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Screening of Children at Risk of Dyslexia in Primary Schools of Gujrat

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ABSTRACT

Dyslexia, a common neurodevelopmental disease, impairs children's ability to read, write, and spell, despite having enough IQ and educational opportunity. Early detection is critical to reducing its influence on academic performance and mental health. Sample of 1000 students were selected from different schools of Gujrat city from 2-5 class. Firstly, teachers identified students who were having problem in reading, writing or mathematical expression using Teacher Identification checklist and SCID (Screening checklist for identification of dyslexia) to identify or diagnose children with dyslexia. Diagnosed children were excluded from the sample and the remaining data was collected from 941 participants. These participants were then assessed using SPM (standard progressive matrices) (Raven & Raven, 1938) and DST-J (Dyslexia Screening Test Junior) (Fawcett & Nicolson, 2004) to evaluate their academic and cognitive performance. The results reported approximately 13% prevalence of children at risk of Dyslexia from main stream schools of Gujrat city. The findings highlighted the critical need for structured, culturally relevant screening programs, specialized teacher training, early interventions, and policy actions that promote inclusive education.

Keywords: *At risk Dyslexia, Schools, Screening, and Cognitive Assessment*

INTRODUCTION

Dyslexia is a specific learning disorder that affects a child's ability to read, write, and spell, despite the child's normal intelligence and education exposure (Shaywitz & Shaywitz, 2020). It is one of the most prevalent neurodevelopmental disorders in the world and has a significant impact on well-being and academic performance. Many children in underdeveloped nations like Pakistan go undiagnosed because of a lack of knowledge, insufficient teacher preparation, and the lack of organized screening programs, despite the fact that early diagnosis and intervention can significantly improve literacy results (Ahmad et al., 2021).

Dyslexia is a specific learning disorder that affects a child's ability to read, write, and spell despite their normal intelligence and education (Shaywitz & Shaywitz, 2020). It is one of the most prevalent neurodevelopmental disorders in the world and has a significant impact on well-being and academic performance. Many children in developing nations like Pakistan are not diagnosed due to a lack of

knowledge, inadequate teacher preparation, or organized screening programs, despite the fact that early diagnosis and intervention can significantly improve literacy results (Ahmad et al., 2021).

Dyslexia affects between 5 and 15 percent of school-age children worldwide, according to research (Lyon et al., 2019). However, prevalence estimates may be higher in low- and middle-income nations like Pakistan due to misinterpretation and underreporting. Dyslexia screening programs have been incorporated into early education systems in developed nations like the United States and the United Kingdom, allowing for prompt identification and assistance (DfE, 2021). In Finland, a nation known for its exceptional educational system, phonological screening is used as early as preschool to ensure that at-risk children receive specialized interventions (Boets et al., 2018). Depending on how it is defined and diagnosed, the global prevalence of dyslexia is estimated to be between 5% and 15% of the population. Some studies indicated that percentages are higher in nations with well-developed educational assessments and high literacy rates. Although dyslexia affect people of all linguistic and cultural backgrounds, the structure of a language has an impact on its manifestation and severity (Peterson & Pennington, 2012).

Dyslexia often goes undiagnosed across South Asia, particularly in Pakistan, due to a lack of awareness, insufficient diagnostic tools, and cultural barriers. Although the estimated prevalence of dyslexia in Pakistan ranges from 5% to 10%, aligning with global figures, the actual number may be higher due to frequent misdiagnosis and the absence of clear diagnostic standards (Ashraf & Najam, 2020; Malik, et al., 2013; Mufti et al., 2021). In many cases, dyslexia are mistaken for poor academic performance or low intelligence, even though numerous children in Pakistani primary schools struggle specifically with reading and writing skills. The multilingual education system in Pakistan—students are instructed in Urdu, English, and a variety of regional languages—increases the difficulty of diagnosis. Rather than dyslexia itself, some children may appear to have reading difficulties due to language confusion. Additionally, many dyslexic students are unable to receive the necessary assistance as a result of teachers' lack of specialized dyslexia training. Addressing this issue requires focused efforts on improving teacher training and implementing early screening programs.

