–0.625, $P < 0.001$); GAD-7 vs. PSQI disturbance: $r = 0.577$ (95% CI: 0.508–0.639, $P < 0.001$) (Table 6). H1 was fully supported.

Hypothesis 2: Year-of-study comparisons:

Senior students (years 4–6) reported significantly higher PSS-10 scores (mean = 28.63, SD = 7.65) than junior students (years 1–3; mean = 23.77, SD = 8.02): $t(298) = -5.379$, mean difference = 4.87 (95% CI: 3.09–6.65), $P < 0.001$, Cohen's $d = 0.62$ (Table 7). One-way ANOVA: $F(5,294) = 8.220$, $P < 0.001$, $\eta^2 = 0.123$. Tukey HSD identified years 1–2 as a lower-stress cluster, year 3 as transitional, and years 4–6 as a higher-stress cluster, peaking in year 6 (mean = 29.84, SD = 7.93) (Table 8). H2 was fully supported.

Gender differences:

No statistically significant gender differences were found: PSS-10, Welch $t(284.76) = -1.547$, $P = 0.123$; GAD-7, $t(298) = -1.176$, $P = 0.240$. For PSS-10, Levene's test indicated a significant violation of the equal-variances assumption between men and women ($P < 0.05$); the Welch correction was therefore applied, and the corresponding adjustment to the degrees of freedom (284.76 rather than 298) reflects this correction. For GAD-7, the equal-variances assumption was not violated, so the standard pooled-variance t -test is reported.

Discussion.

Both pre-specified hypotheses were supported. The proportions of students with moderate-to-high stress (96.3%) and severe anxiety (49.7%) are high, clearly exceed general population benchmarks, and are in line with meta-analytic estimates from large international cohorts [5]. The strong stress-anxiety correlation ($r = 0.736$) is consistent with transactional stress theory [11,12], and the stress-sleep association ($r = 0.561$) mirrors Harvey's cognitive model of insomnia [13] and recent empirical data from international samples [15,23,24].

The pattern of higher stress in later years, with the first clear rise at year 3, matches the trajectory documented in the only published six-year longitudinal study of medical student stress [7] and agrees with prospective evidence on burnout and mood deterioration [10]. Because the data are cross-sectional, this pattern reflects differences between year cohorts rather than change within individuals. Even so, the rise at year 3 mirrors prior empathy erosion findings [8] and is consistent with narrative syntheses documenting curriculum-transition-linked escalation [25]. Single-institution Georgian data previously documented high insomnia prevalence [16]; the present findings from five Tbilisi institutions extend that observation by demonstrating it as part of a broader, intercorrelated psychological burden. Findings from Sri Lanka [17] and a systematic review from outside North America [18] confirm that similar patterns characterize medical education in comparable settings globally.

The findings point to several practical steps that the

participating universities, and Georgian medical schools more broadly, could take. Routine screening with short instruments such as the PSS-10 and GAD-7, offered once or twice per academic year, would allow early identification of students under high strain. Accessible counseling services with clear referral pathways, peer-support groups organized within each cohort, and structured academic advising would give students concrete places to turn. Year 3 deserves particular attention: a short preparatory module covering clinical workload, patient contact, and time management, combined with closer mentoring during the first clinical semester, could ease the entry into clinical training. Sleep education also has a place in such programmes, given that more than half of the participants rated their sleep as fairly or very bad.

Several limitations should be kept in mind. The design is cross-sectional, so the results describe associations only and do not support causal or developmental claims. The PSQI was used in subscale form rather than as a full global score. All participating institutions were located in Tbilisi, so the findings say nothing about medical education in other regions of Georgia. The demographic data were limited to sex, institution, and year of study; age, nationality, local or international student status, marital status, and year-specific academic workload were not recorded, although each of these may affect stress, anxiety, and sleep. The instruments were administered in their original English versions, which have not been formally validated for this specific population, so measurement equivalence across student subgroups cannot be guaranteed. A further limitation concerns the sampling strategy itself. Because stratified purposive sampling fixed equal cell sizes for each institution ($n = 60$) and each year of study ($n = 50$), the resulting sample does not reflect the true enrolment ratios across institutions or years, and participants were not selected through a random or probabilistic mechanism. This design was chosen to guarantee adequate statistical power for year-by-year and institution-level comparisons, but it also introduces a non-negligible risk of selection bias: students who volunteered or were more readily accessible to data collectors within each stratum may differ systematically from non-participants in ways that were not measured. Consequently, the inferential statistics reported here (independent-samples t -tests, one-way ANOVA, and associated P -values) should be interpreted with caution, since their formal justification presumes random sampling from a defined population, an assumption that a purposive, equal-allocation design does not strictly satisfy. The statistically significant differences reported should therefore be read as evidence of association within this specific, non-randomly selected cohort rather than as unbiased population-level estimates, and replication using probability-based sampling is needed before the findings are generalized to the broader population of medical students in Georgia.

