

Development and validation of a teacher awareness questionnaire about dyslexia



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Background: Dyslexia is a learning disability that affects children of school-going age and exists in all cultures and backgrounds. Dyslexic children are deficient in phonological awareness, which makes the children to fail to attain the skills of reading, writing and spelling commensurate with their intellectual abilities. Inadequate knowledge about the nature of dyslexia by primary school teachers results in poor categorisation of at-risk children.

Aim: This study sought to achieve two objectives. The first was to develop and validate the Teachers Awareness Questionnaire (TAQ), while the second goal was to use the validated TAQ to assess primary school teachers' level of awareness about dyslexia.

Setting: Primary school teachers in Nsukka and nearby rural communities filled the TAQ and the Scale of Knowledge and belief about Developmental Dyslexia. Nsukka is called the university town and it is a slow-paced environment that is devoid of the usual hustle and bustle of most major towns in Nigeria.

Methods: The cross-sectional design was employed to gather data for the measurement process. Data were analysed using bivariate correlations and descriptive statistics.

Results: The TAQ has good internal consistency ($r = 0.77$) and an adequate convergent validity ($r = 0.74, p < 0.01$). Results also reveal that primary school teachers possessed low level of awareness about dyslexia.

Conclusion: The study findings show that primary school teachers in Nigeria lack the requisite knowledge about dyslexia. The study suggests psycho-education for primary school teachers to empower them with information about the condition.

Contribution: This study measured primary school teachers' level of awareness about dyslexia. The results showed that primary school teachers' awareness about dyslexia is poor, and this suggests that the use of labels (e.g., dullard) by some primary school teachers to describe their pupils may be incorrect. The study recommend to School Management Boards to take action to improve the teachers level of awareness about dyslexia, which would promote early identification of dyslexic pupils and possible intervention.

Keywords: dyslexia; phonological processing; reading difficulties; Teachers Awareness Questionnaire; psycho-education.

Introduction

Word recognition and decoding are core determinants of academic success. But there are students who struggle through school because of one form of learning disability or another. Dyslexia is a learning disability that is prevalent among school aged children. It affects more than half of pupils with learning disability (Hulme & Snowling 2013; Peterson & Pennington 2015) or approximately one in five children, regardless of gender (Lyon, Shaywitz & Shaywitz 2003; Shaywitz 2003; Washburn, Binks-Cantrell & Joshi 2013; Washburn, Malathesa & Binks 2011). Dyslexia is a learning disability that affects language-processing skills; it begins from childhood and may persist through the teenage years and adulthood (Wadlington & Wadlington 2005). Most children who are identified as living with dyslexia have poor reading, poor spelling and poor writing capacities. Nicolson, Fawcett and Curcio (2019) described dyslexia as a disability in children who, despite conventional classroom experience, fail to attain the language skills of reading, writing and spelling commensurate to their intellectual abilities. In other words, many dyslexic children, who attempt to read, often do so with difficulty and at a level lower than their

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chronological ages. The difficulty in reading is not to be attributed to poor intelligence, a lack of motivation, poor instruction or problems associated with poor hearing and vision (Lyon et al. 2003; Nicolson et al. 2019). Rather, dyslexia is characterised by problems that relate to poor phonological processing. Phonological deficit theory posits that individuals with poor phonological awareness have difficulties in performing tasks, such as syllable counting, remembering sequences of sounds or letters and achieving lexical retrieval tasks (Ramus, Rosen & Dakin 2003). The theory further proposed that phonological awareness, verbal short-term memory, and lexical retrieval are responsible for the representation, storage, and retrieval of linguistic material; failure in one or all of these abilities may explain a variety of behavioural manifestations of dyslexia.

