

# **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 შედეგის 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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## PSYCHOPHYSIOLOGICAL CORRELATES OF STUDENTS' WELL-BEING IN ARMENIA

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### Introduction.

Over the past decade, the concept of well-being has become a subject of scientific and social interest around the world serving as the basis for the development of new approaches to the study and research of this issue, which today is also relevant in connection with the pandemic [1-4], negative emotions and distress [5], isolation through the lockdown [6], distance learning in the Universities [7], influence of IoT on well-being [8], and research on the impact of data and other factors, such as sleep [9], weather [10,11], health [12], Urban Living [13] etc. on subjective well-being.

The problem of well-being is interdisciplinary and is considered in health care, psychology, sociology, political science, and economics [12,14]. There are many studies in this area (European studies on quality of life, including the measurement of subjective well-being in European countries; the Research on Health, Aging and Retirement, which covers 12 countries of the European Union (EU) and Switzerland; The feasibility study of well-being indicators carried out by the Statistical Office of the European Communities (Eurostat), etc., but the problem is that each of these studies treat the concept of well-being differently [15,16]. The concept of "subjective well-being" is not new to the science of the 21st century; it has been studied since the 60s of the last century. Life satisfaction, feelings of happiness, sadness, anger, stress, and pain, as well as a sense of meaning in life, can be marked as different aspects of subjective well-being. In our opinion, subjective wellbeing is formed based on three groups of factors: social (living environment, conditions and requirements at work, immersion in a digital environment), psychological (bodily image and appearance, negative and positive emotions, self-esteem, personal beliefs etc.) and physiological (physiological health indicators etc.).

**Psychological factors:** PWB description (psychological wellbeing) was introduced by N. Bradburn as a balance between positive and negative affects, which, according to the author, is a state of happiness [17]. A similar concept was proposed by a Russian scientist B. I. Dadonov (1978), who considered happiness not as the absence of negative emotions; moreover, he stated that the absence would not make it possible to record the experience of happiness, which is the ratio of emotions of different valences [18]. According to Izard, the 'emotion' influences thinking, decision-making, actions, social relationships, well-being, and physical and mental health [19]. Thus, the first direction psychological well-being study is traced, namely, the study of the emotional state and well-being of an individual, as the main factor of well-being. Klernan, F has undertaken an interesting approach to the study of emotion as a creative act and its connection with the social well-being, from this point of view [20]. The hedonistic principle of well-being

and personal functioning, which, considered by Dadonov, is based on the question of satisfaction and dissatisfaction with life [11,17]. As with any object or phenomenon that is perceived from a person's environment, well-being as perceived phenomenon is a cognitive (in this case, ideas about life satisfaction) and an emotional component (the experience of happiness) [21]. As for perceptions of life satisfaction, it is interesting to study Yang, F., Knobe, J., & Dunham, Y. (2021), which shows the relationship of a person's morality assessment to the state of happiness attributed to him. They found that moral judgment plays a relatively unique role in happiness attributions [22].

**Social factors:** An important criterion of well-being is social relationship with other people, the more frequent and deeper the connections, the higher the level of WB [23-25]. Perhaps this explains the distress during the pandemic and the self-isolation that led to even deeper immersion in social networks, which also has a connection with the satisfaction of life. The results of the research by Wu & others revealed that watching videos (passive use) predicted reduced life satisfaction and reduced effect after controlling for age and gender, whereas posting online (active use) predicted enhanced life satisfaction [26]. So, the level of immersion in the digital environment should be considered as a social factor effecting the WB.

Well-being is a subjective concept that can be influenced by some objective social conditions, such as

1. Conditions, terms, and requirements in the workplace [27],
2. Income. Macchia L, Anke C, Plagnol, Powdthavee N. (2019) find the association between income rank and an individual's well-being significantly larger in countries where income inequality, represented by the share of taxable income held by the top 1% of income earners, is high [7],
3. Place of residence and city size, which makes the study of individual's well-being important in economics, too [13].
4. The number of green areas in the place of residence, which are elements of life satisfaction and SWB [28].
5. The connection between Environmental Identity and Mental Wellbeing was also confirmed [3,16].
6. Scientists are examining another determinant of happiness and well-being, namely religion and religiosity [29]. Spiritual health is one way to stay healthy and develop resistance for those who are religious [30]. Compared with no attendance, attendance of religious services was associated with greater life satisfaction and well-being [31].

