

THE PREVALENCE OF DYSLEXIA, DYSCALCULIA, AND DYSGRAPHIA AS PREDICTORS OF ACADEMIC PERFORMANCE IN STUDENTS SUFFERING FROM SPECIFIC LEARNING PROBLEMS IN KARACHUONYO NORTH SUB COUNTY, HOMA BAY COUNTY

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Abstract - This study sought to determine the degree of impact of dyslexia, dyscalculia, and dysgraphia prevalence on the academic achievements of children having specific learning disabilities within Karachuonyo North Sub County in Homa Bay County. Using an ecological perspective grounded in Bronfenbrenner's Ecological System Theory and a learner-centered perspective based on Montessori's philosophy, this study used a descriptive survey design that was qualitative and quantitative in nature. The target population included 386 learners and 24 education stakeholders, from whom a sample size of 219 respondents was obtained using the Yamane's Formula. The results showed a high rate of SLDs prevalence among learners (65%, 127 learners), where dyslexia (28%, 55 learners), dyscalculia (22%, 43 learners), and dysgraphia (15%, 29 learners) were the major factors determining low academic achievement. Dysgraphia showed the lowest mean scores (42%) and highest standard deviation ($\pm 18\%$), suggesting that the teachers failed to recognize the disorder. Inferential analysis revealed that these SLDs impede academic literacy and numeracy skills among learners. Among psychosocial measures such as reassuring the teacher (21%), training in behavior modification (18%), and follow-up support (24%), significant improvements in academic performance were noted.

Keywords: *Specific Learning Disorders (SLDs), Dyslexia, Dyscalculia, Dysgraphia, Academic Performance*

Introduction

Education plays a key role in fostering social and economic development; however, students often encounter various obstacles that are invisible and include Specific Learning Disorders (SLD), which include dyslexia, dyscalculia, and dysgraphia among others. Specific Learning Disorders account for approximately 15% of all the school-going children around the world. The United States has effective mechanisms for detecting Specific Learning Disorders. In Africa, particularly Kenya, there are many challenges in detecting SLD because of lack of policies, poor teaching methodologies, and social stigma. While learning disorders are less known than other

disabilities in Kenya, despite various reforms conducted through the Competency-Based Curriculum (CBC) framework supporting legislative acts, studies have shown that dyscalculia occurs in 6.4 percent of learners.

However, no reliable data are available for other conditions, such as dyslexia, dyscalculia, and dysgraphia, particularly in rural regions, including Homa Bay County. Learners diagnosed with SLD struggle with their abilities to retain information, comprehend it, and perform tasks, but are poorly identified and supported. This research examined the incidence rate of dyslexia, dyscalculia, and dysgraphia as factors that influence the academic performance of pupils in Karachuonyo North Sub County.

1.1 Background

Specific Learning Disorders (SLD) are neurological impairments affecting the basic academic skills like reading, writing, and mathematical abilities among students who may have normal or above-average intelligence (American Psychiatric Association, 2023). Examples of SLD include dyslexia, dyscalculia, and dysgraphia. The disorders can be diagnosed at school level, and they do not emanate from culture, emotion, or socio-economic status (Afzal, 2019). About 15% of people around the globe suffer from the disorders, although their incidence varies depending on various countries' levels of awareness and support mechanisms for the affected learners (Scaria et al., 2023). SLD leads to constant academic failure which provisions for children with Specific Learning Difficulties (SLDs).

undermines the learner's self-esteem and motivation.

According to studies done in Kenya, it has been found out that the percentage of dyscalculia among children and adolescents enrolled in primary and secondary education is around 6.4%. In other words, the effects of mathematical problems are very prevalent for the advancement in academic success and employment opportunities (Wang'ang'a, 2023). However, national surveys done on special needs education have found out that there is a lack of identification regarding learning disabilities due to untrained teachers. This has affected children

negatively, especially those from rural areas such as Homa Bay (Development Initiatives, 2023).

Although there have been efforts for reforms through the Competency-Based Curriculum (CBC) in Kenya, alongside existing laws such as the Children's Act (2022) and the Disability Act (2003), learning difficulties are not well recognized compared to other types of disabilities such as auditory and physical disability (Nthenge, 2017). In the case of Homa Bay County in particular, and Karachuonyo North Sub County within, this is further hampered by lack of adequate studies and With this kind of background, the current research attempts to determine the frequency of dyslexia, dyscalculia, and dysgraphia as predictors of academic achievement in students suffering from learning difficulties in Karachuonyo North Sub County, Homa Bay County. The research will attempt to find evidence that can be used for interventions and to prepare teachers accordingly in order to foster inclusive education.

