

# GEORGIAN MEDICAL NEWS

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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](http://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](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.nlm.nih.gov/bsd/uniform_requirements.html)  
[http://www.icmje.org/urm\\_full.pdf](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 საქურაღებოლ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დაიცვათ 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, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები 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.

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## THE RELATIONSHIP BETWEEN MENTAL HEALTH AND PHYSICAL ACTIVITY AMONG STUDENTS FROM A PRIVATE UNIVERSITY: A CROSS-SECTION STUDY

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### Abstract.

Depression is being recognized worldwide as a serious public health problem. Health problems may affect a college student's quality. Project aims to analyze the effects of physical activity on anxiety and depression in university student.

**Methods:** This study employed cross-sectional, self-reported survey methodology. A sample of 2008 student completed a test that included social-demographic data, GAD-7, PHQ-9, IPAQ and EAT-26. GAD-7 was assessed using the anxiety questionnaire (range 0–21, with higher scores indicating more anxiety). PHQ-9 was assessed using the depression questionnaire (range 0–27, with higher scores indicating more depression). Physical activity was assessed using a short version of the International Physical Activity Questionnaire (IPAQ), which is divided into three levels: low, moderate and high levels of physical activity. Eating attitude test-26 (EAT-26) is widely used screening instruments for disordered eating attitudes (Scores 20 or above was defined as disordered eating attitude). The data were analyzed by SPSS 20.0 system.

**Results:** There was no significant correlation between depression and anxiety symptoms and child in the family, parents are highly educated, single-parent family and parents are doctors or nurses and other medical staff. The experimental data suggested that mental health was significantly associated with the suffer from domestic or social violence, use cell phones and computers for fun time, low-intensity exercise, high-intensity exercise and eating disorder.

**Conclusion:** The thesis concludes that the physical activity was significantly associated with mental health. It is necessary to take measures to reduce anxiety and depression in college students, to improve their understanding of the importance of healthy.

**Key words.** Physical activity, mental health, anxiety, depression, Students, University.

### Introduction.

Depression has become a common mental health disorder, according to the World Health Organization, depression is a leading cause of heart disease [1-5]. And people with depression have higher rates of diabetes [6], and cardiovascular disease [7] than the general population. And has a significant impact on an individual's daily functioning [1].

Depression is gaining recognition as a serious public health issue. Low mood, lack of motivation, mental anxiety, loss of appetite or overeating, and delayed reactions are characterized [5]. A number of recent studies have shown that the rate of depression showing varying degrees was 68.5 %, while the rate

of anxiety was 54.4% [6]. Depression and anxiety symptoms are affected by many factors. It may contribute to psychological stress and lower quality of life. Previous research has established that alcohol consumption, illicit drug use, tobacco use, and physical activity levels are important factors affecting major depressive disorder and generalized anxiety disorder. Research in this area has shown that has a strong correlation between anxiety and depressive symptoms [7-10]. And mixed anxiety and depressive disorders are the most common psychiatric problems. The most important result was that physical activity has an antidepressant effect [11]. It has previously been observed that the relationship between physical activity and mental health.

### Materials and Methods.

#### Design and participants:

We recruited 2100 participants to do an online survey. 92 participants were excluded because of missing information. All subjects are required to obtain written informed consent and agree to provide relevant personal information. Participation was voluntary and the students were informed of the purpose of the study. Confidentiality was assured and questionnaires were submitted anonymously.

#### Instruments:

In this study, general demographic statistics, General Health Questionnaire, the Patient Health Questionnaire-9 (PHQ-9) and the Generalized Anxiety Disorder 7-item (GAD-7) were used to evaluate the depression and anxiety symptoms of college students. The general characteristics of participants included gender, place of origin, BMI, child in the family, Single-parent family, parents are highly educated, Parents are doctors or nurses and other medical staff, cell phones and computers for fun time, Suffer from domestic or social violence.

#### Patient Health Questionnaire-9(PHQ-9):

The Patient Health Questionnaire-9 was used to evaluate depression. The PHQ-9 questionnaire contains 4 possible responses to each item. The 4 options consist of the following: "not at all = 0"; "a few days = 1"; "more than half = 2"; and "almost every day = 3." The higher the total score, the greater the severity of the depression symptoms.