Conclusion.

In this sample of medical students from five Tbilisi universities, psychological distress was highly prevalent, and stress scores were higher in later years of study, with the highest mean in year 6. Year 3, when students move from preclinical to clinical training, appears to be the point at which stress scores begin

to rise. Because the sample was selected purposively and all institutions were located in Tbilisi, these results describe associations within this cohort and should not be generalized to all medical students in Georgia. Within these limits, the findings support routine mental health screening and accessible support services at the participating universities, with particular attention to the transition into clinical training. Longitudinal research following students across the full curriculum, ideally with probability-based sampling and fuller demographic data, is the most important next step.

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Conflict of interest.

The authors declare no conflicts of interest.

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Резюме.

Цель исследования: Известно, что студенты медицинских вузов испытывают более высокую психологическую нагрузку по сравнению со сверстниками из общей студенческой популяции, при этом данные из Грузии и региона Южного Кавказа немногочисленны. Целью настоящего исследования явилась оценка уровней воспринимаемого стресса, тревожности и нарушений сна у студентов-медиков пяти университетов Тбилиси, а также сравнение этих показателей между годами обучения.

Материал и методы: Поперечное наблюдательное исследование включало 300 студентов-медиков из пяти университетов, расположенных в Тбилиси, отобранных методом стратифицированной целенаправленной (неслучайной) выборки ($n = 60$ на учреждение; $n = 50$ на год обучения). Данные собирались очно в марте–апреле 2026 года с использованием трёх валидизированных инструментов самооценки: Шкалы воспринимаемого стресса (PSS-10), Шкалы генерализованного тревожного расстройства (GAD-7) и Питтсбургского индекса качества сна (PSQI). Статистический анализ включал корреляции Пирсона, t -тесты для независимых выборок и однофакторный дисперсионный анализ (ANOVA) с постхок-тестом Тьюки. Этическое одобрение получено от Отдела развития и поддержки научных исследований Грузинско-американского университета (№ #ethc-00012026).

Результаты: Средний балл PSS-10 составил 26,20 ($CO = 8,19$); 96,3% студентов находились в диапазоне умеренного–высокого стресса. Средний балл GAD-7 составил 13,45 ($CO = 5,72$); 73,7% соответствовали критериям умеренной–тяжёлой тревоги. В общей сложности 58,0% оценили качество сна как «довольно плохое» или «очень плохое». Все три показателя значимо коррелировали между собой: PSS-10 и GAD-7 ($r = 0,736$, $P < 0,001$); PSS-10 и нарушения сна по PSQI ($r = 0,561$, $P < 0,001$). Студенты старших курсов (4–6) демонстрировали значительно более высокий уровень стресса, чем студенты младших курсов (1–3): $t(298) = -5,379$, $P < 0,001$, d Коэна = 0,62. Однофакторный ANOVA показал более высокие показатели на последующих курсах: $F(5,294) = 8,220$, $P < 0,001$, $\eta^2 = 0,123$, с пиком на 6-м курсе (среднее = 29,84).

Заключение: В данной выборке психологический дистресс был широко распространён, а показатели стресса были выше на старших курсах, достигая максимума на 6-м курсе. Переход от доклинического к клиническому обучению на 3-м курсе представляется моментом, с которого показатели стресса начинают расти. Поскольку выборка была целенаправленной и ограничивалась вузами Тбилиси, результаты не следует распространять на всех студентов-медиков Грузии. С учётом этих ограничений полученные данные поддерживают внедрение регулярного скрининга психического здоровья и доступных служб поддержки в участвовавших университетах.

Ключевые слова: студенты-медики, воспринимаемый стресс, тревожность, качество сна, психологическое благополучие, поперечное исследование, Грузия, PSS-10, GAD-7, PSQI

რეზიუმე.

კვლევის მიზანი: ცნობილია, რომ მედიცინის სტუდენტები ზოგად სტუდენტურ პოპულაციასთან შედარებით უფრო მაღალი ფსიქოლოგიური დატვირთვის ქვეშ იმყოფებიან, ხოლო საქართველოსა და სამხრეთ კავკასიის რეგიონიდან არსებული მონაცემები მწირია. წინამდებარე კვლევის მიზანი იყო თბილისის ხუთი უნივერსიტეტის მედიცინის სტუდენტებში აღქმული სტრესის, შფოთვისა და ძილის დარღვევების დონის შეფასება და ამ მაჩვენებლების შედარება სასწავლო წლების მიხედვით.

