

Exploring the Relationship between Attention-Deficit/Hyperactivity Disorder and Criminogenic Factors in a Kenyan Prison Population

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Abstract

Attention-deficit/hyperactivity disorder (ADHD) is a *neurodevelopmental disorder* and one of the most common mental disorders affecting children, but often persisting into adulthood. The disorder is considered a chronic and debilitating condition that is known to adversely impact the individual in many aspects of their life including daily functioning, interpersonal relationships, academic and occupational achievements. Some of the symptoms of ADHD expose the individual to behavioural and emotional challenges that may often be associated with negative outcomes, including crime. Global research has reported disproportionately higher rates of ADHD among youth and adult offenders across the criminal justice system. The disorder remains largely undiagnosed and untreated, more so amongst adults in general, and in prisoners in Kenya. This quasi-experimental study sought to investigate the criminogenic risk factors most associated with ADHD among an adult prison population aged 18-65 years, in Central Kenya. Data was obtained using a socio-demographic questionnaire from respondents (N=113) first screened for ADHD symptoms using Adult ADHD Self-Report Scale (ASRS-v1.1) Symptom Checklist. Purposive sampling was applied to assign the participants into two groups: experimental (n = 52) and control (n = 61). With 95% confidence level and *p*-value of ≤ 0.05 , descriptive and inferential analysis showed that ADHD among the inmates was statistically significantly associated with marital and educational circumstances, recidivism, and family environment. The study found a strong link between ADHD traits and criminogenic factors among male inmates in the selected Kenyan prisons, including self-control issues, antisocial behavioural traits, substance abuse, family difficulties, and educational challenges. It therefore recommends that ADHD should be accorded more attention in Kenya aimed at reducing incidences of criminal conviction and re-offending.

Keywords: Attention-deficit/hyperactivity disorder, crime, criminogenic risk factors, inmates.

Introduction and Background

Attention-Deficit/Hyperactivity Disorder (ADHD) has been defined as a neurodevelopmental condition characterized by the presence of persistent and developmentally inappropriate levels of hyperactivity, impulsivity, and inattention (Anns et al., 2023). The Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5), defines ADHD as a persistent pattern of inattention and/or hyperactivity-impulsivity that interferes with normal functioning or development. Some level of impairment, signs and symptoms must present in at least two areas of life, like home, school, or in recreational and social activities, for a minimum of six months, for a diagnosis of ADHD to be made (American Psychiatric Association, 2013; Capuzzi et al., 2022). Additionally, the American Psychiatric Association (2013) lists three subtypes of ADHD in the DSM-5, namely, the predominantly inattentive (ADHD-PI) sub-type, the predominantly hyperactive-impulsive (ADHD-PH) sub-type, and a combined sub-type covering both inattentive and hyperactive-impulsive symptoms (American Psychiatric Association, 2013).

The symptoms of ADHD normally first occur by the age of 7 years, persisting into adulthood in 40–60% of cases, and in some studies as high as 60-86%, causing impairment in interpersonal relationships, social, academic, and occupational functioning. The symptoms can range from mild to severe (Capuzzi et al., 2022; Cherkasova et al., 2022; Prakash et al., 2021). The disorder has also been associated with disruptive, defiant, antisocial behaviours, substance misuse, unsafe driving, self-harm, problems with organization of their daily tasks and emotional dysregulation (Cherkasova et al., 2022; Retz et al., 2021). Therefore, ADHD is a prevalent mental health disorder, with a male to female ratio estimated to be 3:1 (Willcutt, 2012; Young et al., 2020). The worldwide prevalence of adult ADHD has been estimated to fall between 2% and 7% (Polyzoi et al., 2018; Song et al., 2021) for the general adult population.

While ADHD by itself does not predispose individuals to criminality, several criminogenic factors are associated with the condition, which may contribute to higher involvement in illegal activities. The severity of ADHD during childhood and its persistence into adolescence correlates with high levels of anger, hostility, and verbal aggression, often driven by affective outbursts, impulsivity, poor impulse control, difficulties in managing frustration, and impaired decision-making processes commonly seen in individuals with ADHD (Anns et al., 2023; Barkley, 2015). Untreated ADHD may result in academic and occupational challenges,

increasing the likelihood of economic difficulties and instability, which can indirectly contribute to criminal behaviour (Young et al., 2020). Substance abuse, another common issue among individuals with ADHD, is a significant criminogenic risk factor, as it can lead to impulsive and risky behaviours that result in criminal convictions (Philipp-Wiegmann et al., 2017). Therefore, while ADHD itself is not a direct cause of criminality, it is essential to consider its criminogenic correlates when exploring the intersection of ADHD and an incarcerated population.

