

TEACHERS' AWARENESS OF FACTORS RESPONSIBLE FOR DYSCALCULIA AMONG PRIMARY SCHOOL PUPILS IN OBIO-AKPOR LOCAL GOVERNMENT AREA, RIVERS STATE

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Abstract: The study investigated on teachers' awareness of factors responsible for dyscalculia among primary school pupils in Obio-Akpor Local Government Area of Rivers State. The study was guided by two research questions and one null hypothesis developed for testing at 0.05 level of significance. Using the descriptive survey design, a sample of 200 primary school teachers drawn using stratified random sampling technique was used for the study. A researcher-developed instrument which was adequately assessed for validity, with an alpha coefficient of 0.76 was used for data collection. Mean and standard deviation were used to provide answers for the research questions, while independent sample t-test was used for testing the null hypothesis. Result showed that teachers were aware that teaching methods, heredity, inappropriate curriculum, and Mathematics anxiety were factors contributing to dyscalculia. This result further showed that there were no significant differences in the awareness level of male and female teachers on the factors responsible for dyscalculia among primary school pupils. From the obtained result, it was recommended that teacher trainers should make it mandatory for every trainee teacher to take some basic courses in mathematics and mathematics teaching methods using current teaching methods and technology.

Keywords: Dyscalculia, Awareness, Mathematics, Primary School.

1. INTRODUCTION

Background to the Study: Mathematics is one of the core subjects in the school curriculum in Nigeria both at the primary and secondary school levels. Yet it is seen as one of the most difficult subjects and has generated fear in the heart of students. Nigeria has been recording high rate of failures by students in examination like Common Entrance Examination, Junior School Certificate Examination (JSSE), Senior Secondary Certificate Examination (SSCE) and others for some students, these difficulties may result from a learning disability called dyscalculia. Dyscalculia is a mathematic and arithmetic's disability which manifests in different ways like counting, the concept of size and space relational, use of ordinal members comparing numbers and writing numbers. There is no aspect of daily life that is not touched by numerical ideas such as telephone numbers, currency and time, shopping, buying and selling and so on. All these areas depend on a rich awareness of numbers and their meaning. In-fact, the concept of number is dubious in this modern world According to Butter- worth and Yeo (2004) dyscalculia covers a wide range of mathematical inabilities such as inability to understand the meaning of numbers and their quantities. Students with dyscalculia cannot understand

basic operations of additions, subtraction, multiplication and division. They may not understand complex problems. According to Lander (1993) students with learning disabilities such as dyscalculia are at risk of being seen as less capable than they are. However, they may have general ability to learn higher than their peers but they simply have specific weakness in some areas of calculation in many ways except with appropriate specially designed instruction.

Shaywitz (2003) is of the view that students with dyscalculia have weakness in organizing, sequencing, time concepts, using code, making home life, social life and school life. According to Brown (2002) learning disabilities such as dyscalculia also affect vocational choice and success. Such individuals sometimes feel that their job opportunities are limited. They often feel anxious about course and training needed for certain occupation. Many students, with dyscalculia may have been told by their teachers that they just do not have ability for mathematics. They also may have grown up in homes where other people were struggling with learning disabilities and this condition can lead to frustration, anger, alienation and lack of self-esteem.

The problem of dyscalculia is the order of the day in most schools. In Nigeria, students avoid classes that have to do with subject that involve calculations (Ernosh, 2013). This is as a result of mathematics anxiety which is an emotion based on reaction to mathematics, causing students to freeze up when they confront mathematics problems or when they take mathematics test.

Some factors that may be responsible for dyscalculia include lack of instructional materials, attitude of teachers towards students, inappropriate curriculum content, memory problems, teacher's expertise and level of intelligence. Teachers are aware that most students when asked to choose subjects that will lead to their futures career, end up choosing subjects that have little or nothing to do with calculations. Most students run away from mathematics because this specific learning disability called dyscalculia. Most children or pupils who are affected by this disability struggles to grasp mathematics concept and also have difficulty in developing mathematics skills.

