



SOCIO-DEMOGRAPHIC CHARACTERISTICS OF INCARCERATED MALE ADULTS WITH ADHD IN SELECTED PRISONS IN KENYA

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Abstract:

Attention-Deficit/Hyperactivity Disorder (ADHD) is a mental disorder characterized by difficulties in behaviour control. This study aimed to explore the socio-demographic characteristics of incarcerated male adults with ADHD in selected prisons in Kenya. A mixed methods approach was employed, combining quantitative and qualitative data collection and analysis. The target population consisted of incarcerated male adults aged 18 to 65 years. The study revealed important insights into the profile of these individuals. The majority of respondents fell within the age range of 20 to 50 years, indicating a prevalence of ADHD among individuals in their prime adulthood. Common previous occupations included agriculture, transport-related, and casual jobs. Marital status analysis showed a significant number of married respondents, highlighting family responsibilities among incarcerated male adults with ADHD. In terms of education, the majority had levels below college, with primary and secondary education being the most common backgrounds. First-borns had the highest representation, and many respondents came from large families with four or more children. Mothers were reported as the most common parent during the respondents' childhood. Regarding income levels, the majority had low-income levels, reflecting socioeconomic challenges faced by incarcerated male adults with ADHD and their limited financial resources. These findings provide a comprehensive understanding of the socio-demographic characteristics of incarcerated male adults with ADHD in Kenya. The insights gained from this study may inform targeted interventions and support services within the prison system to address the specific needs of this population.

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1. Introduction

ADHD was initially introduced in 1902 by British paediatrician Sir George Still, describing it as an “*abnormal defect of moral control in children*” (Holland & Higuera, 2017). Sir George Still found that those children affected by the “defect” were not able to control their behaviour the way other children could, yet still being as intelligent as other children (Holland & Higuera, 2017). The disorder was initially referred to as hyperkinetic impulse behaviour, but it was only in the late 1960s when the American Psychological Association (APA) officially acknowledged it as a mental disorder, and recorded it as hyperkinetic impulse disorder in the Diagnostic and Statistical Manual of Mental Disorders, second edition, DSM-II (APA, 1968).

In the third edition of DSM (DSM-III), released in 1980, the APA altered the name of the disorder from hyperkinetic impulse disorder to Attention Deficit Disorder (ADD) (APA, 2013). On the realization that hyperactivity was not a general ADD symptom, the APA listing created two subtypes of ADD: one with hyperactivity and the other without. The revised edition of DSM-III discarded the hyperactivity distinction and altered the name to Attention Deficit Hyperactivity Disorder (ADHD), combining the three broad symptom-types of inattentiveness, impulsivity and hyperactivity into one type with no distinction (APA, 2013). Further on in DSM-IV released in 2000, three subtypes were established, being the predominantly inattentive type; the predominantly hyperactive-impulsive type, and the combined type ADHD. These categories are still in use today in DSM-V (APA, 2013).

Earlier years of ADHD research findings estimated that 33 to 66 percent of the children diagnosed with ADHD continued to present substantial ADHD-related symptoms into adulthood, causing a considerable negative effect on their interpersonal relationships, education and employment (Gentile, Atiq, & Gillig, 2006). However, despite extensive data of ADHD in childhood today, and the high rate of transitioning of symptoms into adulthood, adult ADHD remains undiagnosed, misdiagnosed and untreated (Ginsberg et al., 2014). In childhood, ADHD often overlaps with disorders such as CD and ODD which are often considered to be “externalizing disorders,” and which may later develop to antisocial behaviours and criminality (APA, 2013). In line with this, Fletcher and Wolfe (2009) studied the effects of childhood mental illness in the long-term on criminality, while focusing on ADHD, and found that individuals with ADHD symptoms through the stage of age 5 to 12 years were more probable to be engaged in criminal activities in young adulthood than their non-ADHD counterparts.

Fletcher and Wolfe (2009) further reported that the results were consistent with the expected findings of economic models of crime, which suggested that ADHD individuals had lower work prospects, linked with an increased likelihood of being in crime than comparable adolescents and young adults in the overall population. The

increased risk of ADHD individuals having contact with the justice system starts at a younger age, because of its association with rule-breaking behaviours, delinquency, criminality, reoffending, and a two to three times increased risk of later arrest, conviction and imprisonment (Mohr-Jensen & Steinhausen, 2016; Philipp-Wiegmann et al., 2017; Young, Moss, Sedgwick, Fridman, & Hodgkins, 2014).

2. Objective

The specific objective of the study was to determine socio-demographic characteristics of incarcerated male adults with ADHD in selected prisons in Kenya.

