

## Prevalence of attention deficit hyperactivity disorder among public primary school pupils in Jos North, Plateau state Nigeria

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### Abstract

Attention Deficit Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity. Symptoms appear before age of 12 years, present for more than six months and causes problems in at least two of either school, home or recreational settings. Prevalence rate of ADHD for those under 18 years is put at 6-7% worldwide based on DSM-IV criteria. Few studies exist in Nigeria and puts the prevalence at 8.7%. The etiology is largely unknown. Across the world, prevalence rates vary due to methodologies used. The study set out to determine the prevalence of ADHD and the dominant subtype among public primary schools in Jos, North using a cross-sectional, descriptive, multi-staged sampling approach. Vanderbilt ADHD Diagnostic Teacher (VADTRS) and Parent (VADPRS) rating scales were employed to obtain pupils behavior at school and home respectively. A prevalence of 14.3% was found among the study population of 300 pupils with combined group having the highest prevalence of 8.7% while inattention group and hyperactivity/impulsivity group have 2.63% prevalence each. A good correlation existed between the two rating scales in the study. The greatest number of ADHD were diagnosed among the 7-year-old. We recommended adequate education to government, parents and teachers on the nature of ADHD to ensure that adequate motivation will be given to children with ADHD to ensure proper learning.

### Keywords

ADHD; Disorder; Hyperactivity.

### Introduction

Attention deficit hyperactivity disorder (ADHD) is a mental disorder of the neurodevelopmental type [1,2], characterized by difficulty paying attention, excessive activity, and behavior without regards to consequences which is not appropriate for a person's age [3,4]. It also comes with problem regulating

emotions [5-7]. Symptoms appear before age of 12 years, present for more than six months and causes problems in at least two of either school, home or recreational settings [8,9]. The Diagnostic and Statistical Manual, 4<sup>th</sup> edition [10] (DSM-IV) describes three types of ADHD as ADHD predominantly hyperactivity and impulsivity deficit type, ADHD predominantly inattention type, ADHD combined type.

Prevalence rate of ADHD for those under 18 years is put at 6-7% worldwide based on DSM-IV criteria [11]. This contrast widely with ICD-10 criteria of hyperkinetic disorder (ADHD) that puts the worldwide prevalence for those 18 years and below at 1-2% [12]. Methodological differences in assessment criteria, information source and accommodation of impairment in the operational definition criteria are the major influence on the varying prevalence rates [13]. These differences have been used to argue why American children have more ADHD than African and Middle East children [14]. It is a general assumption that using the same methodology, the prevalence may be the same across the world. Estimates for ADHD in Africa is put at between 5.4% – 8.7% [15]. Prevalence rates across the world include; Saudi Arabia 2-7% [16], South America 16% [17], Germany 4.8% [18] and Ukraine 19% [18]. In Nigeria, only few studies exists and the prevalence is put at 8.7% [15].

The precise cause of ADHD is yet to be identified. Possible etiological factors include heredity, difficulties during pregnancy, prenatal exposure to alcohol and tobacco, prematurity and low birth weight, excessively high body lead levels as well as postnatal injury to frontal region of brain [9]. No cure exists for ADHD but the many treatments available have assisted effectively in managing the disorder. These include stimulants and tricyclic antidepressants. Psychoeducation and behavioral modifications in classroom and parent training in child behavior methods has also been very helpful.

Predominant features of ADHD are impulsivity or lack of capacity to delay gratification, hyperactivity and inattention. Subtypes of impulsivity could show as poor working memory, delayed development of internal language, difficulty in regulating emotions, diminished ingenuity and flexibility in pursuing long term goals and greater than normal variability in task performance. The symptoms of ADHD are noticeable on average between 3 and 6 years (childhood onset), vast majority before 13 years of age and runs a relatively chronic course with 50-80% reaching adolescent years and 10-65% may continue into adulthood.

### **Objectives of the study**

The study aimed to determine the prevalence of ADHD and the dominant subtype among public primary schools in Jos, North.

### **Justification of the study**

The study adds to the limited Nigerian literature on ADHD, particularly highlighting the types of ADHD and the effects of age on the prevalence. The findings will aid the government in policy development relating to ADHD. It will equip parents and teachers with knowledge relevant to dealing with children with ADHD.

## Materials and Methods

### Setting

The study was conducted among selected primary schools in Jos North Local Government Area (LGA) of Plateau state. The LGA has 285 sq km in land mass, has 50 public primary schools as at May 2014, with each having either a Muslim or Christian dominated population based on location.

### Study Population

Pupils of selected public primary schools in Jos North LGA aged between 5-13 years. Jos North pupils are a mix of all geopolitical zones of Nigeria. This is not unrelated to the geography of Jos, its commercial history in mining and its hospitable nature.

### Design

We adopted a cross sectional descriptive design.

