Scientific Research Publishing

Open Journal of Psychiatry, 2023, 13, 324-344
https://www.scirp.org/journal/ojpsych
ISSN Online: 2161-7333
ISSN Print: 2161-7325

Attention Deficit Hyperactivity Disorder in the General Adult Population in Benin (Parakou 2022)

Ataigba Ireti Nethania Elie[1,2,3*], Soumaoro Kémo[4,5], Kamdem Kamgaing Claudel Kévin[2], Tokpanoude Coovi Nonwanou Ignace[6], Djossou Sègnon Eurydice Elvire[6], Koivogui David Sinet[4], Moussa Djibrilla[7,8], Tognon Tchegnonsi Francis[1,2], Gandaho Prosper[1,2]

[1]Faculté de Médecine & Institut de Formation en Soins Infirmiers et Obstétricaux, Université de Parakou, Parakou, Bénin
[2]Centre Hospitalier Universitaire Départemental du Borgou Alibori: service de psychiatrie, Parakou, Bénin
[3]Organisation Non Gouvernementale de Soutien, de Réhabilitation, d'Insertion et de Réinsertion (SouRIR ONG), Parakou, Bénin
[4]Faculté des Sciences et Techniques de Santé, Université Gamal Abdel Nasser de Conakry, Conakry, Guinée
[5]Hôpital National Donka, CHU de Conakry: service de psychiatrie, Conakry, Guinée
[6]Unité de Santé Publique, Faculté des Sciences de la Santé, Cotonou, Bénin
[7]Faculté des Sciences de la Santé, Université André Salifou de Zinder, Zinder, Niger
[8]Hôpital National de Zinder, Service de Psychiatrie, Zinder, Niger
Email: *elieataigba@gmail.com

How to cite this paper: Elie, A.I.N., Kémo, S., Kévin, K.K.C., Ignace, T.C.N., Elvire, D.S.E., Sinet, K.D., Djibrilla, M., Francis, T.T. and Prosper, G. (2023) Attention Deficit Hyperactivity Disorder in the General Adult Population in Benin (Parakou 2022). *Open Journal of Psychiatry*, **13**, 324-344.
https://doi.org/10.4236/ojpsych.2023.134025

Received: January 17, 2023
Accepted: October 10, 2023
Published: October 13, 2023

Abstract

Introduction: Attention deficit hyperactivity disorder (ADHD) is a little-studied psychiatric pathology in our countries, and particularly here in Benin. **Objectives:** To calculate the prevalence and identify the factors associated with attention deficit hyperactivity disorder among adults in the commune of Parakou in 2022. **Methods:** Cross-sectional, descriptive, analytical study including subjects aged 18 and over. ADHD was assessed with the Adult ADHD Self Report Scale (ARSR-v1.1) and consequences with the Weiss functional impairment rating scale (WFIRS-S). **Results:** A total of 456 people were included in the study. The mean age of those surveyed was 25.9 ± 11.6 years. The prevalence of ADHD symptoms among the adults surveyed was 6.8%. The clinical form of ADHD with a predominance of inattention had a prevalence of 3.3%. After multivariate analysis, the factor associated with the presence of ADHD symptoms in adults in the commune of Parakou was: a poor relationship with the subject's partner (p = 0.031, ORa = 6.5 [1.18-35.68]). **Conclusion:** ADHD is present in the community of Parakou and needs further attention.

Keywords

Attention Deficit Disorder, Couple Conflict, Drop In Performance, Benin-2022

1. Introduction

Attention deficit hyperactivity disorder (ADHD) is a persistent (over the past 06 months) pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, characterized by inattention and/or hyperactivity and impulsivity [1]. Little research has been carried out in Africa on adult ADHD. Prevalence studies have focused on ADHD in children, and it is only recently that adults have become a focus of interest [2]. Bakare *et al.* in 2012 reported that the prevalence of ADHD varied between 5.4% and 8.7% in children in Sub-Saharan Africa [3] [4]. ADHD disappears with age, but 60% to 70% will continue to present symptoms into adulthood [5] [6]. Okhakume and Oluwafemi [7] in 2014 (Nigeria) found a prevalence of 12.2%, and Jenkins *et al.* [8] in 2015 in Kenya reported a prevalence of 13.1% in the general population.

Furthermore, adults with ADHD often present with concomitant psychiatric disorders, so much so that up to two-thirds of adults with ADHD present with at least one psychiatric comorbidity. Similarly, ADHD is present in around 15% of adults with other psychiatric disorders [9], and these psychiatric comorbidities often mask the symptoms of ADHD, so that only a minority of these patients are correctly diagnosed and receive appropriate treatment [9].

This syndrome affects all areas of life. One of the best studied concerns academic and professional success. For the same intellectual potential, these young adults do less well in school and interrupt their studies earlier. In addition, they do not stay in the same job for as long, and are more likely to be unemployed. For example, one study showed that 17% of young adults with ADHD had no high school diploma, 48% were unemployed at the time of the survey and had already changed jobs 5.4 times [10]. Even with a high Intelligence Quotient (IQ), they are less successful academically and professionally. In terms of relationships, they have more frequent difficulties. Their marital and family life is affected, as is their children's upbringing, with an increased risk of divorce. They are more exposed to accidents in the home, and they are also less healthy for a variety of reasons: use of psychotropic drugs, reckless sex life, sleep disorders, poor health care. Lastly, when it comes to driving, they have a higher number of offences and accidents than if they were not cared for. This constitutes a real social handicap [10] [11].

Njuwa *et al.* [12] in Cameroon in 2020 found that factors associated with ADHD included a history of chronic illness, a family history of ADHD, severe depression and anxiety disorders. Another study by Jenkins *et al.* [8] in Kenya in 2015 found that common mental disorders, a history of significant life events, self-employment, household size and perceived lack of social support were factors associated with ADHD.

Therapeutically, ADHD can be treated with both medication and psychotherapy. Medication includes stimulants such as methylphenidate and D-amphetamine. Some 60%-70% of patients receiving stimulants showed moderate to marked improvement, compared with 20% of patients receiving placebo. Psychothera-

peutic treatment involves education about the disorder and its manifestations in the subject's life, as well as helping the patient to understand that the chronic nature of the disorder can lead to the development of maladaptive compensatory behavior that may require psychotherapeutic intervention such as supportive therapy or coaching [13].