Higher rates of ADHD have been reported among incarcerated and criminal offenders compared to the general population. The prevalence of adult ADHD in detention and prison inmates is generally high at a level of 5 to 10 times more compared to the general population (Baggio et al., 2018). Young and Cocallis (2022) indicated that ADHD among youth and adult offenders across police custody, prison, probation and forensic mental health settings was estimated to fall within a 25% range. ADHD is heavily associated with several comorbid psychiatric disorders, key among them oppositional-defiant disorder (ODD)/conduct disorder (CD), substance abuse and antisocial personality disorder (Retz et al., 2021). The comorbidity, together with other psychosocial factors may tend to influence delinquent behaviour (Mohr-Jensen et al., 2019; Retz et al., 2021).

Adequate research evidence suggests that ADHD may in itself be a risk factor for interactions with the criminal justice system (CJS). This study sought to explore this relationship, with the aim of establishing the specific criminogenic needs and risk factors influencing the relationship on a selected Kenyan prison population. Criminogenic needs are those factors in an offender's life that are directly related to crime, or more specifically, recidivism, and include low self-control, anti-social personality, history of anti-social beliefs and behaviours, criminal associates, substance abuse, problems at school and/or work, problems with leisure and/or recreational time, a dysfunctional family or family and/or marital strain (Office of Court Services, 2022; van Deirse et al., 2020). ADHD could only complicate and influence criminality and risk of re-offending further. While the criminogenic needs, that refer to the dynamic aspects of each risk factor, are modifiable and responsive to change when addressed effectively by treatment, training or education (van Deirse et al., 2020) the static aspects are not treatable and therefore not modifiable.

The dynamic aspects, criminogenic needs, have the strongest associations with criminal behaviour, and have been believed to be the same for individuals involved in the criminal justice system, regardless of the presence of mental disorders, with proposals that the former alone is a weak predictor of criminal offending (van Deirse et al., 2020; Bonta et al., 2014). However, it has been demonstrated that people suffering from mental illnesses and who are involved in the justice system have criminogenic risk factors at similar or higher levels when compared to those involved in the criminal justice system but without experiencing mental illnesses, a situation where further research explains for the overrepresentation of people with mental illnesses in the criminal justice system (van Deirse et al., 2020; Wilson et al., 2014).

Evidence suggests that ADHD may itself be a risk factor for engagements with the criminal justice system, with increased risk of arrests, convictions, incarcerations, and recidivism in adolescence and adulthood compared to the non-ADHD general population (Anns et al., 2023; Young & Cocallis, 2022). Even as age is a static criminogenic factor, research has also shown that, individuals with ADHD are more likely to be younger at their first arrest and conviction compared to those without ADHD, probably because of its close association with rule-breaking behaviours, delinquency, and criminality (Philipp-Wiegmann et al., 2018; Young & Cocallis, 2022), while also tending to have an increased risk of recidivism (George, 2022; Retz et al., 2021), and a higher number of further engagements with the criminal justice system (Philipp-Wiegmann et al., 2018).

Previous meta-analyses and studies have been reported as suggesting that the strongest predictors of criminal recidivism among offenders with mental disorders are criminogenic factors, such as criminal history and deviant lifestyle choices including substance abuse and antisocial behaviour (Edberg et al., 2022). Regarding ADHD, some theories submit that the symptomatology of ADHD may lead to criminality due to its associations with low self-control, a widely recognized criminogenic risk, while others suggest that the impulsive, cognitive, and behavioural aspects of ADHD may mean that the offending individuals are more likely to get caught for crimes committed due to traces left behind (Anns et al., 2023; van der Maas et al., 2018). Proposals have been made to the effect that ADHD may be overrepresented in interactions with the criminal justice system due to its comorbidity with other psychiatric disorders linked to criminal behaviours, such as CD, substance abuse, and antisocial personality disorder (Retz et al., 2021).

