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Psychosocial Variables and Mathematics Performance of Pupils with Attention-Deficit Hyperactivity Disorder (ADHD) in Port Harcourt Metropolis, Rivers State

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Abstract

Attention-Deficit Hyperactivity Disorder (ADHD) is a common neurodevelopmental condition that affects a substantial proportion of school-aged children and is frequently associated with difficulties in academic settings. This study examined the relationship between selected psychosocial variables and academic performance in mathematics among pupils with ADHD in Port Harcourt Metropolis, Rivers State. The psychosocial variables investigated were impulsiveness, inattentiveness, parental socioeconomic status, parental involvement in children's learning activities, and gender. A correlational survey design was adopted. The entire population of 20 pupils diagnosed with ADHD in selected inclusive and special education settings within the metropolis formed the sample through a census approach. Data were collected using the Psychosocial Scales (PSS), the Parental Readiness Scale (PRS), and pupils' previous Mathematics Performance Test (MPT) scores. Pearson's product-moment correlation and an independent samples t-test were employed for analysis at the 0.05 level of significance. Results indicated that impulsiveness, inattentiveness, and parental socioeconomic status showed weak and non-significant relationships with mathematics performance. In contrast, parental involvement demonstrated a strong positive and statistically significant relationship with mathematics performance ($r = .905$, $p < .05$). No significant gender difference was found in mathematics performance. The findings highlight the central role of parental engagement in supporting the academic progress of pupils with ADHD. Recommendations include targeted teacher training in inclusive classroom strategies and structured programmes that promote active parental participation in the education of children with ADHD.

Keywords: Academic performance, Attention-Deficit Hyperactivity Disorder, Inclusive education, Parental involvement, Socioeconomic status

Introduction

A person's academic achievement is a reflection of their efforts and the extent to which they have accomplished their objectives. There is no agreement on the nature of the most essential factor or the best way to quantify it, but it may be done via exams or continual evaluation. Students' progress from one test to another or their score on a single test is what academic performance is referred to as advancement by Henderson & Mapp (2002) in Ubani et al. (2022). Academic performance is also defined as the knowledge and competence gained by studying a topic, usually as assessed by test results. According to Obi (2021)), a student's performance is characterised by how far they go on a certain test or standardised evaluation. According to Ubani and Sanikpege (2020), children's success in life is a product of the support they get from their homes and schools. School-based assessment, which combines continuous

assessment with periodic tests, is a widely accepted means of judging pupils' academic performance (Ukwuije & Opara, 2013).

Using a descriptive study grounded in the qualitative research paradigm, Ubani et al. (2022) sought to understand how pre-service teachers felt about working with students who had special needs throughout their practicum experiences. Eleven pre-service teachers participated, and their experiences with kids with special needs during practicum confirmed the need for professional development opportunities to help them better understand and meet the needs of students with disabilities. Effective teaching of pupils with learning disabilities depends on instructional approaches that are adapted to their individual learning needs (Ubani, 2022).

In this study, academic achievement serves as the dependent variable, with psychosocial characteristics serving as the independent variables. Gender, socioeconomic position, class, prejudice, and age are some of the elements that impact social variables. In this study, the researcher could only look at two social variables: the socioeconomic position of parents and their level of engagement in their children's learning objectives related to Attention-Deficit-Hyperactivity-Disorder (ADHD). The research takes impulsivity and inattentiveness into account as psychological issues.

Hence, 270 normally developing primary school students (142 males and 128 girls) from various nationalities were recruited from Malaysia using purposive sampling; the mean age of the students was 9.75 years, and the study examined the effects of attention, impulsivity, and gender on academic achievement. The researchers looked at the relationships between different perceptual and motor skills and academic performance. Research found a strong correlation between academic success and the ability to regulate impulses and focus. The study showed that attention and impulse control are closely tied to academic achievement among typically developing children (Alavi et al., 2018).