However, children living with dyslexia who receive appropriate educational intervention and treatment will have fewer problems with reading (Ikediashi 2012; Odo et al. 2021; Wadlington & Wadlington 2005). Dyslexia is universal (e.g. Kuerten, Mota & Segaeert 2019; Riddick 1995; Wadlington & Wadlington 2005), and Nigeria is likely to have her own fair share of the disability. The condition is perhaps prevalent in Nigeria, but people's knowledge about the condition is low. Previous local studies on the condition (e.g. Adubasim 2018; Ikediashi 2012; Osa-Afina 2003; Tikolo 2019; Ugwu & Adubasim 2018) show that many people do not know much about dyslexia. Moreover, according to Sriano-Ferrer and Echegaray-Bengoa (2014), insufficient and inaccurate knowledge regarding the nature of dyslexia may play a role in the over-identification or under-identification and treatment of children with dyslexia. Literature (e.g. Ugwu 2015) shows that many children living with dyslexia in Nigeria are not detected early because many teachers do not know much about dyslexia. Ugwu (2015) argues that it might not be so embarrassing if a lay person's knowledge about dyslexia is poor, but if a teacher seems to be ignorant about the condition that would be considered too bad.

Measuring primary school teachers' level of awareness about dyslexia should be important to ensure that students who are called 'dullards' in primary schools are not wrongly labelled after all. Chances are that the so-called 'dullards' in many primary schools in Nigeria today may be children living with dyslexia whose condition makes them to struggle to read, comprehend and follow instructions. The present study develops and validates a scale for assessing primary school teachers' awareness about dyslexia and utilises the scale – Teachers Awareness Questionnaire (TAQ) – to assess primary school teachers' level of awareness about dyslexia. The questions that guided the present research were as follows:

- Is the Teachers Awareness Questionnaire a valid and reliable measure for assessing primary school teachers' awareness level about dyslexia?
- Is primary school teachers' level of awareness about dyslexia high or low?

Development of the Teachers Awareness Questionnaire

Eignor (2001) emphasised that the first step in the development of a scale is the review of extant literature. Thus, the development of the TAQ started with a review of relevant literature. Based on the literature on knowledge and beliefs about dyslexia (Sriano-Ferrer & Echegaray-Bengoa 2014; Wadlington & Wadlington 2005), the authors generated a pool of 45 items that were structured to elicit information regarding teachers' awareness about dyslexia. The items on the scale were structured in positive and negative statements about dyslexia to control for possible floor and ceiling effects in the teachers' responses. The authors asked five judges (three clinical psychologists and two special education experts) to determine which items would fall into which subscales of reading awareness, comprehension, general knowledge and attitude. The judges made their comments about the scale known in writing. The judges were instructed to score each item on scale ranging from 1 to 5. An item was considered appropriate for the subscale if it scores an average of 3 or above, on the judgements by five experts. Following this criterion, some items were deleted. Also, some other items that were adjudged ambiguous by the judges were amended for clarity and simplicity. In the end, only 34 items survived this process.

A pilot study (study 1) was conducted with 56 primary school teachers in Nsukka urban area (16 male and 40 female). The teachers were asked to complete the 34-item TAQ. The items were in Likert-type response format and participants were to indicate for each item the extent to which they disagree or agree with the statement by ticking from among the response options: 'strongly disagree', 'disagree', 'neutral', 'agree', and 'strongly agree'. After reverse-scoring the negatively worded items, the highest composite score for TAQ was 170.

After collecting the responses from the 56 primary school teachers, we utilised the Cronbach's alpha coefficient to estimate the reliability of the TAQ. The Cronbach's alpha for the composite TAQ was 0.75; and 0.73, 0.68, 0.73, and 0.74 for reading, comprehension, general, and attitude, respectively. Four items failed to reach the threshold of 0.30 (Nunnally 1970). The four items were deleted, leaving the scale with 30 items. The authors further conducted exploratory factor analysis (EFA) using the principal component analysis (PCA) and confirmatory factor analysis (CFA). The appropriateness of the data for factor analysis was assessed a priori by inspecting the correlation matrix, the Kaiser-Meyer-Olkin (KMO) value, and the Bartlett's test of sphericity. The authors applied CFA to test the four-dimensional model of TAQ. Omnibus tests, such as Chi-square (χ^2), Goodness-of-Fit Index (GFI), comparative fit index (CFI), and root mean square error of approximation (RMSEA), were used to determine the model with goodness-of-fit indices that supports the four-dimensional structure of TAQ, as recommended by Hu and Bentler (1999).