The absence of statistical data on adult ADHD in Benin is the reason for the present study, which was initiated to take stock of the disorder.

2. Study Framework and Methods

The present study took place in the commune of Parakou, in the north-east of the Republic of Benin. It was a cross-sectional, descriptive, analytical study conducted from March 19 to December 07, 2022. A total of 456 major subjects were recruited during a general population survey in the commune of Parakou and clearly consented to participate during the collection period. A face-to-face interview was conducted. Sampling was probabilistic, using the WHO cluster sampling technique. The statistical unit was represented by all adults aged 18 and over meeting our inclusion criteria. The sampling frame consisted of a list of the 42 neighborhoods/villages in the commune of Parakou, with their respective populations. Thirty (30) clusters were selected according to WHO recommendations. The 30 clusters were distributed as follows: After listing the districts of the Parakou commune, the list was distributed in a random order chosen by a random number generator. Then, starting from the first district on the list, the cumulative number of inhabitants per district was calculated. A cluster sampling step (k) was then obtained by dividing the total number of neighborhoods (255,478) by the total number of clusters (30), *i.e.*, 255,478. The cluster sampling step calculated was equal to 8515.93, *i.e.*, 8516; every 8516 individuals on the cumulative list were then drawn into a cluster. A number between 1 and 8516 (1332) was drawn at random. To identify the start, a cluster was drawn in the neighborhood containing the 1332nd individual. A step was then added, incrementing each time to identify the next cluster, and so on until all 30 clusters were reached. In the field, the interviewer went to the center of the neighborhood and randomly chose a direction using the bottle method (turning the bottle on the ground), numbering all the houses along the direction and choosing a house by a simple random draw from this numbered list; this choice was made using a random number generator on a smartphone. Targets meeting the inclusion criteria were searched for in the house selected, and then one was selected by simple random draw. Targets from neighboring houses were then included. The same operation was repeated in the neighborhoods containing the clusters. In concessions containing more than one household and in family homes, households were numbered and then a single individual who had been surveyed was drawn at random. In the latter case, a target household meeting the inclusion criteria was selected at random. If no household target met the inclusion criteria, the household was dropped and the same household and target selection

procedure repeated until a target meeting the inclusion criteria was found. The 30 clusters were made up of adults aged 18 and over who had consented to take part in the study, were able to answer the questions and were present at home when the interviewers visited. The dependent variable was the presence of ADHD symptoms (two modalities: yes/no) in adults, obtained by means of a self-report scale, the Adult ADHD Self Report Scale (ARSR-v1.1) [9]. This scale was used to calculate the prevalence of the three clinical forms of ADHD, which are secondary dependent variables.

Data analysis was performed using R software version 4.3.0. Quantitative data were expressed as mean and standard deviation. Qualitative data were expressed as numbers and percentages. The Chi² test and Fisher's exact test were used to test the association between two categorical variables. Results were considered significant at the 5% confidence level ($p < 0.05$). Also, the logistic regression model was used to identify the independent variables explaining the presence of ADHD symptoms in adults. The diagnosis of ADHD had not been clinically confirmed.

3. Results

3.1. Prevalence of Attention Deficit Hyperactivity Disorder (ADHD)

The sample consisted of 456 individuals surveyed in the commune of Parakou. ADHD was present in 31 individuals, representing a prevalence of 6.8% (IC95% [4.5%-9.1%]) in 2022. Among the clinical forms, the predominantly inattentive presentation of ADHD was the most objectified clinical form in the general population (Figure 1), as well as in subjects with ADHD (Figure 2).

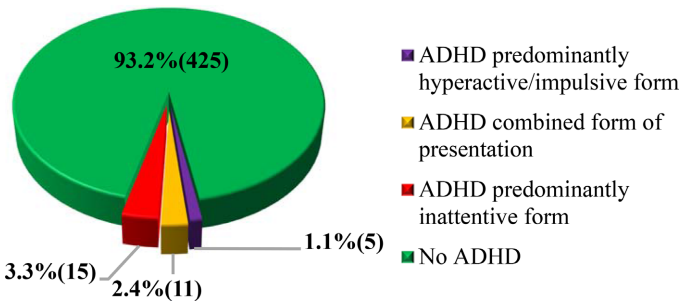

Figure 1. Distribution of different clinical forms of ADHD in the general population (Parakou, 2022; N = 456, n = 31).

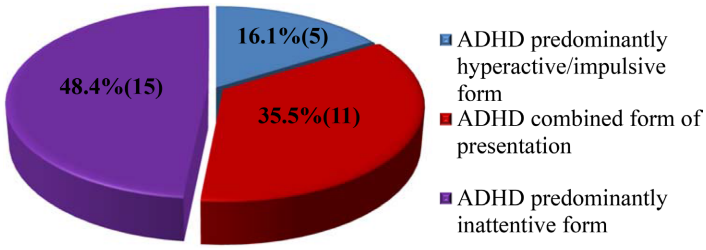

Figure 2. Distribution of different clinical forms of ADHD among subjects with ADHD (Parakou, 2022; n = 31).

3.1.1. Sociodemographic Characteristics (Table 1)

The average age of the participants was 30.4 ± 12 years, with extremes ranging from 18 to 82 years.

Among those with ADHD, the mean age was 25.90 years. Most were male (64.52%), with a gender ratio (M/F) of 1.81. The dominant age group was between 18 and 24 (64.54%). The following tables summarize these data.

3.1.2. Background Characteristics (Table 2)

Among the participants, 28.8% had a medical history. Approximately 11% of the participants had already had problems with the law. The surgical history sought was an accident (domestic or road traffic) with traumatic brain injury (TBI).

Among ADHD sufferers, 45.1% had a medical history. More than half used psychoactive substances (54.8%), and 35.30% had used them for more than 5 years.

3.1.3. Biography Features (Table 3)

Within the sample, people with living parents dominated (54.6%). Married people represented 47.1% of the study population. The majority had lived in a nuclear family during their childhood (58.6%). More than half had a father who did not attend school (51.4%), and around 7 out of 10 had a mother who did not attend school (69.9%). Most respondents had a partner (79.6%), and 75.7% had a good relationship with their partner.