Early detection of dyslexia is crucial, as research shows that interventions are most effective before the age of seven. Without early screening, children often face academic struggles and emotional distress. Therefore, it is important to identify that problem soon in order to ensure normal academic performance by providing appropriate support. The integration of vocabulary learning throughout all subject-area education, daily chances for reading for meaning, and a stronger emphasis on reading for comprehension in upper elementary grades are all possible policy considerations.

METHOD

Sample

A cross-sectional research design was used in this study to identify dyslexic students in Gujrat city schools**.** The current study's sample consisted of students from a number of public and private schools in Gujrat. A total of 1000 pupils in grades 2–5 were first assessed. Schools were chosen based on their willingness to participate in the study and administrative approval. The Teacher Identification Checklist and SCID (Screening Checklist for Identification of Dyslexia) were used by teachers to identify kids who demonstrated difficulties with reading, writing, or mathematical expression. Students suspected of having dyslexia were further evaluated on the basis of this preliminary assessment.

Out of 1000 kids, 59 were identified with dyslexia and removed from the final sample. The total sample for the study included 941 students (485 males and 456 females). These pupils were subsequently

evaluated using the Standard Progressive Matrices (SPM) and the Dyslexia Screening Test Junior (DST-J) to determine their cognitive ability and dyslexia risk levels. Students from both government and private schools participated in the study, representing a wide range of socioeconomic origins and residential zones (urban and rural).

Inclusion Criteria (Who Can Participate?)

The target population includes 1,000 pupils from various elementary schools in Gujarat.
The study focuses on children in grades 2–5. A predetermined number of students (depending on feasibility) will be screened.

Exclusion Criteria (Who Cannot Participate?)

Students with existing learning problems (e.g., ADHD, autism, or intellectual disability).
Students who do not have parental consent to participate.

Tools for Data Collection

To ensure accurate screening, two standardized tools were used be:

1. **Standard Progressive Matrices (SPM):**
   The standard progressive matrices evaluate nonverbal reasoning skills and overall intelligence while reducing cultural bias. The Raven SPM contains 60 elements in total, divided into five sets of 12 each (Sets A, B, C, D, and E). The set's pieces become more difficult one by one. Although each set begins with easy objects, each set follows a different logic. These sets identify the many mental processes required to solve challenges. SPM criteria were introduced in Pakistan in 2008 (Ahmad). Researchers from several continents have reported good psychometric qualities. According to Kline (2013) and Sbaibi et al. (2014), it is the most widely used metric.
2. **Dyslexia Screening Test (DST) Response Sheet:**
   Dyslexia Screening Test Junior (Fawcett & Nicholson, 1997) was used to identify students at risk for dyslexia. DST assesses junior high school pupils aged 6.6 to 11.6 who are at risk of dyslexia. It is a performance-based test that must be administered to each student individually. Individuals are assessed for approximately 35 minutes
3. **Questionnaires for Teachers**
   A structured questionnaire was designed to collect teachers' observations on students' reading difficulties, letter reversals, and phonological awareness. The questionnaire included Likert-scale and open-ended questions to gather qualitative and quantitative data.

Ethical Considerations

Permission was obtained from school officials to conduct the study, and ethical clearance will be sought to ensure the protection of students' rights and privacy. Parents or guardians was informed about the purpose of the study and asked to provide written consent for their child's participation. Teachers was briefed on the study's objectives and was assisted in identifying students with reading difficulties. The research process will begin with the administration of the SPM test to assess students' intelligence levels, followed by the use of the DST response sheet to screen for dyslexia. All assessments will be conducted in a quiet classroom setting to ensure students remain focused. Responses were carefully recorded, and all personal information was kept strictly confidential, used only for research purposes, and stored securely. To protect participants from labeling or stigmatization, results were only shared with appropriate school authorities and were not made public.

