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Prevalence of Neurodevelopmental Disorders Among Children Attending Early Year Education Level Within Kiambu County, Kenya

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Abstract

Neurodevelopmental disorders (NDDs) significantly affect a child's capacity to function in educational, social, and personal settings. This study sought to determine the prevalence of NDD symptoms among children in early year education levels in Kiambu County, Kenya. A cross-sectional descriptive design was employed, targeting 348 early childhood teachers from public and private schools across 12 sub-counties. Data collection utilized the Early Symptomatic Syndromes Eliciting Neurodevelopmental Clinical Examination Questionnaire (ESSENCE-Q), a 12-item screener for early detection of NDD-related symptoms. The ESSENCE-Q tool, developed by Gillberg Neuropsychiatry Centre, has proven effective as a screening mechanism for various symptoms associated with NDDs. The tool comprises items related to developmental, behavioral, and emotional symptoms, and though it is not diagnostic, it serves as a valuable initial screener. Out of 348 administered questionnaires, 311 were returned (89% response rate). The findings revealed a high prevalence of symptoms related to Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD). Specifically, 13% of learners exhibited clear signs of inattention and hyperactivity, 10% had feeding difficulties associated with ASD, and 15% showed significant mood-related symptoms, with an additional 18% presenting mild symptoms. These findings indicate a concerning level of potential NDDs in the region, necessitating further diagnostic assessments and policy-level interventions. Comparisons with global studies revealed significantly higher symptom prevalence, which may be attributed to methodological, cultural, and environmental factors. The study underscores the urgency for tailored early interventions and enhanced teacher training in Kenya.

Keywords*: Neurodevelopmental Disorders, Prevalence, Early Childhood Education, Inclusive Education & Child Development*

Stratford Peer Reviewed Journals and Book Publishing
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1. Introduction and background

Neurodevelopmental disorders (NDDs) are mental health conditions characterized by impairments in the development of the brain and central nervous system, affecting emotional regulation, learning ability, self-control, and memory (Reichard & Zimmer-Bensch, 2021). In the section on NDDs, the DSM V and ICD 10-11 categorized all the disorders that occur during the development time. As explained by Herwegen et al., (2019), the word NDD was implemented since the disorders were considered to be brought about by the linkage of different factors, for instance, genetics, medical and surrounding components especially at the time of the prenatal period of growth, leading to complicated neurological difficulties which influences brain operations in the predisposed children. Even though characteristics differ in various disorders, many of them are manifested by deficits in development which causes dysfunctions in social, school, personal, and even occupational operations which are mostly indicated as soon as before joining school (Thapar et al., 2017). Among the non-verbal NDDs include those about learning, attention, motor, and communication (Garralda, 2023).

These disorders typically emerge early in childhood and include conditions such as Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorder (ASD), Intellectual Developmental Disorder (IDD), communication disorders, and specific learning disorders (Banu et al., 2022). NDDs often result in substantial challenges in personal, social, academic, and occupational functioning. They can disrupt a child's development and compromise their educational attainment unless detected early and managed effectively. Teachers in early childhood education are often the first to observe behaviors and symptoms that may indicate the presence of an NDD. However, many teachers lack the specialized training necessary for recognizing and appropriately supporting children with these conditions (Rhodes, 2022).

Despite increasing awareness and identification of NDDs globally, much of the research and support structures are concentrated in high-income countries. In Kenya, there is limited research on the prevalence of NDDs in early education settings. Most children with mild forms of NDDs are integrated into mainstream classrooms, yet they often go unidentified and unsupported due to a lack of screening tools and teacher training (Onyishi, 2022). The situation is exacerbated by a lack of diagnostic resources and specialized support systems within Kenyan schools, particularly in rural and peri-urban areas such as Kiambu County. Although Kenya has embraced inclusive education policies, implementation remains inconsistent, and teachers frequently report being unprepared to support learners with special needs (Abubakar et al., 2022).

Neurodevelopmental disorders are commonly found in typical classroom settings, and students with these conditions often experience difficulties in both behavior and learning. These challenges are exacerbated by the continuous assessments that are standard in mainstream education (Huber & Helm, 2020). Although all-inclusive schooling means that all students suffering from NDDs are fit to seek their education in regular schools, the specific manifestations linked to different NDDs have brought about specific difficulties in all-inclusive classrooms. Nevertheless, the specific behavior difficulties linked for instance in ASD, such as participating in constant screams, singing, and even insignificant continuous utterances, have mostly suggested the importance of more vigilant methods in managing schooling in such settings (Griffin, 2018). To support this, Barua et al., (2022), contend that most children suffering from NDD mostly appear different and misplaced

in regular school classrooms, therefore attaining their specific needs is complicated as well as a demanding task for tutors and other students.