#### Generalized Anxiety Disorder 7-item (GAD-7):

The GAD-7 was used by us to assess the generalized anxiety disorder and severity of other anxiety disorders with good reliability [12,13]. GAD-7 consists of 7 projects. Each part is graded according to grade 0 ~ 3, and the cumulative score of each part is the total score of GAD-7. The GAD-7 has a

score range of 0~21, with high scores indicating the worse the symptoms of anxiety.

**Physical Activity Questionnaire (IPAQ):**

Physical activity was assessed using a short version of the International Physical Activity Questionnaire (IPAQ), which is divided into three levels: low, moderate and high levels of physical activity. The MET of high levels of physical activity is 8.0, that of moderate levels of physical activity is 4.0, and that of low levels of physical activity is 3.3.

**Eating attitude test-26 (EAT-26):**

Eating attitudes test-26 (EAT-26) was a widely used self-report measure for assessment of disordered eating attitudes and behavior with 26 questions. Each part is graded according to grade 0 ~ 3, and the cumulative score of each part is the total score of EAT-26. Scores 20 or above was defined as disordered eating attitude.

**Statistical analyses:**

Statistical analyses were conducted using the SPSS, the characteristic distribution of the included subjects was analyzed for descriptive statistical analysis. The current study adopts Pearson to the relationship between physical activity and anxiety and depression.

**Results.**

Among the 2008 students who participated in this research, 1288(64.1%) were males, while 720(35.9%) were females. Demographic characteristics of participants are shown in Table 1. The prevalence of depression and anxiety symptoms among college students both were 20.9%(GAD-7≥5 □ PHQ-9≥5). The total 688 respondents were Only child in the family. A total of 1616 (80.5%) of college students parents without higher education. A total of 1691 (84.3%) participants were reported done the low-intensity exercise at least once a week .1441 (71.8%) participants were reported done the high-intensity exercise at least once a week. In addition, a total of 445(22.2%) subjects had eating disorder.

There were some significant differences between GAD-7 and PHQ-9 with different demographic characteristics (Tables 2 and 3). Closer inspection of the table shows that the female was more likely to have symptoms of anxiety compared to the male (p =0.028). Anxiety and depression levels showed a non-significant difference by BMI (P=0.111, P=0.25). There were no detailed differences in anxiety or depression levels among students from single-child families (P=0.186, P=0.283), single-parent families (P=0.552, P=0.428), parents are highly educated (P=0.824, P=0.246), parents are doctors or nurses and other medical staff (P=0.574, P=0.813), or High-intensity exercise (P=0.138, P=0.273). Students who reported that suffer from domestic or social violence more anxiety or depression symptoms (p<0.001). College students who use their cell phones and computers for fun time for more than six hours a day have more anxiety or depression symptoms (p<0.001). Students who reported that low-intensity exercise once a week or more had fewer symptoms anxiety or depression (p<0.05, p<0.001). College students with eating disorders tend to have anxiety or depression symptoms (p<0.001).