RESULT

Table 1 Demographic characteristics of participants (N = 1000)

Variable	Category	Frequency	Percent
Gender	male	485	48.5
	female	515	51.5
no. of siblings	1	131	13.1
	2	202	20.2
	3	253	25.3
	4	248	24.8
	5	116	11.6
	6	30	3
	7	20	2
birth order	only child	182	18.2
	1st born	308	30.8
	middle born	388	38.8
	last born	122	12.2
type of school	govt.	456	45.6
	private	544	54.4
year of education	2 class	222	22.2
	3 class	246	24.6
	4 class	254	25.4
	5 class	278	27.8
area of residence	rural	404	40.4
	urban	596	59.6
Quotient	Non diagnosis	941	94.1
	dyslexic	59	5.9
at risk	normal	35	3.5
	mildly at risk	279	27.9
	moderately at risk	553	55.3
	severely at risk	133	13.3
SPM	superior intelligence	534	53.4
	above average	295	29.5
	average intelligence	120	12
	below average intelligence	12	1.2
	poor intelligence	39	3.9

Table 1 reveals the majority of participants were in Grade 3 (37.7%), followed by Grade 2 (32.8%), and Grade 1 (29.5%). The sample comprised slightly more girls (55.7%) than boys (44.3%). Table also reported that mostly participants have superior, above average or average intelligence.

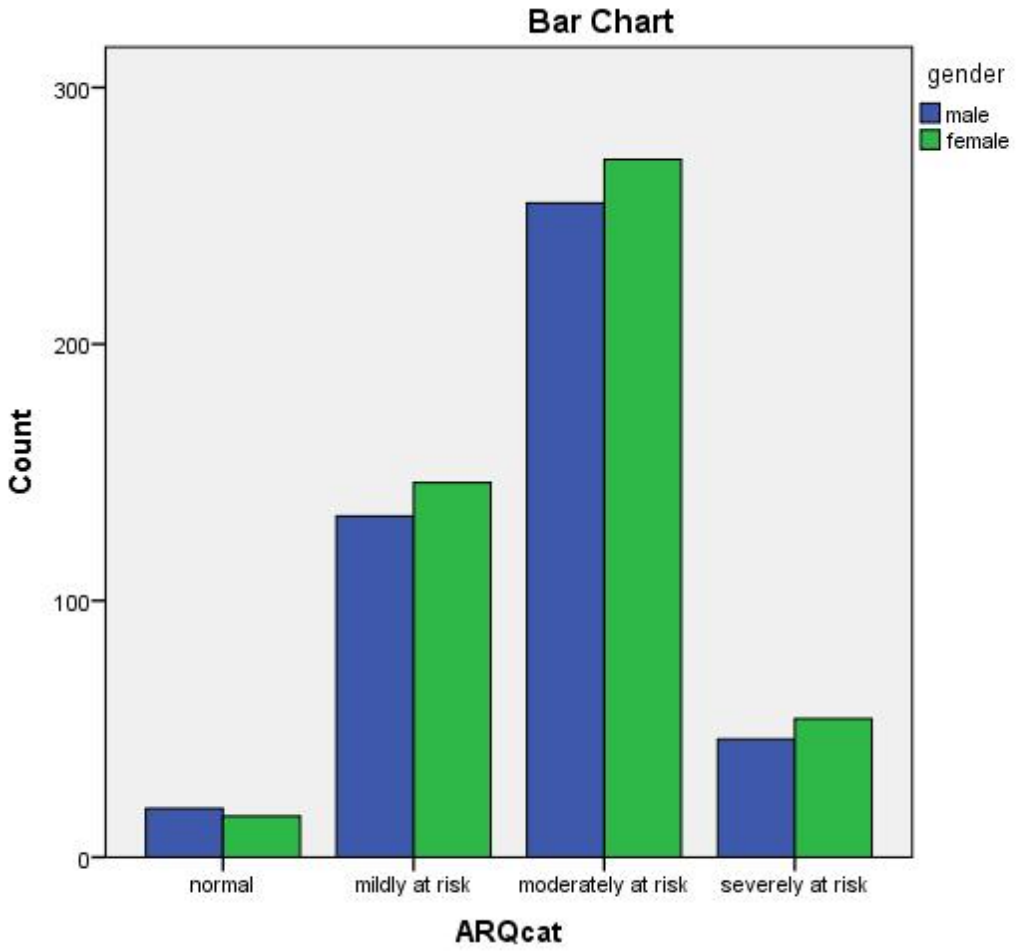

Figure 1: Gender Differences between Different Categories of Children at risk of Dyslexia

A bar chart illustrating the distribution of male and female participants across different risk groups (normal, mildly at risk, moderately at risk, and severely at risk) revealed that the largest proportion of both boys and girls fell into the moderately at risk group, with a slightly higher number of girls than boys. In the mildly at risk group, girls also outnumbered boys by a small margin. In contrast, in the normal group, boys slightly outnumbered girls. The number of boys and girls in the severely at risk group was nearly equal. Overall, the majority of students were classified as moderately at risk, with girls showing a slightly higher overall risk level compared to boys.