The prevalence of several NDDs including visual impairment, epilepsy, neuro-motor disability (like cerebral palsy), hearing impairment, speech and language disorder, ASD, intellectual developmental disorder (IDD), ADHD, and learning disorders. Globally, various studies have attempted to quantify the prevalence of NDDs in childhood. A study by Arora et al. (2018) in India found that the prevalence of NDDs ranged from 2.9% to 18.7% among children aged 2–6 years. ADHD and ASD were among the most prevalent disorders, with significant comorbidity observed across different NDDs. Francés et al. (2022) conducted a systematic review of studies using DSM-5 criteria and found ADHD to be the most prevalent NDD globally, with rates ranging between 5% and 11%. Other disorders such as learning disorders, ASD, and communication disorders had prevalence rates ranging from 1% to 10%. Their findings highlighted the chronic, underdiagnosed, and comorbid nature of these disorders.

Fleming et al. (2020) examined the prevalence of NDDs in Scotland and noted that multi-morbidity was common, with 33% of children with ASD having another co-occurring disorder. ADHD was found to have the highest correlation with school exclusion, emphasizing its disruptive nature. Kita et al. (2020) studied co-occurrence rates among ADHD, ASD, and learning disorders in Japan. Their findings revealed a significant overlap, with teachers reporting higher symptom rates than parents, indicating the importance of school-based screening. In Norway, Hansen et al. (2020) reported that 55.5% of children referred to child and adolescent mental health services had at least one NDD. ADHD was the most prevalent, affecting 44.5% of referred children, and co-occurrence with other disorders was common.

While these studies provided prevalence estimates for common NDDs, such research focused on the African and Kenyan context appears limited. No studies were found examining the current rates of disorders like ADHD, ASD, IDD, and LD specifically among school-aged populations in Kenya. Existing studies, such as those by Mbugua (2019) and Onyishi (2022), note a significant gap in awareness and diagnostic capacity. This data scarcity represents a notable gap, as prevalence likely varies based on geographic, cultural, socioeconomic, and other population factors. This has occasioned the dissemination of inaccurate information on neurodevelopmental diseases and a significant deficiency in understanding among professionals tasked with conducting diagnostic procedures and managing NDDs (Onyishi, 2022).

Understanding NDDs prevalence among Kenyan children could aid educational institutions in the allocation of resources and support services. Investigating differences across demographic variables may also reveal groups at higher risk requiring targeted interventions. Thus, more research was needed to document the occurrence of different neurodevelopmental conditions among students in key African regions, including Kenya. This study contributes to filling this gap by providing data on NDDs symptom prevalence in among school going children in early year education level in Kiambu County.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Sociology, Psychology & Religious Studies
Volume 7||Issue 2||Page 14-24 ||April||2025|
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2. Statement of the Problem

The global prevalence of NDDs is rising, posing significant challenges to education systems worldwide. In Kenya, there is increasing concern about the number of children entering the school system with undiagnosed or unsupported NDDs such as ADHD, ASD, IDD, and learning disorders. These disorders impair children's academic, social, and personal functioning, limiting their capacity to thrive in mainstream education settings. Although inclusive education has gained traction in Kenya, the reality on the ground reveals limited screening mechanisms, insufficient teacher training, and lack of structured support services, especially in early childhood education. Preliminary observations in Kiambu County suggest that many children exhibit symptoms consistent with NDDs, yet no formal assessment or support mechanisms are in place. The lack of empirical data on the prevalence of NDDs among children in early year education in Kiambu County has created a significant knowledge gap that hinders policy development, teacher preparedness, and early intervention planning. This study aimed to address this gap by determining the prevalence of NDD-related symptoms using a standardized screener tool.