*Table 1. Demographic characteristics of the study population.*

| variable  |                            | N    | (%)  |
|---|----------------------------|------|------|
| Gender  | male                       | 1288 | 64.1 |
|   | female                     | 720  | 35.9 |
| BMI   | underweight                | 254  | 12.6 |
|   | normal                     | 1120 | 55.8 |
|   | Overweight                 | 319  | 15.9 |
|   | obesity                    | 130  | 6.5  |
|   | Very fat                   | 185  | 9.2  |
| Only child in the family                              | yes                        | 688  | 34.3 |
|   | no                         | 1320 | 65.7 |
| Single-parent family                                  | yes                        | 127  | 6.3  |
|   | no                         | 1881 | 93.7 |
| parents are highly educated                           | both sides                 | 124  | 6.2  |
|   | one                        | 268  | 13.3 |
|   | neither                    | 1616 | 80.5 |
| Parents are doctors or nurses and other medical staff | both sides                 | 25   | 1.2  |
|   | one                        | 35   | 1.7  |
|   | neither                    | 1948 | 97.0 |
| Suffer from domestic or social violence               | > 5 times/year             | 19   | .9   |
|   | 1-5 times/year             | 133  | 6.6  |
|   | none                       | 1856 | 92.4 |
| Use cell phones and computers for fun time            | ≥6h/ day                   | 129  | 6.4  |
|   | 3-6h/ day                  | 843  | 42.0 |
|   | 1-3h/ day                  | 913  | 45.5 |
|   | < 1h/ day                  | 123  | 6.1  |
| Low-intensity exercise                                | never                      | 317  | 15.8 |
|   | 1 to 2 times per week      | 987  | 49.2 |
|   | 3 to 4 times per week      | 403  | 20.1 |
|   | More than 5 times per week | 301  | 15.0 |
| High-intensity exercise                               | never                      | 567  | 28.2 |
|   | 1 to 2 times per week      | 1010 | 50.3 |
|   | 3 to 4 times per week      | 279  | 13.9 |
|   | More than 5 times per week | 152  | 7.6  |
| EAT   | EAT<20                     | 1563 | 77.8 |
|   | EAT≥20                     | 445  | 22.2 |

It can be seen from table 4 that symptoms of depression and anxiety are significantly correlated with suffer from domestic or social, cell phones and computers for fun time, EAT and Low-intensity exercise. Depression and anxiety showed a significant positive correlation. Depression significantly negatively correlated with suffer from domestic or social violence (r =-0.161, p<0.01) and use cell phones and computers for fun time

