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ORIGINAL PAPER

EVALUATION OF ADHD SYMPTOMS AND THEIR ASSOCIATION WITH EARLY OFFENDING AND RECIDIVISM IN ALBANIAN INMATES

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Abstract

Introduction. Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder that begins during childhood and often persists into adulthood, increasing the risk of criminal involvement. While ADHD is highly prevalent in prison populations, the mechanisms linking it to criminal trajectories remain under-researched in the Balkan region.
The objective of the study was to examine ADHD symptoms in Albanian inmates and to evaluate their association with recidivism, focusing on the age at first offense as a potential mediator.
Materials and methods. A cross-sectional study was conducted among 112 adult inmates in Albania. Childhood ADHD symptoms were assessed with the Wender Utah Rating Scale-25, and current symptoms with the Adult ADHD Self-Report Scale v1.1. Associations were analyzed using nonparametric tests and mediation analysis.
Results. 32.1% of participants screened positive for childhood ADHD symptoms and 16.1% for current symptoms. Childhood ADHD symptoms were negatively correlated with age at first offense ($r = -0.480$, $p < 0.001$) and were associated with recidivism. Mediation analysis showed a significant indirect effect

Résumé

Évaluation des symptômes du TDAH et de leur association avec la délinquance précoce et la récidive chez les détenus Albanais

Introduction. Le trouble déficitaire de l'attention/hyperactivité (TDAH) est un trouble neurodéveloppemental qui débute pendant l'enfance et persiste fréquemment à l'âge adulte, ce qui accroît le risque de délinquance. Bien que le TDAH soit très répandu au sein des populations carcérales, les mécanismes liant le TDAH aux trajectoires criminelles restent sous-étudiés dans la région des Balkans.
L'objectif de l'étude a été d'examiner les symptômes du TDAH chez les détenus Albanais et évaluer leur association avec la récidive, l'âge au moment de la première infraction constituant un médiateur potentiel.
Matériels et méthodes. Une étude transversale a été menée auprès de 112 détenus adultes en Albanie. Les symptômes du TDAH chez l'enfant ont été évalués à l'aide de l'échelle d'évaluation Wender Utah-25, et les symptômes actuels, à l'aide de l'échelle d'auto-évaluation du TDAH chez l'adulte v1.1. Les associations ont été analysées à l'aide de tests non paramétriques et d'une analyse de médiation.

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of childhood ADHD symptoms on recidivism through age at first offense.
Conclusions. ADHD symptoms in Albanian inmates are associated with earlier offending and recidivism. These findings support the need for early ADHD screening and intervention in at-risk populations.

Keywords: neurodevelopmental disorders, forensic psychiatry, early detection, criminal behavior, ADHD screening.

List of abbreviations:
ADHD – attention-deficit/hyperactivity disorder
ASRS v1.1 – Adult ADHD Self-Report Scale version 1.1
WURS-25 – Wender Utah Rating Scale (25-item version)

Résultats. 32,1% des participants ont été dépistés positifs pour les symptômes du TDAH chez l'enfant et 16,1% pour les symptômes actuels. Les symptômes du TDAH chez l'enfant étaient négativement corrélés à l'âge au moment de la première infraction ($r = -0,480$, $p < 0,001$) et étaient associés à la récidive. L'analyse de la médiation a montré un effet indirect significatif des symptômes du TDAH chez l'enfant sur la récidive selon l'âge au moment de la première infraction.
Conclusions. Les symptômes du TDAH chez les détenus Albanais sont associés à des délinquances et à des récidives précoces. Ces résultats étayent la nécessité d'un dépistage précoce du TDAH et d'une intervention auprès des populations à risque.

Mots-clés: troubles du neurodéveloppement, psychiatrie médico-légale, détection précoce, comportement criminel, dépistage du TDAH.