Impaired socialization during an individual's development, resulting from adverse effects associated with ADHD symptomatology, may lead to interactions with the criminal justice system (Anns et al., 2023; van der Maas et al., 2018; Watts, 2018). Another criminogenic factor to consider concerns an individual's educational capability, environment and problems at school. Edberg et al. (2022) indicated that there was limited literature focusing specifically on factors relating to criminal recidivism in connection to intellectual disability (ID). Investigating the criminogenic factors associated with ADHD within the context of a study examining the link between intellectual disability (ID) and criminal recidivism among offenders receiving forensic psychiatric care, it was revealed that individuals with comorbid ADHD and ID exhibited a notably higher rate of recidivism when compared to their counterparts without ADHD (Edberg et al., 2022)

With findings from various studies linking ADHD with criminality, it becomes necessary to not only appreciate how ADHD might lead to interactions with the criminal justice system but to also understand the ways in which it may influence such interactions and affect an individual's trail through the justice system (Anns et al., 2023). This is more so because individuals with ADHD may be at risk from their incidence of first encounter with the criminal justice system for several reasons, including being wrongly perceived as uncooperative or less credible arising from some of the answers they may give (Mohr-Jensen & Steinhausen, 2016; Young & Cocallis, 2022).

Additionally, they may be at risk of giving false confessions or information, for a variety of reasons (Cunial et al., 2020), or influenced by ADHD related difficulties such as anxiety, low self-esteem, or due to ADHD symptoms of restlessness, or hyperactivity, which may motivate them to leave the place of custody (Young & Cocallis, 2022). Identifying people with mental illnesses when being processed within the criminal justice system may be challenging, especially in settings that are not fully established. This may also impede research concerning criminogenic needs and mental health symptom severity (van Deirse et al., 2020), including ADHD. To begin to address such a research gap in Kenya, this study used a socio-demographic instrument to identify criminogenic risks associated with ADHD among an adult incarcerated population.

One of the aims was to investigate specific criminogenic factors among the participants who had posted positive results for ADHD, using socio-demographic and risk data. This involved

exploring family dysfunction in multiple dimensions, including educational level statuses, the role of the common childhood parent, marital status, and historical substance or alcohol abuse by a parent. Additionally, the study assessed low socioeconomic status through participants' pre-incarceration monthly income and examined substance abuse and criminal histories. However, certain key criminogenic factors, such as criminal associates, anti-social beliefs, anti-social personality disorder, and specific school or work-related issues, fell outside the study's scope.

The relationship between ADHD and criminogenic factors appears to be complex. While ADHD itself does not essentially predispose individuals to criminal behaviour, it presents a unique set of challenges and vulnerabilities that can intersect with various criminogenic features. Factors such as impulsivity, poor impulse control, emotional dysregulation, and substance abuse, often observed in individuals with ADHD, can contribute to a higher risk of involvement in illegal acts. Furthermore, untreated ADHD may lead to academic and occupational difficulties, which, in turn, can in/directly contribute to criminality. It is essential to recognize the multifaceted interaction between ADHD and criminogenic factors, as understanding this relationship is important for developing effective prevention and intervention strategies that would benefit inmates.

Moreover, it is worth noting that, to the best of our knowledge, there appears to be a scarcity of previous studies examining the prevalence of ADHD among inmates in Kenya or broader African contexts. This unique perspective remains largely unexplored, leaving a significant gap in our understanding of how ADHD interconnects with criminogenic factors in this particular population. This study aimed at contributing valuable insights into this underrepresented area of research, shedding light on the prevalence and implications of ADHD within a section of inmates in Kenya and, by extension, the broader African context.

Methodology

A quasi-experimental research design was used to investigate the risk factors associated with ADHD among male adult prisoners in selected prisons in Kenya. There were a total of 113 participants after screening for ADHD symptoms, who were aged between 18 and 65 years. Five prisons were purposively selected based on availability of the target population and appropriate

sample size. Purposive sampling was used to select study participants with reported presentation of ADHD symptoms. Inclusion criteria included; signed informed consent, prison sentence term of above 6 months from the start of the study, comprehension of the tools, and having presented with ADHD symptoms at baseline screening. Data was collected using researcher-generated socio-demographic questionnaire, Adult ADHD Self-Report Scale (ASRS-v1.1) checklist, and the mental health screening form (MHSF-III), which were all done as self-reports.

The researcher-developed socio demographic questionnaire was used to collect socio demographic characteristics such as age, marital status, educational and occupational history, income level, lifestyle practices, parents' marital status, family background and conviction history. The ASRS-v1.1 was used to screen for ADHD symptoms among the participants. The ASRS-v1.1 has 18 items forming Part A, 6 items, and Part B, 12 items. Part A of the checklist focuses on identifying symptoms that are highly consistent with adult ADHD while Part B establishes the frequency of specific symptoms, and is usually associated with severity of the symptoms. The rating criteria is based on the Likert-Scale representing frequency of symptoms, ranging from "never" to "very often". Other levels are "rarely", "sometimes", and "often". In Part A, a score of either sometimes, often and very often in at least 4 of the 6 questions would be indicative of ADHD characteristics.