Several potential deficits, such as decreased emotional/motivational regulation, impaired fine motor coordination, decreased time management, increased behavioural disruptiveness, poor sleep hygiene, academic performance below anticipated intellectual capacity, and worse quality of life, may accompany the onset of two of these critical symptoms; impulsivity, inattention, and hyperactivity; in children as early as before the age of twelve (American Psychiatric Association, 2013). On the other hand, the disease is known to remain stable and ongoing from childhood into adulthood, and it has the potential to become a chronic condition requiring financial and social assistance (Pelham et al., 2020). An individual with ADHD is at increased risk for a variety of negative outcomes, including low educational achievement and substance abuse, which may interact with or worsen risks associated with socioeconomic disadvantage; however, when families are involved in their children's education, many stakeholders become aware of the child's disability (Mantey, 2020). Furthermore, since ADHD and ADHD-related traits are also highly heritable, a parent's lack of education might be linked to their ADHD status, leading to a child's or parent's lack of educational achievement.

Due to their preference for "hands-on" or "active" work; which is characterised as having lower socioeconomic status; one parent may have less prestigious employment than other parents with the same traits. Concerning fathers' roles, new research indicated that a correlation with behavioural issues in children (also associated with ADHD) was only shown in cases where the father was actively involved in raising his children (Condo et al., 2022). Condo et al. (2022) set out to determine the effects of parental participation, ADHD symptoms, and co-occurring ODD on children's general, reading, and arithmetic performance. 162 children, aged 8 to 13 (mean age 6 to 9 days), from clinically evaluated or community-based samples, had their academic success standardised, parental engagement measured, and ADHD symptoms measured by instructors. Math and total academic accomplishment were negatively correlated with parental participation ($\beta = -.13$ to $-.26$, both $p < .05$), but this did not interact with the correlations between ADHD symptoms and academic performance in any of the models that were examined. Prior research on the academic performance of ADHD has mostly ignored this population in Nigeria in favour of secondary school and college students from other countries. Therefore, the purpose of this paper was to investigate the following: first, how gender, as a moderating variable, affects students' math grades; second, how psychosocial factors, including impulsivity, lack of focus, social skills, parental socioeconomic status, and parental involvement in their children's education, affect students' math grades in Port Harcourt Metropolis, Rivers State.

Because of the disorder's characteristics, children with ADHD often struggle in social situations. In particular, the level of parental involvement or lack thereof; in terms of rapport, aid with school learning activities, communication style, moral support, and financial duties for intervention might be critical determinants of these adolescents' performance. This only goes to show that a child's academic performance may be affected by the level of involvement and support from their parents or guardians. Although many studies have looked at what makes ADHD students struggle in secondary school in Africa, with some focusing on Nigeria in particular, it appears that no one has tried to compare the academic performance of ADHD students to that of students with other special needs, specifically those with learning and behavioural disorders, using the same curriculum guide and assessment tools that all students in secondary school use, regardless of whether they have ADHD or not.

The researcher aimed to determine the extent to which psychosocial variables were associated with the academic performance of young children with ADHD in primary education in Nigeria, with a focus on the study area of Rivers State. Prior research has focused on secondary school settings, where factors such as teachers' prior knowledge of ADHD, parents' stress levels, and parents' academic qualifications have been examined. Since there have been relatively few studies conducted in primary schools in Nigeria, this study sought to fill that gap.

Students in Port Harcourt Metropolis, Rivers State, who suffer from ADHD were the subjects of this research, which set out to investigate the relationship between psychosocial factors and mathematical achievement. The study's secondary objective is to identify gender differences in the chosen primary schools' students' psychosocial characteristics and their potential ramifications.

