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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 ВИНИТИ 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 ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

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. Корректура авторам не высылается, 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 compu-ter-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 საყურადღებოდ!

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, 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 შეღებვის 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 ფჩხილებში 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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IS HEALTH AT RISK? A QUANTITATIVE STUDY ASSESSING THE IMPACT OF EXCESSIVE MOBILE APPLICATION USE ON PHYSICAL AND MENTAL WELL-BEING AMONG ADULTS IN SAUDI ARABIA

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Abstract.

Background: The widespread adoption of smartphones and mobile applications has transformed communication, education, and productivity but also raised concerns about their potential impact on physical and mental well-being. Excessive daily use is linked to sleep disturbance, musculoskeletal discomfort, visual strain, anxiety, and depressive symptoms. In Saudi Arabia, where smartphone penetration is remarkably high, these challenges demand systematic attention and targeted interventions.

Methods: This study adopted a cross-sectional design and addressed the relationship between mobile application use and health outcomes among adults. Data were collected using a validated survey that included sociodemographic variables, app usage patterns, sleep quality, physical symptoms, and psychological status. The assessment incorporated the PSQI, NMP-Q, and DASS-21. Statistical analysis included descriptive measures, chi-square tests, correlations, and regression models to evaluate predictors of health outcomes.

Results: A total of 823 participants completed the survey. Excessive app use (>4 hours/day) was highly prevalent. Eye strain, neck and shoulder pain, and headaches were the most frequent physical symptoms, while insomnia, anxiety, and depression were common psychological complaints. Poor sleep quality was significantly associated with longer app use, shorter sleep duration, and anxiety. Nomophobia scores revealed moderate to high dependency, with participants frequently reporting discomfort and anxiety when disconnected from their phones.

Conclusion: The findings highlight a strong relationship between mobile application overuse and negative health outcomes. Excessive use, particularly of social media, entertainment, and gaming apps, was linked with impaired sleep, physical discomfort, and psychological distress. These results call for greater attention in clinical practice, targeted public health interventions, and national policies to promote balanced and mindful technology use.

Key words. Smartphone addiction, mobile applications, sleep quality, mental health, nomophobia, Saudi Arabia.

Introduction.

The widespread integration of smartphones and mobile applications into daily life has brought notable convenience but also raised concerns about their potential impact on health, particularly physical and mental well-being. Frequent and prolonged mobile device use has been associated with adverse outcomes such as eye strain, poor sleep quality, musculoskeletal discomfort, anxiety, and depressive symptoms [1-3]. In Saudi Arabia, where smartphone usage exceeds 95% of the population [4], these issues are especially relevant among both youth and adults who rely heavily on mobile applications for communication, entertainment, learning, and professional tasks.

Recent research in the Kingdom has documented a growing pattern of health concerns linked to smartphone use. Alhazmi et al. [5] reported that nearly 40% of university students experienced blurred vision, and over one-third reported sleep disturbances associated with smartphone use. Similarly, Alosaimi et al. [6] found strong links between smartphone addiction and physical inactivity, obesity, and musculoskeletal complaints. Mental health outcomes are also significant concerns. Studies have demonstrated moderate to high levels of nomophobia—defined as the fear of being without a mobile phone—alongside elevated symptoms of stress, anxiety, and depression, particularly among young adults [7-9]. Alhassan et al. [10] identified a significant relationship between smartphone addiction and depressive symptoms, while Alzahrani et al. [11] reported that frequent smartphone use predicted psychological distress.

Additional investigations have highlighted further risks. Smartphone addiction rates have been observed to be significantly

higher among psychiatric outpatients compared with the general population [12]. Al-Khlaiwi and Meo [13] associated mobile phone radiation exposure with fatigue, headaches, and sleep disturbances. International research supports these findings, demonstrating associations between smartphone overuse and diminished academic performance [14], impaired emotional regulation [15], and behavioral dependency on certain app types, particularly gaming and social media [16,17]. Jeong et al. [18] emphasized the role of app content, reporting that social networking applications may contribute more strongly to problematic use. Duke and Montag [19] have called for broader inquiry into digital dependency as a behavioral health issue requiring sustained research and policy attention.