Introduction

Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by persistent difficulties with attention, concentration, organization, and impulse control[1]. It begins at an early age and tends to persist into adulthood. The global prevalence is estimated at 6–8% in children and adolescents[2] and around 2.6% in adults[3].

ADHD has been associated with numerous complications, including criminal offending. Studies have shown that ADHD is several times more prevalent in prison populations than in the general population, with recent meta-analyses estimating prevalence rates ranging from 8.3% (95% CI: 3.8–12.8)[4] to 22.2% (95% CI: 15.7–28.6)[5], depending on the study methodology and inclusion criteria. Individuals with ADHD are at increased risk of earlier offending and greater persistence of criminal behavior, including recidivism[6-8].

In penitentiary settings, unidentified and untreated ADHD symptoms may contribute to poorer adjustment, more psychiatric comorbidity, and greater difficulty with rehabilitation. Early identification and adequate intervention may improve outcomes and reduce return to prison[9].

The objective of the study was to examine ADHD symptoms in inmates from two Albanian penitentiaries, and their association with recidivism, with age at first offense as a potential mediator.

Materials and methods

This cross-sectional study was conducted in two penitentiary institutions in Albania, involving 112 inmates (85 men and 27 women) interviewed between June and December 2024.

Eligible participants were adults (aged 18-65 years) who were willing to provide written informed consent and able to answer the interview. Individuals held in isolation, those classified as high-risk for security reasons according to the institution's policy, non-Albanian residents, and residents with severe mental disorders were excluded from the study.

The study was approved by the Ethics Committee of the University of Medicine, Tirana, Albania (approval number 11, date 18.03.2024) and received official permission from the General Directorate of Prisons. All participants provided written informed consent before enrollment.

Childhood ADHD symptoms were assessed using the Wender Utah Rating Scale (WURS-25) (Ward et al., 1993), a 25-item retrospective self-report instrument[10]. Current ADHD symptoms were measured with the Adult ADHD Self-Report Scale (ASRS-v1.1) (Kessler et al., 2005)[11]. Socio-demographic characteristics and criminal history, including age at first offense and number of previous incarcerations, were collected through structured interviews and official records.

Data were analyzed using IBM SPSS Statistics Version 26. All variables showed non-normal distribution based on the Shapiro-Wilk test ($p < 0.001$). Spearman correlations, Mann-Whitney U tests, and mediation analysis using Hayes' PROCESS Macro (Model 4)[12] with 5,000 bootstrap resamples were performed. Bias-corrected and accelerated (BCa) 95% confidence intervals were reported. Statistical significance was set at $p < .05$.

Table 1. Socio-demographic characteristics of the participants (n=112)

Variable	*Category*	*n*	*%*
Gender	Female	27	24.1
	Male	85	75.9
Marital status	Single	55	49.1
	Married	41	36.6
	Divorced	15	13.4
	Widowed	1	0.9
Education	Primary education	9	8.0
	8/9 years of education	41	36.6
	Secondary/vocational	45	40.2
	University	15	13.4
	Postgraduate	2	1.8
Residence before detention	Urban	72	64.3
	Rural	40	35.7
Employment before detention	Yes	73	65.2
	No	39	34.8

Table 2. Prevalence of ADHD symptoms in the study group (n = 112)

Instrument	*Measured Construct*	*Cut-off*	*n*	*%*
Wender Utah –25	Childhood ADHD symptom	≥ 46	36	32.1
ASRS Part A	Current ADHD symptoms	≥ 4	18	16.1

Table 3. Comparison of retrospective ADHD symptoms with recidivism status (Mann-Whitney U test)

	Mann-Whitney U	*Z*	*Asymp. Sig. (2-tailed)*	*Effect size (r)*
Wender Utah	1113.500	-2.625	0.009	0.25

Results

Socio-demographic characteristics and criminal history

Table 1 presents the socio-demographic characteristics of the sample (n= 112). Most participants were male (75.9%, n = 85), and the mean age was 35.88 ± 11.864 years. Nearly half of the respondents were single (49.1%), followed by married (36.6%), divorced (13.4%), and widowed (0.9%). Regarding education, 40.2% had completed secondary or vocational education, 36.6% had completed obligatory education (8 or 9 years, depending on the period of study), 13.4% had completed university, and 8.0% had completed primary education (4 years). Most participants came from urban areas (64.3%), and 65.2% were employed before incarceration.