Analysis of the KMO value showed that the obtained value was 0.74, which is above the recommended value of 0.6. Also, the Bartlett's test of sphericity was 1305.66 ($p < 0.001$),

indicating that the data can be tested for factorial validity. Using the 30 reliable items that yielded 0.30 and above on the reliability index, the PCA revealed the presence of four components with eigenvalues exceeding 1 and explaining 47.2%, 38.03%, 19.0% and 21.6% of the variances, respectively. Constraining each item on the hypothesised component of CFA resulted in poor fit. Items that loaded poorly on the model or which had high cross-loading on more than one component were removed from the structure. This adjustment led to the retaining of only 16 items that loaded well on the model and that yielded goodness-of-fit for the model. This supports the four-component model of the scale (see Figure 1). The omnibus tests applied showed that Chi-square goodness-of-fit (χ^2) = 5460.12, $p = 0.001$. Other fit indices were within acceptable limits, GFI = 0.92; Tucker-Lewis Index (TLI) = 0.94, CFI = 0.93, and RMSEA = 0.05. The model was estimated by using AMOS Graphics (version 24) and was considered acceptable.

Method

Participants

A sample of 213 primary school teachers (mean age = 42.16 years; standard deviation [SD] = 6.84) comprising 77 men (36.15%) and 136 women (63.85%) were sampled from nine primary schools in Nsukka urban town and nearby rural primary schools. Participants who participated in the pilot study were excluded from the main study (i.e. study 2). Nsukka is usually called the university town because it is the site of the main campus of the University of Nigeria, Nsukka. The University of Nigeria, Nsukka was Nigeria's first indigenous University, founded a few days after Nigeria's independence on 01 October 1960. Nsukka town is a slow-paced environment, devoid of the usual hustle and

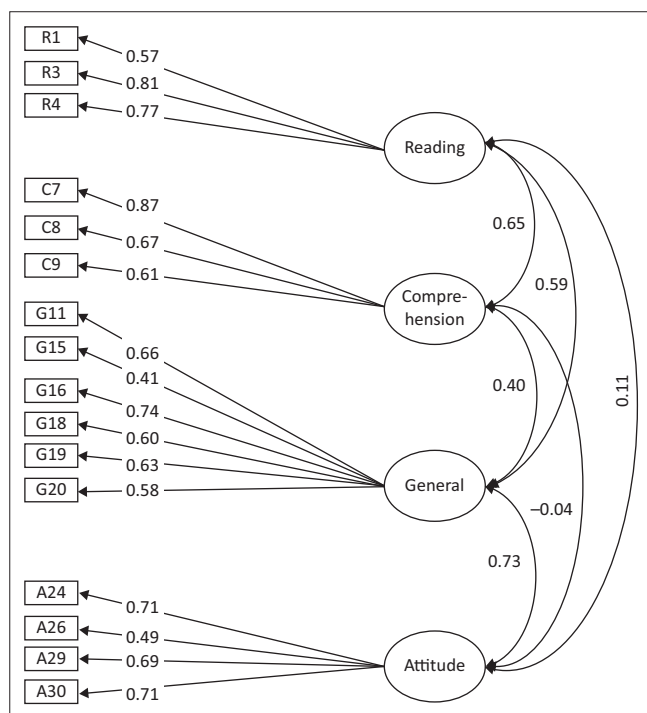


FIGURE 1: Four-dimensional model of the four components of the Teachers Awareness Questionnaire.

bustle of most major towns in Nigeria (Mefoh 2007). Other distributions or characteristics of the sample show that 117 (54.93%) of the sample were from the urban centre, while 96 (45.07%) of the sample were from rural area. With respect to marital status, 72 of the teachers were single (i.e. 33.80%), and 141 (66.20%) were married. As regards work experience, 116 (54.56%) of the primary school teachers have more work experience (10 years or above) than the rest 97 (45.54%) primary school teachers who have less work experience (less than 10 years). The number of primary school teachers who answered 'yes' to the question, 'have you heard about dyslexia before?' were 146 (68.54%), while those who answered 'no' were 67 (31.46%) (see Table 1).