The study's specific objectives are:

1. Identify impulsivity as a predictor of mathematical achievement among students in Port Harcourt Metropolis who suffer from ADHD
2. Find out how the maths grades of students in Port Harcourt Metropolis who suffer from ADHD correlate with their levels of inattentiveness.
3. Find out if the maths grades of students in Port Harcourt Metropolis who have ADHD are correlated with their parents' socioeconomic position.
4. Find out if the students' Mathematics scores relate to how involved parents are in their children's education who have ADHD in Port Harcourt Metropolis,
5. To find out if there is a difference in maths grades between boys and girls in Port Harcourt Metropolis who have ADHD

The following research questions guided the study:

1. To what extent does impulsiveness relate to the mathematics performance of pupils with ADHD in Port Harcourt Metropolis?
2. To what extent does inattentiveness relate to the mathematics performance of pupils with ADHD in Port Harcourt Metropolis?
3. To what extent does parents' socio-economic status relate to mathematics performance of pupils with ADHD in Port Harcourt Metropolis?
4. To what extent does parental involvement in children's learning activities relate to mathematics performance of pupils with ADHD in Port Harcourt Metropolis?
5. To what extent does mathematics performance of pupils with ADHD in Port Harcourt Metropolis differ based on gender?

The following hypotheses were formulated to guide the study at a 0.05 level of significance:

1. Mathematics performance of pupils in Port Harcourt Metropolis who have ADHD is not significantly related to impulsiveness.
2. Pupils in Port Harcourt Metropolis who suffer from ADHD do not show a correlation between their inattentiveness and their mathematical ability in school.
3. Among pupils in Port Harcourt Metropolis who suffer from ADHD, there is no discernible correlation between the numerical proficiency of the students and their parents' socioeconomic position.

4. Among pupils in Port Harcourt Metropolis who suffer from ADHD, there is no discernible correlation between the level of parental participation and their mathematical academic performance.
5. In the Port Harcourt Metropolis, pupils with ADHD do not vary significantly in maths grades by gender on average.

This study experimentally investigated one of the few ideas that explained how educational accomplishment is attained: Walberg's (1981) theory on educational productivity. According to Walberg, students' learning outcomes (cognitive, behavioural, and attitude-based) are influenced by their near-environmental psychological factors as well as their own personal psychological characteristics. Students' motivation, age, developmental level, classroom atmosphere, home environment, peer group, and exposure to mass media outside of school are the nine factors that Walberg found to affect educational outcomes. Previous studies have shown that the psychosocial aspects of classroom learning settings have an incremental validity when it comes to effects on accomplishment. Research on curriculum assessment may benefit from students' self-concept, attitudes, behaviours, intrinsic motivation, and general learning engagement. Teachers can utilise this knowledge to create more effective classrooms. To get at students' unique, rather than group-based, viewpoints on classroom life, other researchers in the field of learning environment evaluation have created and verified constructivist-based, individual learning environment measures (Shamaki, 2015).

The goal of studying the learning environment has always been to help students learn as much as possible there. Moreover, learning is a contextually specific yet fundamentally personal process. Instead of relying just on IQ, one may get a deeper understanding of the world around them by direct experience and observation. According to research (Singh et al., 2021), when parents are involved, their children's interest, skill, and attitude all increase. It follows that one's home front has an effect on one's self-perception, competence, attitude, interest, and value systems. This study is noteworthy because it integrates the intrapersonal and interpersonal aspects that may influence the academic achievement of elementary school-aged children with ADHD. While many researchers have looked at how student-teacher interactions affect students' grades, not many have dug further into the complexities of diseases and the role of psychosocial factors in predicting grades. This research is also noteworthy since it looks at elements both inside and outside of the classroom to see whether they affect students' performance in school.