3. Socio-Demographic Characteristics of Incarcerated Male Adults with ADHD

In regard to age at onset, ADHD is widely recognised as beginning in childhood, and requires that several symptoms present before the age of 12 years thereby indicating the criticality of a significant clinical presentation within childhood for a diagnosis to be made (APA, 2013). Gender and birth order have been posed as material with the male sex and first-born status being risk factors for ADHD (Canals et al., 2016). However, research has reported that it is common for childhood ADHD to show full remission in adulthood as one matures (Karam et al., 2015). This may explain the increased rates of childhood prevalence when compared to those found in adolescents and adults (Baggio, et al., 2018). ADHD symptoms, especially under hyperactive-impulsive, have also been reported to reduce and become milder during adolescence through adulthood for a subset of the children, resulting in the presentation of ADHD in adults being fairly different compared to that in childhood (Antshel et al., 2011; Vos & Hartman, 2022).

The prevailing notion has for long been that ADHD is a childhood onset disorder, and one predominantly affecting the male gender. It is now recognized that ADHD in children will often persist into adulthood at a rate of about 30 to 50 percent, or even more (Biederman et al., 2012; Ginsberg et al., 2014; Kooij et al., 2019). Adult onset has also been established, as has been adult gender-balanced prevalence rate (Moffitt, 2016). Other research has supported the view that the number of adults with ADHD has increased over the decades, with part of this increase being due to the permanence of ADHD symptoms in adulthood for 76 percent of those diagnosed (Núñez-Jaramillo et al., 2021).

In the adult category, researchers have found the prevalence of ADHD to differ in different age bands, with a level of 4.4 percent to 5.2 percent in the age group of 18 to 44 years; 2.8 percent to 3.5 percent in older adults, further sub-categorized as 6.2 percent in the age group of 48 to 52 years and 2.2 percent for those aged 68 to 74 years (Das et al., 2014; Prakash et al., 2021). Still on the category of older adults, aged over 50 years and even up to 80 years old, Dobrosavljevic et al. (2020) observed a significant knowledge gap on ADHD in older adults and highlighted the need for increased awareness of its clinical diagnosis and treatment in the group, by way of more research.

Adults living with ADHD frequently undergo a range of negative life experiences and underperformances resulting from their neuropsychological deficiencies, behaviours of inattention, impulsivity and (Beaton et al., 2022). The common such experiences and underperformances are inter-personal, academic, and vocational difficulties (Beaton et al., 2022). As a result of exhibiting the ADHD traits, the affected adults further suffer experiences of criticism from other people (Beaton et al., 2022).

In examining hyperactivity and impulsivity in adults with ADHD, studies have indicated that hyperactivity may manifest as talking excessively, fidgeting and extreme restlessness, while impulsivity may exhibit as higher urgency, lower premeditation and perseverance, saying inappropriate things at inappropriate times, talking over others or being accident prone (Beaton et al., 2022; Lopez et al., 2015). Additionally, whereas there is greater decrease in symptoms of hyperactivity in adults, the persisting inattention and impulsivity symptoms in adulthood may remain problematic, causing adult ADHD to be associated with risky and self-destructive behaviours. Inattention can be detected through difficulty focusing on, planning and completing tasks, or keeping to time, making recurrent mistakes, losing things often or seeming distracted (Beaton et al., 2022).

In regard to individuals living in detention, no difference was found between adolescents and adults, and this was explained as resulting from efforts to divert young ADHD offenders from the criminal justice system and referring them for treatment (Young et al., 2015). However, due to the substantially high association between ADHD symptoms and increased risk of offending, adults with ADHD may be overly represented in prisons and such judicial institutions compared to the general non-ADHD population (Mohr-Jensen & Steinhausen, 2016; Young, et al., 2015).

Concerning gender, ADHD is generally more common with the male gender than with females, at an estimated ratio of 2:1 in children compared to 1.6:1 in adults (APA, 2013). Various studies have also drawn similar conclusions. According to Fayyad et al. (2007) one of the factors observed in adult ADHD was that it is more significantly related to males compared to females. Rucklidge (2010) also reported that ADHD is recognized to exist in both males and females but with literature supporting a higher prevalence in the male gender. Using a prison-based population, compared with results from a non-prison general population higher levels of ADHD prevalence in males and youths have been observed (Young et al., 2015).

Studies have also shown that in adults, gender differences may be attributed to diagnostic procedures and not presentation of ADHD (Rucklidge, 2010; Young et al., 2015). Rucklidge (2010) determined that males presenting with ADHD seemed to be incarcerated more often than their female counterparts, and even while acknowledging that small sample sizes may negatively impact many studies, there was indication of ADHD referral biases and differences in diagnostic procedures. Female offenders get more noticed, while the wide disparity in ratio of incarcerated males to females might mean that females have the advantage of protective agencies that keep them out of prison (Young et al., 2015). This current study does not incorporate female inmates, a position

partly influenced by the significantly lower number of female inmates in the country at barely 10 percent of the total inmate population.

ADHD implies key challenges for personal functioning, and job performance, and has also been associated with less educational achievement. Evidence suggests reduced levels of educational achievement in undiagnosed ADHD individuals compared to those diagnosed (Arnold et al., 2020; Hamed et al., 2015). Using 176 published studies running over a period of >30 years, Arnold et al. (2020) endeavoured to synthesize the data regarding long-term effects of ADHD on information learned using achievement tests, and academic performance. The conclusion was that long-term academic outcomes are adversely impacted by ADHD; while both achievement test scores and academic performance improved with treatment at rates as high as 79 percent to 100 percent (Arnold et al., 2020). This infers that with treatment, individuals experiencing ADHD-related characteristics can be helped towards improving levels of the academic performance, the extent to which is unclear.