In the case of ADHD sufferers, 67.7% had living parents, most of whom were married (58.0%). Most had lived in a nuclear family during childhood (48.39%). For the most part, the parents had not attended school (39.3% for the father and 53.6% for the mother). More than 8 out of ten had a partner (83.8%) with a good relationship (70.9%). Table 3 shows the breakdown of the survey population by biography.

3.1.4. Characteristics Related to the Respondent's Intellectual and Professional Development (Table 4)

The present study shows that secondary education was dominant (49.1%) among those surveyed. More than 6 out of 10 had experienced failure during their school career (67.3%). Among those surveyed, 51.3% said they had never had a job.

Most of the respondents with ADHD (61.29%) had a secondary education.

Resumption of the school year was reported by 77.4%. It was found that 8 out of 10 people in this population were unable to find a job (80.0%).

3.1.5. Lifestyle Characteristics (Table 5)

The majority of respondents subscribe to a social network (74.0%). Of these, 71.1% spend up to 8 hours a day and 20.9% spend more than 8 hours a day on this social network.

Among people with ADHD, 8 out of 10 (80.6%) were subscribed to at least one social network. Most (84.0%) spent up to 8 hours on their favorite social networks, and 16.0% spent more than 8 hours.

Table 1. Distribution of respondents by sociodemographic characteristics (Parakou 2022).

	Sample (N = 456)	ADHD Positive (n = 31)	ADHD Negative (n = 425)
Age (years)			
[18-24[	175 (38.4%)	20 (64.5%)	155 (36.5%)
[25-34[	163 (35.7%)	9 (29.0%)	154 (36.2%)
[35-44[	62 (13.6%)	1 (3.2%)	61 (14.4%)
[45-54[	26 (5.7%)	0 (0%)	26 (6.1%)
[55-64[	15 (3.3%)	0 (0%)	15 (3.5%)
[65-74[	12 (2.6%)	0 (0%)	12 (2.8%)
[75 and over	3 (0.7%)	1 (3.2%)	2 (0.5%)
Gender			
Female	274 (60.1%)	11 (35.4%)	263 (61.9%)
Male	182 (39.9%)	20 (64.5%)	162 (38.1%)
Religion			
Muslim	235 (51.5%)	15 (48.3%)	220 (51.8%)
Christian	204 (44.7%)	16 (51.6%)	188 (44.2%)
Endogenous	11 (2.4%)	0 (0%)	11 (2.6%)
No	6 (1.3%)	0 (0%)	6 (1.4%)
Marital status			
Married*	154 (33.8%)	6 (1.3%)	148 (34.8%)
Single	179 (39.3%)	19 (76%)	160 (37.6%)
Concubinage	118 (25.9%)	6 (24%)	112 (26.4%)
Divorced	5 (1.1%)	0 (0.0%)	5 (1.2%)
Occupation (n = 407)			
Retailers	114 (27.9%)	4 (14.3%)	110 (29.0%)
Pupils/students	89 (21.8%)	10 (35.7%)	79 (20.8%)
Artisans	62 (15.2%)	4 (14.3%)	58 (15.3%)
Workers	45 (11.1%)	5 (17.9%)	40 (10.6%)
Civil servant	33 (8.1%)	1 (3.6%)	32 (8.4%)
Housewife	19 (4.7%)	2 (7.1%)	17 (4.5%)
Farmer/fishermen	12 (2.9%)	2 (7.1%)	10 (2.6%)
Motorcycle/auto driver	11 (2.7%)	0 (0.0%)	11 (2.9%)
Teachers	5 (1.2%)	0 (0.0%)	5 (1.3%)
Economic operator	5 (1.2%)	0 (0.0%)	5 (1.3%)
Animator	4 (1.0%)	0 (0.0%)	4 (1.1%)

Continued

Hotel manager	3 (0.7%)	0 (0.0%)	3 (0.8%)
Health agent	2 (0.5%)	0 (0.0%)	2 (0.5%)
Footballer	1 (0.2%)	0 (0.0%)	1 (0.2%)
Constable	1 (0.2%)	0 (0.0%)	1 (0.2%)
Computer scientist	1 (0.2%)	0 (0.0%)	1 (0.2%)
Pastor	1 (0.2%)	0 (0.0%)	1 (0.2%)

*Grooms were subjects in couples, whether in civil, religious or informal unions.

Table 2. Distribution of respondents by background (Parakou, 2022).

	Sample (N = 456)	ADHD Positive (n = 31)	ADHD Negative (n = 425)
Medical history			
Presence	131 (28.8%)	14 (45.1%)	117 (27.5%)
Absence	325 (71.2%)	17 (54.8%)	308 (72.5%)
History of traumatic brain injury			
Presence	62 (13.6%)	5 (16.1%)	57 (13.4%)
Absence	394 (86.4%)	26 (83.8%)	368 (86.6%)
Neurosurgical intervention			
Yes	1 (1.5%)	1 (3.2%)	0 (0.0%)
No	61 (98.5%)	30 (96.7%)	31 (7.3%)
Psychiatric history			
Yes	3 (0.7%)	0 (0.0%)	3 (0.7%)
No	453 (99.3%)	31 (100%)	422 (99.3%)
Psychoactive substances (n = 187)			
Yes	187 (41%)	17 (54.8%)	170 (40.0%)
No	269 (59%)	14 (45.1%)	255 (60.0%)
Consumption period (year)			
<5 years	21 (11.4%)	11 (35.4%)	10 (2.4%)
≥5 years	55 (29.6%)	6 (19.3%)	49 (11.5%)
Type of psychoactive substance			
Alcohol	26 (74.28%)	1 (50.0%)	25 (75.75%)
Tobacco	7 (20.0%)	1 (50.0%)	6 (18.18%)
Tramadol	1 (2.85%)	0 (0%)	1 (3.03%)
Cannabis	1 (2.85%)	0 (0%)	1 (3.03%)
Criminal record			
Yes	50 (11.0%)	25 (80%)	25 (5.9%)
No	406 (89.0%)	6 (19.3%)	400 (94.1%)

Table 3. Distribution of survey population by biography (Parakou, 2022).