3. Methodology

A cross-sectional descriptive study design was adopted. The target population included teachers in early year education that comprised teachers supporting learners at PP1, PP2, Grade1, Grade 2 and Grade 3 within Kiambu County. The researcher disseminated a total of 348 questionnaires to respondents that met the inclusion criteria, out of which 311 questionnaires (89.4%) were properly completed and returned for analysis. Thirty-seven (37) questionnaires, representing 10.6%, had some section left incomplete thereby limiting the ability to analyze the same. With a response rate of 50% is fair, 60% is good, and more than 60% is exceptional for analysis and interpretation. The response rate of 89.4% is therefore exceptional and within the acceptable rate to be used as a representative sample. Data collection instruments included structured questionnaires with a sociodemographic section and the ESSENCE-Q tool. The ESSENCE-Q, is a 12-item tool used as a quick screener for various problems that correlate with neurodevelopmental disorders. Its purpose is to identify children with symptoms of NDDs. The tool's psychometric characteristics include a Cronbach's alpha of 0.82, consistent agreement across different raters in more than five studies, stability over time, and agreement with clinical diagnoses. It consists of 12 questions representing various NDD symptoms, with teachers participating in the studies expected to respond with either a Yes (Y), Maybe A Little (MAL) or No (N) for each question in relations to the learners within their classrooms. A total of 311 questionnaires were returned, reflecting an 89% response rate. Data was analyzed using SPSS version 23 to generate descriptive statistics. Ethical clearance was obtained from DU-ISERC, NACOSTI, and Kiambu County Educational Office while informed consent was provided for all participants.

4. Results

4.1 Sociodemographic Information of Participants

This section presents the demographic information of the respondents, including gender, age bracket, highest level of education, duration of teaching at the current level, type of school, and the location of the school. The data is essential for understanding the background of the teachers participating in the study and ensuring that the sample represents a diverse group of educators. Table 1 present the results of the demographic information of the respondent.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Sociology, Psychology & Religious Studies
Volume 7||Issue 2||Page 14-24 ||April||2025|
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Table 1: Sociodemographic Information of the Respondents

Demographic Variable	Category	Frequency	Percent
Gender	Male	50	16%
	Female	261	84%
	Total	311	100%
Age Bracket	25 - 34 years	102	33%
	35 - 44 years	84	27%
	45 - 54 years	121	39%
	Above 55 years	4	1%
	Total	311	100%
Highest Level of Education	ECD Certificate	107	34%
	P1 Diploma	153	49%
	Undergraduate	51	16%
	Total	311	100%
Teaching Experience at Current Level	Below 5 years	31	10%
	5 - 10 years	75	24%
	11 - 15 years	109	35%
	16 - 20 years	36	12%
	Above 20 years	60	19%
	Total	311	100%
Type of School	Private school	33	11%
	Public school	278	89%
	Total	311	100%
School Location	Urban	24	8%
	Semi-Urban	255	82%
	Rural	32	10%
	Total	311	100%

The majority of the respondents were female, representing 84% (261) of the total sample, while male teachers accounted for 16% (50) of the participants. This gender imbalance is consistent with the general trend in early childhood education, where women often dominate the teaching workforce. Since the gender reflects the normal trends of teachers' population within early-year education level, this therefore does not affect the validity of findings. In addition, the focus of this study was on broader themes that applied to all participants, regardless of gender, rather than on variables directly associated to gender.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Sociology, Psychology & Religious Studies
Volume 7||Issue 2||Page 14-24 ||April||2025|
Email: info@stratfordjournals.org ISSN: 2706-6622

In terms of age, the largest group among the respondents was 45-54 years, comprising 39% (121) of the sample, followed by the 25-34 years age bracket at 33% (102) and the 35-44 years age group at 27% (84). Only 1% (4) of the respondents were above 55 years old. The mix of experienced and relatively younger teachers in the early childhood education sector could lead to a balance between traditional teaching methods and newer, more innovative approaches in the classroom. Nearly half of the respondents, 49% (153), held a P1 Diploma, while 34% (107) had an ECD Certificate. Teachers with an undergraduate degree made up 16% (51) of the sample. These figures indicate that most of the respondents have the necessary qualifications to teach at the early childhood level. However, the relatively lower representation of teachers with undergraduate degrees may suggest a need for further professional development and higher education opportunities in the sector.

The study established that 35% (109) of the participants had been teaching at their current level for 11-15 years, followed by those with 5-10 years of experience at 24% (75) and teachers with more than 20 years of experience at 19% (60). Teachers with 16-20 years and below 5 years of experience represented 12% (36) and 10% (31) of the sample, respectively. The high proportion of teachers with 11-15 years of experience suggested a stable and experienced workforce in early childhood education, which could contribute to better classroom management, understanding of child development, and the ability to support children with diverse needs, including those with neurodevelopmental disorders.

A significant majority of the respondents, 89% (278), were teaching in public schools, while 11% (33) were teaching in private schools. This predominance of public-school teachers in the sample reflected the larger proportion of public schools in the Kiambu County education system. The differences in resources, policies, and support systems between public and private schools may influence teachers' experiences and their ability to support children with neurodevelopmental disorders.