In a large nationwide cohort study involving over 750,000 Scottish school children diagnosed with ADHD, in which educational achievement was assessed, it was determined that even while on medication, these children were still more than three times as likely as their typically developing peers to have low educational achievement, more than twice as likely to drop out of school before the age of 16 years, and more than eight times as likely to have a special educational needs record (Faraone et al., (2021). In addition to these factors, the children were 50 percent more likely to get injured, and 40 percent more likely to be unemployed (Faraone et al., 2021), further increasing the likelihood of future criminality. This underscores the urgency of achieving widespread ADHD diagnosis and subsequent intervention that will not only focus on enhancing educational achievement but the general functioning of those affected.

Impairments associated with adult ADHD often result in difficulties across many different relationships including those with parents, family, intimate partners and friends; difficulties that can be attributed to such symptoms of ADHD as forgetfulness, inattention, impulsive talking, irritability and frustration tolerance (Brod et al., 2012). All these factors have potential of being misinterpreted by all parties. Interestingly, a comparison between the daily life functioning in adults with ADHD and adults with other psychiatric disorders showed that ADHD in adulthood is related to significant impairment in many areas even compared to individuals with other psychiatric disorders, with executive functioning deficits appearing to at least partially explain these impairments (Holst & Thorell, 2019). The behavioural change focus of the projected intervention on such impairments guided its selection for this study.

Parenting behaviours of adults with ADHD have associations between their own relationship as a couple, and parental style with their children (Weissenberger et al., 2017). Self-reports and observations on ADHD inattentive parents in particular, have been found to be most likely to self-report negative parenting, resulting from the tendency to consistently ignore their own children and getting easily angered by them (Weissenberger et al., 2017). Research has also reported that ADHD increases risk of

difficulties in parenting and interparental conflict, as was established in a 90-parent couples' interaction with children exhibiting either ADHD/ODD-like behaviour or typical behaviour (Wymbs et al., 2014). Such negative experiences may perhaps be minimized by administering an appropriate intervention, after achieving an expansive clinical evaluation on those affected.

The cycle of behaviour is noted as ADHD/ODD-like behaviour in children and was found to predict more negative parenting and communication beyond adult ADHD symptoms, while child and adult ADHD behaviour interacted to predict both negative parenting and interparental communication, thereby indicating greater parental ADHD symptoms (Wymbs et al., 2014). Partner ratings showed parents with inattentive sub-type symptoms as parenting and communicating more negatively when dealing with child ADHD/ODD-like behaviour than parents presenting fewer ADHD symptoms or those dealing with usual child behaviour. In view of the strong dysfunctionality noted between ADHD in children and parents, it becomes necessary to adopt a family perspective on ADHD (Ginsberg et al., 2014). In our study we sought to establish insights into any associations between adult male inmates and different variables within their family background from a Kenyan context.

In examining the relationship of parenting and family environment factors with ADHD outcomes by way of a systematic review of literature from 59 longitudinal studies ranging from 2014 to 2021, Claussen et al. (2022) analysed parenting interaction quality factors such as sensitivity/warmth, intrusiveness/reactivity, and negativity/harsh discipline, general maltreatment and physical abuse, parental relationship status like divorce or single parenting, parental incarceration, and child media exposure. All the factors showed a significant direct association with ADHD outcomes, except sensitivity/warmth which had an inverse association, indicating that parenting factors predicted diagnosis and overall ADHD outcomes as well as inattentive and hyperactive symptoms (Claussen et al., 2022). The probability of cultural practices playing a role in these differences cannot be ruled out.

Generally, parenting and family environment have significant impact on child development, including development of executive function, attention, and self-regulation, and may affect the risk of developmental disorders including ADHD and its symptoms (Claussen et al., 2022). It is therefore critical that prevention strategies be adapted that support and train parents, partner relational interactions, in behaviour management and adjustments with the goal of improving children's long-term developmental well-being, and avert the dangers of antisocial behaviours that could ultimately lead to incarceration.

Occupational health is further complicated by the indirect effects of ADHD arising from educational under-performance and increased rates of substance abuse and other form of criminal activities. This has a generally substantial economic cost arising from absenteeism and lost productivity (Faraone et al., 2021; Kooij et al., 2019). At the same time, it is held that adults with a history of ADHD achieve significantly lower occupational attainment levels, compared to non-ADHD adults (Prakash et al., 2021). In

view of these factors, the non-ADHD group may on average achieve mid to high-level occupational attainment, whereas those with ADHD may proportionately be at the low end of occupational attainment with fewer of them employed (Klein et al., 2012).