An interesting fact is that, in its turn, SWB influences the economic and political activity of the society [32]. For Political Science, it is important to realize that SWB diagnostics can help to understand and predict the characteristic features of electoral behavior. The findings suggest that SWB is a powerful high-level marker of (dis)content and that SWB should be



routinely considered alongside with economic explanations of electoral choice [33]. It was found that individuals who report higher levels of life satisfaction are significantly more likely to report higher levels of civic compliance. Negative mood, or loss in happiness, predicts lower compliance [34]. In addition to the aforementioned, there is also an economic effect: research demonstrates the relationship between happiness and productivity of the employee [35]. It is shown there is direct evidence that individuals trade-off levels of happiness with levels of income, physical health, family, career success and education [36].

**Psychophysiological factors:** In our opinion, the concept of subjective well-being is important to consider in the context of physical (Chen Y, Vander Weele TJ., 2018) and psychological health [31,37]. The criterion of psychological health is the ability to maintain a dynamic balance of a person with the external environment, to apply coping strategies and at the same time realize social functions and internal capabilities and personal potential. This determines SWB in its turn [4,38].

The criteria for physical health, among other things, are indicators of the functional state of the human body, namely, indicators of Cardiovascular System, hemodynamics and indicators of Central Nervous System activity, balance of the sympathetic and parasympathetic divisions of the vegetative nervous system.

**Research hypothesis:** It is assumed that indicators of physical health also play an important role in the structure of psychological well-being.

**The purpose:** of our research is to reveal the relationship of students' psychological well-being with physiological features of the body as an indicator of physical health.

**The object of the study:** psychological well-being.

**The subject of the study:** the relationship between psychological well-being and physical health of students.

**The clinical significance of the study:** The relationship and interdependence of such variables as psychological well-being and physical health of the individual lies in an integrated approach to the development of health-saving and corrective measures. We can say that a set of methods and technologies for maintaining and correcting the physical health of people should also contain techniques in forming and developing psychological well-being.

## Methods.

The study was conducted by phases. On the first phase of the research a theoretical analysis of the problem of psychological well-being, its structural and functional components, as well as the structure of physical health and its relationship with other variables of personality functioning was carried out. On the basis of the theoretical analysis, the hypothesis, purpose and objectives of the research were determined.

On the second phase of the research, the methodological tools of empirical research were determined: questionnaires were compiled to identify the characteristics of the sample, psychological tests were selected to determine the level and structure of psychological well-being, quality of life, as well as

methods for diagnosing physical health indicators. Registration of physical health indicators was carried out in the scientific research laboratory of the Armenian State Institute of Physical Culture and Sport "SPORT-EMI" (Education Modernization and Improvement).

On the next phase, empirical research was carried out based on the developed tools. The obtained data were subjected to statistical processing by the SPSS-22.0 statistical program, applying descriptive, correlative analysis as well as analysis of average values. The study lasted 10 months.

## Participants.

The sample consisted of 140 voluntary respondents from different HEIs from Armenia, at age 18–25 years old (average age-22,4), The research was anonymous. The undergraduate students of 1st-3rd year of Yerevan State University, Armenian State Institute of Physical Culture and Sport, Ijevan branch of YSU and Vanadzor State University and of various specialties were included in the research. Students were selected from the capital and provincial universities.

At the same time, 45% (63 students) of the respondents were female, 55% (77 students) were male. 45 students participated from the Armenian State Institute of Physical Culture and Sports (15 female, 30 male), from Yerevan State University - 32 students (20 female, 12 male), from Vanadzor State University - 40 students ( 18 female, 22 male) and from the Ijevan branch of the Yerevan State University - 23 students (10 female, 13 male). As mentioned above out of 1-3 year students 40 were first-year students, 55 were the 2nd year, 45 were the 3rd year students of bachelor's degree. The choice of respondents was random. The questionnaires were preceded by an informed consent form describing the research, data storage and processing conditions, as well as other ethical considerations.

A representative sample for different purposes is formed on different bases. Thus, for mass research, the ratio of the general sample to the sample under study is applied. For formation of our sample, we focused on constructing an "arithmetic mean" sample. The most significant features were chosen as construction criteria: age, gender of respondents, place of residence and study, level and degree of education and year of study. Thus, we obtained the following sample: out of 7-8 age groups, we examined one age group of students of both sexes (the second sign). The students from the capital and regions of Armenia were included in the research. The next feature for participation considered the level and degree of education: students of the 6th level of higher education (undergraduate students). And the last criterion was the year of study: the sample consisted of three categories - 1-3 years of study. So we got the following sampling formula:  $1*1+2*2+3*2+4*1+5*3=30$  respondents. Multiplying the outcome number by the number of universities, in this case 4 universities, we get 120 respondents. Thus, the group of 120 respondents is a representative sample to study the relationship between psychological well-being and physical health among students in Armenia. Our sample consisted of 140 respondents.