**Table 2.** GAD-7 scores by respondent characteristics.

| Variable   | None (Range,0-1)<br>(n=1588) | Minimal<br>(Range,5-9)<br>(n=358) | Moderate<br>(Range,10-13)<br>(n=32) | Moderate to<br>severe (Range, 10-<br>13) (n=18) | Severe<br>(Range,19-21)<br>(n=12) | P Value |
|--|------------------------------|-----------------------------------|-------------------------------------|---|-----------------------------------|---------|
| <b>Gender</b>  |                              |                                   |                                     |   |                                   | 0.028   |
| male   | 1045 (81.1)                  | 204 (15.8%)                       | 19 (1.5%)                           | 11 (0.9%)                                       | 9 (0.7%)                          |         |
| female   | 543 (75.4%)                  | 154 (21.4%)                       | 13 (1.8%)                           | 7 (1.0%)  | 3 (0.4%)                          |         |
| <b>BMI</b>   |                              |                                   |                                     |   |                                   | 0.111   |
| underweight  | 200 (78.7%)                  | 49 (19.3%)                        | 0 (0.0%)                            | 2 (0.8%)  | 3 (1.2%)                          |         |
| normal   | 898 (80.2%)                  | 190 (17.0%)                       | 18 (1.6%)                           | 10 (0.9%)                                       | 4 (0.4%)                          |         |
| Overweight   | 246 (77.1%)                  | 56 (17.6%)                        | 9 (2.8%)                            | 6 (1.9%)  | 2 (0.6%)                          |         |
| obesity  | 103 (79.2%)                  | 22 (16.9%)                        | 4 (3.1%)                            | 0 (0.0%)  | 1 (0.8%)                          |         |
| Very fat   | 141 (76.2%)                  | 41 (22.2%)                        | 1 (0.5%)                            | 0 (0.0%)  | 9 (1.1%)                          |         |
| <b>Only child in the family</b>                              |                              |                                   |                                     |   |                                   | 0.186   |
| yes  | 549 (79.8%)                  | 120 (17.4%)                       | 14 (2.0%)                           | 2 (0.3%)  | 3 (0.4%)                          |         |
| no   | 1039 (78.7%)                 | 238 (18.0%)                       | 18 (1.4%)                           | 16 (1.2%)                                       | 9 (0.7%)                          |         |
| <b>Single-parent family</b>                                  |                              |                                   |                                     |   |                                   | 0.552   |
| yes  | 98 (77.2%)                   | 24 (18.9%)                        | 4 (3.1%)                            | 1 (0.8%)  | 0 (0.0%)                          |         |
| no   | 1490 (79.2%)                 | 334 (17.8%)                       | 28 (1.5%)                           | 17 (0.9%)                                       | 12 (0.6%)                         |         |
| <b>parents are highly educated</b>                           |                              |                                   |                                     |   |                                   | 0.824   |
| both sides   | 103 (83.1%)                  | 19 (15.3%)                        | 0 (0.0%)                            | 1 (0.8%)  | 1 (0.8%)                          |         |
| one  | 217 (81.0%)                  | 42 (15.7%)                        | 5 (1.9%)                            | 2 (0.7%)  | 2 (0.7%)                          |         |
| neither  | 1268 (78.5%)                 | 297 (18.4%)                       | 27 (1.7%)                           | 15 (0.9)  | 9 (0.6%)                          |         |
| <b>Parents are doctors or nurses and other medical staff</b> |                              |                                   |                                     |   |                                   | 0.574   |
| both sides   | 22 (88.0%)                   | 2 (8.0%)                          | 1 (4.0%)                            | 0 (0.0%)  | 0 (0.0%)                          |         |
| one  | 25 (71.4%)                   | 9 (25.7%)                         | 0 (0.0%)                            | 1 (2.9%)  | 0 (0.0%)                          |         |
| neither  | 1541 (79.1%)                 | 347 (17.8%)                       | 1.6%                                | 17 (0.9%)                                       | 12 (0.6%)                         |         |
| <b>Suffer from domestic or social violence</b>               |                              |                                   |                                     |   |                                   | 0.000   |
| > 5 times/year   | 12 (63.2%)                   | 5 (26.3%)                         | 1 (5.3%)                            | 0 (0.0%)  | 1 (5.3%)                          |         |
| 1-5 times/year   | 76 (57.1%)                   | 43 (32.3%)                        | 6 (4.5%)                            | 5 (3.8%)  | 3 (2.3%)                          |         |
| none   | 1500 (80.8%)                 | 310 (16.7%)                       | 25 (1.3%)                           | 13 (0.7%)                                       | 8 (0.4%)                          |         |
| <b>Use cell phones and computers for fun time</b>            |                              |                                   |                                     |   |                                   | 0.000   |
| ≥6h/ day   | 86 (66.7%)                   | 36 (27.9%)                        | 1 (0.8%)                            | 4 (3.1%)  | 2 (1.6%)                          |         |
| 3-6h/ day  | 648 (76.9%)                  | 164 (19.5%)                       | 202.4%                              | 6 (0.7%)  | 5 (0.6%)                          |         |
| 1-3h/ day  | 752 (82.4%)                  | 144 (15.8%)                       | 6 (0.7%)                            | 4 (0.7%)  | 5 (0.5%)                          |         |
| < 1h/ day  | 102 (82.9%)                  | 14 (11.4%)                        | 5 (4.1%)                            | 2 (1.6%)  | 0 (0.0%)                          |         |
| <b>Low-intensity exercise</b>                                |                              |                                   |                                     |   |                                   | 0.045   |
| never  | 234 (73.8%)                  | 67 (21.1%)                        | 8 (2.5%)                            | 5 (1.6%)  | 3 (0.9%)                          |         |
| 1 to 2 times per week  | 773 (78.3%)                  | 188 (19.0%)                       | 13 (1.3%)                           | 8 (0.8%)  | 5 (0.5%)                          |         |
| 3 to 4 times per week  | 325 (80.6%)                  | 70 (17.4%)                        | 5 (1.2%)                            | 1 (0.2%)  | 2 (0.5%)                          |         |
| More than 5 times per week                                   | 256 (85.0%)                  | 33 (11.0%)                        | 6 (2.0%)                            | 4 (1.3%)  | 2 (0.7%)                          |         |
| <b>High-intensity exercise</b>                               |                              |                                   |                                     |   |                                   | 0.138   |
| never  | 436 (76.9%)                  | 105 (18.5%)                       | 14 (2.5%)                           | 8 (1.4%)  | 4 (0.7%)                          |         |
| 1 to 2 times per week  | 796 (78.8%)                  | 191 (18.9%)                       | 11 (1.1%)                           | 6 (0.6%)  | 6 (0.6%)                          |         |
| 3 to 4 times per week  | 223 (79.9%)                  | 47 (16.8%)                        | 6 (2.2%)                            | 2 (0.7%)  | 1 (0.4%)                          |         |
| More than 5 times per week                                   | 133 (87.5%)                  | 15 (9.9%)                         | 1 (0.7%)                            | 2 (1.3%)  | 1 (0.7%)                          |         |
| <b>EAT</b>   |                              |                                   |                                     |   |                                   | 0.000   |
|  | 1305 (83.5%)                 | 235 (15.0%)                       | 12 (0.8%)                           | 5 (0.3%)  | 6 (0.4%)                          |         |
|  | 283 (63.6%)                  | 123 (27.6%)                       | 20 (4.5%)                           | 13 (2.9%)                                       | 6 (1.3)                           |         |