Perceptions relating to ADHD too have been found to suggest cross-cultural differences. Watabe et al. (2022) examined cross-cultural differences in the perceptions of specific externalizing symptoms, such as hyperactivity impulsivity associated with ADHD. They engaged 39 and 34 American and Japanese college students respectively, assessed the acceptability of externalizing symptoms, with the results showing cross-cultural patterns of perceptions for the externalizing symptoms (Watabe et al., 2022).

4. Research Methodology

This study was guided by mixed methods approach as it allows the researcher to combine elements of quantitative and qualitative research data collection and analysis in order to get an in-depth investigation of the study variables, using both questionnaires and interviews.

This study pursued a quasi-experimental design, which is described as an experimental means of research where participants are not randomly assigned to a specific group (Creswell, 2009). This implies that the participants were first purposively selected into the screening group before those emerging as having ADHD symptoms being separated into two groups; an experimental one and the other a control group.

More specifically, a non-equivalent baseline and endline control-group design was selected for this study as it allows for non-random assignment of subjects with symptoms of adult ADHD characteristics to form either the experimental group or the control one. The two groups took a baseline, midline and endline assessment but with only the experimental group receiving the selected treatment program in between the two tests, thus enabling a comparison between the participant groups, an evaluation of the effectiveness of intervention and a measure of the degree of change at completion of the intervention sessions resulting from the treatment administered. In this study, the participants were screened for ADHD at the start of the study before treatment being administered to any group.

The target population covered in this study was incarcerated male adults aged from 18 to 65 years, within the selected prisons in Kenya. The target population is estimated at 60 percent of the inmates at approximately 1,400 within five prisons. The study applied purposive sampling technique to pick the inmate participants. The prison personnel who subsequently participated in the interviews were also purposively selected, or approached as directed by the respective prison authorities.

The total population in this study could be estimated at 1400 (N=1400) prisoners (Anonymous, personal communication, May 2022), from which the respondents within the five selected prison sites of the study are drawn. The sample was calculated using the Fisher (1983) sample size determination formula. The sample size for this study was drawn after the first stage of screening 672 respondents, who included male inmates aged

between 18 and 65 years. Ultimately, a sample of 154 inmates was extracted at baseline, less withdrawals by endline.

In view of a limited target population, the actual sample size for purposes of testing the intervention on the experimental group against the control group was further guided by previous research in similar settings. Young et al. (2014) analysed data for 42 prisons across the globe and established the prevalence of ADHD amongst prisoners to be at 25.5 percent; with subsequent findings suggesting a prevalence rate of 21.3 percent (Young et al., 2015). In Canada, Usher et al. (2013) reported a 16.5 percent rate of ADHD in the highest range amongst male offenders screened at start of prison term, while 25.2 percent reported inconclusive ADHD symptoms in the moderate range.

In comparison, male prisoners from a Scottish prison were found to meet the screening criteria for ADHD at 14 percent (González et al., 2013), compared to a 17 percent finding in an Australian prison study (Moore et al., 2016). This was much lower than the 35 percent ADHD level established amongst the inmates in a Norwegian male prison (Stokkeland et al., 2014) but consistent with a 16.2 percent ADHD presence determined in an Iranian male prison (Hamzeloo et al., 2016). The above literature presents an average prevalence rate of ADHD amongst male prisoners at 20.5 percent, and a median of 17 percent. Thus, the sample size could be adjusted as:

$$\begin{aligned}n &= no \\ &1 + ((no-1)/N) \\ &= 301 \\ &1 + ((301-1)/ 205) \\ &= 122\end{aligned}$$

Taking an anticipated attrition of 25 percent, a baseline sample size of 154 participants was therefore adequate for the study. Since 50 percent of the participants were to be assigned to the experimental group and another 50 percent to the control group, the possibility of withdrawals could not be ruled out. Moreover, participation was voluntary and confidential and with no incentives given to the participants to influence their involvement at any stage. There were many other factors with potential to affect participation given the controlled nature of the study environment. Thus, the working sample size upon screening was 154 but which subsequently reduced.

This study therefore proposed to work with a multi-staged sampling process that included inmates meeting the criteria for screening, from whom those identified for possible ADHD diagnosis were selected for purposes of furthering the study. This translated to an estimated 113 inmates having ADHD symptoms and characteristics, with 52 making the experimental and 61 control groups respectively.

Respondents were recruited through maximum variation technique employed on the target population. In order to determine which prison facility was to form the experimental group and which would form the control group, convenience sampling was done based on the size of the target population in each of the study sites, cooperation of

the relevant personnel, the appropriateness and availability of meeting premises for the sessions, in addition to the number of respondents meeting the criteria set for the study.

We applied both qualitative and quantitative data collection tools. A triangulated process of data collection was used, with the tools including questionnaires, discussions with the participants and the prison personnel, and observation. The prison personnel did not form part of the sampled population as their role was limited to providing necessary insights on the participants and relevant set routine programs involving the participants. The main screening tool was the Adult ADHD Self-Report (ASRS-v1.1) symptom checklist.