## Procedure.

All respondents gave their written or oral consent to participate in the study. To exclude the influence of various factors, the study was conducted at the same hours of the day, on the same days of the week. At the first stage, the respondents answered the questions of the questionnaire described above, then the functional indicators were registered in the laboratory. Relevant information about the results of the study and its interpretation were given to the students after the study.

**Physiological indicators:** Diagnostics of physiological parameters was carried out by using the hardware and software complex "Varikard", which is a microprocessor device working together with a personal computer under the control of applied software. Variability of Heart Rhythm\ analysis in the time domain is performed by statistical and geometric methods (variational heart rate monitoring, correlation rhythmography). Mathematical analysis of variability of Heart rhythm in the histogram, the calculation of several indicators, among which the most commonly used index, is the tension of regulatory systems, reflecting the degree of centralization of management of the heart rhythm lies in the bases of variation pulsometry, or cardiointervalography.

**Correlation rhythmography (CRG)** is a method of graphical representation of a dynamic series of cardio intervals in the form of a "cloud" (scatter gram) plotting a series of points in a rectangular coordinate system. In optimum state, the cloud is shifted upward from the origin and has the shape of an ellipse with the ratio of the longitudinal axis to the transverse axis (2:1). The contraction of the correlation cloud into a small circle with a simultaneous displacement to the origin, indicates an increase in tension in the functioning of the body systems. An important advantage of this method is that it allows recognizing and analyzing cardiac arrhythmias effectively. It is the visual geometric method for assessing Variability of Sinus Rhythm.

**Autocorrelation and spectral analysis:** of the heart rhythm make it possible to reveal its wave structure, a certain periodicity in changing the duration of R-R intervals. Autocorrelation analysis is aimed at studying the internal structure of the dynamic series of cardio intervals, and spectral analysis is used to quantify accurately periodic processes in the heart rhythm.

Based on the abovementioned analysis, the following indicators are identified, which are indicated on the level of activity of the central and peripheral nervous systems.

**The standard deviation - SDNN (ms)** - reflects the total effect of vegetative regulation of blood circulation.

**The coefficient of variation of the total ranges of cardio intervals - CV (%)** - a normalized indicator of the total effect of regulation.

**Stress index - SI** - the degree of tension of regulatory systems - reflects the degree of predominance of the activity of the central regulatory mechanisms over the autonomous ones.

**The centralization index - CI** - reflects the degree of centralization of heart rhythm control.

**IRSA** - is an indicator of the activity of regulatory systems.

**The Number of arrhythmia - Narr (%)**

**Power HF (%)** - the power of the spectrum of the high-frequency component of variability in % of the total power

of oscillations - reflects the relative level of activity of the parasympathetic link of regulation.

**LF power (%)** power spectrum of the low-frequency component of heart rate variability in % of total capacity fluctuations reflects the relative level of activity of the vasomotor center.

**VLF power (%)** power spectrum of the low-frequency component of heart rate variability in % of the total power of oscillations reflects the relative level of activity of the sympathetic link of the regulation.

**TR** - the total power of the heart rate variability spectrum - the total level of activity of regulatory systems.

**Questionnaires - WHOQOL** : Measuring Quality of Life.

WHO defines Quality of Life as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. The WHOQOL-100 assesses individuals' perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It was developed collaboratively in some 15 cultural settings over several years and has now been field tested in 37 field centers. It yields a multi-dimensional profile of scores across domains (one of them is psychological well-being) and sub-domains (facets) of quality of life.

## Results.

The analysis of the average indicators of the components of life quality was held determining the sub-perception of well-being according to the WHOQOL: Measuring Quality of Life test for Armenian students was carried out, the results are shown in Table 1.

As can be seen from Table 1, all components of well-being among students are in the middle-level range, with the exception of the component of "social relations", the latter indicators are in a low-level range. The above-mentioned data, in our opinion, are due to the limitations of social relations that arose because of the epidemic (COVID-19).

In order to diagnose the level of physical health, the analysis of the average indicators of the functional state of RA students was carried out, the results are shown in Table 2.

The analysis of the average indicators of the functional state shows that the heart rate among students is within the normal range, which indicates an optimal level of physical and psychological health. At the same time, high levels of the tension index may be due to age characteristics, as well as the state of emergency in the country (epidemic and war).