Instrument

The primary school teachers were asked to complete the 16-item TAQ, of which the items were in Likert-type response format, and participants were to indicate for each item the extent to which they agree or disagree with the statement by ticking from among the response options. Sample items on the TAQ are as follows: 'reading problem can be caused by parents not reading to their children' (*reading*), 'pupils with reading problem find it difficult remembering letters and their sounds' (*comprehension*), 'many pupils with reading problem are very good in artworks' (*general*), and 'all poor readers have reading problem' (*attitude*). The criterion set for categorisation as possessing high awareness about dyslexia was getting a score of 75% (i.e. equivalent of a score of 60/80) or above (see Appendix 1 for the 16-item TAQ).

The Scale of Knowledge and Beliefs about Developmental Dyslexia (Sriano-Ferrer & Echegaray-Bengoa 2014) was also administered to all the participants. The scale of knowledge and beliefs about developmental dyslexia is a 36-item scale with response options in Likert-type format. To each item, participants were asked to respond 'true (V)', 'false (F)', or 'don't know (NS)'. Sample items on the scale are as follows: 'dyslexia is the result of a neurological-based disorder' (item 1), 'intelligence tests are useful in

TABLE 1: Table of descriptive statistics showing demographic composition of the sample and scores on Teachers Awareness Questionnaire.

Variables	Frequency of teachers	Percent (i.e. /100%)	Mean performance on TAQ	Standard deviations
Gender				
Male	77	36.15	79.32	6.67
Female	136	63.85	71.58	9.14
Marital status				
Married	141	66.20	72.59	7.03
Single	72	33.80	67.40	8.64
Experience				
Above 10 years	116	54.56	71.45	9.38
Less than 10 years	97	45.54	73.55	7.94
Locality				
Urban	117	54.95	77.80	9.69
Rural	96	45.07	73.50	10.04
Have you heard about dyslexia before?				
Yes	146	68.54	-	-
No	67	31.46	-	-

TAQ, Teachers Awareness Questionnaire.

identifying dyslexia' (item 15), and 'dyslexia is characterised by difficulty with learning to read fluently' (item 36). Scores from the present study found Cronbach's alpha coefficient of 0.77 for scores from the scale of knowledge and beliefs about developmental dyslexia. It must be pointed out that the 213 participants completed both the TAQ and the Scale of Knowledge and Beliefs about Developmental Dyslexia.

Procedure and ethical obligation

This study was approved by the Ethics Committee of the Department of Psychology, University of Nigeria, Nsukka. The permission to carry out the study in the schools, however, was obtained from the Director, Enugu State Primary School Management Board, which is the agency of government supervising all primary schools in the state, including those in Nsukka zone. The two questionnaires were stapled together for convenience. There was no compulsion whatsoever; only teachers who indicated willingness to complete the scale were allowed to complete the questionnaires. Anonymity was achieved by barring the teachers from indicating their personal identifications, such as names or their classes. Two hundred twenty copies of the questionnaire were distributed, but 216 copies were returned (i.e. 98.18% response rate). Out of the 216 completed questionnaires, three were discarded for improper filling, leaving the remaining 213 copies for statistical analysis.

Data analysis

Cronbach's alpha coefficient and Pearson's bivariate correlation were calculated to determine the reliability (internal consistency) and convergent validity of TAQ. Descriptive statistics was then utilised to investigate the other objective of the study.

Ethical considerations

Ethical clearance to conduct this study was obtained from the University of Nigeria Teaching Hospital Health Research Ethics Committee (No. NHREC/05/01/2008B-FWA00002458-1RB00002323).