5. Data Analysis and Discussion

The objective of the study sought to establish the socio-demographic characteristics of incarcerated male adults with ADHD in selected prisons in Kenya. These factors included individuals' age, family background, social and family relationship status, employment experience, income history, and education attainment. This information was obtained by use of the socio-demographic questionnaire. The results are presented in Table 1.

Table 1: The Age Categories of the Respondents with ADHD (N=108)

Age of the Respondents	Group		Total	Pearson chi-square
	Experimental	Control		
20-30 years	8(7.4%)	30(27.8%)	38(35.2%)	.000
31-40 years	17(15.7%)	16(14.8%)	33(30.6%)	
41-50 years	16(14.8%)	11(10.2%)	27(25.0%)	
51-60 years	9(8.3%)	1(0.9%)	10(9.3%)	
Total	50(46.3%)	58(53.7%)	108(100.0%)	

The table shows the age ranges of the respondents in the control and experimental groups. Findings indicate that 20-30-year-olds were 8(7.4%) in the experimental group and 30(27.8%) in the control group. Hence the control group had more 20-30 year-olds and the differences were statistically significant ($p=0.000$). The differences in representation of the 31-40 year-olds and 41-50 year-olds in the control and experimental group were minimal where overall, there were more of the 31-40 year-olds 33(30.6%) compared to the 41-50 year-olds 27(25%). The 51-60 year-olds were few 10(9.3%) where most were in the experimental group 9(8.3%). Based on these findings it is clear that majority of the respondents were between 20 to 50 years-olds.

Table 2: The Previous Occupations before Incarceration (N=104)

Occupations of the Respondents	Group		Total	Pearson chi-square
	Experimental	Control		
Professional	4(3.7%)	2(1.9%)	6(5.6%)	.014
Business	4(3.7%)	7(6.5%)	11(10.3%)	
Technical	1(0.9%)	7(6.5%)	8(7.5%)	
Construction	5(4.7%)	2(1.9%)	7(6.5%)	

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Transport	4(3.7%)	16(15.0%)	20(18.7%)
Casual	8(7.5%)	9(8.4%)	17(15.9%)
Agricultural	20(18.7%)	15(14.0%)	35(32.7%)
Total	46(45.8%)	58(54.2%)	104(100.0%)

Table 2 shows that the respondents were in different occupations before incarceration. Higher representation was among those who had been in agricultural jobs 35(32.7%), followed by transport related jobs 20(18.7%) and then casual jobs 17(15.9%). Least representation was among those who had been in professional jobs 6(5.6%) and construction jobs 7(6.5%). There were statistically significant differences in representation of occupations between the control and experimental group ($p=0.014$). The differences are majorly in the transport category; control 16(15.0%), experimental 4(3.7%) and technical jobs; control 1(0.9%), experimental 7(6.5%)

Table 3: The Marital Statuses of the Respondents (N=104)

Marital statuses of the Respondents	Group		Total	Pearson chi-square
	Experimental	Control		
Single	12(10.8%)	22(19.8%)	34(30.6%)	.370
Married	31(27.9%)	28(25.2%)	59(53.2%)	
Engaged	3(2.7%)	6(5.4%)	9(8.1%)	
Separated	4(3.6%)	5(4.5%)	9(8.1%)	
Total	50(45.0%)	61(55.0%)	111(100.0%)	

The table shows that majority of the respondents were married 59(53.2%) followed by those who were single 34(30.6%). There were no differences between the control and the experimental group ($p=0.370$) in terms of marital status representation.

Table 4: The Educational Level Statuses of the Respondents (N=105)

Education Levels	Group		Total	Pearson chi-square
	Experimental	Control		
Primary	25(23.8%)	20(19.0%)	45(42.9%)	.192
Secondary	14(13.3%)	27(25.7%)	41(39.0%)	
College	6(5.7%)	9(8.6%)	15(14.3%)	
University	1(1.0%)	3(2.9%)	4(3.8%)	
Total	46(43.8%)	59(56.2%)	105(100.0%)	

The table shows that highest representation was among those who had primary level education 45(42.9%) then secondary school education 41(39.0%), college education 15(14.3%) and only a few had university level education 4(3.8%). There were no differences between the control and experimental group in terms of education levels ($p=.192$). Hence, majority of the respondents had below college level education.

Table 5: Respondents' Birth Order

Birth order	Experimental	Control	Total
First born	15(31.2%)	16(28.1%)	31(29.5%)
Second born	8(16.7%)	9(15.8%)	17(16.2%)
Third born	6(12.5%)	13(22.8%)	19(18.1%)
Fourth born	5(10.4%)	3(5.3%)	8(7.6%)
Fifth born	6(12.5%)	6(10.5%)	12(11.4%)
Sixth born	4(8.3%)	4(7.0%)	8(7.6%)
Seventh born	1(2.1%)	2(3.5%)	3(2.9%)
Eighth born	1(2.1%)	3(5.3%)	4(3.8%)
Ninth born	1(2.1%)	1(1.8%)	2(1.9%)
Tenth born	1(2.1%)	0(0%)	1(1.0%)
Total	48(100.0%)	57(100.0%)	105(100.0%)

Based on the findings, the highest representation was for first borns 31(29.5%), then third borns 19(18.1%), with the second borns (16.2%) showing third highest level. There was much lower representation from the fourth borns through to tenth, except for the fifth borns whose estimate prevalence followed that of the second borns.