Despite growing awareness, most existing studies have examined overall screen time or generalized smartphone use, often overlooking distinctions between app types and usage contexts. These limits understanding of how specific patterns of app engagement—such as excessive use of messaging, entertainment, or gaming apps—may differentially influence health outcomes. Given that many Saudi adults spend multiple hours daily using mobile applications, there is a need to investigate the relationship between such behaviors and both physical complaints (e.g., eye fatigue, sleep difficulty, neck pain) and psychological responses (e.g., anxiety, emotional burnout).

This study seeks to quantitatively evaluate the relationship between excessive mobile application use and self-reported physical and mental health outcomes among adults in Saudi Arabia. By focusing on app-specific usage patterns and employing validated instruments for both psychological and physical health, this research aims to address a critical gap in the literature. The findings are intended to inform public health strategies focused on digital well-being and to support the development of targeted educational and behavioral interventions in high-use populations.

Methods.

Study Design and Setting:

This study adopted a quantitative cross-sectional design to examine the association between mobile application use and physical and mental health outcomes among adults in Saudi Arabia. Data were collected using an online, self-administered survey distributed nationwide between May 21 and July 28, 2025. Online recruitment enabled broad geographic reach, including participants from both urban and rural regions; however, this approach inherently reflects the characteristics of digitally active populations.

Participants and Sampling:

The study population comprised Saudi adults aged 18 years and older. A stratified convenience sampling strategy was employed to enhance representation across age groups, gender, and geographic regions. Eligibility criteria included smartphone ownership, residency in Saudi Arabia, and the ability to read and understand Arabic. Individuals who self-reported a diagnosed psychiatric or neurological disorder were excluded to minimize potential confounding effects on psychological outcomes. Although stratification was applied, participation remained voluntary and online, which may have contributed to overrepresentation of younger and male respondents, a limitation acknowledged in the interpretation of findings.

Sample Size:

Sample size estimation was conducted using G*Power software. Assuming a medium effect size ($f^2 = 0.15$), a significance level of 0.05, and statistical power of 0.80, a minimum sample of 150 participants was required for multiple regression analysis with up to ten predictors. To enhance external validity and compensate for potential non-response or incomplete data, the recruitment target was increased to at least 500 participants. A total of 823 complete responses were ultimately included in the analysis.

Data Collection Instrument:

Data were collected using a structured questionnaire developed in Arabic and organized into four sections:

1. **Sociodemographic characteristics:** age, gender, education level, employment status, marital status, and region of residence.
2. **Mobile application usage:** average daily duration of mobile application use and predominant application categories (e.g., social media, entertainment, gaming, productivity/ education, communication). Excessive mobile application use was operationally defined as more than four hours per day, a threshold commonly applied in prior research examining associations between smartphone use and adverse sleep, physical, and psychological outcomes. This cutoff reflects usage levels exceeding typical functional or occupational needs and allows comparability with existing literature.
3. **Physical health indicators:** sleep quality assessed using the Pittsburgh Sleep Quality Index (PSQI), self-reported physical symptoms (eye strain, headaches, neck and shoulder pain), and body mass index (BMI), calculated from self-reported height and weight.
4. **Mental health assessment:** nomophobia measured using the Nomophobia Questionnaire (NMP-Q) and psychological distress assessed using the Depression, Anxiety, and Stress Scale (DASS-21).

While duration of use was the primary exposure variable, the questionnaire also captured dominant app categories to partially account for differences in usage purpose. More detailed contextual factors (e.g., work-related versus late-night recreational use) were not assessed and are proposed for future research.

Validity and Reliability:

Validated Arabic versions of the PSQI, NMP-Q, and DASS-21 were used, each of which has demonstrated acceptable psychometric properties in comparable populations. To further ensure clarity and reliability, the questionnaire was pilot-tested among 30 adults prior to full deployment, leading to minor wording refinements. Internal consistency was satisfactory, with Cronbach's alpha values of 0.89 for the DASS-21, 0.81 for the PSQI, and 0.87 for the NMP-Q.

Ethical Considerations:

The study protocol complied with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from

the relevant institutional review board prior to data collection. All participants provided informed electronic consent, and participation was anonymous. Data confidentiality was strictly maintained, and responses were used solely for research purposes.