Methodology

The study adopted a correlational survey design. This design was considered appropriate for examining the strength and direction of relationships between psychosocial variables and academic performance without experimental manipulation of variables. An independent samples t-test was additionally used to examine gender differences. The population consisted of 20 pupils aged 8–11 years who had been diagnosed with ADHD and were enrolled in inclusive or special education classrooms in Port Harcourt Metropolis, Rivers State. Inclusion criteria required a history of ADHD symptoms before the age of seven or a formal diagnosis based on clinical interviews with parents and teachers, as well as placement in Primary 2, 3, or 4. Because the population was small and accessible, a census sampling approach was used; all 20 pupils were included. Three instruments were employed. The Psychosocial Scales (PSS) assessed impulsiveness and inattentiveness using a 10-item, 4-point Likert-type scale (Strongly Agree = 4 to Strongly Disagree = 1). The Parental Readiness Scale (PRS) measured parental involvement in children's learning activities. Pupils' previous Mathematics Performance Test (MPT) scores, obtained from school records, served as the measure of academic performance in mathematics. Face and content validity of the instruments were established by specialists in inclusive education, measurement and evaluation, and mathematics education. Cronbach's alpha reliability coefficients were 0.83 for the PSS and 0.78 for the PRS, indicating acceptable internal consistency. Teachers completed the PSS for each pupil, while parents completed the PRS. Mathematics scores were retrieved from school records with the permission of school heads. Pearson's product-moment correlation was used to answer research questions 1–4 and to test the corresponding hypotheses. An independent samples t-test was used for research question 5 and hypothesis 5. All analyses were conducted at the 0.05 level of significance.

Results

Table 1: Relationship between Impulsiveness and the Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis

Variable	Impulsiveness	Academic Performance
Impulsiveness	1	-.015
Sig. (2-tailed)		.394
N	20	20
Academic Performance	-.015	1
Sig. (2-tailed)	.394	
N	20	20

**. Correlation is significant at the 0.05 level

Table 1 shows that the relationship between pupils' impulse behaviour and academic achievement in Mathematics of ADHD pupils in Port Harcourt metropolis is-.015. The result indicates that, between pupils with ADHD and academic performance quality in Mathematics, there is a very low negative relationship between them: this means that pupils with ADHD were negatively related and that the less impulsive the pupils with ADHD, the better their academic performance in Mathematics. The finding indicates that there is a marginal decrease in the scores on Academic performance in Mathematics as scores for the variable impulsiveness increase for pupils with ADHD in Port Harcourt Metropolis. Table 1 reveals that at the 5 percent (0.05) level of significance the relationship is significant between impulsiveness and the academic performance of Primary school pupils in Mathematics in the study area (Port Harcourt Metropolis out of Rivers State). The result from the null hypothesis is accepted. This is because the p-value is higher than the level of significance in the results obtained, which is 0.05, with a p-value of 0.394. The null hypothesis based on the results obtained is that there is no significant relationship between the mathematics performance of pupils with ADHD in Port Harcourt Metropolis and impulsiveness.

Table 2: Relationship between Inattentiveness and Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis

Variable	Inattentiveness	Academic Performance
Inattentiveness	1	-.027
Sig. (2-tailed)		.909
N	20	20
Academic Performance	-.027	1
Sig. (2-tailed)	.909	
N	20	20

**. Correlation is significant at the 0.05

Table 2 shows that the correlation of Inattentiveness and academic performance in Mathematics of pupils with ADHD in Port Harcourt Metropolis is .027. The result indicated that there was a very low positive relationship between Inattentiveness and Academic performance in Mathematics among pupils with ADHD in Port Harcourt Metropolis. This finding suggests that there is a positive correlation between Pupils with ADHD scores in Inattentiveness and academic performance in Mathematics of the study pupils in Port Harcourt Metropolis. Table 2 above shows that there is a significant and positive relationship between Inattentiveness and academic performance of Primary School Pupils

in Rivers State at the 0.05 level of significance. The conclusion of the null hypothesis is congruent with it. This is because the p-value (.103) is greater than the level of significance (0.05). The result of the null hypothesis is that there is no significant relationship between Inattentiveness and academic performance in Mathematics among pupils with ADHD in Port Harcourt Metropolis.