The mean duration of current incarceration was 18.6±28.28 months (range 1–132 months). More than half of participants (52.7%) were repeat offenders, with the number of previous incarcerations ranging from 1 to 8. The mean age at first offense for the entire sample was 29.20 ± 12.608 years (range 11–65 years).

As shown in Table 2, 32.1% of the sample (n = 36) exceeded the clinical cutoff for childhood ADHD symptoms on the WURS-25 (≥ 46). For current symptoms, 16.1% (n = 18) scored above the clinical threshold on ASRS Part A (≥ 4). Among participants who screened positive for childhood ADHD symptoms, 47.2% also met the clinical threshold for adult ADHD symptoms. Overall, 15.2% of the sample screened positive on both measures.

A Mann-Whitney U test showed a statistically significant difference in age at first offense between participants with and without childhood ADHD symptoms, as measured by the Wender Utah scale (U = 1113.5, Z = –2.62, p = 0.009). The effect size (r = 0.25) suggests a moderate strength of association, indicating that neurodevelopmental retrospectiveness is an important distinguishing element in profiling the subjects of this study (Table 3).

Before the mediation analysis, Spearman correlations were computed between childhood ADHD symptoms (WURS total score) and criminal history variables. WURS scores showed a strong negative correlation with age at first offense (r = –0.480, p < 0.001).

Table 4. Mediation analysis: age at first offense as a mediator between childhood ADHD symptoms and recidivism

Path	*B*	*Standard Error (SE)*	*t/Z*	*p*
A: WURS → Age at first offense	-0.246	0.049	-5.02	< 0.001
B: Age at first offense → Recidivism	-0.130	0.030	-4.36	< 0.001
C': Direct effect (WURS → Recidivism)	-0.005	0.011	-0.45	0.649
Indirect effect (Bootstrap)	*Effect*	*BootSE*	*LLCI*	*ULCI*
WURS – Age at first offense – Recidivism	0.032	0.011	0.017	0.059

Positive correlations were also observed with the number of previous incarcerations (r = 0.292, p = 0.002) and total months of previous incarceration (r = 0.294, p = 0.002).

To examine whether the age of first offense mediated the relationship between childhood ADHD symptoms (WURS-25) and recidivism (returns to prison), a mediation analysis was conducted using Hayes' PROCESS Macro (Model 4) with 5,000 bootstrap resamples.

As shown in Table 4, the indirect effect was statistically significant (Effect = 0.032, Boot SE = 0.011, 95% BCa CI 0.017, 0.059). After including the mediator, the direct effect of WURS on recidivism became non-significant (B = –0.005, p = 0.649), indicating full mediation.

Path A (Wender Utah – Age of first offense) was significant (beta = –0.2462, p < 0.001). For each additional point on the ADHD test (Wender Utah), the age of first offense decreases by about 0.25 years (3 months).

Path B (Age of first offense – Recidivism): also significant (beta = –0.130, p < 0.001). The younger the age at offense, the higher the probability of recidivism.

Path C' (Direct effect): beta = –0.005, p = 0.6493 (n.s. for not significant).

Discussion

This study provides the first empirical evidence from Albania on the relationship between persistent ADHD symptoms, age at first offense, and recidivism in a prison population. It also adds to the limited literature from the Western Balkans, by examining the mediating role of early criminal onset in this association.