Statistical Analysis:

Data were entered and analyzed using IBM SPSS Statistics version 26. Descriptive statistics (means, standard deviations, frequencies, and percentages) were used to summarize sociodemographic characteristics, mobile application use patterns, and health outcomes. Bivariate associations between mobile application use and health indicators were examined using Pearson's correlation coefficients, independent t-tests, and chi-square tests as appropriate. Multiple linear regression analyses were conducted to identify predictors of physical symptoms and psychological distress, adjusting for age, gender, and other relevant covariates. Statistical significance was set at $p < 0.05$.

Results.

A total of 823 participants were included in the study. The majority were male (n = 647, 78.6%), while females accounted for 21.4% (n = 176). The most common age group was 25–34 years (n = 301, 36.6%), followed by 18–24 years (n = 279, 33.9%), 45 years or above (n = 134, 16.3%), and 35–44 years (n = 109, 13.2%). Nearly half of the participants were single (n = 382, 46.4%), while 47.0% were married (n = 387) and 6.6% were divorced or widowed (n = 54). Over half of the respondents held a bachelor's degree (n = 422, 51.3%), with smaller proportions having a postgraduate degree (n = 151, 18.3%), a diploma (n = 132, 16.0%), or high school education or less (n = 118, 14.3%). More than half were employed (n = 492, 59.8%), 26.4% were students (n = 217), and 13.8% were unemployed (n = 114). Regarding monthly household income, 35.1% reported earning between 5,000 and 9,999 SAR (n = 289), 24.4% earned between 10,000 and 14,999 SAR (n = 201), 24.0% earned less than 5,000 SAR (n = 198), and 16.4% earned 15,000 SAR or more (n = 135). Detailed sociodemographic characteristics are presented in Table 1.

Regarding smartphone use, 34.5% of participants reported using their smartphone for 5–6 hours daily (n = 284), while 31.8% used it for 7 hours or more (n = 262). About one-quarter used it for 3–4 hours per day (n = 213, 25.9%), and a smaller proportion reported 2 hours or less of daily use (n = 64, 7.8%). In terms of sleep quality over the past week, 38.3% rated their sleep as good (n = 315), 33.0% as fair (n = 272), 15.4% as very good (n = 127), and 13.2% as poor (n = 109). Average sleep duration was most commonly reported as 7–8 hours per night (n = 341, 41.4%), followed by 5–6 hours (n = 311, 37.8%), ≥ 9 hours (n = 117, 14.2%), and ≤ 4 hours (n = 54, 6.6%). These patterns of smartphone use and sleep characteristics are detailed in Table 2.

The most prevalent regularly experienced symptom was eye strain, reported by 58.5% of participants, followed by neck and shoulder pain (51.1%) and headaches (45.7%). Insomnia was reported by 34.5% of participants, while 33.9% experienced anxiety and 26.1% reported symptoms of depression. These findings are illustrated in Figure 1, which presents the prevalence of commonly experienced symptoms among participants.

Participants reported moderate to high levels of nomophobia and smartphone dependency. The highest mean score was for the item "I would feel anxious if I lost access to my phone" (M = 3.91, SD = 1.08), followed closely by "I feel uncomfortable without access to my smartphone" (M = 3.82, SD = 1.02). Other commonly endorsed statements included "I get annoyed if I cannot look up information on my phone" (M = 3.74, SD = 1.06) and "I feel nervous if I cannot use my smartphone" (M = 3.58, SD = 1.15). The lowest mean score was for "I panic when my phone battery runs out" (M = 3.49, SD = 1.20), though this still reflected a moderate agreement level. All responses were