The Mental Health Screening Form (MHSF-III) was used to collect information on past psychiatric history. MHSF-III is a general questionnaire which may look at different potential comorbid disorders associated with ADHD, and only gives some indication of symptoms associated with other disorders that may affect the individuals whether at the present time or in the past. The form contains 18 "yes" and "no" questions, 13 of which are unique to specific diagnosis. A "yes" response to questions 5 through 17 does not guarantee the presence of a mental health issue during the current time of screening. Such responses are merely indicative of the potential for a current or past problem, emphasizing the importance of seeking consultation with a mental health specialist (Carroll & McGinley, 2000).

The MHSF-III was modified so as to incorporate another tool, CAGE Adapted to Include Drugs [CAGE-AID]. The CAGE questionnaire is a simple yet effective tool for identifying potential alcohol-related problems. It comprises four direct "yes" and "no" questions that assess an

individual's relationship with alcohol, while the CAGE-AID is an expanded version of the CAGE questionnaire, which incorporates aspects related to drug use. It is used to assess both alcohol and drug-related issues. As in MHSF-III, a “yes” response would be indicative of a (past or current) alcohol and/or drug problem. The CAGE-AID responses are typically interpreted as indicators of potential alcohol and drug use problems, with "yes" responses to specific questions suggesting the need for further assessment and intervention, rather than providing a definitive diagnosis

Data collected from the respondents was analyzed using the Statistical Package for Social Sciences program (SPSS version 20). Descriptive statistics of frequencies, percentages and Pearson’s Chi-Square tests were used to analyze the variables. More specifically, Chi square tests were used to assess the relationships between the socio-demographic variables of age, education level, marital status, occupation, income levels, family settings, and conviction history, and to establish the significance of the socio-demographic variables and risk factors in predicting ADHD.

Results

Following the analysis of the data collected through the socio-demographic questionnaire, the results are presented in line with the specific criminogenic factors, both static and dynamic.

Table 1: The Age at which the Participant was First Incarcerated

Age at first Incarceration	Group		Total	Pearson chi- square
	Experimental	Control		
Below 14 years	1(0.9%)	1(0.9%)	2(1.8%)	.387
15-17 years	2(1.8%)	2(1.8%)	4(3.5%)	
18-22 years	6(5.3%)	15(13.3%)	21(18.6%)	
23-25 years	9(8.0%)	13(11.5%)	22(19.5%)	
Above 25 years	34(30.1%)	30(26.5%)	64(56.6%)	
Total	52(46.0%)	61(54.0%)	113(100.0%)	

Table 1 shows that the majority of the participants (56.6%) were first imprisoned at above 25 years of age, followed by those who were first imprisoned at ages 23-25 years. Thus, most were

first imprisoned in adulthood (18 years and above). This could imply that criminality peaks as offenders settle into the early adulthood stage. It could also be an indication of limited juvenile correctional facilities, minimized reporting of juvenile offending cases.

In regard to the education level statuses of the participants, the study found that highest representation was among those participants who had attained only primary level education (42.9%), then secondary school education (39.0%), with only a few attaining university level of education (3.8%). Hence, majority of the participants had below college level of education, which may subsequently impact on employment and/or occupational experiences and income levels.

Possibly corresponding with the level of education attained by the participants were their different occupations before incarceration, with the highest representation being in agricultural jobs 32.7% followed by transport related jobs 18.7% and then casual jobs 15.9%. Least representation was among those who had been in professional jobs 5.6% followed by construction work at 6.5% and then the technical category at 7.5%, with business representing at 10.3%. The high magnitude of non-professional, unskilled occupation may be a reflection of the low education levels of the participants.

On income categories, majority of the participants were found to have been earning Kshs. 0-10000 before incarceration (52.7%), followed by those who were earning Kshs. 10001-50000 (26.8%). Hence, most of them were low-income earners (combined 79.5%). The low incomes appear to correspond with the level of education and cadre of occupation amongst the participants, with a high magnitude of non-professional and unskilled occupations.