Dyscalculia is a common learning issue that impacts kids' ability to do math. It doesn't just affect them at school, however. The challenges can also create difficulties in daily life. Some cannot even figure out the correct change to give or receive when buying or selling. Research has shown that 6.7% of the world's population suffers from this serious disability called dyscalculia. This is about the prevalence as dyscalculia but it is far less widely recognized by teachers, parents, educational authorities and scientists. Poor number skills are more of a handicap in the work place than poor literacy. It has been found by teachers that men and woman aged 30, with poor number skills are more likely to be depressed, unemployed, more likely to be ill and more likely to be arrested. In schools, dyscalculia leads to distress, low self-esteem, stigmatization and, disruptive behavior in class. Teachers as the drivers and imparters of knowledge are aware that dyscalculia, a mathematical disability, poses serious problems to individuals' development. It hinders visual-spatial relationship and produces a mathematical related problem. Dyscalculia can disrupt a child foundation leading to problems 'in learning numbers, sorting objects by groups and patterns, comparing and contrasting as well as matching and recognizing numbers, basic operations such as fractions, decimals and 'percentages, terminology, multiplication of whole numbers, place value, measurement skills and so on. Students with dyscalculia cannot comprehend those operations.

According to Hardman, Drew Egan (1987) majority of students with learning disabilities seem hyperactive they tend to be restless each time they have a subject that has to do with calculation. "They also find it difficult to engage in calculation for a longtime. There is also withdrawal syndrome that students with dyscalculia display. They most times refuse to join others to carry out any activities in and outside the classroom. There is also attention deficit, they are not able to listen or pay attention to their teachers. Every lesson may look difficult and appear impossible to them. The consequence of this is that they easily get distracted. Any little noise in or outside classroom is enough to shift their focus from what is being length. There is also low frustration tolerance. Abandoning a task is always easy for students with dyscalculia. They lose hope and give up trying a task or other methods easily.

Statement of the Problem: Mathematics is a compulsory subject at the secondary and primary school levels in Nigeria. It is imperative for all students who want to further their studies. However most students find it difficult to learn and solve mathematics related problems, leading to poor performance in Mathematics both at internal and external examinations. This has made most students to opt for courses that do not require much of mathematical skills in tertiary institutions. This can be evidenced in the large number of students that seek and gain admission into art and humanity related courses compared to science and related courses in the universities and other tertiary institutions.

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Since dyscalculia is a common learning issue that affects most children and even adults' ability to do mathematics and solve mathematics related problems, it can create difficulties in daily- to- day lifestyle and activities if not detected and handled properly early in life. It is therefore necessary to look into teachers' awareness of the factors responsible for dyscalculia among primary school pupils. The problem of dyscalculia has been a major issue in our education system which implies that teachers are not very much aware of the factors responsible for it and they themselves may even have been victims of it hence the need to investigate into teachers' awareness of the factors responsible for dyscalculia among primary school teachers in Obio-Akpor LGA of Rivers State.

Purpose of the Study: The purpose of this study is to investigate teachers' awareness of the factors responsible for dyscalculia. Specifically, this study will:

1. Investigate the extent to which teachers are aware of the factors, responsible for dyscalculia among primary school pupils
2. Find out if gender makes any difference on teachers' awareness of the factors responsible for dyscalculia among primary school pupils
3. Make recommendation on how teachers can detect pupils with dyscalculia.
4. Make recommendation on how teachers can help out with children that has the problem of dyscalculia in primary schools in Obio-Akpor LGA.

Research Questions: Two research questions were stated to guide the study:

Research Question 1: To what extent are teachers aware of the factors responsible for dyscalculia among primary school pupils?

Research Question 2: Does teachers' gender make any difference on their awareness of the factors responsible for dyscalculia among primary school pupils?