	Sample (N = 456)	ADHD Positive (n = 31)	ADHD Negative (n = 425)
Parents' status			
Living	249 (54.6%)	21 (67.7%)	228 (53.6%)
Deceased	207 (45.4%)	105 (32.2%)	197 (46.4%)
Parents' marital status			
Married	215 (47.1%)	18 (58.0%)	197 (46.4%)
Divorced	28 (6.1%)	2 (6.4%)	26 (6.1%)
Physically separated	213 (46.7%)	11 (35.4%)	202 (47.5%)
Family during childhood			
Nuclear family	267 (58.6%)	15 (48.39%)	252 (59.3%)
Extended family	136 (29.8%)	12 (38.7%)	124 (22.2%)
Single-parent family	24 (5.3%)	3 (9.6%)	21 (4.9%)
Polygamous family	24 (5.3%)	1 (3.22%)	23 (5.4%)
Blended family	5 (1.1%)	0 (0.0%)	5 (1.2%)
Father's level of education (401)			
Out of school	206 (51.4%)	11 (39.3%)	195 (52.3%)
Primary	59 (14.7%)	5 (17.9%)	54 (14.5%)
Secondary	92 (22.9%)	9 (32.1%)	83 (22.3%)
Higher	44 (11.0%)	3 (10.7%)	41 (11.0%)
Mother's level of education (418)			
Out of school	292 (69.9%)	15 (53.6%)	277 (71.0%)
Primary	52 (12.4%)	6 (21.4%)	46 (11.8%)
Secondary	62 (14.8%)	5 (17.9%)	57 (14.6%)
Higher	12 (2.9%)	2 (7.1%)	10 (2.6%)
Relationship with father (n = 456)			
Good	429 (94.1%)	29 (93.5%)	400 (94.1%)
Wrong	27 (6.0%)	2 (6.4%)	25 (5.9%)
Relationship with mother (n = 456)			
Good	440 (95.5%)	30 (96.8%)	410 (96.5%)
Wrong	16 (3.5%)	1 (3.2%)	15 (3.6%)
Presence of a partner (n = 456)			
Yes	363 (79.6%)	26 (83.8%)	337 (79.3%)
No	93 (20.4%)	5 (16.1%)	88 (20.7%)
Relationship with partner (n = 363)			
Good	275 (75.7%)	22 (70.9%)	253 (96.2%)

Continued

Bad*	14 (3.9%)	4 (12.8%)	10 (3.8%)
Number of descendants (n = 456)			
0	210 (46.1%)	20 (64.5%)	190 (44.7%)
≥à 1	246 (53.9%)	11 (35.4%)	235 (55.3%)
Type of relationship with descendants (n = 246)			
Good	245 (99.6%)	11 (100.0%)	234 (99.6%)
Wrong	1 (0.4%)	0 (0.0%)	1 (0.4%)

*A bad relationship is defined by the presence of conflict, a toxic or even abusive relationship; a relationship in which the subject is not fulfilled.

Table 4. Distribution of survey population by intellectual and professional development (Parakou, 2022).

	Sample (N = 456)	ADHD Positive (n = 31)	ADHD Negative (n = 425)
Study level			
Higher	130 (28.5%)	9 (29.0%)	121 (28.5%)
Secondary	224 (49.1%)	19 (61.2%)	205 (48.2%)
Primary	55 (12.1%)	2 (6.4%)	53 (12.5%)
Out of school	47 (10.3%)	1 (3.2%)	46 (10.8%)
School failure			
Yes	307 (67.3%)	24 (77.4%)	283 (66.6%)
No	149 (32.7%)	7 (22.5%)	142 (33.4%)
Frequency of school failure			
Once	149 (48.5%)	3 (9.6%)	146 (57.0%)
More than once	111 (36.1%)	1 (3.2%)	110 (43.0%)
Number of jobs obtained			
0	234 (51.3%)	4 (80.0%)	230 (51.0%)
1	164 (36.0%)	1 (20.0%)	163 (36.1%)
2	38 (8.3%)	0 (0.0%)	38 (8.4%)
3	8 (1.8%)	0 (0.0%)	8 (1.8%)
4	6 (1.3%)	0 (0.0%)	6 (1.3%)
5	5 (1.1%)	0 (0.0%)	5 (1.1%)
10	1 (0.2%)	0 (0.0%)	1 (0.2%)
Redundancies			
Yes	15 (3.3%)	2 (6.4%)	13 (3.1%)
No	441 (96.7%)	29 (93.6%)	412 (96.9%)
Frequency of layoffs			
Once	13 (86.7%)	1 (50.0%)	12 (92.3%)
More than once	2 (13.3%)	1 (50.0%)	1 (7.7%)

Table 5. Distribution of survey population by lifestyle (Parakou, 2022).

	Sample (N = 456) Workforce	ADHD Positive (n = 31) Workforce	ADHD Negative (n = 425) Workforce
Time spent online (n = 333)			
≤8 hours	240 (72.1%)	19 (73.1%)	221 (72.0%)
>8 hours	93 (27.9%)	7 (26.9%)	86 (28.0%)
Social network subscription (n = 456)			
Yes	340 (74.0%)	25 (80.6%)	315 (74.1%)
No	116 (25.4%)	6 (19.3%)	110 (25.9%)
Time spent on social networks (n = 329)			
≤8 hours	260 (79.1%)	21 (84.0%)	239 (78.61%)
>8 hours	69 (20.9%)	4 (16.0%)	65 (21.38%)

Table 6. Impact of ADHD (Parakou, 2022).

	Workforce	Percentage
Self-esteem	6	1.3
Social functioning	2	0.4
Family	1	0.2
Work	1	0.2
School	0	0
Life skills	0	0
Risky behavior	0	0

3.1.6. ADHD Repercussions

ADHD caused different types of impact. Among these, self-esteem was predominant (1.3%).

The presence or absence of ADHD repercussions is shown in Table 6.

3.1.7. Associated Factors (Table 7, Table 8 & Table 9)

1) Bivariate analysis

Bivariate analysis showed that there was a statistically significant difference between ADHD and age (p = 0.013), presence of medical history (p = 0.002), use (p = 0.002) and duration of use of a psychoactive substance (p = 0.000), relationship with life partner (p = 0.040) and number of offspring (p = 0.033).