### Instruments

The Vanderbilt ADHD Diagnostic Teacher (VADTRS) and Parent (VADPRS) rating scales were employed to obtain pupils behavior at school and home respectively. VADPRS and VADTRS have well documented properties. The estimate finding of coefficient for binary item version range from 0.88 to 0.91. The test-retest reliability exceeded 0.80 for all summed up scales. The VADPRS and VADTRS psychometric properties showed sensitivity of 0.80, specificity of 0.75, positive predictive value of 0.19 and negative predictive value of 0.78 with positive predictive value of 0.19 and negative predictive value of 0.78 when applied to ADHD case definition that combined teachers rating scale and parent interview response [19]. The Vanderbilt ADHD scale is a narrow band tool which assesses four conditions associated with ADHD; inattentive, hyperactive/impulsive, combined and opposition disruptive disorder subtypes along with conduct disorder and anxiety/depressive symptoms. It has an internal consistency coefficient of 0.90 – 0.94. The beauty of this parent and teacher versions is that they cover both the symptoms and impairments in performance and are based on ADHD, DSM-IV criteria. The teacher rating scale has 35 items while the parent rating scale has 47 items. It has been validated in Nigeria among public primary school pupils [13].

### Procedure

A multi-staged sampling technique was used. The first stage involved stratifying the primary schools in Jos North into Christian dominated (n=28) and Muslim dominated (n=22) following consultation with the education authority. Schools within the clusters were arranged serially and numbers assigned to them, written on a piece of paper and folded. Random sampling was used to pick three (3) schools from each of the two clusters after shuffling, the selected number listed in our record book and the piece of paper returned to the bag, shuffled well before making another pick. This is repeated till three different schools are selected from each of the two clusters. Any number picked twice will be returned, bag re-shuffled and

another pick made.

The class register was used to select all students that have odd numbers, if the pupil is absent, the next pupil to him on the register is selected until thirty pupils are selected from each of the three school, 150 pupils from each cluster and a total of 300 pupils from the two cluster

### **Inclusion criteria**

Pupils aged 5 – 13 years, who were present in school the time of research, accented to the study and whose parents were willing and signed the informed consent form were selected.

### **Exclusion criteria**

Pupils on any form of medication at the time of study, those that did not meet the inclusion criteria and those whose parents declined participation.

### **Data collection**

Teachers were trained and retrained on how to administer the Teachers Rating Scale until they grasped it. Pupils first took consent form to their parents for reading and signing. Clarification was given over the phone for those that demanded it. Parent Rating Scale was later sent to parents that consented through the pupils for their rating.

The rating by both teachers and parents took a minimum of five (5) days, allowing room for bottle necks and busy schedules. Teachers aided in collecting and returning both completed parents and teachers rating scales to the researchers.

### **Ethical consideration**

Clearance and letter of introduction obtained from the Department of Psychology, University of Jos, Nigeria. Approval was gotten from the Education Secretary and Head of Primary Education, Jos North LGA of Plateau state. Approval was also obtained from Head Teachers of selected schools. Informed consent was obtained from parents/guardians of pupils.

### **Data Analysis**

Data was collated, cleaned up and analyzed using SPSS version 22. Simple descriptive statistics was used to describe the demographics of participants and continuous variables expressed as means and standard deviations. Chi square test of independence was used to determine associations among categorical variables. A probability value of 0.05 was considered statistically significant.

## **Results**

Only 114 out of the 300 questionnaires administered were returned and found to be properly filled giving a response rate of 38%. Males were 51(44.7%) while females were 63(55.30%). Christian pupils

were 70 (61.40%) while Muslim pupils were 44 (38.60%). The age distribution of the pupils is as shown in Table 1. Mean age of participants was 9.38, SD 2.22 years.

**Prevalence of ADHD**

A total of sixteen pupils were diagnosed with ADHD representing 14.03% of the total study population.

The inattention subtype of ADHD (Table 2) was found among 3 (2.63%) of the pupils comprising 3 males (66.70%) and a female (33.30%), aged 6, 7 and 10 with a mean age of 7.67 (SD = 2.08).

The hyperactivity/impulsivity subtype of ADHD was found among 3 pupils representing 2.63% of the study population, all were males with ages 6, 7 and 10, mean age of 7.67 (SD=2.08).

**Table 1:** Demographic distribution of participants.

	Mean	Std dev	Frequency	%
<b>Gender</b>	1.55	4.99	114	100.00
Male			51	44.70
Female			63	55.30
<b>Religion</b>	1.39	4.99	114	100.00
Christianity			70	61.40
Islam			44	38.60
<b>Age</b>	9.38	2.22	103	90.40
5			2	1.80
6			9	7.90
7			15	13.30
8			12	10.50
9			14	12.30
10			19	16.70
11			10	8.80
12			11	9.60
13			11	9.60
<b>Missing</b>			11	9.60
<b>Total</b>			<b>114</b>	<b>100.00</b>