**Table 3.** PHQ-9 scores by respondent characteristics.

| variable   | None (Range,0-1) (n =1589 ) | Minimal (Range,5-9) (n =335 ) | Moderate (Range,10-14) (n = 53) | Moderate to severe (Range, 15-19) (n =22 ) | Severe (Range,20-27) (n =9 ) | P Value |
|--|-----------------------------|-------------------------------|---------------------------------|--|------------------------------|---------|
| <b>Gender</b>  |                             |                               |                                 |  |                              | 0.146   |
| male   | 1040 (80.7%)                | 197 (15.3%)                   | 30 (2.3%)                       | 15 (1.2%)                                  | 6 (0.5%)                     |         |
| female   | 549 (76.2%)                 | 138 (19.2%)                   | 23 (3.2%)                       | 7 (1.0%)                                   | 3 (0.4%)                     |         |
| <b>BMI</b>   |                             |                               |                                 |  |                              | 0.25    |
| underweight  | 202 (79.5%)                 | 43 (16.9%)                    | 5 (2.0%)                        | 1 (0.4%)                                   | 3 (1.2%)                     |         |
| normal   | 888 (79.3%)                 | 190 (17.0%)                   | 26 (2.3%)                       | 14 (1.2%)                                  | 2 (0.2%)                     |         |
| Overweight   | 246 (77.1%)                 | 54 (16.9%)                    | 12 (3.8%)                       | 6 (1.9%)                                   | 1 (0.3%)                     |         |
| obesity  | 107 (82.3%)                 | 15 (11.5%)                    | 6 (4.6%)                        | 1 (0.8%)                                   | 1 (0.8%)                     |         |
| Very fat   | 146 (78.9%)                 | 33 (17.8%)                    | 4 (2.2%)                        | 0 (0.0%)                                   | 2 (1.1%)                     |         |
| <b>Only child in the family</b>                              |                             |                               |                                 | 7  | 1                            | 0.283   |
| yes  | 560 (81.4%)                 | 102 (14.8%)                   | 18 (2.6%)                       | 7 (1.0%)                                   | 1 (0.1%)                     |         |
| no   | 78.00%                      | 233 (17.7%)                   | 35 (2.7%)                       | 15 (1.1%)                                  | 8 (0.6%)                     |         |
| <b>Single-parent family</b>                                  |                             |                               |                                 |  |                              | 0.428   |
| yes  | 96 (75.6%)                  | 23 (18.1%)                    | 5 (3.9%)                        | 3 (2.4%)                                   | 0 (0.0%)                     |         |
| no   | 1493 (79.4%)                | 312 (16.6%)                   | 48 (2.6%)                       | 19 (1.0%)                                  | 9 (0.5%)                     |         |
| <b>parents are highly educated</b>                           |                             |                               |                                 |  |                              | 0.246   |
| both sides   | 101 (81.5%)                 | 16 (12.9%)                    | 6 (4.8%)                        | 1 (0.8%)                                   | 0 (0.0%)                     |         |
| one  | 225 (84.0%)                 | 33 (12.3%)                    | 5 (1.9%)                        | 3 (1.1%)                                   | 2 (0.7%)                     |         |
| neither  | 1263 (78.2%)                | 286 (17.7%)                   | 42 (2.6%)                       | 18 (1.1%)                                  | 7 (0.4%)                     |         |
| <b>Parents are doctors or nurses and other medical staff</b> |                             |                               |                                 |  |                              | 0.813   |
| both sides   | 20 (80.0%)                  | 3 (12.0%)                     | 1 (4.0%)                        | 1 (4.0%)                                   | 0 (0.0%)                     |         |
| one  | 29 (82.9%)                  | 4 (11.4%)                     | 1 (2.9%)                        | 1 (2.9%)                                   | 0 (0.0%)                     |         |