2) Multivariate analysis

The multivariate model of potential predictors of attention deficit disorder with or without hyperactivity in the commune of Parakou in 2022 shows that among people aged over 18, only the nature of the relationship with the life partner explains the presence of ADHD symptoms (p = 0.031, Ora = 6.5 [1.18-35.68]. Couples with a poor relationship were 6.5 times more likely to have

Table 7. Relationship between ADHD and sociodemographic characteristics of respondents.

	Existence of ADHD (N = 456)		*p*
	Yes	No	
Gender			
Male	20 (4.4%)	254 (55.7%)	0.602
Female	11 (2.4%)	171 (37.5%)	
Age			
[18-24]	20 (4.4%)	155 (34.0%)	
[25-34]	9 (2%)	154 (33.8%)	
[35-44]	1 (0.2%)	61 (13.4%)	
[45-54]	0 (0.0%)	26 (5.7%)	0.013
[55-64]	0 (0.0%)	15 (3.3%)	
[65-74]	0 (0.0%)	12 (2.6%)	
[75 and over	1 (0.2%)	2 (0.4%)	
Religion			
No	0 (0.0%)	6 (1.3%)	
Christian	16 (3.5%)	188 (41.2%)	0.647
Endogenous	0 (0.0%)	11 (2.4%)	
Muslim	15 (3.3%)	220 (48.2%)	
Widowed/not widowed			
Widowed	2 (0.4%)	24 (5.3%)	0.149
Not widowed	4 (0.9%)	124 (27.2%)	
Marital status			
Married	6 (1.3%)	148 (32.5%)	0.079
Unmarried	25 (60.7%)	277 (60.7%)	
Single	19 (4.2%)	160 (35.1%)	
Concubinage	6 (1.3%)	112 (24.6%)	0.07
Divorced	0 (0.0%)	5 (1.1%)	
Number of weddings/remarriages			
Once	4 (2.7%)	125 (84.5%)	0.626
More than once	1 (0.2%)	18 (12.2%)	
Study level			
Out of school	0 (0.0%)	38 (8.3%)	
Literate	1 (0.2%)	8 (1.8%)	
Primary	2 (0.4%)	53 (11.6%)	
Secondary	19 (4.2%)	205 (45.0%)	0.297
Higher	9 (1.0%)	121 (26.5%)	

Table 8. Individual influence of different explanatory variables on attention deficit hyperactivity disorder (N = 456).

	Existence of ADHD (N = 456)		p
	Yes	No	
Time spent online			
≥ 8 hours	19 (5.7%)	221 (66.4%)	0.905
< 8 hours	7 (2.1%)	86 (25.8%)	
Social network subscription			
Yes	25 (5.5%)	315 (69.1%)	0.42
No	6 (1.3%)	110 (24.1%)	
Social network subscription			
≥8 hours	26 (5.8%)	353 (78.8%)	0.745
<8 hours	4 (0.9%)	65 (14.5%)	
Medical history			
Presence	14 (3.1%)	88 (19.3%)	0.002
Absence	0 (0.0%)	337 (73.9%)	
Psychiatric history			
Yes	0 (0.0%)	3 (0.7%)	0.639
No	31 (6.8%)	422 (92.5%)	
Criminal record			
Yes	25 (80.6%)	50 (11.0%)	0.121
No	6 (19.4%)	406 (89.0%)	
History of Cranio-Encephalic Trauma			
Presence	5 (1.1%)	57 (12.5%)	0.670
Absence	26 (5.7%)	368 (80.7%)	
Neurosurgical intervention			
Yes	1 (0.2%)	6 (1.3%)	0.428
No	30 (6.6%)	419 (91.9%)	
Parents' status			
Alive	21 (4.6%)	228 (50.0%)	0.128
Died	10 (2.2%)	197 (43.2%)	
Family during childhood			
Extended family	12 (2.6%)	124 (27.2%)	0.505
Single-parent family	3 (0.7%)	21 (4.6%)	
Nuclear family	15 (3.3%)	252 (55.3%)	
Blended family	0 (0.0%)	5 (1.1%)	

Continued

Polygamous	1 (0.2%)	23 (5.0%)	
Psychoactive substances			
Yes	17 (3.7%)	170 (37.3%	0.002
No	14 (3.1%)	255 (55.9%)	
Consumption period (year)			
<05	11 (5.9%)	41 (21.9%)	<0.000
≥05	6 (3.2%)	129 (69.0%)	
Relationship with father (n = 456)			
Good	29 (6.4%)	400 (87.7%)	0.711
Conflict	1 (0.2%)	13 (2.9%)	
Wrong	1 (0.2%)	12 (2.6%)	
Relationship with mother (n = 456)			
Good	30 (6.6%)	410 (89.9%)	
Conflict	1 (0.2%)	5 (1.1%)	0.559
Wrong	0 (0.0%)	10 (2.2%)	
Presence of a partner			
Yes	26 (5.7%)	337 (73.9%)	0.643
No	5 (1.1%)	78 (17.1%)	
Relationship with the partner			
Good	22 (4.8%)	323 (70.8%)	0.040
Conflict	1 (0.2%)	6 (1.3%)	
Wrong	3 (0.7%)	8 (1.8%)	
Number of children			
0	20 (4.4%)	190 (41.7%)	0.033
≥1	11 (2.4%)	235 (51.5%)	
Relationship with children			
Good	11 (2.4%)	234 (51.3%)	0.100
Wrong	0 (0.0%)	1 (0.2%)	
School failure			
Yes	24 (5.3%)	283 (62.1%)	0.215
No	7 (1.5%)	142 (31.1%)	
Number of failures			
0	7 (1.5%)	142 (31.1%)	0.215
≥1	24 (5.3%)	283 (62.1%)	
Currently employed			
Yes	12 (2.6%)	237 (52.0%)	0.066