Table 2: The Number of Times Participants Had Been Married

Number of times married	GROUP		Total	Pearson chi-square
	Experimental	Control		
None	9(8.1%)	16(14.4%)	25(22.5%)	.856
Once	25(22.5%)	27(24.3%)	52(46.8%)	
Twice	13(11.7%)	14(12.6%)	27(24.3%)	
Thrice	2(1.8%)	2(1.8%)	4(3.6%)	
Four times	1(0.9%)	2(1.8%)	3(2.7%)	
Total	50(45.0%)	61(55.0%)	111(100.0%)	

As presented in Table 2, 24.3%, 3.6% and 2.7% of the participants had been married twice, thrice and four times respectively. The 30.6% of participants who have been married at least twice may imply a weakening in the marriage, and family structure, as well poor relational skills.

Concerning the participants; parental experience in childhood, the findings showed majority of the participants indicating that mothers were the most common parent in childhood 52.1% followed by those who had both parents 38%. Those that lived with their fathers were at 9.9%. This means that mothers did much of the upbringing of the children, even in some cases where they were married. A separate category may have been parented by other relatives or arrangements. Meanwhile, 42.3% of the participants were brought up by single parents, 36.6% were brought up by married parents and 21.1% had widowed parents. Thus, most participants had parents who either were single or widowed. However, there were statistically significant differences in the parents' marital status ($p=0.005$).

Another criminogenic factor considered in the study was the number of times the participants had been in prison. According to the findings, most of the participants (76.8%) were serving their first prison term. Only a few were serving their second term (14.3%), third (3.6%) or more than 3 terms (5.4%). Thus, for the majority it was their first time to be incarcerated. The repeat incarcerations are indicative of some underlying factors, which could be personal, familial, or societal that would need to be investigated further and addressed.

*Table 3: Multiple Regression Analysis for *Age, Marital Statuses and Education*

Model		Hyperactivity			T	Sig.
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
1	(Constant)	.788	.441		1.785	.081
	Age	.001	.011	.012	.077	.939
	Marital status	-.088	.105	-.123	-.835	.408
	Times married	.260	.105	.404	2.480	.017*
	Education level	.038	.110	.047	.346	.731
	Times transferred	-.309	.143	-.284	-2.157	.036*
1		Inattention				
		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta		
	(Constant)	3.002	.223		13.441	.000
	Age	-.001	.006	-.021	-.125	.901
	Marital status	-.011	.053	-.034	-.209	.836
	Times married	.010	.053	.035	.191	.849
	Education level	-.037	.056	-.100	-.666	.509
	Times transferred	-.006	.073	-.013	-.086	.932

Table 3 indicates that the predictors of high hyperactivity-impulsivity symptoms of ADHD among the participants were the number of times they had married and the number of times they had changed schools. None of the variables predicted the inattention type of ADHD ($p > .05$). The predictors give insights into the need to explore and address some of the otherwise normal life patterns from a mental health perspective early in life.

Table 4: Analysis of Variance for Birth Order, Number of Siblings and Times they had been in Prison and ADHD Overall Scores

Variable	Group	Response	Mean	N	Std. Deviation	ANOVA				
						F	p			
Birth Order	Experimental	First	11.67	15	3.52	.484	.919			
		Second	11.50	8	3.96					
		Third	9.67	6	2.42					
		Fourth	9.60	5	2.70					
		Fifth	11.00	6	1.79					
		Sixth	11.25	4	4.92					
		Seventh	10.00	1	.					
		Eighth	10.00	1	.					
		Ninth	8.00	1	.					
		Tenth	12.00	1	.					
		Total	10.92	48	3.17					
	Control	First	9.00	17	2.09	1.528	.154			
		Second	9.22	9	1.48					
		Third	11.31	13	3.09					
		Fourth	9.33	3	1.15					
		Fifth	9.83	6	2.71					
		Sixth	8.75	4	1.89					
		Seventh	11.50	2	4.95					
		Eighth	9.33	3	1.53					
		Ninth	10.00	1	.					
		Total	9.76	58	2.43					
Number of siblings	Experimental	1-3	10.57	7	3.10	1.218	.308			
		4-6	11.44	16	3.12					
		Above 7	10.54	26	3.31					
		Total	10.84	49	3.18					
		Control	1-3	9.38	13			2.26	1.048	.423
			4-6	9.85	26			2.78		
			Above 7	10.06	18			2.04		
Total	9.81	57	2.42							
Times in prison	Experimental	Once	10.46	41	3.19	2.040	.044*			
		Twice	11.43	7	2.57					
		Thrice	11.67	3	4.93					
		4 times	17.00	1	.					
		Total	10.79	52	3.27					
		Control	Once	10.02	45			2.84	1.052	.418
			Twice	9.22	9			1.48		
			Thrice	10.00	1			.		
			4 times	10.20	5			2.59		
			Total	9.9167	60			2.61865		

Table 4 shows the number of times participants had been in prison implying statistically significant findings (Mean =10.46[once]; 11.43[twice];11.67[thrice]; 17.00[4 times]; F= 2.04; p=0.044), and further indicating that means of ADHD increased as the number of times the

respondents had been in prison increased. Incarceration and more so when repeated could mean the presence of existing psychiatric symptoms rather than simply deviant behaviour.