Hypotheses: One hypothesis was also stated to guide the findings of the study

HO₁: There is no significant difference in teachers' awareness of the factors responsible for dyscalculia among pupils in primary schools based on teachers' gender.

Significance of the Study: This research would help to highlight the teacher's awareness on factors responsible for dyscalculia among primary school pupils. It will aid teachers to encourage pupils towards subject that has to do with calculation by setting up learning strategies on how to help pupils with dyscalculia develop self-confidence and self-esteem. The finding of this study would help teacher change their attitude towards pupils with this learning disability. It would highlight the needs for use of appropriate mathematics curriculum, it would help teacher in primary school to concretize learning by making use of adequate instructional material and thereby assisting pupils acquire strategies for meeting the challenge of calculation.

Scope of the Study: This study is limited to investigating the extent to which teachers are aware of the factors responsible for dyscalculia among primary school pupils in Obio/Akpor Local Government: Area of Rivers State. The study would involve all levels of primary school pupils in both public and private schools in Obio/Akpor Local Government Area.

2. RESEARCH METHODOLOGY

Research Design: Survey research design is used for this study. The researcher sought to find out teachers' awareness on factors responsible for dyscalculia among primary school pupils through the use of questionnaires.

Population of the Study: The population of this study comprise all the primary school teachers in both private and public primary schools in Obio/ Akpor Local Government Area of Rivers State.

Sampling Technique: The sampling technique used is the stratified random sampling. The stratification was based on gender (male and female), and type of school (public and private).

Sample: Two hundred primary school teachers were selected through stratified random sample techniques and used for the study.

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Instrument for Data Collection: A self-development questionnaire titled "Dyscalculia Inventory" (DI) was used in gathering data for the study. The instrument is divided into two. Section A consists of personal data of the respondents namely while section B consisted of items designed to measure teachers awareness of the factor responsible for dyscalculia among primary school pupils. The items were constructed on a four point likert scale of Strongly Agree (SA), Agree (A), Strongly Disagree (SO) and Disagree (D).

Validation of the Instrument

The questionnaire was face validated by other experts in the field of research methodology in the Department of Educational Psychology, Guidance and Counseling, Ignatius Ajuru University of Education, Port Harcourt. Thereafter it was subjected to construct validation to ensure that the items really address the construct under study.

Reliability of the Instrument: The reliability of the instrument was established using the Cronbach alpha method. The instrument was administered to 50 primary school teachers in another Local Government Area in Rivers State who were not part of the sample to be studied. On collection, they were coded and used to estimate the reliability using cronbach alpha formula and a reliability coefficient of 0.76 was obtained.

Administration of the Instrument: The questionnaires were administrated personally by the researcher. The respondents were given necessary information on how to fill or respond to the items. The filled questionnaire were collected immediately after exercise.

Method of Data Analysis: The data was analyzed using mean for the research questions and independent t-test for the hypothesis at 0.05 level of significance.

Research Questions 1: To what extent are teachers aware of the factors responsible for dyscalculia among primary school pupils?

Table 1: Mean and Standard deviation of the responses of Primary school teachers on their awareness of dyscalculia in pupils.

S/N	Factors	N	Mean	SD	Crit. Mean	Decision
1	Teaching Methods	280	3.19	1.78	2.5	H.A
2	Heredity	280	3.90	1.02	2.5	H. A
3	Inappropriate Curriculum	280	3.48	1.81	2.5	H.A
4	Teachers' Attitude to Pupils	280	1.68	2.00	2.5	N.A
5	Teachers' use of instructional materials	280	2.35	1.33	2.5	L.LA
6	Inappropriate textbooks	280	3.02	0.95	2.5	H.A
7	Teachers' level of expertise in teaching mathematics	280	3.51	1.92	2.5	H.A
8	Lack of confidence in pupils to solve mathematics problems	280	3.80	1.54	2.5	H.A
9	Emotional Mathematics Anxiety problems in pupils	280	3.20	1.50	2.5	H.A
10	Large Class size	280	3.25	1.67	2.5	H.A