Table 3: Relationship between Parental Socioeconomic Status and the Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis

Variable	Parental SES	Academic Performance
Parental SES	1	.202
Sig. (2-tailed)		.394
N	20	20
Academic Performance	.202	1
Sig. (2-tailed)	.394	
N	20	20

** . Correlation is significant at the 0.05

Table 3 hereby presents the Mathematics performance of Pupils with ADHD between the two variables, Parental SES and Academic performance, in Mathematics, in Port Harcourt Metropolis. The correlation (.202) shows that there is no relationship between the measures of the two. From the aforementioned Table 3 shows that there was a significant relationship between Parental SES and the academic performance of Primary school pupils (especially in Mathematics) in Port Harcourt Metropolis of Rivers State at 0.05 level of significance. If the null hypothesis is accepted, the null hypothesis is accepted. This is because the p-value (.394) is greater than the level of significance (0.05). Under the null hypothesis is that there is no significant relationship between Parental SES and the academic performance in mathematics for pupils with *ADHD* in Port Harcourt Metropolis.

Table 4: Relationship between Parental Involvement in their children's learning activities and the Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis

Variable	Parental Involvement	Academic Performance
Parental Involvement	1	.905**
Sig. (2-tailed)		.000
N	20	20
Academic Performance	.905**	1
Sig. (2-tailed)	.000	
N	20	20

** . Correlation is significant at the 0.05

From Table 4, it is observed that the Mathematics Performance of the pupils with ADHD in Port Harcourt Metropolis has a relationship of .905 with Parental Involvement. The results shown in Table 4 shows that the Parent Involvement and Academic Performance of Primary School pupils in Port Harcourt Metropolis of Rivers State is significant at the 0.05 level of significance. The result of the null hypothesis is rejected. This is because the p-value (.000) is less than the level of significance (0.05). The result of the null hypothesis is that there is no significant relationship between Parental Involvement and in Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis.

Table 5: Independent Sample t-test of the mean difference in the Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis

Gender of pupils	N	$\bar{X}$	S	Df	Cal t-value	P-value	Decision
Male	9	30.0	31.2				H ₀ accepted p
Female	11	34.9	18.7	18	-0.436	0.063	> 0.05

Alpha level = 0.05

The table above shows that there are 9 male pupils and 11 female pupils that comprised the 20-pupil sample size. The male pupils had a lower mean performance (Mean = 30.0, S.D = 31.2), compared to their female counterparts (Mean = 34.9, S.D = 18.7). This result indicates that the female pupils performed better in Mathematics than the male pupils.

Thus, the answer to this research question indicates that the Mathematics test scores in Table 5 slightly differ among pupils with ADHD in Port Harcourt Metropolis. Table 5 presents an independent-samples t-test of the mean difference in the Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis. As can be seen from Table 5, the estimated value of tcal is -0.436, the p-value at this t is 0.063, and the value of the selected alpha is 0.05. This shows that the significance level ($p > 0.05$) has been surpassed by the p value (0.063). The result shows that male and female pupils who have ADHD in Port Harcourt metropolis had a negative mean difference in their academic performance in Mathematics. This further suggested that average results were obtained by female pupils, but slightly better than their male counterparts. Thus, the null hypothesis is accepted. The result revealed that the mean difference in the Mathematics Performance of pupils with ADHD in Port Harcourt Metropolis is significant at the 0.05 level of significance.

Students with ADHD may have difficulties in the classroom due to a variety of psychosocial factors, including impulsivity, lack of focus, social skills, parental socioeconomic status, and parental involvement in their children's education. A study was conducted in the Port Harcourt Metropolis of Rivers State to examine the relationship between students' academic performance and psychosocial characteristics. A combination of survey and correlational research methods was employed in the study. In the study, six research issues were addressed, and related null hypotheses were examined. The research was conducted in the Port Harcourt Metropolis LGA of Rivers State. Within the local government, there are a variety of towns, metropolitan areas, and regions that make up the greater Port Harcourt region.