Regarding alcohol and substance use/abuse by the participants, 67.3% of the reported having used drugs or alcohol before incarceration. The high rate of substance and alcohol use could suggest a likelihood of high alcohol and/or substance abuse within the study area. Compared to their parents' use/abuse of alcohol and/or drugs during the participants' childhood, the study findings indicated that the participants' parent who most abused substances or alcohol were fathers (85.5%), with mothers at 6.5%. Those whose both parents indulged in substances accounted for 8.1%. A high rate of substance/alcohol abuse by fathers at 85.5% could indicate some form of disruption in their parenting role, and a destabilizing family environment.

Table 5: The Pearson Chi-square Test to Assess the Relationship between the Parent who Abused Drugs/Alcohol and ADHD Statuses

Group	Parent using drugs/alcohol	Hyperactivity status			Total	p
		No hyperactivity	Low hyperactivity	High hyperactivity		
Experimental	Both	0(0%)	0(0%)	1(100%)	1(100%)	.004
	Mother	1(50%)	1(50%)	0(0%)	2(100%)	
	Father	0(0%)	9(34.6%)	17(65.4%)	26(100%)	
	Total	1(3.4%)	10(34.5%)	18(62.1%)	29(100%)	
Control	Both		3(75%)	1(25%)	4(100%)	.222
	Mother		0(0%)	2(100%)	2(100%)	
	Father		13(48.1%)	14(51.9%)	27(100%)	
	Total		16(48.5%)	17(51.5%)	33(100%)	
Total	Both	0(0%)	3(60%)	2(40%)	5(100%)	.004
	Mother	1(25%)	1(25%)	2(50%)	4(100%)	
	Father	0(0%)	22(41.5%)	31(58.5%)	53(100%)	
	Total	1(1.6%)	26(41.9%)	35(56.5%)	62(100%)	
Inattention						
Experimental	Both	0(0%)	0(0%)	1(100%)	1(100%)	.157
	Mother	0(0%)	1(50%)	1(50%)	2(100%)	
	Father	0(0%)	2(7.7%)	24(92.3%)	26(100%)	
	Total	0(0%)	3(10.3%)	26(89.7%)	29(100%)	
Control	Both	0(0%)	0(0%)	4(100%)	4(100%)	.103
	Mother	0(0%)	1(50%)	1(50%)	2(100%)	
	Father	0(0%)	2(7.4%)	25(92.6%)	27(100%)	
	Total	0(0%)	3(9.1%)	30(90.9%)	33(100%)	
Total	Both	0(0%)	0(0%)	5(100%)	5(100%)	.016
	Mother	0(0%)	2(50%)	2(50%)	4(100%)	
	Father	0(0%)	4(7.5%)	49(92.5%)	53(100%)	
	Total	0(0%)	6(9.7%)	56(90.3%)	62(100%)	

Table 5 indicates that high hyperactivity was more distributed among the participants whose fathers abused alcohol/drugs (58.5%). The table shows that hyperactivity-impulsive status was influenced based on the parent who abused the substances/alcohol, where fathers were the

highest abusers. High inattention was more distributed among the participants whose fathers abused alcohol/drugs (92.5%). Where both parents abused the drugs or alcohol, all the participants (100%) had high inattention. Thus, having a father who abused either alcohol or drugs was related to high hyperactivity status, and having a father or both parents abusing drugs/alcohol was related to high inattention status. The finding suggests the father's behaviour may play a highly significant role in influencing the (ADHD) outcome of an individual.

Discussion

Results from this study showed differentiations based on individuals' age, family background, social and family relationship status, employment experience, income history, and education attainment. These factors fit into the description of demographics presented in an earlier study (Li et al., 2019) as predictors of criminality. Majority of the participants were aged between 20 and 50 years, with the mean age at 36.4, median at 36 and mode at 29 and giving a decreasing trend. At the same time, majority of the participants, 56.6% were first imprisoned at above 25 years of age, followed by those who were first imprisoned at ages 23-25 years (19.5%), meaning that most of the individual were first imprisoned in adulthood (18 years and above).