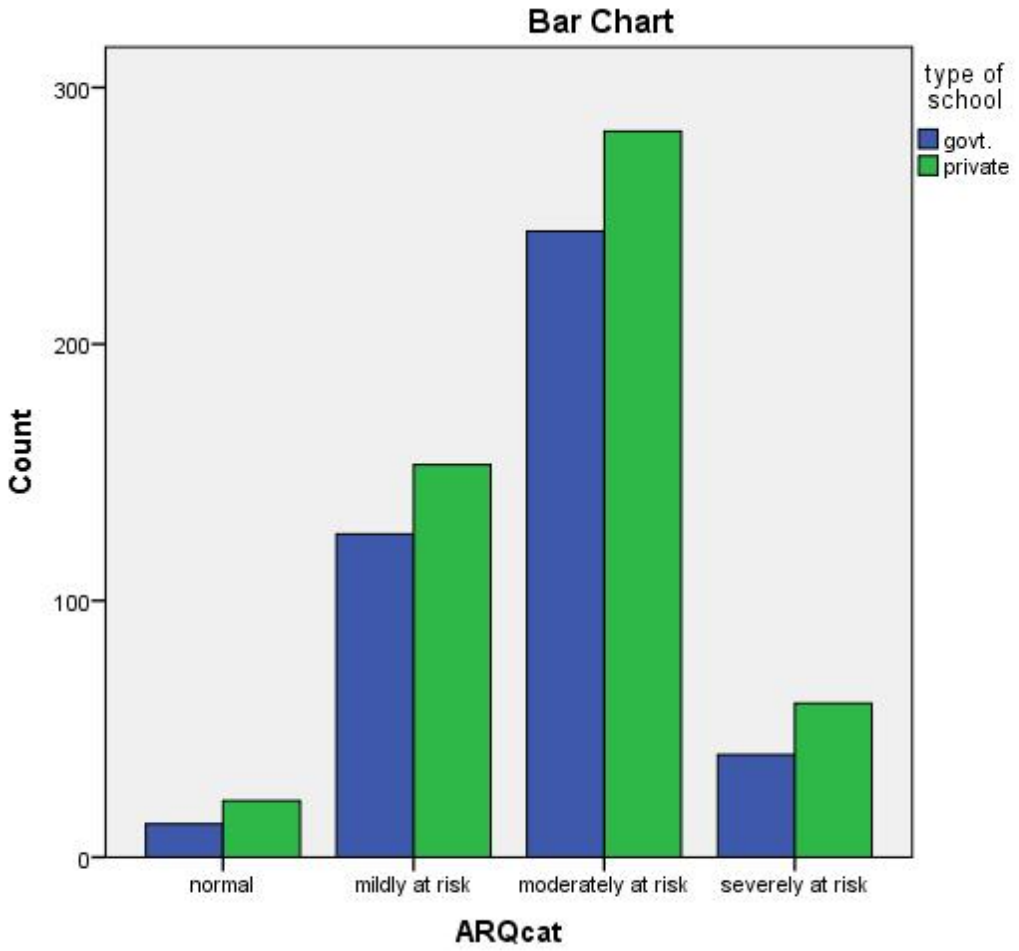

Figure 2: School wise Differences between Different Categories of Children at risk of Dyslexia

The bar graph shows that the majority of students from both government and private schools were classified as moderately at risk, with a slightly higher proportion among private school students. In the mildly at risk group, private school students also outnumbered their government school counterparts by a small margin. Very few students from either school type were classified in the normal group. In the severely at risk group, the number of private school students was slightly higher than that of government school students. Overall, the largest proportion of students fell into the moderately at risk category, with private school students exhibiting a slightly higher overall risk level.