Continued

No	19 (4.2%)	188 (41.2%)	
Number of jobs already held			
0	19 (4.2%)	215 (47.1%)	0.250
≥1	12 (2.6%)	210 (46.1%)	
One-time dismissal			
Yes	2 (0.4%)	13 (2.9%)	0.307
No	29 (6.4%)	412 (90.4%)	
Number of dismissals			
1	1 (6.7%)	12 (80.0%)	0.101
≥1	1 (6.7%)	1 (6.7%)	
Father's level of education			
Literate	1 (0.2%)	9 (2.0%)	
Higher	3 (0.6%)	41 (9.0%)	
Unknown	3 (0.6%)	52 (11.4%)	0.736
Primary	5 (1.1%)	54 (11.8%)	
Secondary	9 (2.0%)	83 (18.2%)	
Out of school	10 (2.2%)	186 (40.8%)	
Mother's level of education			
Literate	1 (0.2%)	6 (1.3%)	
Higher	2 (0.4%)	10 (2.2%)	
Unknown	3 (0.6%)	35 (7.67%)	0.293
Primary	6 (3.2%)	46 (10.1%)	
Secondary	5 (1.1%)	57 (12.5%)	
Out of school	14 (3.1%)	271 (59.4%)	

Table 9. Multivariate model of potential predictors of attention deficit hyperactivity disorder (Parakou, 2022).

	ADHD		Multivariate analysis		
	Yes	No	Adjusted OR	IC95%	*p*
Relationship with the partner					
Good	22 (6.1%)	323 (89.0%)	1		
Wrong	4 (1.1%)	14 (3.9%)	6.5	[1.18 - 35.68]	0.031
Age					
≤24	20 (4.4%)	155 (34.0%)	1		
>24	11 (2.4%)	270 (59.2%)	0.6	[3.720 - 0.097]	0.583

Continued

Marital status					
Married	6 (1.3%)	148 (32.5%)	1		
Unmarried	25 (5.5%)	277 (60.7%)	1.091	[0.270 - 4.410]	0.903
Parents' status					
No	30 (6.6%)	197 (43.2%)	1		
Yes	21 (4.6%)	228 (50.0%)	1.169	[0.266 - 5.136]	0.836
Relationship with father					
Good	29 (6.6%)	382 (87.2%)	1		
Wrong	1 (0.2%)	12 (2.6%)	1.093	[0.093 - 12.789]	0.943
Relationship with mother					
Good	29 (6.5%)	403 (90.0%)	1		
Wrong	1 (0.2%)	15 (3.3%)	4.322	[0.381 - 49.022]	0.237
Relationship with children					
Good	11 (4.5%)	234 (95.1%)	1	0	1
Wrong	1 (0.4%)	0 (0.0%)	0		
Number of children			1.042	[0.832-1.305]	0.722
School failure					
No	7 (1.5%)	142 (31.1%)	1		
Yes	24 (5.3%)	283 (62.1%)	1.058	[0.244 - 4.597]	0.94
Redundancies					
No	29 (6.4%)	412 (90.4%)	1	0	
Yes	2 (0.4%)	13 (2.9%)	0		0.999
Frequency of layoffs					
Never	29 (6.4%)	412 (90.4%)	1		
At least once	2 (0.4%)	13 (3.0%)	0.909	[0.228 - 3.625]	0.892

ADHD symptoms than couples with a good relationship.

4. Discussion

4.1. Limitations of the Study

To achieve the objectives of this study, a cross-sectional, descriptive and analytical study was carried out. It enabled us to identify subjects with ADHD [14], estimate their prevalence and establish their profile. But it also enabled us to avoid missing data and to have a complete base.

The procedure used was probability sampling using the WHO cluster sampling technique. The statistical unit was represented by all adults aged 18 and over meeting the inclusion criteria. The sampling frame consisted of the list of

42 neighborhoods/villages in the commune of Parakou, with their respective populations. 30 clusters were selected according to WHO recommendations. Determined using the Schwartz formula based on the prevalence of ADHD found in Nigeria in 2014, which was 12.5%, the sample size initially planned for 371 subjects was increased to a size of 456 surveyed subjects in order to obtain greater reliability of the results. By deduction, the methodology used was reliable, reinforcing the quality of the results obtained.

Prior to the start of data collection, authorization was obtained from the Mayor of the commune of Parakou (N˚50/155/MPKOU).

The data collection technique was a guided face-to-face interview using a digitized survey form with the aid of Kobocollect software, which included sociodemographic data, history, biography, clinical data, lifestyle data, intellectual and professional development data and the ARSR-v1. 1 (Adult ADHD Self-Report Scale) to screen for ADHD and the WFIRS-S (Weiss functional impairment rating scale) to assess the consequences of ADHD.

The one-on-one interview is a rapid and appropriate data collection technique. It allowed for follow-up and rephrasing to help the participant express his or her point of view, and to deepen and complete the information in addition to the questions asked. Anonymity ensured more honest responses. This technique ensured that the information collected was as reliable as possible. As with any self-reporting study, there are always biases associated with the source of the information, which may minimize or exaggerate certain aspects of the statements. As the questionnaire used was in French, not having been validated in local languages, an intervention bias may have arisen during the interviews. To limit information bias due to misunderstanding of the questions, the interview guide was written in precise French, using simple themes with suggested answers and respecting anonymity, which made the task easier for the subjects in the study population. Similarly, each interviewing team included at least one interviewer fluent in a local language. Consequently, the results obtained are valid and can be the subject of etiological hypotheses that could lead to an analytical study to identify the factors associated with ADHD in order to undertake corrective actions.

4.2. Sociodemographic Characteristics of the Study Population

Age

Among the 31 individuals with ADHD symptoms, the average age was 25.90 ± 11.6 years. This is close to that reported by Jenkins *et al.* [8] in Kenya in 2015, who reported an average age of 23 years. Our average age is similar to that reported by De Ridder *et al.* in the general population [15] (31.9 years with extremes of 18 and 44 years) in Belgium in 2008. On the other hand, it is higher than that reported by Vňuková *et al.* [16] (41.56 ± 13.64 years) in 2021 in the Czech Republic. This could be explained by the fact that subjects aged 60 to 65 were represented with a higher proportion, around 15% of the total workforce in the work of Vňuková *et al* versus a proportion of less than 7% of individuals in

the present work.

There was a statistically significant difference between age and ADHD (p = 0.013). The average age of subjects with ADHD was 25.90 years. As age increases, ADHD symptoms decrease, as was the case in the study by Vňuková *et al.* [15] (P < 0.001) in 2021 in the general population of the Czech Republic. In both studies, the highest age category was the one with the fewest affected subjects. This could be attributed to the disappearance of symptoms with age. This association of age with ADHD was also observed by Zwaan *et al.* in 2012 [17] in Germany and also by Michielsen *et al.* [18] in 2012 in the Netherlands (p = 0.003).