Regarding school location, most of the respondents, 82% (255), categorized their school as semi-urban, while rural schools accounted for 10% (32) of the sample, and urban schools represented 8% (24) of the respondents. The high percentage of teachers working in semi-urban schools may be indicative of the general distribution of schools in Kiambu County. The school location could have implications for the availability of resources, access to professional development opportunities, and the socio-economic background of the students, all of which may impact teachers' experiences and their ability to support children with neurodevelopmental disorders.

4.2 Prevalence of Neurodevelopmental Disorders

Teachers were asked to complete the ESSENCE-Q by indicating whether they had any learner in their class who showed each of the NDDs symptoms in the tool by indicating Yes (Y) for symptoms that were clearly present, Maybe A Little (MAL) for mild symptoms and No (N) if no learner in that class showed any of the mentioned symptoms. The results are summarized in Table 2.

Stratford Peer Reviewed Journals and Book Publishing
Journal of Sociology, Psychology & Religious Studies
Volume 7||Issue 2||Page 14-24 ||April||2025|
Email: info@stratfordjournals.org ISSN: 2706-6622

Table 2: Prevalence of Symptoms of Neurodevelopmental Disorders

Statements	Screened NDDs	Yes	May be a little	Not at all
Have delays in general development	IDD	3%	20%	77%
Have challenges with motor development/milestones	IDD, ASD	3%	15%	82%
Have challenges with sensory reaction (e.g., touch, sound, light, smell, taste, heat, cold, pain)	ASD	5%	7%	88%
Have challenges with communication/language acquisition	Communication Disorder or ASD	8%	22%	70%
Are overactive or challenges with impulsivity	ADHD	6%	18%	76%
Have challenges with paying attention/concentration/ "listening"	ADHD	13%	23%	64%
Have challenges with social interaction/interest in other children	ASD	6%	7%	87%
Have behaviours that would appear repetitive or insistence on routine	ASD	7%	19%	73%
Their mood is often depressed, elated/manic, extreme irritability, crying spells	ADHD, ASD	15%	18%	68%
Have challenges with sleeping	ASD, ADHD	6%	14%	81%
Have challenges with feeding	ASD	10%	24%	66%

While ESSENCE-Q is not a diagnostic tool for NDDs, the majority of the participants indicated that children in early year education levels do not exhibit significant symptoms of NDDs. Nevertheless, a notable proportion of children had some mild levels of NDDs symptoms necessitating further investigation, with a small proportion of the learners clearly having symptoms associated with specific NDDs. The most prevalent symptom reported by teachers was mood-related issues that are often associated with ADHD and ASD, with 15% of the participants indicating they had learners in their classrooms who clearly had the symptoms, while an additional 18% of children exhibited milder symptoms of the same. Challenges with paying attention, concentration, or "listening" were the second most prevalent symptom that is also associated with ADHD, with 13% of the participants indicating they had learners who clearly showed these symptoms, while 23% of the participants indicated they had learners who had milder symptoms. Closely related, over-activity and impulsivity, which are often associated with ADHD, were clearly observed by 6% of the participants in their learners, while 18% of the participants indicated they had learners who showed mild symptoms of the same.

Feeding difficulties were the third most common symptom that is often associated with ASD. The results showed that 10% of the participants had learners in their class who clearly exhibited these symptoms, while 24% of the participants indicated they had learners in their class who had mild symptoms of the same. This was followed by communication or language acquisition challenges that are also often associated with ASD and Communication Disorder. The data revealed that 8% of the participants had learners who clearly showed these symptoms, while 22% of the participants

Stratford Peer Reviewed Journals and Book Publishing
Journal of Sociology, Psychology & Religious Studies
Volume 7||Issue 2||Page 14-24 ||April||2025|
Email: info@stratfordjournals.org ISSN: 2706-6622

indicated they had learners with mild symptoms of the same. Repetitive behaviors or insistence on routine, which are often associated with ASD, were clearly observed by 7% of the participants in their learners, while 19% of the participants indicated they had learners in their classrooms that exhibited milder symptoms of the same.