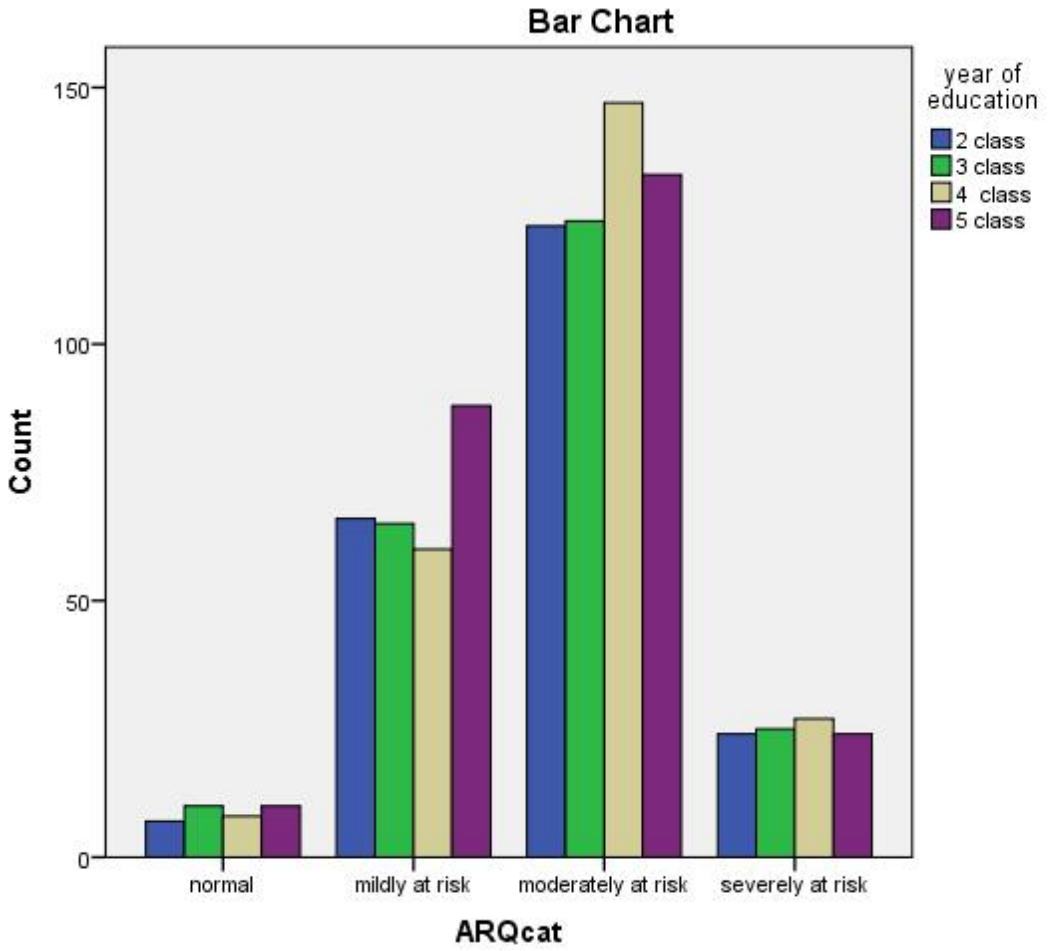

Figure 3: Class wise Differences between Different Categories of Children at risk of Dyslexia

The bar graph shows that the majority of students across all grade levels (Grades 2 to 5) were classified as **moderately at risk**, with Grade 5 students comprising the highest proportion in this category. In the **mildly at risk** group, Grade 4 students slightly outnumbered students from other grades. Very few students were categorized as **normal** across all grade levels. In the **severely at risk** group, the distribution was relatively even across grades, with only minor differences. Overall, most students were moderately at risk, with Grade 5 students representing the largest share in that category.