NOTE: 3.00-4.00=Highly Aware, 2.5-3.9=Moderately Aware, 2.0-2.4= Low Level Awareness, 1.0-1.9=Not Aware

Table 1 shows that among the variables investigated, Heredity as a factor responsible for dyscalculia among pupils has the highest mean (mean=3.90, SD=1.02). This is followed by lack of confidence in pupils to solve mathematics problems (mean=3.80, SD=1.54). Teachers' level of expertise in teaching mathematics (mean=3.51, SD=1.92) comes next, then Inappropriate curriculum (mean=3.48, SD=1.8), Class size (mean= 3.25, SD=1.65), Mathematics Anxiety / Emotional problems in pupils (mean=3.20, SD=1.59), Teacher' teaching methods (mean=3.19, SD=1.78), Inappropriate textbooks (mean=3.02, SD=0.95), Teachers' use of instructional materials (mean=2.35, SD=1.33) and Teachers' attitude to pupils (mean=1.68, SD=2.00) in that order. This implies that teachers are highly aware that factors such as heredity, lack of confidence in pupils to solve mathematics problems, Teachers' level of expertise in teaching mathematics, inappropriate curriculum, Mathematics Anxiety / Emotional problems in pupils, Teacher' teaching methods and Inappropriate textbooks are some factors that are responsible for dyscalculia in pupils. However, the teachers studied have low level of awareness of the fact that teachers' non-use of instructional materials in the teaching of mathematics can lead to dyscalculia in pupils. They are also not aware that negative attitude of teachers towards their pupils can also lead to dyscalculia in the pupils.

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Research Question 2: Does teachers’ gender make any difference on their level of awareness of the factors responsible for dyscalculia among primary school pupils?

Table 2: Mean and Standard deviation of the responses of Primary school teachers on their awareness of dyscalculia in pupils based on gender

S/N	Factors	Gender	N	Mean	SD	Crit. Mean	Decision
1	Teaching Methods	Male	80	3.20	1.69	2.5	H.. A.
		Female	200	3.18	1.85		
2	Heredity	Male	80	3.91	1.10	2.5	H. A
		Female	200	3.92	1.00		
3	Inappropriate Curriculum	Male	80	3.50	1.90	2.5	H.. A
		Female	200	3.39	1.92		
4	Teachers’ Attitude to Pupils	Male	80	2.00	2.11	2.5	Not Aware
		Female	200	1.88	1.90		
5	Teachers’ use of instructional materials	Male	80	2.45	1.25	2.5	L. L .A
		Female	200	2.25	1.41		
6	Inappropriate textbooks	Male	80	3.10	0.90	2.5	H. A
		Female	200	3.05	1.90		
7	Teacher’s level of expertise in teaching mathematics	Male	80	3.55	1.41	2.5	H. A
		Female	200	3.45	1.61		
8	Lack of confidence in pupils to solve problem	Male	80	3.70	1.00	2.5	H. A
		Female	200	3.91	1.80		
9	Emotional problems in pupils	Male	80	3.10	0.90	2.5	H. A
		Female	200	3.35	2.00		
10	Class Size	Male	80	3.18	1.48	2.5	H. A
		Female	200	3.33	1.81		

NOTE: 3.00-4.00=Highly Aware, 2.5-3.9=Moderately Aware, 2.0-2.4= Low Level Awareness, 1.0-1.9=Not Aware

Table 2 shows that among the factors investigated in this study both male and female teachers are highly aware of some of the factors responsible for dyscalculia among pupils. However, male teachers have relatively higher awareness about teaching method than female teachers (mean=3.20 > mean 3.08). Male teachers are also more aware of some other factors that are responsible for dyscalculia among pupils like inappropriate curriculum (3.50>3.35) teachers’ attitude to pupils (2.00>1.88), teachers’ use of instructional materials (2.45>2.25), inappropriate textbooks (3.10>3.05) and teachers level of expertise in teaching mathematics (3.55 >3.45).