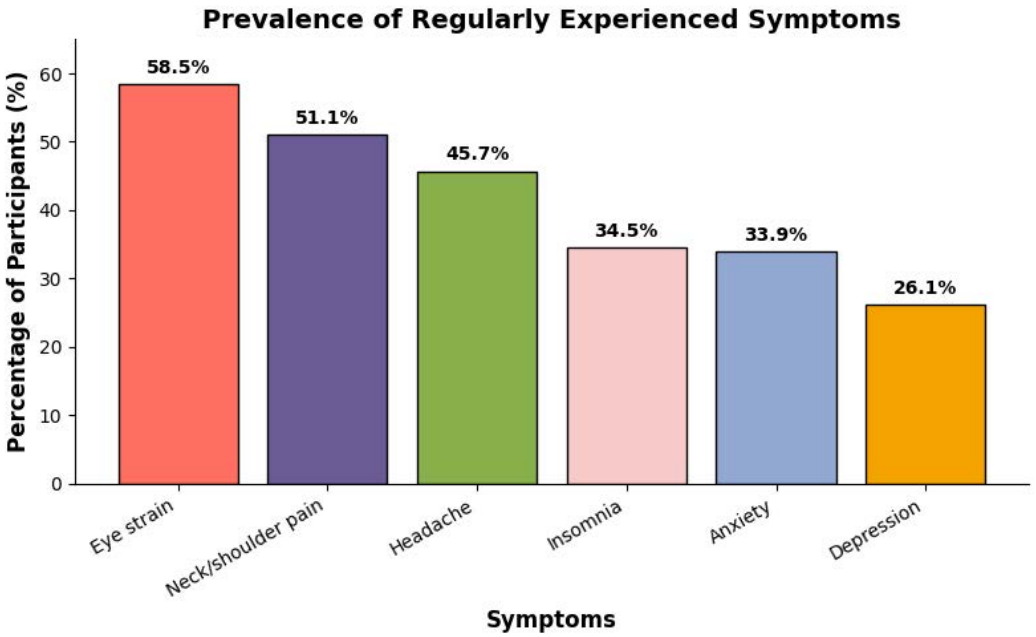

Figure 1. *Prevalence of Commonly Experienced Symptoms Among Participants.*

Table 1. *Sociodemographic Characteristics of Participants (N = 823).*

Variable	Category	n	%
Gender	Female	176	21.4
	Male	647	78.6
Age Group (years)	18–24	279	33.9
	25–34	301	36.6
	35–44	109	13.2
	45 or above	134	16.3
Marital Status	Single	382	46.4
	Married	387	47
	Divorced/Widowed	54	6.6
Educational Level	High school or less	118	14.3
	Diploma	132	16
	Bachelor's degree	422	51.3
	Postgraduate degree	151	18.3
Employment Status	Employed	492	59.8
	Student	217	26.4
	Unemployed	114	13.8
Monthly Household Income	< 5,000 SAR	198	24
	5,000–9,999 SAR	289	35.1
	10,000–14,999 SAR	201	24.4
	≥ 15,000 SAR	135	16.4

Table 2. *Sleep Patterns, Smartphone Use, and Associated Symptoms (N = 823).*

Variable	Category	n	%
Daily Smartphone Use (hours)	≤ 2 hours	64	7.8
	3–4 hours	213	25.9
	5–6 hours	284	34.5
	≥ 7 hours	262	31.8
Sleep Quality (past week)	Very good	127	15.4
	Good	315	38.3
	Fair	272	33
	Poor	109	13.2
Average Sleep Duration (hours/ night)	≤ 4 hours	54	6.6
	5–6 hours	311	37.8
	7–8 hours	341	41.4
	≥ 9 hours	117	14.2

Table 3. *Nomophobia and Smartphone Dependency Indicators (N = 823).*

Item	Mean (M)	SD
I feel uncomfortable without access to my smartphone.	3.82	1.02
I get annoyed if I cannot look up information on my phone.	3.74	1.06
I feel nervous if I cannot use my smartphone.	3.58	1.15
I would feel anxious if I lost access to my phone.	3.91	1.08
I panic when my phone battery runs out.	3.49	1.2

Note: *Responses were rated on a 5-point Likert scale (1 = Strongly disagree, 5 = Strongly agree).*

measured on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Detailed results are presented in Table 3.

Participants reported varying levels of psychological distress symptoms. The highest mean score was observed for "I was intolerant of anything that delayed me" (M = 3.02, SD = 1.09), followed by "I found it difficult to relax" (M = 2.95, SD = 1.16) and "I felt that I was using a lot of nervous energy" (M = 2.93, SD = 1.14). Other relatively higher mean scores included "I felt sad and depressed" (M = 2.89, SD = 1.17), "I was aware of dryness in my mouth" (M = 2.84, SD = 1.11), and "I felt down-hearted and blue" (M = 2.81, SD = 1.18). Lower scores were reported for items such as "I experienced breathing difficulty" (M = 2.53, SD = 1.12) and "I felt scared without any reason" (M = 2.58, SD = 1.09). These results indicate that while some distress symptoms were relatively more common, no item reached a mean value indicative of frequent or near-constant occurrence. Detailed item-level descriptive statistics are presented in Table 4.