Difficulties with social interaction or interest in other children, which are often associated with ASD, were clearly observed by 6% of the participants in their learners, while 7% of the participants indicated they had learners in their classrooms exhibiting milder symptoms of the same. Challenges with sleeping, which are often associated with ADHD or ASD, were clearly observed by 6% of the participants in their learners, while 14% of the participants indicated they had learners in their classrooms exhibiting milder symptoms of the same. Sensory reaction challenges, which are often associated with ASD, were clearly observed by 5% of the participants in their learners, while 7% of the participants indicated they had learners in their classrooms exhibiting milder symptoms of the same. Delays in general development and difficulties with motor development or milestones, which are often associated with IDD and ASD, were the least prevalent symptoms. The results showed that 3% of the participants had learners in their classrooms who clearly exhibited general development and difficulties with motor development or milestones symptoms, while 20% of participants indicated they had learners in their classrooms exhibiting milder symptoms of general development, and 15% indicated they had learners in their classrooms exhibiting milder difficulties with motor development or milestones symptoms.

5. Discussion

The study found that neurodevelopmental disorders (NDDs) are prevalent among children in early year education within Kiambu County, with Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder (ASD) being the most common. The results indicated that 13% of children at the early year education level exhibited clear symptoms of attention and concentration difficulties associated with ADHD, while an additional 23% showed milder symptoms. These findings are higher than the prevalence rates reported by Wang et al. (2020), who found a weighted prevalence of 8.5% for ADHD among US children and adolescents aged 3-17 years. The higher rates in this study could be attributed to the focus on early year education, where ADHD symptoms are more noticeable unlike in the study by Wang et al (2021) that focused on both children and adolescents. The findings align more closely with Francés et al. (2022), who reported ADHD prevalence rates of 5-11% in their systematic review of NDDs in childhood across various countries.

The study established that ASD-related symptoms were significant, with 10% of children exhibiting clear feeding difficulties often associated with ASD, and 24% showing milder symptoms. This prevalence is notably higher than the rates reported by Arora et al. (2018), who found ASD prevalence ranging from 0.09% to 1.1% in their study of Indian children aged 2-9 years. The disparity in prevalence rates is attributed to differences in screening methods, cultural factors, and environmental influences. The study relied on teacher observations rather than clinical diagnoses, contributing to the higher reported rates.

The study also found a high prevalence of co-occurring symptoms associated with multiple NDDs. Mood-related issues, linked to both ADHD and ASD, were the most prevalent overall, with 15% of children showing clear symptoms and 18% exhibiting milder symptoms. This finding aligns

with the research of Hansen et al. (2020) conducted in Norway, who reported that 21.7% of children with NDDs had more than one neurodevelopmental disorder. The similarity in findings across different countries indicates that co-occurrence of NDD symptoms is a common phenomenon, transcending geographical boundaries. The differences in prevalence rates between this study and others are influenced by various factors, including variations in medical care during pregnancies and post-natal care. The higher rates observed in Kiambu County are attributed to environmental factors, differences in diagnostic criteria, and variations in screening methods.

In addition, there are other studies that contrast with the findings of this research. For instance, Sayal et al. (2018) indicated that only 1.4% of children aged 5-7 years in the UK met the full diagnostic criteria for ADHD, significantly lower than the 13% exhibiting clear ADHD symptoms in the present study. Also, Kim et al. (2011) reported an ASD prevalence rate of 2.64% among children aged 7-12 years in South Korea, which is lower than the 10% exhibiting clear ASD-related symptoms in this study. Moreover, Polanczyk et al. (2015) contrasts with the study findings, reporting a pooled worldwide ADHD prevalence of 5.29% with no significant differences between countries or regions. Further, Elsabbagh et al. (2012) found no significant difference in ASD prevalence estimates between high-income and low- and middle-income countries, challenging the notion that environmental factors in developing countries necessarily lead to higher prevalence rates.

6. Conclusion

This study established a high prevalence of symptoms associated with neurodevelopmental disorders among children attending early year education in Kiambu County. Symptoms related to ADHD and ASD were particularly prominent, highlighting a critical need for early identification and support mechanisms. The findings reinforce the relevance of equipping teachers with the knowledge and tools to recognize these symptoms early, as well as the importance of integrating structured screening procedures within school systems. The data underscore an urgent need for systemic changes in Kenya's education and health sectors to promote inclusive and supportive learning environments for all children

7. Recommendation

1. The Ministry of Education should adopt standardized screening tools such as the ESSENCE-Q for routine use in early childhood education to facilitate early identification of NDDs.
2. Comprehensive pre-service and in-service training should be provided to teachers to enhance their skills in identifying and supporting learners with NDDs.
3. Allocate adequate resources to schools, including learning aids, specialized personnel, and referral systems, to ensure learners with NDDs receive appropriate interventions.

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