Table 6: Respondents' Number of Siblings (n=105)

Group	Number of siblings			Total
	1-3	4-6	7-12	
Experimental	7(14.6%)	16(33.3%)	25(52.1%)	48(100.0%)
Control	13(22.8%)	26(45.6%)	18(31.6%)	57(100.0%)
Total	20(19.0%)	42(40.0%)	43(41.0%)	105(100.0%)

In the experimental group, majority of the respondents had 7-12 siblings 25(52.1%) while in the control group, highest representation was for those with 4-6 siblings 26(45.6%). Overall, highest representation was for those with 7-12 siblings 43(41%) followed by 4-6 siblings 42(40%) and then 1-3 siblings 20(19%). Thus, majority of respondents came from large families with 4 or more siblings.

Table 7: The Common Childhood Parent (n=71)

Group	Common childhood parent			Total
	Father	Mother	Both	
Experimental	3(10.0%)	15(50.0%)	12(40.0%)	30(100.0%)
Control	4(9.8%)	22(53.7%)	15(36.6%)	41(100.0%)
Total	7(9.9%)	37(52.1%)	27(38.0%)	71(100.0%)

Based on the findings, majority of the respondents indicated that mothers were the most common parent in their childhood 37(52.1%) followed by those who said it was both parents 27(38%).

Table 8: The Marital Status of the Respondents' Parents (n=71)

Marital status of parent	Experimental	Control	Total	Pearson chi-square
Single	9(30.0%)	21(51.2%)	30(42.3%)	.005
Married	9(30.0%)	17(41.5%)	26(36.6%)	
Widowed	12(40.0%)	3(7.3%)	15(21.1%)	
Total	30(100.0%)	41(100%)	71(100%)	

The findings indicate that 30(42.3%) [Experimental:9(30%); Control:21(51.2%)] were brought up by single parents, 26(36.6%) [Experimental:9(30%); Control:17(41.5%)] were brought up by married parents and 15(21.1%) [Experimental: 12(40%); Control:3(7.3%)] had parents who were widowed. Thus, most respondents had parents who either were single parents or widowed.

Table 9: The Monthly Income of the Respondents before Incarceration (n=112)

Monthly income in Kshs.	Group		Total	Pearson chi-square
	Experimental	Control		
0-10000	26(23.2%)	33(29.5%)	59(52.7%)	.278
10001-50000	13(11.6%)	17(15.2%)	30(26.8%)	
50001-100000	4(3.6%)	0(0.0%)	4(3.6%)	
Over 100000	1(0.9%)	2(1.8%)	3(2.7%)	
Don't know	7(6.2%)	9(8.0%)	16(14.3%)	
Total	51(45.5%)	61(54.5%)	112(100.0%)	

Majority of the respondents were earning Kshs. 0-10000 before incarceration 59(52.7%), followed by those who were earning Kshs. 10001-50000 who were 30(26.8%). Hence, most were low-income earners. There were no statistically significant differences between the experimental and the control group (p=.278).

6. Discussion

The current study included an estimate of ADHD prevalence among adult male prison inmates from selected facilities in Kenya. Further, we assessed the socio-demographic factors displayed by prison inmates showing positive results for ADHD symptoms. We estimated a prevalence rate of 22.9% among these prison inmates, which may be termed as average yet consistent compared to previous similar outcomes. The prevalence was found to reduce with age, with those inmates within the 20 to 30 years' age range showing the highest prevalence rate and those aged 51 and above having the lowest rate in the study.

We further found that those confirmed with ADHD symptoms were largely associated with single parent childhoods; and even more when we consider parents who either were single parents or widowed. Majority of the respondents indicated that mothers were the most common parent in their childhood. Previous studies have reported findings that families of those with ADHD had significantly higher levels of family dysfunction than in those families without ADHD history (Foley, 2011). In

addition, educational and income levels were poor among ADHD inmates. Thus, our findings suggest prison inmates with ADHD do present a strongly destabilized group when considered relative to common family background variables.

Although ADHD is common among incarcerated adult males, prevalence estimates may range from a low of 9% to a high of 50% and above (Murphy & Appelbaum, 2017). The ADHD Report documented prevalence estimates for different regions of the world including USA, United Kingdom, France, Belgium, Netherlands, Spain, Italy, Mexico, Columbia and Lebanon ranging from 1.2% to 57% from an all-prison population in Israel (Murphy & Appelbaum, 2017). Young et al. (2014) analysed data for 42 prisons across the globe and established the prevalence of ADHD amongst inmates to be at 25.5%; with subsequent findings suggesting a prevalence rate of 21.3 percent (Young et al., 2015). Our findings are consistent with the two rates in particular,

Inconsistent estimates have been determined in Canada, Australia, Scotland, Norway and Iran (González et al., 2013; Hamzeloo et al., 2016; Moore et al., 2016; Stokkeland et al., 2014; Usher et al., 2013). Previous studies have found prevalence estimates in international male prison inmates of as high as 50% in Canada, Finland, Germany, Norway, and Sweden (Young et al., 2011). It has been suggested that the already high prevalence rates may in actuality be even higher, perhaps meaning that ADHD is overrepresented in the population of incarcerated individuals when compared to ADHD prevalence in the adult general population, which is estimated to be between 3% to 5% (Barkley, Murphy, & Fischer, 2008; Kessler et al., 2006; Murphy & Appelbaum, 2017).