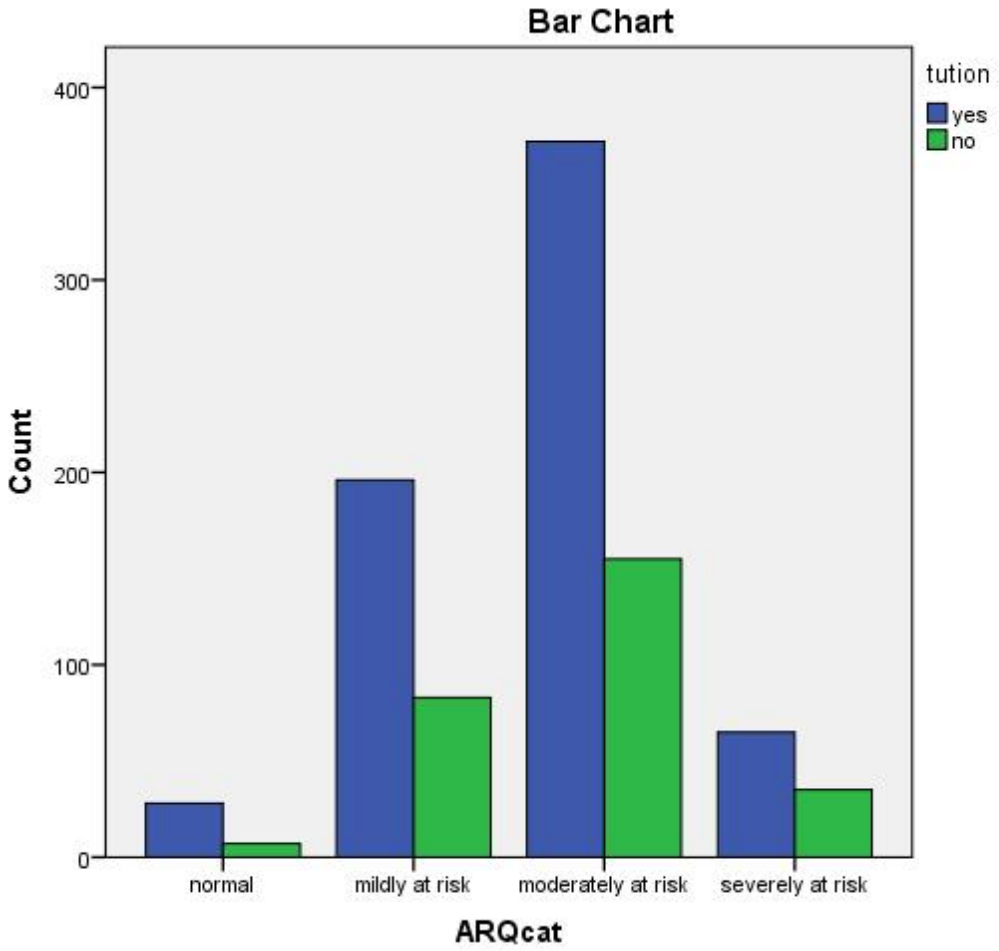

Figure 4: Tuition wise Differences between Different Categories of Children at risk of Dyslexia

The bar graph shows that students who did not receive tuition were more likely to be classified in higher risk categories compared to those who received tuition. The majority of students without tuition were classified as **moderately at risk**. In all risk categories, the number of students who received tuition was consistently lower than those who did not. Very few students in either group were classified as **normal**. Overall, students who received tuition appeared to be at a lower risk level than those who did not receive tuition.