1.2 statement of the problem

In spite of Kenya's advanced policies concerning education such as Free Primary Education, The Children's Act (2022) and Persons with Disabilities Act (2003), learners with Specific Learning Disorders (SLDs) such as dyslexia, dyscalculia and dysgraphia have been ignored. According to national estimates, about 10-15% of all learners have learning problems but less than 2% of these learners are diagnosed and catered for (MOE, 2021). In Homa Bay County, a dropout rate among lower primary learners is 7.2% as a result of ineffective identification, inadequate teacher's preparation and parental participation. The most prevalent problem here is the lack of materials and people who can diagnose or help SLDs in this community.

Most studies done earlier on learning disabilities only focused on physical disabilities or intervention measures in general, but not the psychosocial interventions like teacher's encouragement, behavioral management, and follow-ups academically. Consequently, undiagnosed learners end up failing academically, having low self-esteem and eventually drop out and involve in risky social vices. The purpose of this study is thus to find out the extent of Specific Learning Disorders among grade three learners and establish the efficacy of the psychosocial interventions in raising the academic performance.

1.3 Objective of the Study

The objective of the study was to assess the extent to which the prevalence of dyslexia, dyscalculia, and dysgraphia influences the academic performance of learners with Specific Learning Disorders in Karachuonyo North Sub-County, Homa Bay County.

1.4. Scope of the Study

This research evaluated the influence of prevalence of dyslexia, dyscalculia and dysgraphia on the performance of learners with specific learning disorder at the Karachuonyo North Sub-County of Homa Bay County. The research focused on the effect of the above mentioned learning disabilities on performance. The target population comprised the class teachers, subject teachers, school counselors and the Grade 3 learners within the six selected primary schools while the sample consisted of 219 respondents. A descriptive survey design was used where the quantitative part of the research entailed use of questionnaires while the qualitative approach involved interview of education policy makers and psychologists on the issue. The research collected quantitative data concerning prevalence rates of the three conditions and qualitative information on their influence on performance. Through analysis of data collected, the study successfully fulfilled its research objective by evaluating the extent to which dyslexia, dyscalculia and dysgraphia affect the academic performance of the learners.

According to Sofologi et al. (2022), who focus on the multidimensional nature of learning disorders and the consequences associated with it on the academic and socio-emotional welfare of students with learning disorders, an elaborate explanation of learning disorders is provided. Learning disorders can be either learned through experience or genetically transferred, and in most cases, lead to academic difficulties disproportionate to the intelligence of the child. Also, the internalized and externalized problems faced by learners with learning disorders such as anxiety and depression disorders, issues with self-esteem, socialization problems, and criminal behavior are brought into discussion.

2.0 LITERATURE REVIEW

Although the perspective sheds light on the problems encountered by children with learning disorders, it is imperative to critique it to avoid overgeneralization and understand the various strengths and skills that exist among these learners. Given that the deficit-based approach towards children with learning disorders can blur the picture, highlighting the unique strengths is crucial. The following sections deal with the four major areas namely; difficulties in following instructions, poor comprehension, memory retrieval problems, and lack of concentration in academic tasks.

2.1 Academic Performance of Learners with Specific Learning Disorders (SLDs)

Several empirical studies conducted in different contexts have found that learners suffering from Specific Learning Disorders like dyslexia, dyscalculia, and dysgraphia encounter persistent academic difficulties compared to their typical peers. Academic difficulties tend to span across reading, writing, spelling, and arithmetic tasks, becoming more apparent with increased academic demands. In the case of the study conducted by Español-Martín et al. (2023), the researchers used a cross-sectional population-based sample, applying several standardized methods of diagnosis that included DSM criteria, Strengths.

and Difficulties Questionnaire, and Protocol for Detection and Management of Dyslexia in evaluating ADHD and Specific Learning Disorders. School records were used to assess academic performance of the participants, showing that emotional-behavioral difficulties, academic problems, and NDs were common in the low-middle-income children. It was also noted that ADHD and Specific Learning Disorders had adverse effects on academic achievements, being compounded by lower SES. Despite the critical implications of the results and recommendations for psychologists working with the problem group, the results could hardly be generalized for the cases of Africa or other rural communities because of the differences in educational processes.