Unaddressed adult ADHD is allied to negative outcomes on several aspects of individuals' wellbeing and functioning including education, work, relationships and conflict resolution (Geffen & Forster, 2017); with ADHD-related symptoms into adulthood, causing a considerable negative effect on individuals' interpersonal relationships, education and employment (Gentile, Atiq, & Gillig, 2006). It has been observed previously that ADHD strongly correlates with an unstable employment history for affected individuals, presence of some form of learning disability, lower educational completion, greater criminal behaviour risk levels, and other types of mental health challenges among inmates (Usher et al., 2013). Similarly, this study found low educational, occupational and income levels among ADHD inmates, a combination of which could be presumed as predictors of criminal behaviours.

ADHD implies key challenges for personal functioning in different aspects of an affected individual's daily life operations. Decreased cognitive functioning has previously been associated with offending, and adults with ADHD being found to be more impaired in regard to not just academic functioning, current occupational status, but also in daily life functioning, criminality, and some aspects of social functioning, partly due to executive functioning deficits (Holst & Thorell, 2019; Stewart, Wilton, & Sapers, 2016). The challenges associated with ADHD symptoms, coupled with changing mood swings and irritability as well as comorbidity factors which are common among

adults with ADHD have potential to result in educational under-achievement and repeated failures (Bayrami, Alizadeh, Hashemi, & Mahmood-Alilu, 2012).

Overall, the existence of ADHD in an adult, with or without comorbidity, can lead to significant socio-occupational dysfunction, presented by inability to gain or maintain employment, and which may partly be resultant from low education achievement (Prakash et al., 2021). Nonetheless, we propose that underachievement in education, socio-occupational dysfunction and low-income levels may be influenced by external factors that may either aggravate an ADHD situation, or even the reverse. Education is generally a valued asset across many of the communities in Kenya.

However, despite the government providing grants to secondary schools so as to retain all children, challenges facing boy child retention exist as boys continued to drop out of schools, mainly due to poverty, orphaned children, negative attitude towards education, by the community, influence from and recruitment into militia groups, disregard of the boy-child education, peer influence, drug and substance abuse, child labour, poor academic performance, indiscipline, family break ups, transfer of children between public schools and to private academies (Njuguna & Muchanje, 2019). Yet still, these factors are majorly represented in our study findings.

Meanwhile, it is worth mentioning that different cultural settings may confound the ADHD situation and more so in relation to criminality. In a country where education, though compulsory at lower level, is not freely accessible by all school-age children, secondary education unattainable for all Kenyans, many of whom are from low-income backgrounds, even as unemployment is rampant, underachievement in daily life functioning should not misconstrued to always be indicative of ADHD or its comorbidity.

An investigation on boys under participation by way of low achievement levels in education measured by their enrolment, school attendance and performance in national examinations, and with most boys achieving below average mean scores, limiting their chances of progressing to well-equipped secondary schools (Muyaka et al., 2021) supports this argument. The study was done in one of the counties covered in this study. This shows need to have clinical evaluation adopted and entrenched into routine check-ups as the means for making a diagnosis for ADHD to avoid unexplained behavioural characteristics escalating into intrapersonal and social dysfunctionality.

In addition to these characteristics, ADHD in adults has been associated with such experiences as neglect and conflict between parents (Ebejer et al., 2012; Thapar et al., 2011). Psychological problems arising from family dysfunction have 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). Parenting interaction quality factors such as sensitivity/warmth, intrusiveness/reactivity, and negativity/harsh discipline, general maltreatment and physical abuse, parental relationship status like divorce or single parenting have all shown a significant direct association with ADHD outcomes, except that sensitivity/warmth had an inverse

association, indicating that parenting factors predicted diagnosis and overall ADHD outcomes as well as inattentive and hyperactive symptoms (Claussen et al., 2022).

However, parenting may also be influenced by cultural beliefs and practices of a particular group. It is a common cultural belief and practice across the communities under study in particular that boys are “men” and as men, they do not show emotions. Firstborn inmates in this study may therefore be candidates of an insensitive, demanding and harsh upbringing that would not complement unrecognized, undiagnosed and untreated ADHD treatment, thus laying a fertile ground for criminality.