Table 4. *Psychological Distress Items (N = 823).*

Item	Mean (M)	SD
I was aware of dryness in my mouth.	2.84	1.11
I felt that I had nothing to look forward to.	2.71	1.14
I experienced breathing difficulty.	2.53	1.12
I found it difficult to relax.	2.95	1.16
I felt down-hearted and blue.	2.81	1.18
I was intolerant of anything that delayed me.	3.02	1.09
I was unable to become enthusiastic about anything.	2.74	1.15
I felt I wasn't worth much.	2.66	1.1
I felt scared without any reason.	2.58	1.09
I felt that I was using a lot of nervous energy.	2.93	1.14
I was worried about situations where I might panic.	2.85	1.12
I felt sad and depressed.	2.89	1.17

Table 5. *Bivariate Associations Between Sleep Quality and Key Variables (N = 823).*

Variable	χ^2(df)	p-value
Gender × Sleep Quality	6.87 (3)	0.076
Age Group × Sleep Quality	12.41 (9)	0.189
Daily Smartphone Use × Sleep Quality	42.15 (9)	< .001
Average Sleep Duration × Sleep Quality	89.24 (9)	< .001
Anxiety Symptoms × Sleep Quality	57.88 (3)	< .001

Bivariate analyses were conducted to examine associations between sleep quality and selected variables. No statistically significant associations were found between sleep quality and gender, $\chi^2(3, N = 823) = 6.87$, $p = .076$, or age group, $\chi^2(9, N = 823) = 12.41$, $p = .189$. However, daily smartphone use was significantly associated with sleep quality, $\chi^2(9, N = 823) = 42.15$, $p < .001$, indicating that higher daily smartphone usage was related to poorer reported sleep quality. Average sleep duration was also strongly associated with sleep quality, $\chi^2(9, N = 823) = 89.24$, $p < .001$, as was the presence of anxiety symptoms, $\chi^2(3, N = 823) = 57.88$, $p < .001$. Full results of the bivariate associations are shown in Table 5.

Discussion.

This study examined the association between excessive mobile application use and physical and mental health outcomes among adults in Saudi Arabia. The findings demonstrated that higher levels of mobile application engagement were significantly associated with a range of adverse outcomes, including eye strain, musculoskeletal discomfort, headaches, sleep disturbances, anxiety, and depressive symptoms. These results reinforce a growing body of international evidence indicating that prolonged and intensive smartphone use poses measurable risks to both physical and psychological well-being [7-9].

The physical symptoms reported in this study are consistent with findings from prior research across diverse settings. Prolonged smartphone use has been repeatedly linked to musculoskeletal strain, particularly involving the neck, shoulders, and upper extremities. Studies conducted in South Korea have shown higher rates of neck and shoulder pain among heavy smartphone users [20], while European and North American studies have similarly demonstrated associations between handheld device overuse and upper extremity discomfort [21], underscoring the global relevance of these physical health concerns.

Sleep disturbance emerged as a particularly salient outcome, with more than one-third of participants reporting poor or fair sleep quality. This finding aligns with previous research demonstrating that excessive smartphone use—especially during evening and late-night hours—is associated with delayed sleep onset, reduced sleep duration, and impaired sleep quality [22]. U.S.-based cohort studies have further shown that increased screen exposure is linked to daytime fatigue and reduced sleep duration [23]. Although the present study did not directly assess the timing or functional context of mobile application use, the observed association between longer daily use and poorer sleep quality suggests that excessive engagement may interfere with healthy sleep behaviors.