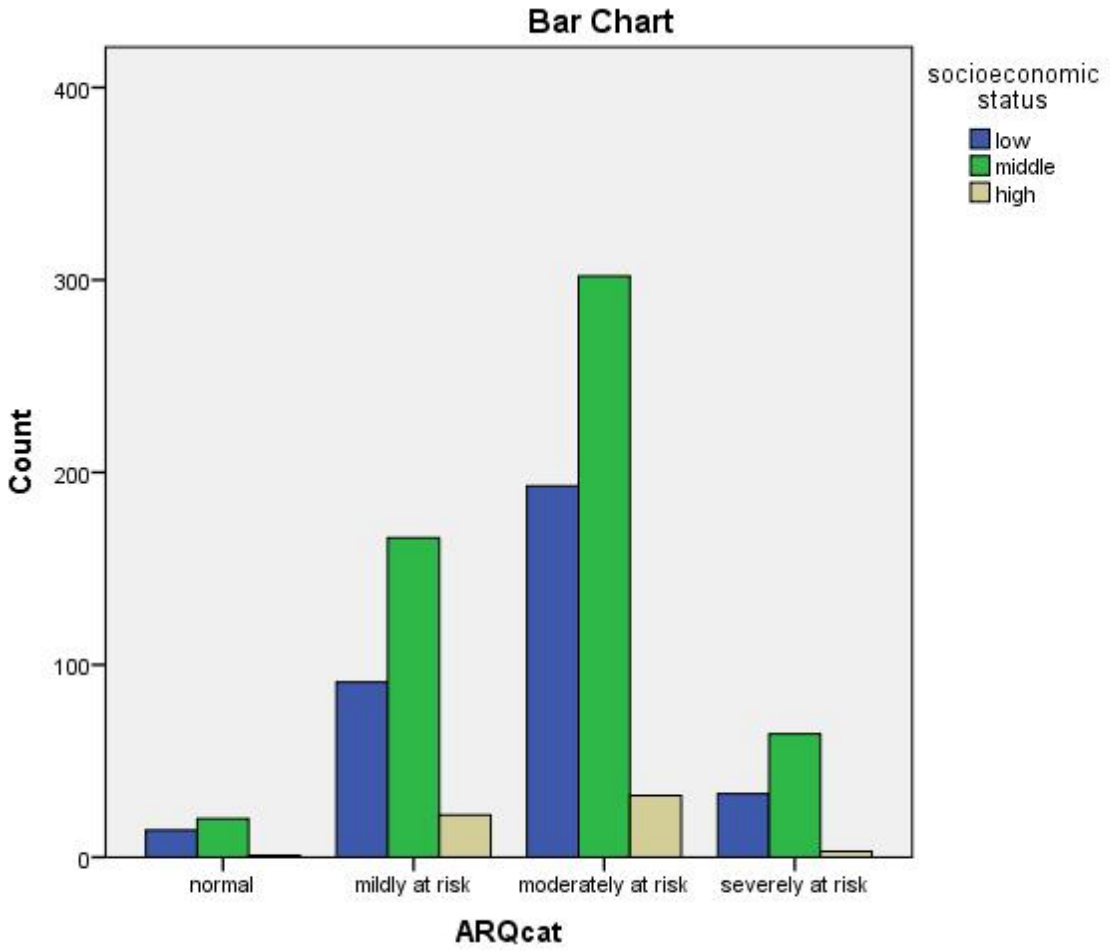

Figure 5: Socio-economic Differences among Different Categories of Children at risk of Dyslexia

The bar graph shows that the students from **middle** and **low socioeconomic backgrounds** were more frequently classified as **moderately at risk** compared to those from **high socioeconomic backgrounds**. Across all groups, relatively few students were categorized as **normal** or **severely at risk**. Overall, students from middle and low socioeconomic status appeared more likely to experience elevated levels of academic risk than those from higher socioeconomic backgrounds.

