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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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THE URBAN BATTLEFIELD OF THE MIND: ENVIRONMENTAL INFLUENCE ON ADHD AND EXECUTIVE FUNCTIONS IN ADOLESCENTS

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Abstract.

This study examines the influence of urban environments on Attention-Deficit/Hyperactivity Disorder (ADHD) and executive function (EF) impairments in adolescents. Drawing from a school-based cohort of 1,260 students aged 11–18 in Kosovo, the research investigates how environmental stressors, gender, and parental education shape the severity and presentation of ADHD-related symptoms. Results indicate that adolescents living in urban areas exhibit significantly higher rates of EF impairments—particularly in behavioral, emotional, and cognitive regulation—compared to their rural peers. Notably, girls with ADHD displayed elevated emotional dysregulation scores, while lower paternal education emerged as a strong predictor of symptom severity. Urban adolescents also performed more poorly on Stroop and Go/No-Go tasks, indicating deficits in inhibition and cognitive control. These findings underscore the importance of incorporating environmental and socio-demographic variables into ADHD assessment and intervention protocols. ADHD should be conceptualized not only as a neurodevelopmental disorder but also as an ecologically embedded condition that reflects the broader psychosocial context of adolescence.

Key words. ADHD, executive function, urban environment, adolescents, gender differences, cognitive regulation, ecological risk.

Introduction.

Attention-Deficit/Hyperactivity Disorder (ADHD) is among the most frequently diagnosed neurodevelopmental conditions in childhood and adolescence, affecting between 1% and 15% of youth worldwide. Traditionally considered a genetically determined disorder, ADHD is classically associated with persistent patterns of inattention, hyperactivity, and impulsivity. However, recent findings suggest that this view is overly reductive. An increasing body of interdisciplinary research points toward the importance of environmental contexts—especially urban environments—in influencing the onset, severity, and expression of ADHD symptoms [1,2].

Executive functions (EF) are a constellation of high-level cognitive processes responsible for goal-directed behavior, emotion regulation, working memory, and inhibitory control. Deficits in EF are not only hallmark features of ADHD but also highly sensitive to contextual and ecological factors [3,4]. Urban life—characterized by overstimulation, reduced nature exposure, chronic noise, and social fragmentation—may impair EF development by taxing the self-regulatory system during its critical neurodevelopmental phase [5,6].

Moreover, research shows that urban adolescents are at increased risk for emotional dysregulation, delayed cognitive control, and behavioral inhibition problems [7]. These effects may be further compounded by gender, socioeconomic pressures, and varying levels of parental support. Emerging studies argue that adolescent girls with ADHD often exhibit an "internalizing phenotype," manifesting symptoms that are underdiagnosed due to their emotional, rather than behavioral, presentation [8,9].

While EF deficits have typically been studied in clinical settings, there is a growing recognition that real-world functioning cannot be fully understood without ecological validity. The interplay between environmental adversity and neurocognitive development has thus become a critical focus of contemporary ADHD research. Accordingly, this study investigates how urban residency influences ADHD symptoms and executive function performance in a large school-based sample of adolescents in Kosovo, with a particular focus on gender and parental education as moderating variables [10].

Materials and Methods.

A prospective cohort study was conducted involving **1,260 adolescents aged 11 to 18 years** (M = 14.23, SD = 2.24), recruited from public schools in both urban and rural areas across Kosovo. Stratified random sampling ensured representation across different regions and demographic profiles. The sample was balanced in terms of gender, with 46.8% males and 53.2% females. Participants were categorized into ADHD and non-ADHD groups based on symptom criteria, and analyses were conducted to assess executive function (EF) performance across environmental and demographic variables.

Instruments:

A combination of standardized neuropsychological and self-report tools was used:

- **Youth Self Report (YSR):** Used to assess ADHD symptomatology via the Attention Problems subscale. A T-score above 65 was used to classify participants as exhibiting ADHD characteristics.
- **Behavior Rating Inventory of Executive Function – Self Report (BRIEF-SR):** This instrument measured three EF domains:

☐ **Behavioral Regulation Index (BRI)**
☐ **Emotional Regulation Index (ERI)**
☐ **Cognitive Regulation Index (CRI)**

- **Stroop Color and Word Test:** Administered to evaluate cognitive inhibition and processing speed.
- **Go/No-Go Task:** Employed to assess motor inhibition and attention regulation.