Psychological outcomes observed in this study, including moderate to high levels of nomophobia, anxiety, and depressive symptoms, are also consistent with international literature. Nomophobia has been widely recognized as a behavioral manifestation of problematic smartphone dependency and has been associated with heightened anxiety and emotional distress [24]. Studies from the United States have demonstrated significant relationships between problematic smartphone use, depression, anxiety, and emotional regulation difficulties [25], while research from China has linked smartphone addiction with depressive symptoms and loneliness among young adults [26]. The present findings support the growing recognition of excessive smartphone use as a contributor to psychological vulnerability.

An important contribution of this study lies in its focus on application-specific usage patterns rather than overall screen time alone. Whereas earlier research in Saudi Arabia has primarily examined generalized smartphone use, the current findings indicate that certain application categories—particularly social media, entertainment, and gaming—are more strongly associated with negative health outcomes. This is consistent with evidence showing that social networking applications contribute disproportionately to dependency [18], and with broader behavioral addiction literature emphasizing the predictive role of gaming and social networking platforms [19].

From a clinical perspective, these findings highlight the importance of routinely assessing mobile application use in healthcare settings, particularly when patients present with sleep

disturbances, musculoskeletal pain, or psychological symptoms. Incorporating validated instruments such as the Nomophobia Questionnaire and DASS-21 into clinical evaluations may facilitate early identification of problematic use patterns and associated health risks [20-23].

At the public health level, the results underscore the need for national awareness initiatives aimed at promoting digital well-being and responsible smartphone use. Public education campaigns encouraging balanced screen time, reduced late-night use, and regular breaks from prolonged application engagement may help mitigate adverse health effects. Such initiatives may be informed by international recommendations on sedentary behavior and screen exposure while remaining culturally appropriate for the Saudi context [24].

Educational institutions also represent a critical domain for intervention. Schools and universities can play an essential role by integrating digital literacy and well-being programs that promote mindful technology use and healthier lifestyle behaviors. Previous studies suggest that structured educational interventions can reduce problematic smartphone use among students, supporting their value as preventive strategies [25-27].

From a policy perspective, collaboration between regulatory bodies such as the Communications, Space & Technology Commission and the Ministry of Health may facilitate the development of national guidelines for safe digital practices. Potential measures include encouraging screen-time monitoring, promoting periodic disengagement from digital devices, and supporting technology-based features that nudge users toward healthier usage patterns.

Future research should prioritize longitudinal and interventional designs to establish causal relationships and evaluate the effectiveness of digital health interventions. Additional investigations are needed to examine contextual factors such as time of use, purpose of application engagement, and demographic differences, as well as protective factors including family support, coping strategies, and cultural influences.

Strengths and Limitations.

This study offers several strengths. It is among the few quantitative investigations in Saudi Arabia to examine the association between mobile application use and health outcomes using validated instruments (PSQI, DASS-21, and NMP-Q). The large, diverse sample of over 800 adults enhances the external validity of the findings. Moreover, by differentiating app categories, this research provides novel insights into the types of applications most strongly linked with health risks.

Nonetheless, certain limitations must be acknowledged. The cross-sectional design prevents causal inference, underscoring the need for longitudinal research. Reliance on self-reported questionnaires may have introduced recall and reporting biases. The use of convenience sampling may limit generalizability, particularly among underrepresented groups such as older adults and rural populations. Additionally, the absence of objective usage data (e.g., app logs or digital health trackers) restricts the precision of exposure assessment. Finally, unmeasured variables such as pre-existing mental health conditions or personality traits may have influenced the results.

Despite these limitations, this study provides valuable evidence for clinicians, educators, and policymakers and establishes a foundation for future longitudinal and interventional research addressing digital health in the Saudi context.

Conclusion.

Excessive mobile application use among adults in Saudi Arabia was found to be significantly associated with negative physical and mental health outcomes, including poor sleep quality, eye strain, musculoskeletal discomfort, anxiety, and depressive symptoms. The findings highlight that not only the duration but also the type of application use—particularly social media, entertainment, and gaming—plays a decisive role in shaping health risks.

This study contributes to the growing body of evidence indicating that digital overuse should be recognized as a pressing public health concern. While mobile applications offer considerable benefits for communication, learning, and productivity, uncontrolled patterns of use can compromise well-being. Addressing these risks requires coordinated efforts across clinical practice, public health education, and national policy to promote balanced, mindful, and healthy digital engagement.

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