Gender

In this work male subjects predominated in the ADHD population with a proportion of 64.52%. The same finding was made by Vňuková *et al.* in 2021 (Czech Republic) [16] where the male gender was predominant, representing 52.9% of affected subjects, and those reported by Kessler *et al.* in 2006 in the USA, where the male gender was predominant, representing 61.6% of affected subjects. This may be explained by the fact that males predominated in both the present study population and theirs (60.1% of the total, versus 39.9% for females).

Marital status

Unmarried subjects (66.2%) were dominant in the present study, in contrast to the data from De Ridder *et al.* [15] in which most (83.2%) of the participants were married, as well as those of Faraone and Biederman in 2005 (USA) [19] where 67.7% of affected subjects were unmarried, and by Hesson and Fowler [20] in Canada, where the majority (46.5%) of sufferers were single. This may be explained by the fact that the present sample is relatively young, with subjects aged between 18 and 24 making up a large proportion (38.37%) and therefore not mature enough for a marriage project, this category being mainly made up of students in our country.

Most (60.7%) of the ADHD subjects were also unmarried, since unmarried subjects were dominant in this work, which could justify this result. It should be pointed out that in the present work, the respondents were classified as "married (civil, religious or cultural marriage)" and "unmarried (single, cohabiting, divorced)".

4.3. Prevalences

4.3.1. Prevalence of ADHD Overall

The prevalence of ADHD was 6.8%, measured using the Adult ADHD Self Report Scale (ARSRv1.1) that is a screening scale. This prevalence is higher than those found by Kessler *et al.* in 2006 in the United States (4.4%) [21], De Ridder *et al.* in 2008 in Belgium (4.1%) [15] and Hesson and Fowler in 2018 in Canada (2.9%) [20] in a general population survey. This disproportion can be explained. In the United States, for example, the detection tool used is the Adult ADHD Clinical Diagnostic Scale (ACDS) V 1.2, which is a more discriminating diagnos-

tic scale. In Belgium, the measurement tool used, different from that in the current study, could explain this discrepancy, even though it is a screening scale (third version of the Composite International Diagnostic Interview (CIDI)). As for Canada, this discrepancy could be attributed to a difference in methodology. In the present study, a screening scale was used to assess prevalence, whereas no scale was used in Canada. Instead, respondents were asked whether they had ever been diagnosed with ADHD by mental health professionals.

The prevalence found in the present study was lower than that found (13.1%) by Jenkins *et al.* [8] in 2015 in Masano (Kenya). This contrast could be justified by the difference in the scale's significance thresholds. In both studies the scale was similar, but the present work used the frequency of onset of symptoms in part A of the scale to declare that a subject probably had ADHD, whereas in Kenya a score ≥14 was used. Indeed, the version of the scale used in Kenya had a score to assess the disorder. For each of the six questions in Part A of the scale, a score had been assigned to each response as follows: never = 0, rarely = 1, sometimes = 2, often = 3 and very often = 4 giving a total score of 24. Thus a score ≥14/24 was the threshold used. The prevalence in this study is also lower than that found (12.2%) by Okhakhume and Oluwafemi [7] in 2014 in the Nigerian states of Oyo and Ekiti. This difference can be explained by the fact that the scale used in Nigeria [Barkley Adult ADHD Rating Scale (BAARS IV)] was different from the one used in the present work [Adult ADHD Self Report Scale (ASRS V1.1)]. The difference in methodology and measurement tool could therefore explain that difference.

4.3.2. Prevalence of ADHD in Its Predominantly Inattentive Form

The predominantly inattentive form of ADHD was represented by 3.3%. In the work of various authors (Okhakhume and Oluwafemi in Nigeria in 2014 [7] Atwoli *et al.* [2] in 2011 in Kenya, Umar *et al.* in 2017 in Kano, Nigeria [22]) as well as in the present study, this clinical form of ADHD with predominant inattention was the most represented clinical form, which confirms the literature as a whole [7].

4.3.3. Prevalence of ADHD in Its Combined Form

The combined form of ADHD accounted for 2.4%. It is the second most represented clinical form in this survey. However, other authors have reported much higher proportions: Bassiony *et al.* [23] in 2022 in Egypt (82%) and Umar *et al.* (54%) [22] in 2017 in Nigeria (54%). For these authors, ADHD in its combined presentation was the most represented clinical form. This difference could be attributed to the methodology used.

4.3.4. Prevalence of ADHD in Its Clinical Form with Predominant Hyperactivity/Impulsivity

ADHD in its clinical form with predominant hyperactivity/impulsivity was 1.1% in the present work. Okhakume and Oluwafemi [7] in 2014 (Nigeria) found higher proportions by separating these two subgroups as follows: ADHD with

hyperactivity (3.8%) and ADHD with impulsivity (2.3%). It should be noted that these authors used a different measurement tool from the present survey. In fact, their tools enabled them to assess ADHD by considering distinct symptom groups.

4.4. Associated Factors

In our multivariate regression model, only the poor relationship with the life partner explains the presence of ADHD symptoms (p = 0.040; OR = 7.035). A poor relationship within the couple can therefore generate attention disorders in adults. This result raises the issue of reduced academic and professional performance in a conflict-ridden couple relationship. This work allows us to confirm the need to resolve conflicts within the couple in order to optimize the subject's productivity. A day spent serenely as a couple preserves and improves the subject's performance, enabling him to concentrate on his work.

5. Conclusion

Attention deficit hyperactivity disorder (ADHD) is a disorder for which study data are scarce in our country. The results reveal that it is present in six (6) out of every hundred adults in the commune of Parakou. The associated factor was a poor relationship with a life partner. Taking into account the many aspects of life that can be affected by its presence, ADHD requires in-depth interest to assess all its contours, following clinical confirmation of subjects presenting these symptoms.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Crocq, M.-A. and Guelfi, J.-D. (2015) DSM-5: Manuel diagnostique et statistique des troubles mentaux. 5th Edition, Elsevier Masson, Issy-les-Moulineaux.