Female teachers have relatively higher level of awareness in other factors that are responsible for dyscalculia among pupils like: Class Size (3.33>3.18), Emotional problems in pupils (3.35>3.10) and heredity (3.92>3.91).

This implies that on the overall, male teachers are more aware of factors responsible for dyscalculia in pupils than female teachers.

One hypothesis was also stated to guide the findings of the study:

HO₁: There is no significant difference in teachers’ awareness of the factors responsible for dyscalculia among pupils in primary schools based on teachers’ gender

Table 3: T-test table showing test of significance between the mean scores of the responses of Primary school teachers on their awareness of dyscalculia in pupils based on gender

S/N	Factors	Gender	N	Mean	SD	T	Df	Decision
1	Teaching Methods	Male	80	3.20	1.69	.081	278	NS
		Female	200	3.18	1.85			
2	Heredity	Male	80	3.91	1.10	.479	278	NS
		Female	200	3.92	1.00			
3	Inappropriate Curriculum	Male	80	3.50	1.90	.438	278	NS
		Female	200	3.39	1.92			

4	Teachers' Attitude to Pupils	Male	80	2.00	2.11	.44	278	NS
		Female	200	1.88	1.90			
5	Teachers' use of instructional materials	Male	80	2.45	1.25	.447	278	NS
		Female	200	2.25	1.41			
6	Inappropriate textbooks	Male	80	3.10	0.90	.31	278	NS
		Female	200	3.05	1.90			
7	Teacher's level of expertise in teaching mathematics	Male	80	3.55	1.41	.515	278	NS
		Female	200	3.45	1.61			
8	Lack of confidence in pupils to solve problem	Male	80	3.70	1.00	1.19	278	NS
		Female	200	3.91	1.80			
9	Emotional problems in pupils	Male	80	3.10	0.90	1.41	278	NS
		Female	200	3.35	2.00			
10	Class Size	Male	80	3.18	1.48	.72	278	NS
		Female	200	3.33	1.81			

Table 3 shows that all the t-values are not significant at $df = 278$ and 0.05 level of significance hence H_{01} is retained. This implies that there is no significant difference in the level of awareness of dyscalculia among primary school pupils based on teachers' gender.

Discussion of Findings: The results of the findings in table 1 show that most teachers in primary schools are aware of most of the factors responsible for dyscalculia. This is because some other findings have also shown that most children in Nigeria are afraid of mathematics and other subjects that involve calculations. This is supported by the report of Zahrah et al. (2003) and Tarzimah (2005) that in Nigeria students have difficulty in mathematics because, they have difficulty understanding and retrieving concepts, formulas, facts and procedure and lacked the ability to visualize mathematics problems and concepts. Bassey et al (2010) also discovered that students in schools where mathematics is taught performed better than those in schools that do not use instructional materials in the teaching of mathematics.

The results in table 2 shows that in most of the variables studied, male teachers have relatively higher awareness of the factors responsible for dyscalculia compared to their female counterparts. This is in line with the views of Sharma (1989) that as children age, social biases preclude boys and girls from choosing to play with certain things and in certain ways. At this point of divergence, objects and activities acquire definite gender appropriateness. Blocks, Legos, tree climbing, outdoor activities, and ball sports become "boy" activities. Dolls, playing house, dressing up, talking, cooking, reading, sewing, crafting, and planning social activities become "girl" activities. By avoiding intricate mechanical manipulations and "rough and tumble" physical activities, girls lose ground in spatial organization abilities (Sharma 1989). Girls' more sedentary activities offer few exercises in space/motion judgment, symmetry, part-to-whole constructions, and development of visualization, muscle memory, and geometric principles. Meanwhile, boys are gaining ground in all of these areas- and their improving spatial organizational abilities better prepare them for mathematics tasks (Sharma 1989).