This could imply that criminality peaks as offenders settle into the early adulthood stage. It could also be an indication of limited juvenile correctional facilities within the country. The researcher was interested in establishing any ADHD-age-crime relationship. The findings suggest that such a relationship does present; a position that is supported by previous studies stating that age is one of the strongest predictors in crime, and that the age-crime relationship has been found to exist across cultures and times (Vrucinic, 2019), even as ADHD is commonly reported to show full remission in adulthood as one matures (Baggio, et al., 2018; Vos & Hartman, 2022; Young & Cocallis, 2022).

Evidence presented in previous studies has observed that individuals with ADHD often suffer challenges from otherwise normal life operations such as difficulties with reduced incomes, educational deficits and occupational dysfunction, presented by inability to gain or maintain employment (Faraone, 2021; Prakash et al., 2021). This study explored these factors, expecting to identify any marked observation in relation to ADHD among inmates. The researcher grouped various different occupations the participants engaged in before incarceration, and found

concurrency, with highest representation being in agricultural jobs (32.7%), followed by transport related jobs (18.7%) and then casual jobs (15.9%). The least representation was among those who had been in professional jobs (5.6%). The high magnitude of non-professional, unskilled occupations may reflect the low education levels of the participants.

Similarly, there was not much achievement on the education side, relative to the efforts by government to enforce and promote free education for all school-age children. The current study found the highest representation to be among those who had primary level education at 42.9%, then secondary school education at 39.0%, college education at 14.3% and only a few with university level education at 3.8%. Meanwhile, unemployment is rampant in Kenya, even for university graduates. Therefore, without any form of college, technical or university training then, only low-income casual work would be gained, where available.

Education is generally a valued asset across many of the communities in Kenya, yet, as shown in this study, majority of the participants, all male inmates, would appear to have dropped out of school at or just after attaining the basic level of education. This may be due mainly to prevalent poverty and many other familial and social factors (Muyaka et al., 2021; Njuguna & Muchanje, 2019). The position is congruent with findings represented in this study. Academic underachievement, poverty, unemployment, low incomes, single parenthood and large families would seem to converge and compound the ADHD elements to solidify as predictors of criminal behaviours (Li et al., 2019) as was as was observed within this research.

Another factor associated with ADHD relates to reduced incomes (Faraone, 2021; Prakash et al., 2021). Our study established that majority of the participants (52.7%), were earning Kshs. 0-10,000 before incarceration followed by those earning Kshs. 10,001-50,000 (26.8%). Hence, most were low-income earners, earning below the minimum wage set by government. The low incomes appear to correspond with the level of education and nature of occupation amongst the participants. The consequences of low education, occupation and income levels may further be exacerbated by substance and/or alcohol abuse, at 67.3% of the participants (Edberg et al., 2022; Retz et al., 2021).

ADHD in adults has been associated with such experiences as family dysfunction, child neglect and conflict between parents, relationship with parents, negatively relating to the children due to

their challenges in handling the children's ADHD symptoms, which in turn results in difficult behaviour of the children (Capuzzi et al., 2022; Doulou & Drigas, 2022; Franke et al., 2018; Haack et al., 2016). In line with these factors, the researcher sought to establish specific childhood and family background information on the participants, that would point out any psychological problems arising from family dysfunction, a criminogenic factor that has been found to be a major component of ADHD cases, with hostility and conflict between parents, and single parenthood being correlated with ADHD (Williamson & Johnston, 2015). Our findings indicate that most participants had parents who either were single or widowed at 63.4%, of whom 42.3% were brought up by single parents, 36.6% by married parents and 21.1% whose parents were widowed. This research supports the view that single parenting has a significant direct association with ADHD outcomes (Claussen et al., 2022).

Death of either parent was found to be related to neither hyperactivity-impulsive nor inattention. This differs from other research proposing single parenthood and single-parent families as being correlated with ADHD (Choi et al., 2017; Williamson & Johnston, 2015). This study concurs with these findings in that majority of the participants indicated that mothers were the most common parent in their childhood. It is unclear as to how the prevalence is higher under single-parenthood yet be statistically non-significant where the parent has died.