Results

The result of the internal consistency analysis for the 16-item TAQ scale was adequate; the estimation of reliability of the final TAQ yielded a Cronbach's alpha coefficient of 0.77. Convergent validity for TAQ was determined by correlating a teacher's TAQ scores with the same teacher's scores on the Scale of Knowledge and Beliefs about Developmental Dyslexia. Using the Pearson's bivariate correlation, the result revealed substantial and significant positive correlation between the two measures ($r = 0.74$, $p < 0.01$). The relatively high positive correlation indicates that TAQ is convergent to the Scale of Knowledge and Beliefs about Developmental Dyslexia. Thus, the TAQ like the Scale of Knowledge and Beliefs about Developmental Dyslexia (Sriano-Ferrer & Echegaray-Bengoa 2014), could

be applied to measure primary school teachers' level of awareness about dyslexia.

Descriptive statistics was employed to estimate primary school teachers' level of awareness about dyslexia. The analysis showed that despite significant number of the teachers (146; 68.54%) responding 'yes' to the question, 'have you heard about dyslexia before?', the primary school teachers' level of awareness about dyslexia was very low. Applying the 75% criterion as the threshold for accepting a teacher's level of awareness about dyslexia as high revealed that only 51 (23.94%) primary school teachers reached the criterion (or the cut-off mark). The rest 162 (76.06%) primary school teachers surveyed failed to reach the criterion. This implies that most of the primary school teachers examined possessed low awareness level about dyslexia. These results were plotted in a figure (see Figure 2). The figure shows two categories of bar plotted together on the horizontal x-axis. The first bar shows teachers' responses to the question 'have you heard about dyslexia before?', while the second bar shows teachers' level of awareness about dyslexia. In the first task, teachers responded either 'yes' or 'no' to the said question, and in the second task, their level of awareness was determined by categorising a teacher as 'high' if his or her score reached the criterion 75% (i.e. score of between 60 and 80 on the TAQ), or 'low' if the teacher's score failed to reach the criterion (i.e. score of between 16 and 59 on the TAQ). The values for those categories are represented on the vertical y-axis.

Discussion

The study has two purposes. The first purpose was to develop a valid and reliable instrument to measure primary school teachers' awareness about dyslexia. Analysis of scores obtained by the primary school teachers on the TAQ showed that the convergent validity and internal consistency (Cronbach's alpha) of the scale were adequate. Similarly, the result of the EFA conducted with only items that attained the threshold mark of 0.30 (Nunnally 1970), showed that only 16 items loaded substantially on the four components of the scale. The relatively high positive correlation indexes obtained in the reliability and validity tests for the TAQ provide support that the TAQ is a valid and reliable scale that could be applied to assess primary school teachers'

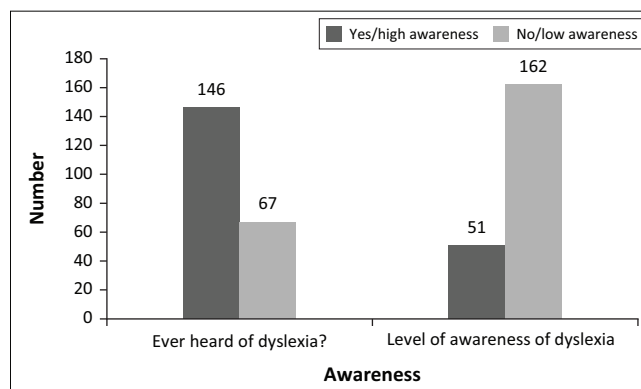


FIGURE 2: Bar chart showing primary school teachers' responses on the question about dyslexia and their level of awareness about dyslexia.

knowledge and awareness about dyslexia. The second purpose examined in the study was to determine the level of dyslexia awareness among primary school teachers. This finding showed that primary school teachers in Nigeria have low level of awareness about dyslexia. That is, the teachers' level of awareness about dyslexia was quite poor, despite significant number of the primary school teachers responding in the affirmative when they were asked the question, 'have you heard about dyslexia before?'. This finding aligns with that of earlier researches (Adubasim 2018; Tikolo 2019; Ugwu & Adubasim 2018), which show that many Nigerians, including primary school teachers, have significantly low level of awareness about dyslexia.