მასალა და მეთოდები: ჯვარედინი (cross-sectional) ობსერვაციულ კვლევაში მონაწილეობამიღობილისში (საქართველო) მდებარე ხუთი უნივერსიტეტის 300-მა მედიცინის სტუდენტმა. მონაწილეთა შერჩევა განხორციელდა სტრატეგიული მიზნობრივი (არა შემთხვევითი) შერჩევის მეთოდით ($n = 60$ თითოეული უნივერსიტეტიდან; $n = 50$ თითოეული სასწავლო წლიდან). მონაცემები შეგროვდა პირისპირ გამოკითხვის გზით 2026 წლის მარტ-აპრილში სამი ვალიდირებული თვითშეფასების ინსტრუმენტის ინგლისურენოვანი ვერსიების გამოყენებით: აღქმული სტრესის სკალა (PSS-10), გენერალიზებული შფოთვითი აშლილობის სკალა (GAD-7) და პიტსბურგის ძილის ხარისხის ინდექსი (PSQI). სტატისტიკური ანალიზი მოიცავდა პირსონის კორელაციის ანალიზს, დამოუკიდებელი შერჩევების t -ტესტს და ერთფაქტორულ დისპერსიულ ანალიზს (ANOVA) ტუკის პოსტ-ჰოკ შედარებებით. კვლევა დამტკიცებული იყო ქართულ-ამერიკული უნივერსიტეტის კვლევისა და განვითარების მხარდაჭერის დეპარტამენტის მიერ (№ ethc-00012026).

შედეგები: PSS-10-ის საშუალო მაჩვენებელი იყო 26.20 ($SD = 8.19$); სტუდენტების 96.3% მიეკუთვნებოდა საშუალო ან მაღალი სტრესის კატეგორიას. GAD-7-ის საშუალო მაჩვენებელი იყო 13.45 ($SD = 5.72$); მონაწილეთა 73.7% აკმაყოფილებდა საშუალო ან მძიმე შფოთვის კრიტერიუმებს. სტუდენტების 58.0%-მა აღნიშნა ძილის საკმაოდ ცუდი ან ძალიან ცუდი ხარისხი. სამივე მაჩვენებელს შორის გამოვლინდა სტატისტიკურად მნიშვნელოვანი ურთიერთკავშირი: PSS-10 და GAD-7 ($r = 0.736$, $P < 0.001$); PSS-10 და PSQI-ის ძილის დარღვევის მაჩვენებელი ($r = 0.561$, $P < 0.001$). უფროსი კურსების სტუდენტებს (IV-VI კურსი) მნიშვნელოვნად უფრო მაღალი სტრესის დონე აღენიშნებოდათ, ვიდრე უმცროსი კურსების სტუდენტებს (I-III კურსი): $t(298) = -5.379$, $P < 0.001$, Cohen's $d = 0.62$. ერთფაქტორული ANOVA-ის მიხედვით, სტრესის მაჩვენებლები უფრო მაღალი იყო მომდევნო სასწავლო წლებზე: $F(5,294) = 8.220$, $P < 0.001$, $\eta^2 = 0.123$; ყველაზე მაღალი საშუალო დაფიქსირდა VI კურსზე (29.84).

დასკვნები: წინამდებარე შერჩევაში ფსიქოლოგიური დისტრესი ფართოდ იყო გავრცელებული, ხოლო სტრესის მაჩვენებლები უფრო მაღალი იყო უფროს კურსებზე და მაქსიმუმს VI კურსზე აღწევდა. პრეკლინიკური ეტაპიდან კლინიკურ სწავლებაზე გადასვლა მე-3 კურსზე წარმოადგენს იმ ეტაპს, საიდანაც სტრესის მაჩვენებლები მატულობს. ვინაიდან შერჩევა მიზნობრივი იყო და მხოლოდ თბილისის უნივერსიტეტებს მოიცავდა, შედეგები არ უნდა განზოგადდეს საქართველოს ყველა მედიცინის სტუდენტზე. ამ შეზღუდვების გათვალისწინებით, მიღებული შედეგები მხარს უჭერს ფსიქიკური ჯანმრთელობის რეგულარული სკრინინგისა და ხელმისაწვდომი მხარდაჭერის სერვისების დანერგვას მონაწილე უნივერსიტეტებში.

საკვანძო სიტყვები: მედიცინის სტუდენტები, აღქმული სტრესი, შფოთვა, ძილის ხარისხი, ფსიქოლოგიური კეთილდღეობა, ჯვარედინი კვლევა, საქართველო, PSS-10, GAD-7, PSQI.