Also Sharma (1989), asserts that mathematics outcomes are terrible for a number of reasons. Our mathematics curriculums are not reflecting what we know about how children learn mathematics. Typical mathematics curriculums are guided by chronological age. But in practice mathematics is presented in a pile up fashion. Each year, more math concepts are added to the pile of previously presented concepts. So, ones a child misses one concept, he/she finds it difficult to cope and consequently loses self- concept of doing well in mathematics. This is coupled with the fact that most teachers do not have patience to re-evaluate their teaching and to carry the weaker pupils along because they are also struggling to cover the stipulated syllabus for the terms.

Summary: The results of the findings are as stated below:

1.) Most teachers in primary schools in Obio-Akpor LGA of Rivers State are aware that most primary school pupils have the problem of dyscalculia. Most teachers also feel that the problem may be due to a lot of factors like heredity, lack of confidence in pupils to solve mathematics problems, inappropriate curriculum, Emotional / Mathematics Anxiety problems in pupils, Large Class size, Teachers' level of expertise in teaching mathematics and Teaching Methods. However, most of them are not aware that Teachers' use of instructional materials and Teachers' Attitude to Pupils can also be responsible for dyscalculia in pupils.

2) Results from table 2 shows that generally, male teachers have relatively greater awareness than female teachers of the factors responsible for dyscalculia among pupils in primary schools.

3) Table 3 revealed that there is no significant difference in the teachers' awareness of the factors responsible for dyscalculia among primary school pupils in Obio-Akpor LGA of Rivers State. Hence hypothesis 1 was retained.

Implication of Findings:

The findings of this study reveal that teachers' are aware of the factors responsible for dyscalculia among pupils in primary schools. The issue to be addressed now is how teachers can help children with this problem because mathematics is a compulsory subject at all levels of the educational system in Nigeria. No child can further his /her education without a credit pass in mathematics at the SSCE level. Moreover, mathematics is a subject that has a daily application in various activities of man. The tailor must take proper measurement of this customer to sew to fit the customer. The bricklayer must measure the length and breadth of the building he is constructing. The Engineer, the doctor, even the sellers and buyers in the market need to know how to add the cost of various goods in-order to pay correct amount and receive change. Hence there is need for teachers to start at the primary schools levels to pay extra attention to pupils that have problem of dyscalculia in –order not to let them grow with it and become a problem to themselves and the society at large.

Recommendation / Conclusion: Based on the findings, the researcher made the following recommendations:

1. Teacher trainers should make it mandatory for every trainee teacher to take some basic courses in mathematics and mathematics teaching methods using current teaching methods and technology.
2. Government should revisit the mathematics curriculum and make it simpler for children to follow by every child at a particular level, in such a way that even those who are weak in mathematics can understand the concepts involved.
3. Experts in mathematics should come together to revise the curriculum from time to time and write text books based on the various class levels using language and illustrations and exercises that both the teachers and pupils can easily understand.
4. There is need for universities and higher institutions that train teachers to give priority admission to intending trainees who want to study mathematics so as to make more mathematics teachers available as there are few mathematics teachers in schools at present.
5. Let the teaching of mathematics be left for those who specialize in that field not every classroom teacher to teach mathematics to his/her pupils. This has made some teachers who are not good in mathematics to mislead the pupils in some basic procedures and make the learning of the subject difficult and uninteresting to pupils. Some even tell their pupils that mathematics is a difficult subject hence discouraging many pupils to develop interest in the subject.
6. This researcher suggests that further research need to be carried out on dyscalculia on ways to make the teaching and learning of mathematics easy from the level of childhood education. This will also help more students to opt for science and mathematics related areas of specialization since most students refuse to go into such areas because of fear of mathematics.

If the suggestions given are implemented, it will go a long way to better the teaching and learning of mathematics in schools and reduce the incidences of dyscalculia among pupils from the early stages of development.

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