The given findings have important implications to education management in the country. In the first place, primary school teachers who lack basic understanding about concepts relating directly to dyslexia would ultimately not be able to recognise characteristics of dyslexia when teaching dyslexic children (Odo et al. 2021; Sriano-Ferrer & Echeagaray-Bengoia 2014; Wadlington & Wadlington 2005). If a teacher fails to recognise the characteristics of a dyslexic child, the teacher might be misled to label a pupil wrongly and this would inadvertently delay timely assessment and assistance. Therefore, an effort to develop and validate the TAQ that would be applied to assess primary school teachers' level of awareness about dyslexia is a useful contribution to knowledge. One important implication of this study is that the TAQ would assist education managers (e.g. Primary School Management Boards) to understand how little primary school teachers know about dyslexia and perhaps, the need to organise enlightenment and training workshops for primary school teachers to help raise the consciousness of the teachers about this important condition. Also, the workshop would help teachers in early detection of the condition and in rendering informed services or assistance to pupils living with the condition, in terms of treatment, psychotherapy or referral (Osa-Afina 2003; Peterson & Pennington 2015).

Conclusion

Dyslexia is a learning disability that is characterised by problems related to poor phonological processing. It occurs in several different cultures (Kuersten et al. 2019) and affects more than half of pupils with learning disability (Hulme & Snowling 2013). This study examined two objectives: to develop and validate the TAQ and to apply the questionnaire to assess the level of dyslexia awareness among primary school teachers in Nsukka, (South-eastern) Nigeria. The findings showed that TAQ is a valid and reliable scale to measure primary school teachers' knowledge and awareness regarding dyslexic condition. The study further observed that primary school teachers' awareness about dyslexia in Nigeria is poor. Despite most of the teachers responding that they have heard about the term 'dyslexia' prior to the study, the level of their awareness about dyslexia was significantly poor.

Recommendations

Following the findings obtained in this study, the authors make these recommendations:

- The TAQ is a valid and reliable instrument; thus, it should be used to measure primary school teachers' level of awareness about dyslexia.
- Because primary school teachers possess low awareness about the nature and perspectives of dyslexia, the Primary School Management Board is advised to organise psycho-education or training workshop to educate primary school teachers about the nature of dyslexic condition, which plagues approximately one in five children of school-going age.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

The authors' team is a research group – Family Society Research Group, so all the authors made valuable contributions to all our studies on dyslexia.

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Data availability

As already indicated, our group conducted a large-scale study about dyslexia in Nigeria, and the data for this study and other related studies are available.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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Appendix starts on the next page →

Appendix 1

TABLE 1-A1: Teachers Awareness Questionnaire.

S/N	Items	Corrected item-total correlation	Alpha if item deleted
<i>Reading</i>			
1.	Reading problem can be caused by parents not reading to their children.	0.363	0.754
2.	Pupils with reading problem usually find it difficult to pronounce words.	0.453	0.738
3.	Pupils with reading problem may find it difficult to express themselves verbally.	0.372	0.735
<i>Comprehension</i>			
4.	Pupils with reading problem have difficulty separating and joining sounds in words.	0.445	0.731
5.	Pupils with reading problem may find it difficult understanding what people say.	0.407	0.731
6.	Pupils with reading problem find it difficult remembering letters and their sounds.	0.363	0.754
<i>General</i>			
7.	Reading problem is caused by inadequate functioning of the brain.	0.476	0.724
8.	Pupils who are very intelligent can have reading problem.	0.399	0.732
9.	Reading problem can be inherited from parents.	0.493	0.722
10.	Extra time in exams may help pupils with reading problem.	0.512	0.720
11.	Reading problem is related to other learning difficulties.	0.324	0.738
12.	Many pupils with reading problem are very good in artworks.	0.376	0.735
<i>Attitude</i>			
13.	Reading problem does not actually exist; it's just an excuse for laziness.	0.354	0.755
14.	Giving pupils with reading problem extra time on tests, shorter spelling lists, and special seat is unfair to other pupils.	0.314	0.740
15.	Inability to read and write is inborn so teachers can do little or nothing to help the pupils.	0.310	0.751
16.	Pupils with reading problem do not succeed as adults.	0.463	0.725