To identify the relationship between the indicators of functional state (physiological indicators) and the components of well-being among students of Armenia, a Pearson correlation analysis was performed. Pearson correlation analysis was chosen based on two parameters: first, the nominal scales of the variables were examined, and second, both variables were normally distributed.

As shown in Table 3, positive correlations were found between physical well-being and the acute respiratory syndrome symptoms. It should be noted that heart rate indicators, as well

Table 1. Analysis of average indicators of well-being among Armenian students.

Indicators	X, conventional unit	$\Delta$ , conventional unit	Students
Physical health	23,08	2,1	140
Physical well-being	22,8	3,2	140
Social relationships	11,36	3,01	140
Environment	29,2	4,8	140
Total			140

Note. X- Average mean of Well-being' indicators,  $\Delta$ -standard deviation of indicators

Table 2. Analysis of the average indicators of the functional state of Armenian students.

Indicators	X, conventional unit	$\Delta$ , conventional unit	number of Students
Heart rate	74,11	13,3	140
SDNN	54,19	23,7	140
CV	6,47	2,43	140
SI	176,18	16,297	140
IC	2,4	1,6	140
IRSA	4,1	1,378	140
NArr	0,62	1,39	140
HF %	34,19	13,08	140
LF %	42,22	8,86	140
VLF %	23,59	11,5	140
TP	2944	2706	140
Total			140

Note. X- Average mean of physiological indicators,  $\Delta$ -standard deviation of indicators

Table 3. Correlation analysis of indicators of functional state and components of well-being of students of the RA.

Components of Well-being Physiological indicators	Physical well-being	Psychological well-being	Social relations	Environment	Students
	HR	0,4*	0,23	0,14	0,46*
SDNN	-0,26	-0,39*	0,14	-0,20	140
CV	-0,2	-0,36*	-0,075	-0,16	140
SI	0,17	0,51*	0,028	0,51**	140
IC	0,08	-0,439*	-0,029	-0,11	140
IRSA	0,09	-0,002	-,055	0,18	140
NA	-0,26	-0,353*	-0,177	0,109	140
HF	-0,11	0,73**	-0,093	0,083	140
LF	0,09	-0,54**	0,158	-0,6**	140
VLF	0,05	-0,585**	-0,022	0,143	140
TP	-0,46*	-0,682**	-0,12	-0,147	140
Total	0,4*	0,23	0,14	0,46*	140

as physical well-being indicators are in the range of optimal levels. ARS indicators are the most subtle indicators of health. Thus, it can be assumed that the level of health forms physical well-being, and, on the contrary, physical well-being determines the health of a person. Stronger links were found with the psychological well-being variable. For example, positive reliable associations were found between psychological well-being and SI ( $r = 0.51^{**}$ ), as well as between HF indicators ( $r = 0.73^{**}$ ). Negative links were found between almost all other indicators and psychological components.

Interestingly enough, but no reliable links were found between the "physiological indicators" and social relationships, which proves that the prolonging of the self-isolation phase led to an

adjustment to the scarcity of social relationships, but a longer exposure to stressors could exhaust the resources of resistance and affect the quality of life.

Positive associations were also found between the "environment" factor and some physiological indicators. That is, positive correlations were found between the indicators of HR (Heart Rate), SI and the "environment", meanwhile negative correlations were found between the "environmental" factors and low-frequency waves. According to the test, the "environment" factor indicates the person's degree of satisfaction with his environmental conditions: the hygienic conditions of the workplace or educational institution, transport, road, etc. At the same time, the obtained linear relationships between Heart

Rate Indicators, SI and the "environment" factors indicate the overall adaptation of the organism. Since it has been found that the mentioned indicators are at the optimal level, it can be said that the average level of adaptation is registered among the surveyed students.

### Discussion.

As it has already been mentioned, the purpose of our study is to reveal the connection between students' PWB with the physiological indicators of the state of the body, as an indicator of physical health. The above data indicate that all components of well-being among students are in the mid-range, with the exception of the component of "social relations", whose indicators are in the low-level range. In our opinion, this is due to the self-isolation caused by the recently widespread COVID, and as a result, the restriction of social interactions, contacts and relationships, which the person had to adjust to. It has been established, that the number of social integrations is associated with well-being [25]. According to Csikszentmihalyi, M., the young who spend more time at school and are involved in social activities are happier than those who spend less. Being alone rates the lowest levels of happiness, while being with friend corresponds to the highest [39].