[2] Atwoli, L., Owiti, P., Manguro, G., *et al.* (2011) Attention Deficit Hyperactivity Disorder Symptom Self-Report among Medical Students in Eldoret, Kenya. *African Journal of Psychiatry*, **14**, 286-289. https://doi.org/10.4314/ajpsy.v14i4.5

[3] Bakare, M.O. (2012) Attention Deficit Hyperactivity Symptoms and Disorder (ADHD) among African Children: A Review of Epidemiology and Co-Morbidities. *African Journal of Psychiatry*, **15**, 358-361. https://doi.org/10.4314/ajpsy.v15i5.45

[4] Umar, M.U., Obindo, J.T. and Omigbodun, O.O. (2018) Prevalence and Correlates of ADHD among Adolescent Students in Nigeria. *Journal of Attention Disorders*, **22**, 116-126. https://doi.org/10.1177/1087054715594456

[5] Gentile, J.P., Atiq, R. and Gillig, P.M. (2006) Adult ADHD: Diagnosis, Differential Diagnosis, and Medication Management. *Psychiatry* (*Edgmont* (*Pa.*: *Township*)), **3**, 25-30. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2957278/

[6] Schoeman, R. and de Klerk, M. (2017) Adult Attention-Deficit Hyperactivity Dis-

order: A Database Analysis of South African Private Health Insurance. *South African Journal of Psychiatry*, **23**, 1010. https://doi.org/10.4102/sajpsychiatry.v23i0.1010

[7] Okhakhume, A.S. and Oluwafemi, A.A. (2014) Self-Reported Symptoms of Adult ADHD among the General Population in Nigeria. http://ir.library.ui.edu.ng/handle/123456789/5347.https://doi.org/10.1016/j.cpr.2010.06.001

[8] Jenkins, R., Othieno, C., Ongeri, L., *et al.* (2015) Attention Deficit Hyperactivity Disorder Symptom Self-Report in Adults in Kenya and Its Associated Risk Factors: An Analysis from a Household Survey in a Demographic Surveillance Site. *Global Mental Health*, **2**, e14. https://doi.org/10.1017/gmh.2015.14

[9] Salvi, V., Migliarese, G., Venturi, V., *et al.* (2019) ADHD in Adults: Clinical Subtypes and Associated Characteristics. *Rivista di Psichiatria*, **54**, 84-89.

[10] Bange, F. (2011) Le devenir du trouble déficit de l'attention/hyperactivité chez l'adulte. *Archives de Pédiatrie*, **18**, 831-834. https://doi.org/10.1016/j.arcped.2011.03.022

[11] Barkley, R.A. (2002) Major Life Activity and Health Outcomes Associated with Attention-Deficit/Hyperactivity Disorder. *Journal of Clinical Psychiatry*, **63**, 10-15.

[12] Njuwa, K.F., Simo, L.P., Ntani, L.L., *et al.* (2020) Factors Associated with Symptoms of Attention Deficit Hyperactivity Disorder among Medical Students in Cameroon: A Web-Based Cross-Sectional Study. *BMJ Open*, **10**, e037297. https://doi.org/10.1136/bmjopen-2020-037297

[13] Retz, W. and Klein, R.G. (2010) Attention-Deficit Hyperactivity Disorder (ADHD) in Adults. Karger, Basel. https://doi.org/10.1159/isbn.978-3-8055-9238-3

[14] Kessler, R.C., Adler, L., Ames, M., *et al.* (2012) Adult ADHD Self-Report Scale Symptom Checklist.

[15] De Ridder, T., Bruffearts, R., Danckaerts, M., *et al.* (2008) The Prevalence of ADHD in the Belgian General Adult Population: An Epidemiological Explanatory Study. *Tijdschrift voor Psychiatrie*, **50**, 499-508.

[16] Vňuková, M., Ptáček, R., Děchtěrenko, F., *et al.* (2021) Prevalence of ADHD Symptomatology in Adult Population in the Czech Republic—A National Study. *Journal of Attention Disorders*, **25**, 1657-1664. https://doi.org/10.1177/1087054720934042

[17] de Zwaan, M., Gruss, B., Müller, A., *et al.* (2012) The Estimated Prevalence and Correlates of Adult ADHD in a German Community Sample. *European Archives of Psychiatry and Clinical Neuroscience*, **262**, 79-86. https://doi.org/10.1007/s00406-011-0211-9

[18] Michielsen, M., Semeijn, E., Comijs, H.C., *et al.* (2012) Prevalence of Attention-Deficit Hyperactivity Disorder in Older Adults in the Netherlands. *The British Journal of Psychiatry*, **201**, 298-305. https://doi.org/10.1192/bjp.bp.111.101196

[19] Faraone, S.V. and Biederman, J. (2005) What Is the Prevalence of Adult ADHD? Results of a Population Screen of 966 Adults. *Journal of Attention Disorders*, **9**, 384-391. https://doi.org/10.1177/1087054705281478

[20] Hesson, J. and Fowler, K. (2018) Prevalence and Correlates of Self-Reported ADD/ADHD in a Large National Sample of Canadian Adults. *Journal of Attention Disorders*, **22**, 191-200. https://doi.org/10.1177/1087054715573992

[21] Kessler, R.C., Adler, L., Barkley, R., *et al.* (2006) The Prevalence and Correlates of

Adult ADHD in the United States: Results from the National Comorbidity Survey Replication. *American Journal of Psychiatry*, **163**, 716-723. https://doi.org/10.1176/ajp.2006.163.4.716

[22] Umar, M.U., Salihu, A.S. and Owolabi, S.D. (2017) Prevalence and Correlates of ADHD in Individuals with Substance Use Disorder in Nigeria. ADHD *Attention Deficit Hyperactivity Disorder*, **9**, 189-198. https://doi.org/10.1007/s12402-017-0218-9

[23] Bassiony, M.M., Salah El-Deen, G.M., Ameen, N., *et al.* (2022) Prevalence, Correlates, and Consequences of Attention-Deficit/Hyperactivity Disorder in a Clinical Sample of Adults with Tramadol Use in Egypt. *The American Journal on Addictions*, **31**, 31-36. https://doi.org/10.1111/ajad.13231