| neither  | 1540 (79.1%)                | 328 (16.8%)                   | 51 (2.6%)                       | 20 (1.0%)                                  | 9 (0.5%)                     |         |
| <b>Suffer from domestic or social violence</b>               |                             |                               |                                 |  |                              | 0       |
| > 5 times/year   | 12 (63.2%)                  | 4 (21.1%)                     | 0 (0.0%)                        | 2 (10.5%)                                  | 1 (5.3%)                     |         |
| 1-5 times/year   | 82 (61.7%)                  | 34 (25.6%)                    | 10 (7.5%)                       | 5 (3.8%)                                   | 2 (1.5%)                     |         |
| none   | 1495 (80.5%)                | 297 (16.0%)                   | 43 (2.3%)                       | 15 (0.8%)                                  | 6 (0.3%)                     |         |
| <b>Use cell phones and computers for fun time</b>            |                             |                               |                                 |  |                              | 0       |
| ≥6h/ day   | 86 (66.7%)                  | 30 (23.3%)                    | 5 (3.9%)                        | 7 (5.4%)                                   | 1 (0.8%)                     |         |
| 3-6h/ day  | 640 (75.9%)                 | 158 (18.7%)                   | 34 (4.0%)                       | 7 (0.8%)                                   | 4 (0.5%)                     |         |
| 1-3h/ day  | 756 (82.8%)                 | 135 (14.8%)                   | 14 (1.5%)                       | 4 (0.4%)                                   | 4 (0.4%)                     |         |
| < 1h/ day  | 107 (87.0%)                 | 12 (9.8%)                     | 0 (0.0%)                        | 4 (3.3%)                                   | 0 (0.0%)                     |         |
| <b>Low-intensity exercise</b>                                |                             |                               |                                 |  |                              | 0.001   |
| never  | 223 (70.3%)                 | 72 (22.7%)                    | 11 (3.5%)                       | 9 (2.8%)                                   | 2 (0.6%)                     |         |
| 1 to 2 times per week  | 782 (79.2%)                 | 165 (16.7%)                   | 31 (3.1%)                       | 5 (0.5%)                                   | 4 (0.4%)                     |         |
| 3 to 4 times per week  | 336 (83.4%)                 | 55 (13.6%)                    | 6 (1.5%)                        | 5 (1.2%)                                   | 1 (0.2%)                     |         |
| More than 5 times per week                                   | 248 (82.4%)                 | 43 (14.3%)                    | 5 (1.7%)                        | 3 (1.0%)                                   | 2 (0.7%)                     |         |
| <b>High-intensity exercise</b>                               |                             |                               |                                 |  |                              | 0.273   |
| never  | 223 (70.3%)                 | 72 (22.7%)                    | 11 (3.5%)                       | 9 (2.8%)                                   | 2 (0.6%)                     |         |
| 1 to 2 times per week  | 782 (79.2%)                 | 165 (16.7%)                   | 31 (3.1%)                       | 5 (0.5%)                                   | 4 (0.4%)                     |         |
| 3 to 4 times per week  | 336 (83.4%)                 | 55 (13.6%)                    | 6 (1.5%)                        | 5 (1.2%)                                   | 1 (0.2%)                     |         |
| More than 5 times per week                                   | 248 (82.4%)                 | 43 (14.3%)                    | 5 (1.7%)                        | 3 (1.0%)                                   | 2 (0.7%)                     |         |
| <b>EAT</b>   |                             |                               |                                 |  |                              | 0       |
|  | 1303 (83.4%)                | 224 (14.3%)                   | 27 (1.7%)                       | 6 (0.4%)                                   | 3 (0.2%)                     |         |
|  | 286 (64.3%)                 | 111 (24.9%)                   | 26 (5.8%)                       | 16 (3.6%)                                  | 6 (1.3%)                     |         |