It is interesting to note that no reliable links have been found between the components of social relations of well-being and physiological indicators that are indicators of the human physical health, which is consistent with research by other authors. A number of studies showed that objective physical health, even among the elderly, is barely correlated with Subjective Well-Being [40]. The data show that the person has adapted to the restriction of social relationships and other external stressors as a result of the emergency. Such, Diener, and Fujita (1996) found that in less than three months, the effects of many major life events (e.g., being fired or promoted) lost their impact on Subjective Well-Being [11].

In the process of correlation analysis, positive and reliable correlations were found between the Psychological Well-Being and SI ( $r = 0.51 *$ ) that is close to M. Csikszentmihalyi ideas about flow: He focuses in particular on one dimension of happiness: the flow experience or the state of total involvement in an activity that requires complete concentration [41]. M. Csikszentmihalyi presents a conceptualization of student engagement based on the culmination of concentration, interest, and enjoyment (i.e., flow) [29].

Subjective wellbeing and health are closely linked to age. Keyes identifies three components of mental health: emotional well-being, psychological well-being and social well-being [42,43]. Positive correlations were also found between the "HF" indicators and psychological well-being ( $r=0,73*$ ). The parasympathetic system is activated as a sedative when the external threat has already passed, which may indicate that students assessment of the current post-war and pandemic situation as no longer threatening their well-being and psychological health. SWB and health are closely linked to age.

### Conclusion.

1. The results of the empirical study revealed that the heart rate, which is one of the indicators of physical and psychological

health, is within the normal range, which indicates the optimal physical and psychological state of Armenian students.

2. It was revealed that the quality of life indicators are within the average level, except for the "social relations" indicator, which is possibly due to the limited communication due to the pandemic.

3. Positive correlations were found between the indicators of psychological well-being and the stress index, as well as the optimal level of their manifestations, which can be interpreted from the point of view that psychological well-being develops when overcoming difficulties, self-actualization and self-improvement.

4. Positive correlations were found out between high-frequency heart rate waves and an indicator of psychological well-being, as well as negative correlations between low-frequency and super-low-frequency heart rate waves and an indicator of psychological well-being, which indicates the predominance of the activity of the parasympathetic nervous system and low activity of the sympathetic nervous system at optimal level of psychological well-being.

5. Thus, the obtained correlations between the studied indicators of psychological well-being and physiological indicators allow us to consider the indicators of the cardiovascular system not only as factors of physical health, but also as components of psychological well-being in general. And the revealed average level of these indicators allows us to assert the optimal level of adaptation.

Limitation of investigation: taking into account the fact, that part of the study was to be carried out in laboratory conditions, in order to obtain reliable data, it was decided to conduct both psychological testing and registration of physiological data in laboratory conditions at the same time on weekdays. At the same time, the study was carried out during the pandemic and war in Armenia, which was the reason for the 10-month study period.

Practical recommendations. It is recommended to take into account and implement methods and technologies for the formation and development of psychological well-being when building complex health-saving and corrective measures. Comprehensive programs to ensure the proper level of health of the nation as a whole, and communities in particular, should be aimed at building the knowledge, abilities and skills of the individual in order to maintain the level of health in the long term.

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## Summary

This article focuses on developing the model of psychophysiological bases of well-being, for what Psychophysiological features of well-being of Armenian student was investigated. For diagnosis of well-being was used the WHOQOL-1. The indicators of

functional state were registered the indicators of heart rate variability. All student participated in anonymous research.

**The goal of investigation.** The purpose of our study is to identify the relationship of students Psychological Wellbeing with physiological indicators as an indicator of physical health.

**Methods.** The sample consisted of 140 voluntary respondents from different HEI (High Education Institute) from Armenia (45% female), aged 18–25 years (median age 22, 4), who participated in anonymous research. In the first stage, the students answered WHOQOL2. After the questions of the questionnaire Measuring Quality of Life, the functional indicators were registered in the laboratory "Sport Cab" of Armenian State Institute of Physical Culture and Sport. To identify the relationship between the indicators of functional state (physiological indicators) and the components of well-being of the students in the RA, a Pearson correlation analysis was performed.

**Results.** Psychological well-being was positively correlated with tension indicators and High Frequencies indicators. Negative correlations were found between almost all other indicators and psychological components of well-being. More interesting are those facts that no reliable links have been found between the "physiological indicators" of well-being and social relations.

**Conclusions.** The obtained correlations between the studied indicators of psychological well-being and physiological indicators allow us to consider the indicators of the cardiovascular system not only as factors of physical health, but also as components of psychological well-being.

**Keywords:** well-being, subjective well-being, factors, physiological indicators, students, health.