All instruments were translated and culturally adapted into Albanian. Reliability tests conducted during the pilot phase demonstrated strong internal consistency (Cronbach's alpha = .84 to .91 across instruments).

Table 1. *Sample Characteristics by Residency.*

Variable	Urban (n = 750)	Rural (n = 510)	Total (N = 1260)
Male	350 (46.6%)	240 (47.0%)	590 (46.8%)
Female	400 (53.4%)	270 (53.0%)	670 (53.2%)
Mean Age	14.20 (SD = 1.08)	14.30 (SD = 1.07)	14.23 (SD = 1.08)

Note: *Age is presented as mean (standard deviation). Gender distribution is expressed as absolute values and percentages.*

Table 2. *Prevalence of ADHD and Executive Function (EF) Impairments by Residency.*

Group	ADHD (%)	EF Impairment (%)
Urban	9.3%	19.5%
Rural	4.7%	9.8%
Total	7.5%	15.0%

Note: *Percentages reflect the proportion of adolescents meeting clinical criteria for ADHD and EF impairment based on standardized cutoffs from YSR and BRIEF-SR.*

Ethical Considerations:

The study was conducted in accordance with the ethical principles outlined in the **Declaration of Helsinki (1975, revised 2008)**. Prior to data collection, the study received **official approval from the Ministry of Education and the Department of Pre-University Education of Kosovo**. **Written informed consent** was obtained from the parents or legal guardians of all participants, and **verbal assent** was obtained from the adolescents themselves. All participants were assured of anonymity, voluntary participation, and the right to withdraw at any time.

Statistical Analysis:

All statistical analyses were carried out using **SPSS version 23.0**. Descriptive statistics (means, standard deviations, frequencies) were used to summarize demographic and clinical variables. **Independent-samples t-tests** and **one-way ANOVA** were performed to compare EF scores and ADHD prevalence across environmental and gender-based subgroups. **Chi-square tests** were used for categorical variable associations, and **Pearson's correlations** examined the relationship between ADHD symptoms and EF indices. Additionally, **multiple regression analyses** were employed to assess the predictive power of parental education levels and environmental factors on ADHD symptomatology. A significance threshold of $\mathbf{p < .05}$ was used throughout the study, with $\mathbf{p < .001}$ interpreted as highly significant.

Results.

Out of the total sample, 7.5% of adolescents met the clinical threshold for ADHD, while 15% demonstrated clinically significant impairments in overall executive functioning, as measured by the Global Executive Composite (GEC). Urban adolescents scored significantly higher on the GEC ($p < .001$), indicating greater difficulties in executive regulation compared to their rural peers.

Detailed analysis of BRIEF-SR subscales revealed that urban adolescents showed elevated scores across all three EF domains:

- **Behavioral Regulation Index (BRI):** Urban M = 69.8 (SD = 11.2), Rural M = 63.1 (SD = 9.8), $t(1258) = 8.31, p < .001$
- **Emotional Regulation Index (ERI):** Urban M = 71.3 (SD = 12.6), Rural M = 64.7 (SD = 10.4), $t(1258) = 9.02, p < .001$
- **Cognitive Regulation Index (CRI):** Urban M = 74.5 (SD = 13.8), Rural M = 68.0 (SD = 11.1), $t(1258) = 7.86, p < .001$

Significant gender differences were observed, particularly in the ERI subscale. Female adolescents with ADHD scored higher on ERI (M = 73.4, SD = 11.9) than their male counterparts (M = 67.1, SD = 10.6), suggesting greater emotional dysregulation among girls ($t(94) = 3.48, p = .001$).