Additionally, the study is likely to view learners suffering from specific learning disorders as a homogenous group, ignoring the fact that there might be different levels of severity and coping mechanisms among them. As a result, this research seeks to bridge this gap by concentrating on the learners in Homa Bay County of Kenya. This particular study will benefit greatly due to its focus on learners in the local environment. Involving various perspectives in the study will help come up with appropriate intervention techniques.

The research done by Bali (2019) in India involved studying the prevalence of dyslexia among the scholastically backward students in the high schools located in Hoskote using a cross-sectional method. A total of five English medium high schools were used in the study through a semi-structured proforma and NIMHANS Index for Specific Learning Disabilities – Level II screening tools on 240 students. The prevalence rate of dyslexia was recorded at 14.2%. Habitat, family, and mathematics problems were found to be significantly associated with the condition, posing a threat to the performance of both boys and girls. Nevertheless, some of the drawbacks of the study are its cross-sectional design, meaning no causality can be inferred from the study's results, as well as the small sample size that was obtained from only five schools, thus posing some problems in terms of the generalizability of the findings. As such, the research project that was developed utilized the descriptive survey methodology, incorporating a combination

of methodologies aimed at obtaining richer data and increasing the sample size while considering the students' and families' perspectives on the effects of dyslexia.

2.2 Prevalence of Learners with Learning Disorders

The current research carried out by Margolis et al. (2020) focused on determining the prevalence of Nonverbal Learning Disorder (NVLD) among learners and adolescents using independent samples from the United States and Canada. Data used for conducting the research included those of Healthy Brain Network (HBN), Nathan Kline Institute–Rockland Sample (NKI), and Saguenay Youth Study (SYS) including 2596 participants aged 6 to 19 years. Based on the results obtained, the prevalence of Nonverbal Learning Disorder was found to range from 2.78% to 3.9%, which means about 3% to 4% of the population or, put differently, 2.2 to 2.9 million learners and adolescents living in the United States. While the research provides some insight into the prevalence of Nonverbal Learning Disorder (NVLD), there exist some limitations associated with this study. The samples used in this research had overselected individuals suffering from psychiatric disorders and maternal smoking during pregnancy; hence, the sample may not be reflective of the general population. Furthermore, given the fact that the study was carried out in the United States and Canada, it cannot be said to reflect the prevalence of Nonverbal Learning Disorder (NVLD) in Homa Bay County, Kenya.

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The total number of participants involved in the investigation was 714 students aged between 6 years and 14 years old. The findings from the investigation reveal that the observation tool

used was successful in determining the prevalence of learning difficulties, which were observed in five different categories. However, although this study has been successful in creating an efficient tool for measuring the prevalence of learning difficulties, it does not give any quantifiable information concerning the prevalence rate of the learning disorders. In addition to this, the current study has failed to provide information about the prevalence rate of learning difficulties, which would make it difficult to apply this study in another geographical area like Homa Bay County.

In Kenya, the rate of students with learning disorders and disabilities is an important issue that needs to be considered. In a national survey conducted in Kenya, about 11.4% of the students in the country had some kind of disability or special needs when it comes to education (Juma, 2018). These included different kinds of learning disorders and neurodevelopmental problems. Additionally, another study conducted in 2016 revealed that 2.06% of people suffer from neurodevelopmental disabilities. Further efforts are underway to increase the value of education of such learners. However, various difficulties such as discrimination, stigma, and lack of reliable data persist. Moyi, (2017) conducted research that sought to identify the population suffering from disabilities, the distribution, demographics, and socio-economic features. It was revealed that students suffering from such disabilities face immense barriers towards education. Schools are unable to provide services for such learners and hence make them face difficulty in attending school.

3.0 METHODOLOGY

Descriptive survey design research was employed in conducting the investigation and proved to be suitable as a means of providing a complete description of the present situation concerning learning disorders and their effect on the performance of learners in Grade 3 in Homa Bay County, Kenya. Through the use of the design, information was systematically collected concerning the frequency, pattern, and interrelationships of certain variables in relation to their effects, including teacher reassurance, behavior training, and follow-up support. Through the systematic collection of data from a substantial number of participants, the approach proved useful in line with the objectives of the study. The choice to use the design for the study emanated from its suitability in identifying risk and protective variables that contribute to the success of education. It provided an opportunity to assess the role played by teacher reassurance and behavior training in achieving educational success.