Cross-tabulations between possible risk factors and the hyperactivity-impulsivity and inattention statuses were done, and results interpreted using Pearson chi-square, which revealed that the predictors of high hyperactivity among the participants were the “number of times they had married” and “number of times which they had transferred schools”. There were no predictors for inattention sub-type of ADHD ($p > .05$). Also, the current study found the “number of times one had been in prison”, giving statistically significant findings, with increasing score (Mean = 10.46[once]; 11.43[twice]; 11.67[thrice]; 17.00[4 times]; $F = 2.04$; $p = 0.044$), further implying that the number of times the respondents had been in prison influenced ADHD scores; in line with such previous positions (Edberg et al. 2022; George, 2022; Retz et al., 2021).

The hyperactivity-impulsivity sub-type has been proposed as being more prevalent in males than in females; with suggested indications that males with ADHD show higher rates of externalizing behaviours, and are associated more with higher rates of rule breaking behaviours and

aggression, school drop-outs, divorce and separation as well as re-offending (George, 2022; Young et al., 2018). Further, even though in the current study parental use of alcohol or drugs had no statistically significant relationship with hyperactivity ($p=0.975$) or inattention ($p=0.162$), further analysis was done to determine if there was a relationship between ADHD statuses based on the parent who abused the drugs/alcohol.

Fathers were associated with high hyperactivity distributed among the respondents whose fathers abused alcohol/drugs compared to the mothers or both parents. It is possible that the father's behaviour associated with abuse of drugs and/or alcohol may impact a child's mental development, while also destabilizing the family environment. Likewise, high inattention was more distributed among the participants whose fathers abused alcohol/drugs compared to the mothers, and where both parents abused the drugs/alcohol, all the participants had high inattention. Having a father who abused either alcohol or drugs being related to high hyperactivity status (58.5%) and a father or both parents abusing drugs/alcohol being related to high inattention status (92.5%) may be an indication of how each parent responds in their parenting role, either due to effects of indulgence, or in the absence of active parenting role by one impacting on the other, further translating into effects of a disturbed family environment.

Findings of the current study suggest that there is a correlation between criminality and ADHD scores, and vice versa. This has been supported by similar studies conducted among males in prisons. Inmates challenged by ADHD characteristics may be at a great risk of never understanding background factors that influence their behaviours leading to incarceration. While data has been available on Kenyan and regional studies relating to children and college students, there appears to be a gap in research on ADHD among the incarcerated. The closest available research was conducted in a Borstal Institution in Western Kenya on pre-teens and adolescents (Otieno, Kombo, & Bowen, 2017). Therefore, adequate comparisons could not be made in this study.

Conclusion

This study established that adult male inmates with ADHD characteristics in selected prisons in Kenya present with traits of the criminogenic needs that were explored. The high rates of

hyperactivity-impulsivity symptoms combined with substance abuse may be indicative of low self-control and some element of antisocial behaviour, while other anti-social traits were demonstrated by the nature of crimes committed leading to incarceration, including repeat offences. Findings implying a dysfunctional family history and/or marital strain were illustrated by the participants' childhood history, that was largely experienced in a single-parent setting and/or with a father reported to abuse substance/alcohol. Similarly, over 30% of the participants indicated having been married at least twice, which would be suggestive of family or marital challenges. Education and work factors were observed through the low level of education and occupation experience. The current study did not explore factors directly identifying the participants' values, beliefs or associates.

Generally, inmates and offenders with ADHD are disadvantaged within the criminal justice system including prisons due to their ADHD symptoms remaining unrecognized and/or misunderstood and therefore missed, misdiagnosed and untreated. For as long as the situation remains unaddressed, the struggles and challenging experiences will continue to cost the individual, society and justice system from a health, financial and rehabilitative context. With prevalence estimate of 22.9% from what may be the first such study amongst inmates in Kenya, this implies over-representation of relatively young Kenyans with ADHD at various stages of the judicial and rehabilitative system. Whereas levels of criminogenic risk factors appear to be high among individuals with high levels of mental health symptoms, including ADHD as observed in the current study, there appears to be no available research about interventions that reduce criminogenic risk levels among those with ADHD in Kenyan prisons.

Results highlight the importance of early identification and response to not only ADHD but of potential criminogenic factors within the system and suggest that the judicial and prison systems may require changes in both areas to ensure that young individuals with ADHD receive appropriate access to, and intervention for offenders, identify the dynamic factors with the aim of reducing recidivism. More research about the relationship between criminogenic risks and ADHD is needed in order to adapt interventions for adults and avert situations escalating to criminality.

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