The prevalence of childhood ADHD symptoms (32.1% on WURS-25) was consistent with previous European prison studies using the same instrument. Capuzzi et al. (2022) reported a rate of 32.4% among Italian inmates, while Vegue-González et al. (2011) found rates between 30% and 35% in a Spanish prison sample[13,14]. The prevalence of current ADHD symptoms (16.1% on ASRS Part A) falls within the middle range of estimates reported in recent meta-analyses of prison populations (8.3%–22.2%)[4,5] and is close to the 16.5% reported by Usher et al.[18] in a Canadian federal prison sample.

A notable finding was the relatively high rate of symptom persistence. Among participants who screened positive for childhood ADHD, 47.2% continued to meet the clinical threshold of adult ADHD on the ASRS. This persistence rate (15.2% of the total sample) appears higher than that reported in some Northern European studies[17], but is consistent with research conducted in Southern European prison settings. Such continuity highlights the chronic nature of ADHD in forensic populations and suggests that many Albanian inmates continue to experience impairing symptoms that may hinder rehabilitation.

Participants with higher childhood ADHD symptoms demonstrated a significantly younger onset of criminal offending compared to those without significant symptoms, as evidenced by the Mann-Whitney U test results. This finding aligns with extensive international literature showing that ADHD is associated with earlier offending and a more persistent antisocial trajectory[6,7]. The negative correlation between WURS scores and age at first offense (r = – 0.480, p < 0.001) further supports the association between neurodevelopmental vulnerabilities and early entry into the criminal justice system.

The most important finding was that age at first offense statistically mediated the association between childhood ADHD symptoms and recidivism. The indirect effect was significant, while the direct effect became non-significant after inclusion of the mediator. This suggests that the link between childhood ADHD symptoms and recidivism may operate largely through earlier onset of offending rather than through a direct adult effect.

These findings are consistent with Moffitt's developmental taxonomy[15], particularly the life-course-persistent antisocial pathway, in which neurodevelopmental difficulties such as impulsivity

and inattention interact with environmental risk factors to shape chronic offending trajectories. They also extend previous findings[8,16], by showing this pattern in an understudied cultural context.

The findings have several important implications. Clinically, they support the value of ADHD screening and early intervention in at-risk children and adolescents, especially when combined with broader psychosocial support. Within penitentiary settings, systematic screening upon admission and appropriate treatment of ADHD symptoms may improve engagement in rehabilitation programs and reduce recidivism rates[9].

At the policy level, the findings support integrating neurodevelopmental perspectives into Albania's justice and mental health systems and the development of coordinated screening pathways across services.

Limitations of the study

Despite its contributions, this study has several limitations. The cross-sectional design, although it identifies significant associations, does not allow us to draw causal conclusions. In addition, reliance on self-report measures may be associated with recall or social desirability bias, and the moderate sample size (n = 112) limits statistical power and generalizability. Finally, the absence of a non-incarcerated control group restricts comparisons with the general population.

Conclusions

This study provides the first empirical evidence from Albania on the relationship between persistent ADHD symptoms, early criminal onset, and recidivism. It suggests that ADHD symptoms are associated with earlier offending and recidivism in Albanian inmates. Age at first offense appears to mediate the relationship between childhood ADHD symptoms and recidivism, indicating that early criminal onset may be an important pathway linking ADHD to later criminal trajectories. These findings support the value of early identification and intervention for ADHD, as well as systematic screening and management within penitentiary settings. They also highlight the need to integrate neurodevelopmental perspectives into Albania's justice and mental health systems.

Author Contributions:

Conceptualization, E.M. and R.T.; methodology, E.M.; software, R.T.; validation, E.M. and R.T.; formal analysis, E.M; investigation, E.M. and R.T.; resources, E.M. data curation, E.M. and R.T.; writing–original draft preparation, E.M.; writing–review and editing, E.M. and R.T.; visualization, E.M. and R.T..; supervision, E.M.; project administration, E.M. All the authors have read and agreed with the final version of the article.

Compliance with Ethics Requirements:

"The authors declare no conflict of interest regarding this article"

"The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study"

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