3.1 Sampling Techniques and Sample Size

For this study, a sampling strategy involving three stages was employed in an effort to address issues of relevance and representativeness. For instance, in the first stage, the researcher adopted purposive sampling whereby six public primary schools in Karachuonyo North Sub-County were selected through discussions held with the Sub-County Director of Education. The criteria for selection included having learners with academic problems, being relatively large, and having Grade 3 learners among others. This helped the researcher to select learners who would provide relevant information about psychosocial interventions and academic performance. In the second stage, the researcher used stratified sampling whereby participants were further classified into strata of Grade 3 learners, class and subject teachers, and other key actors within the school environment.

Simple random sampling was used in stage three to select actual subjects (learners and teachers), say by picking names from class registers within each stratum. This reduced potential biases while ensuring that the results obtained had high levels of generalization in the entire sub-county. In the case of key informants like head teachers, school counselors, and county education officials, purposive sampling alone was used. Key informants were vital as they had the knowledge necessary to provide insights concerning issues of psychological assistance to learners suffering from specific learning disorders. The number of respondents to be selected was calculated by applying the Yamane formula at 95% confidence level where “e” is 0.05. The number of respondents, by Yamane formula was 219.

3.2 Data Collection Procedure and analysis

Data was obtained through structured questionnaires for learners and teachers and interviews for the key informants including educational psychologists and policy makers. The learners received assistance from research assistants while the teachers filled the questionnaires independently. A pre-study was done in another sub-county adjacent to the study area. This ensured high validity and reliability of the instruments. Validity was ensured by getting feedback from experts and relevance to the research objectives while reliability was achieved using the test-retest approach and Cronbach’s alpha coefficient (0.78).

Data collection entailed getting permission, administration of questionnaires in schools and conducting of interviews both physically and virtually. Ethics such as informed consent, confidentiality and voluntary participation were maintained throughout the study. In data analysis, the quantitative data was analyzed through descriptive statistics and regression while the qualitative data was subjected to thematic analysis. Presentation of findings was in tables, charts and narrative description. The study finally took into consideration the ethical issues of getting permission from the relevant

authorities, confidentiality and consent from the parents and learners.

4.0 DISCUSSION OF THE FINDINGS

Teachers from Homa-Bay County observed various indicators of Specific Learning Disorder (SLD) among learners in Grade 3. Dyslexia was the common disorder, with 66.7% teachers having knowledge of dyslexia cases and 61.9% observing that learners have difficulties in reading, writing and mathematics. There is also dyscalculia disorder where 57.1% teachers identified the existence of the problem and 76.2% reported that learners are facing challenges in numeracy. Dysgraphia is a less known disorder, but 52.4% teachers admitted having learners who have difficulties in writing. Significantly, 76.2% teachers stated that there are many learners with SLD but they are undiagnosed.

Regarding the question of the level of commonality of the cases of Specific Learning Disorders amongst early primary learners in their locality, it is worth noting that the occurrence of SLDs diagnosed cases of Specific Learning Disorders was not too common since formal assessments were limited. Nevertheless, the respondents reported observing informal instances of dyslexia, dyscalculia, and dysgraphia amongst Grade 3 learners. As noted by MOE (2021), up to 10-15% of Kenyan children attending schools might be having learning disabilities although less than 2% of them have been officially diagnosed. In addition, the poor monitoring processes in place are characterized by manual documentation and flagging through schools records or inspection.

From the results, it can be observed that there are many learning disorders among Grade 3 learners in Homa-Bay County especially dyslexia and dyscalculia while dysgraphia is less common. Although teachers know about the difficulties facing the learners, they are also certain that many cases of SLDs have not been diagnosed. This implies the need for better diagnostic services and interventions. Prevalence of literacy and numeracy disorders is consistent with global prevalence as well as national survey conducted in Kenya. It is an important issue that needs to be taken care of immediately.

5.0 CONCLUSIONS OF THE STUDY

This research proved that Specific Learning Disabilities (SLDs) like dyslexia, dyscalculia, and Dysgraphia exists among Grade 3 students at Homa-Bay County. The teachers noted difficulties in both literacy and numeracy skills and over 75 percent had unreported cases. It clearly shows the gap between classroom observations and proper diagnosis.

5.1 Recommendations of the Study

There is an urgent need to set up screening programs at the county level, in conjunction with the Ministry of Education and health professionals, to facilitate early detection of SLD in learners. Teachers should be taught on how to identify early signs of dyslexia, dyscalculia and dysgraphia in learners, and appropriate referral procedures need to be put in place for professional assessment. There is a need for standardized methods of diagnosis to be put in place to ensure consistency in the detection and classification of learning disorders.

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