This study was intended to be undertaken in the area where the researcher had extensive knowledge. Twenty local students with attention deficit hyperactivity disorder provided the sample for the research. Twenty students in local elementary schools who were diagnosed with ADHD were included in the study's sample. All of the students' parents and instructors were asked to fill out and submit data-collection forms. The research made use of the census sampling method. Two measures that were developed independently: the PRS and the PSS. Further information was derived from the previously administered MPT. The Likert scale was used to design the instruments. Two Educational Psychologists and a Measurement and Evaluation specialist checked the tests for accuracy. To verify the test's and instrument's dependability, the Cronbach alpha reliability approach was used. Both devices had reliability coefficients of 0.83 and 0.78, respectively.

In order to administer the instruments, permission was requested and granted by the head teachers. At the 0.05 level of significance, the Pearson Product Moment Correlation Method was used to answer research questions 1, 2, 3, 4, 5 and to evaluate the hypotheses associated with them. To test the null hypothesis, we used an independent-samples t-test, and to examine research question 6, we employed the mean and standard deviation approach. According to the study's findings, students in Port Harcourt Metropolis who suffer from ADHD have a weak negative correlation between impulsiveness and their math grades. Specifically, the study found that (i) impulsiveness significantly correlates with math grades, and (ii) inattention negatively correlates with math grades, among ADHD students in Port Harcourt Metropolis. (iii) Among students in Port Harcourt Metropolis who have Attention Deficit/Hyperactivity Disorder, there is a strong correlation between impulsivity and their mathematical ability. (iv.) For students in Port Harcourt Metropolis who suffer from ADHD, there is a weak negative correlation between social skills and mathematical achievement.

In the Port Harcourt Metropolis, students with ADHD have a strong correlation between their Math grades and their Social Skills. In the Port Harcourt Metropolis, students with ADHD show a weakly positive correlation between parental socioeconomic status and their mathematical ability in the classroom (vii.) Pupils in Port Harcourt Metropolis with ADHD show a substantial correlation between parental socioeconomic status and mathematical achievement. Students in Port Harcourt Metropolis who suffer from ADHD have a highly favourable correlation between the degree to which their parents are involved in their education and how well those students do in mathematics (ix). Students in Port Harcourt Metropolis who suffer from ADHD show a strong correlation between parental involvement and their mathematical achievement in school. Section (x). In the Port Harcourt Metropolis, students with ADHD show gender differences in their mathematical ability. Chapter XI. In Port Harcourt Metropolis, there is a marked gender gap in the academic achievement of students with ADHD.

Conclusion

This study examined the relationships between selected psychosocial variables and the Mathematics Performance of primary-school pupils with ADHD in Port Harcourt Metropolis. Within the limits of a small sample, impulsiveness, inattentiveness, and parental socioeconomic status were not significantly associated with mathematics performance. Parental involvement, however, showed a strong positive and statistically significant relationship with mathematics achievement. Gender differences in performance were not significant. The findings underscore the practical importance of parental engagement in supporting the academic progress of pupils with ADHD. While behavioural characteristics associated with ADHD remain relevant to classroom management and instructional design, the data suggest that consistent parental involvement may be a particularly potent protective factor for mathematics learning in this population. These results should be interpreted with caution given the small sample size, and they invite further investigation with larger and more diverse groups of pupils.

Recommendations

1. Teachers should employ inclusive instructional and classroom management strategies that help mitigate the effects of impulsivity and inattention on the learning of pupils with ADHD.
2. Parents should be actively encouraged and supported to participate in their children's education through regular monitoring of learning activities and sustained collaboration with teachers.
3. School counsellors and educational psychologists should implement structured behavioural support and parent-engagement programmes aimed at improving academic outcomes for pupils with ADHD.
4. Educational authorities and the Government should provide regular professional development for teachers on evidence-based approaches to identifying and supporting pupils with ADHD in inclusive classrooms.
5. Further research using larger samples and additional geographical locations is recommended to confirm and extend the present findings.

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