**Table 2:** Prevalence of ADHD in the population sampled.

ADHD type	ADHD frequency	ADHD percentage	Prevalence in population (%)
Inattention	3	18.75	2.63
hyperactivity	3	18.75	2.63
Combined type	10	62.50	8.77
<b>Total</b>	<b>16</b>	<b>100.00</b>	<b>14.03</b>

**Table 3:** Correlation between Parents and Teachers rating for ADHD.

Ratings/screening	Mean	Std deviation	Frequency	R	p
Teachers rating	24.49	16.39	114		
Parents rating	33.56	23.07	95	0.36	0.00
Teachers performance rating	13.72	3.98	112		
<b>Parents performance rating</b>	<b>12.16</b>	<b>3.22</b>	<b>86</b>	<b>0.37</b>	<b>0.00</b>

**Table 4:** ADHD Prevalence by age among the participants.

ADHD Type & Age	Mean	Std dev	Frequency	Percentage (%)
<b>Inattention</b>				
Age (years) 6	7.67	2.08	1	33.33
7			1	33.33
10			1	33.33
<b>Hyperactivity/ impulsivity</b>				
Age (years) 6	7.67	2.08	1	33.33
7			1	33.33
10			1	33.33
<b>Combined type</b>				
Age (years) 7	8.00	1.16	4	40.00
8			4	40.00
10			2	20.00

The combined type of ADHD was found among 10 pupils (8.77%), comprising 6 females (60%) and 4 males (40%) with a gender mean of 1.60 (SD = 0.52), with ages 7, 8 and 10.

### **Correlation between teachers and parents rating for ADHD**

The teachers rated 114 pupils compared to parent rating only 95 pupils for ADHD symptoms. Mean for teacher's rating is 24.49, SD 16.39 while mean for parent's rating is 33.56, SD 23.07. Correlation of parents and teachers rating of pupil's behavior showed  $r=0.36$ ,  $p=0.00$ . Teachers' performance rating mean (13.72, SD= 3.98) also correlated well with parents' performance rating mean (12.16, SD= 3.22) with  $r=0.37$ ,  $p=0.00$  (Table 3).

### **ADHD type mostly diagnosed in children**

The inattention and hyperactivity/ impulsivity symptoms of ADHD were found among 3 pupils each representing 2.63% of the total population and 18.75% of the ADHD group respectively. The combined type was recorded among 10 pupils representing 8.7% of the total population and 62.50% of the ADHD group (Table 4).

### **Relationship between age and ADHD**

The age distribution of ADHD among the study population were  $n=2$  for 6 years (22.22%),  $n=6$  for 7 years (40.00%),  $n=4$  for 8 years (33.3%) and  $n=4$  for 10 years (21.05%). This shows that a greater number of ADHD were diagnosed among those participants aged 7 years (Table 4).

## **Discussion**

A high prevalence rate of ADHD was found in the study and is higher than worldwide pooled prevalence of 5.25 [20]. This is similar to findings among South African pupils [21], but lower than findings among pupils in Benin metropolis of Nigeria [22]. It is also lower than findings from USA [20]. Teachers rated pupils higher with performance problems than parents. This could be due to the fact that teachers are trained in assessing performance issues than parents. Also, it could be a reflection of the fact that these days, teachers spend more hours with the pupils than their parents do at home. Busy work schedules and socioeconomic demands robs parents of quality hours with their children.

There was a good correlation between the parents and teachers rating for ADHD subtypes. The most diagnosed ADHD subtype in Jos North is the combined type. This is similar to findings in South Africa [23] but differ with the study in Benin, Nigeria [24] that reported inattention type as more common. The variance most likely is due to methodology and population difference in the Benin study that did community survey.

The greatest number of ADHD were diagnosed among the 7-year-old. There is high heterogeneity among studies in regard to relative age effect on diagnosis of ADHD with a relatively higher proportion of

younger children being diagnosed [25]. Our finding is in agreement with that of Egbochukwu and Abikwi [22].

## Conclusion

The study revealed high prevalence of ADHD among pupils in Jos North, Plateau state, Nigeria. ADHD is commoner among the 7 year old and the combined type is the commonest. Combining teachers and parents rating offers most reliable results.

## Recommendation

The high prevalence of ADHD in this study among public primary school pupils should be of great concern to government, parents and teachers. Adequate education to parents and teachers on the nature of ADHD will be necessary to ensure that adequate motivation will be given to all children to ensure proper learning. Government and curriculum developers should factor in the peculiarities of children with ADHD in programming and curriculum development. Their ability to achieve this can be improved through workshops and update courses.

Counselling units that are pupil friendly should be established in primary schools in line with Universal Basic Education regulations in Nigeria. This would help allay the suffering of the pupils and the confusion of the parents.

## Limitations

The limitation of this study is the low response rate. Out of 300 pairs of questionnaires administered, only 114 pairs were properly filled and returned making it difficult to generalize the findings to the larger population of pupils in Jos North, Plateau state, Nigeria.

**Conflict of interest:** We declare no conflict of interest in performing and reporting this research.

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