Over recent decades, the Kenyan people have witnessed, and experienced great effort from government, from several non-governmental organisations (NGOs) and women profession-based bodies push for women empowerment, including effort to eradicate discrimination against the girl child. In the process though, society and the direct drive appear to have neglected the needs of the boy child (Muyaka et al., 2021). Simultaneously, boys may not always be raised in a gender-neutral atmosphere, right from the home. The cultural beliefs in the communities under study perceive boys even from a young age to be ‘men’ with responsibility towards providing basic needs for their families (Muyaka et al., 2021); a situation that is worsened by parents termed as irresponsible and uneducated, and who do not exploit the resources available in the counties (Njuguna & Muchanje, 2019).

Firstborns and orphaned children may be forced out of school to take parental responsibilities that incorporate caring for their young siblings. These factors might explain why the majority of inmates achieved below college education without which prospects of high-income earnings are diminished. Culturally also, and by extension, education is regarded as a key determinant of incomes and an important departure route from poverty (Njuguna & Muchanje, 2019, yet with no or only basic education only low-level cadres of largely unskilled occupations become available, but which do not help in breaking out of the poverty cycle. Poverty, lack of knowledge and exposure, coupled with pressures from familial responsibilities may prevent parents and individuals experiencing symptoms of persistent or symptomatic adult ADHD from seeking diagnosis and subsequently treatment.

The role of birth order and number of siblings, and the relevance to ADHD if any has been examined in some studies, with varying results. Some studies have found a significant association between birth order, family structure, size and ADHD (Carballo et al., 2013). Also at risk are the firstborns with nearly twice the ADHD risk as individuals in other birth orders (Marin et al., 2014), who might be disadvantaged compared with their younger siblings in regard to the emotional adjustment arising from increased competition for parental attention and more (Jahangard et al., 2013; Reimelt et al., 2018).

In contrast, being the middle child and living with both biological parents appear to be protective factors against the development of ADHD (Reimelt et al., 2018). Our study found firstborns showing the highest representation of adult ADHD among the inmates. We can suggest that a harsh upbringing environment, family background and

demanding responsibilities earlier in life may adversely have impacted with their neurodevelopment with consequences on ADHD potential.

Proposals have been made suggesting that firstborns may concurrently receive less parental resources and more responsibilities if and when younger siblings are born, which happens during the vulnerable developmental period of ADHD in an individual (Reimelt et al., 2018). This current study supports this position, with findings that show firstborn inmates having the highest prevalence estimate, and with the rate increasing with sibship size. It has been argued that parenting skills could play a role in regard to the association of firstborns and ADHD, since younger siblings, may benefit from better developed parenting skills (Reimelt et al., 2018); while parenting styles that are ineffective, inconsistent, and more so negligent have been found to aggravate symptoms of ADHD and predict disruptive behaviour disorders such as CD later in youth (Ullsperger, Nigg & Nikolas, 2015).

Whereas some studies have established an association between the birth order in siblings and ADHD (Carballo et al., 2013; Marin et al., 2014), others have presented differing outcomes, inferring birth order to be unrelated to ADHD (Jahangard et al., 2013; Keshavarzi et al., 2014). In our study, we made a broad classification of the number of siblings each inmate had, banded under 1-3, 4-6, and 7-12 siblings in their family. We also included other additional family structure factors, such as with whom the inmate lived during childhood, marital status of the parent, and if widowed, inmate's age at time of parent's death. We observed a prevalence estimate of ADHD a 23.9% in total for fourth, sixth, seventh, eighth, ninth and tenth born inmates combined. The second borns were seen to be at lower risk compared to first and third borns, but at higher risk than the fifth borns. We also observed that, while inmates with a single parenthood background were at the highest risk group of ADHD, those whose parent was widowed showed the lowest risk. There might be need to investigate the difference, as in the case of fifth borns.

To our best knowledge, this study is the first to report a screening survey for ADHD in adult male inmates in Kenya. In summary, our findings imply the importance of recognising ADHD early and providing effective and immediate treatment. Prospective studies should investigate the birth order, number of siblings in the family and the parenting role, all in relation to specific criminal characteristics when focusing on the association between adult ADHD and family position.

7. Conclusion

This study suggests ADHD to be present among 22.9% of adult male prison inmates. The evaluation for ADHD among 672 inmates incorporated self-reports and a socio-demographic questionnaire. The findings showed that majority of the respondents were aged between 20 to 50 years-old at 91.3% with the over 50 year-olds being the fewest. Only 5.6% of the inmates held professional occupations prior to incarceration, which could be associated with the low education levels achieved by the participants, and corresponding with the income levels. On average the inmates had a family background

of 4 or more siblings, with first borns, third borns and second borns forming the highest levels of ADHD groupings respectively. Further, while participants raised under single parenthood had the highest prevalence, those with a widowed parent showed the least prevalence rate. We conclude the reported findings of ADHD symptoms may be associated with poor education, occupation and income, subsequently increasing the likelihood of criminality. These findings underscore the urgent need for introducing intensive evaluation and ADHD treatment programs, aiming to achieve widespread ADHD diagnosis and subsequent intervention to improve the general functioning of the affected prison inmates.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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