Performance on neurocognitive tests further supported these findings. The **Stroop Test** indicated longer reaction times in urban adolescents with ADHD (M = 52.1 seconds, SD = 8.3) compared to their rural counterparts (M = 46.7 seconds, SD = 7.4), $t(92) = 4.18, p < .001$. Similarly, the **Go/No-Go Task** showed a higher rate of commission errors among urban adolescents (M = 17.3 errors, SD = 3.5) than rural ones (M = 13.2 errors, SD = 3.1), $t(92) = 5.26, p < .001$.

A multiple regression analysis was conducted to explore whether **parental education** predicted ADHD prevalence. The results showed that **father's education level** was a significant negative predictor ($\beta = -0.32, p < .001$), while the **mother's education level** was not statistically significant ($p = .17$). This suggests that paternal educational background may play a more pronounced role in ADHD-related outcomes.

Discussion.

The findings of this study align with a growing body of research that challenges the traditional biomedical narrative of ADHD. While genetic predispositions remain a central element of its etiology, our results provide compelling evidence that **environmental factors—particularly urban living—significantly shape the presentation and severity of ADHD symptoms**. Urban adolescents displayed elevated executive dysfunction, particularly in behavioral, emotional, and cognitive regulation, suggesting that urban stressors may overload the developing executive system.

One of the most striking findings was the **gender-based variation in executive function performance**, specifically in emotional regulation. Female adolescents with ADHD exhibited significantly higher scores on the Emotional Regulation Index (ERI) than males. This may reflect the **"internalizing" phenotype** often observed in girls, where emotional dysregulation manifests as anxiety, rumination, and social withdrawal—symptoms that are easily overlooked in traditional ADHD screening. Hormonal fluctuations during adolescence, coupled with higher societal expectations for emotional control in girls, may further amplify these difficulties.

Additionally, the data highlighted a significant correlation between **father's level of education** and ADHD symptomatology in adolescents. One interpretation is that paternal education serves as a proxy for broader psychosocial and parenting variables—such as cognitive stimulation at home, awareness of behavioral health, and consistency in discipline. Interestingly, the **mother's education level was not statistically significant**, which may suggest a cultural or contextual effect where the father's role in shaping behavioral norms is more pronounced, particularly in patriarchal societies like Kosovo.

Our neurocognitive data, including the **Stroop and Go/No-Go tests**, reinforce the pattern of cognitive overload among urban adolescents. Slower reaction times and higher error rates point to diminished attentional control and impaired inhibitory function, both of which are core features of ADHD. These findings underline the importance of incorporating **ecological screening tools** into clinical assessment protocols, particularly in settings with rising urbanization.

From a clinical and public health standpoint, these results suggest a need to move beyond a categorical model of ADHD toward a more **dimensional and context-sensitive approach**. Environmental screening should become a core component of ADHD diagnostics, particularly when working with adolescents in densely populated and overstimulating environments. Interventions must also address the **emotional burden of adolescent girls**, who may not exhibit classical hyperactivity but are nevertheless impaired.

Limitations.

This study has several limitations. First, data were collected through self-report measures, which can introduce subjectivity and social desirability bias. Second, the sample was geographically restricted to Kosovo, which limits generalizability to other regions or ethnic groups. Third, the study lacked **neuroimaging or neurophysiological tools**, which would have offered a deeper insight into the underlying neural mechanisms of EF dysfunction. Additionally, due to its **cross-sectional design**, causal inferences cannot be made. Future research should utilize **longitudinal designs** and include more diverse samples and multi-method assessments, including biological and behavioral data.

Conclusion.

This study highlights the complex interplay between environmental stressors and neurodevelopmental vulnerabilities in adolescents. Our findings reveal that urban environments significantly contribute to the severity of ADHD symptoms and impairments in executive functions—particularly in emotional regulation among adolescent girls. These results urge clinicians, educators, and policymakers to recognize that ADHD is not merely a genetically driven disorder, but a dynamic, context-sensitive condition shaped by the ecological realities of young people's lives.

By integrating environmental screening into diagnostic protocols and developing targeted interventions for urban youth, we can foster more accurate assessments, earlier detection, and culturally sensitive support systems. Future research should continue to explore the sociocognitive impacts of urban living, with a focus on longitudinal designs and neurobiological data to better capture the evolving nature of executive function development.

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