**Table 4.** The relationship between physical activity, eating disorder anxiety and depression.

|  | 1        | 2        | 3        | 4       | 5       | 6     | 7 |
|--|----------|----------|----------|---------|---------|-------|---|
| 1.GAD-7                                      | 1        |          |          |         |         |       |   |
| 2.PHQ-9                                      | 0.760**  | 1        |          |         |         |       |   |
| 3.Suffer from domestic or social violence    | -0.161** | -0.155** | 1        |         |         |       |   |
| 4.Use cell phones and computers for fun time | -0.087** | -0.121** | 0.110**  | 1       |         |       |   |
| 5.Low-intensity exercise                     | -0.063** | -0.080** | 0.024    | 0.115** | 1       |       |   |
| 6.High-intensity exercise                    | -0.054*  | -0.052*  | 0.019    | 0.127** | 0.515** | 1     |   |
| 7.EAT  | 0.223**  | 0.226**  | -0.074** | -0.004  | 0.014   | 0.016 | 1 |

( $r = -0.087$ ,  $p < 0.01$ ). In addition, depression was Significant negatively correlated with low intensity exercise ( $r = -0.063$ ,  $p < 0.01$ ), was negatively associated with high intensity exercise ( $r = -0.054$ ,  $p < 0.05$ ). Also, depression significantly positively correlated with EAT ( $r = 0.223$ ,  $p < 0.01$ ).

Anxiety significantly negatively correlated with suffer from domestic or social violence ( $r = -0.155$ ,  $p < 0.01$ ) and use cell phones and computers for fun ( $r = -0.121$ ,  $p < 0.01$ ). In addition, anxiety was significant negatively correlated with low intensity exercise ( $r = -0.080$ ,  $p < 0.01$ ), was negatively associated with high intensity exercise ( $r = -0.052$ ,  $p < 0.05$ ). Also, anxiety significantly positively correlated with EAT ( $r = 0.226$ ,  $p < 0.01$ ).

### Discussion.

The main finding of this study was that the overall prevalence of both depression and anxiety was 20.9%, which is consistent with than the prevalence rate found in a meta-analysis in China [14]. The prevalence of mental health may vary depending on country, culture, family background, and physical activity.

Another finding of this study was that mental health was associated with physical activity and eating disorder [15-17]. Physical activity can generate excitement, improve self-esteem and self-perception through self-actualization and expanded social happiness, and reduce the incidence of depression [18]. Regular exercise was inversely related with mild to severe depressive symptoms. This finding is consistent with that of other investigators who have demonstrated a strong association between depression, anxiety symptoms and sleep disorders [19-21]. However, further research is needed to clarify causal. And we found a significantly association between mental health problems and suffer from domestic. Shreejana Gnawali et al. studied domestic violence and mental health and found an association between women who experienced severe physical violence, emotional abuse and sexual assault and mental health problems [22]. Consistent with our findings, another study indicated that using mobile phones and computers for entertainment could be a factor which can influence leading to mental health problems among college students [23].

The experimental data suggested that mental health was significantly associated with the suffer from domestic or social violence, use cell phones and computers for fun time, low-intensity exercise, high-intensity exercise and eating disorder.

### Study Limitations.

We aware that our research may have two limitations. The first is study result may not fully reflect the severity of mental health among students, as the study sample was small. In addition, Cross-sectional studies cannot establish causality relationship

between mental health and physical activity. Despite these limitations, the findings of this study identified a direction for future research. The study reveals that mental health is associated with physical activity and disordered eating attitudes. Appropriate physical activity may be effective in preventing psychological distress.

### Conclusion.

The study showed a significant association correlation between mental health and physical activity may play an important role in reducing the depression and findings clearly indicate college students with disordered eating attitudes also have a tendency toward depression and anxiety symptoms. It is indispensable to raising awareness of depression and anxiety symptoms and its associated risk factors in university students. Relevant departments should establish targeted health intervention measures for depression and anxiety, and actively guide college students to develop healthy living habits.

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### Conflict of interest.

The authors have no conflicts of interest to declare.

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