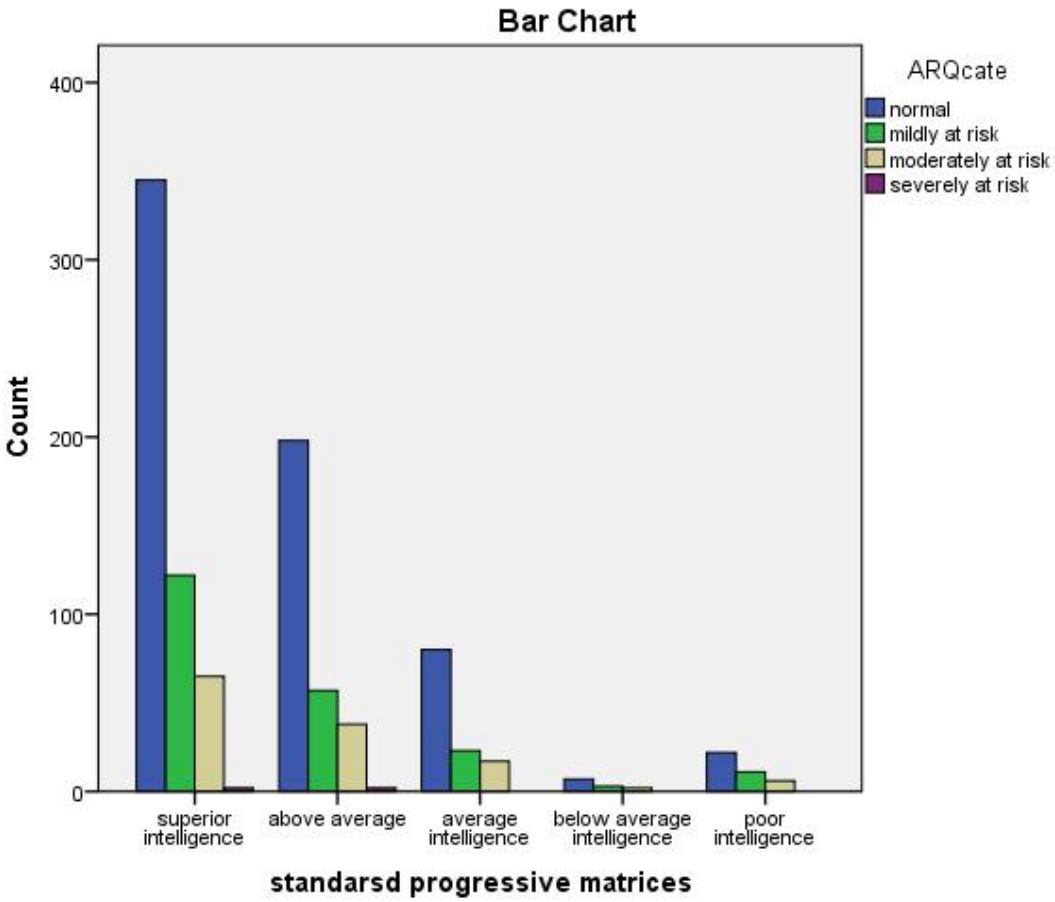

Figure 6: Intelligence levels among Different Categories of Children at risk of Dyslexia

The bar graph shows that there were few students having below average and poor intelligence amongst all participants in all at risk categories. It can be seen that children severely at risk are scare across all intelligence levels.

DISCUSSION

The current study aimed to find out children at risk of dyslexia from main stream schools of Gujrat city. The study identified children from class 2-5 having problems in reading, writing and mathematical expression with the help of teacher identification scale filled by teachers.

The demographic research showed a wide range in gender, birth order, school types, socioeconomic position, and parental education. The slightly increased number of female participants is consistent with overall trends in educational enrollment in several South Asian countries (UNESCO, 2020). A high majority of the sample came from middle-income families and urban locations, which may have an impact on both access to diagnosis and support resources, and hence the observed prevalence of dyslexia risk.

The findings showed that girls were more likely than boys to be classed as moderately or slightly dyslexic. This contradicts much of the previous literature, which indicates a higher prevalence of dyslexia in males (Rutter et al., 2004; Quinn & Wagner, 2015). However, it has been suggested that girls may be underdiagnosed due to superior coping mechanisms (Wadsworth et al. 2000). The recent findings could indicate a more nuanced gender difference in the manifestation or recognition of dyslexia risk.

Students in private schools had a slightly higher incidence of dyslexia risk in most categories. This contradicts the belief that private school kids are less risky since they have more resources. One possible explanation could be increased academic pressure at private universities (Awan et al., 2011), which can exacerbate reading challenges and bring them to light more frequently than in public schools.

Grade 5 pupils had the highest proportion of moderate risk, indicating an increasing risk pattern as they progressed through the grades. This tendency shows that academic demands rise with each grade level, highlighting underlying reading challenges (Catts et al. 2012). It emphasizes the importance of early assessment and intervention in lower elementary grades.

Students who did not receive tuition were more likely to be in the moderate and severe risk groups, implying that tuition may operate as a protective factor. Høien and Lundberg (2000) found that increased instructional time and individualized help are crucial for addressing reading problems. Private tutoring may benefit youngsters who struggle with phonological processing and reading fluency. Dyslexia was more common in children from lower and intermediate socioeconomic backgrounds. In previous studies (Noble et al., 2006; Fernald et al., 2013), low socioeconomic status has been linked to poor literacy outcomes due to a lack of access to reading-rich environments and early educational stimulation. This highlights the necessity of inclusive educational policy and suggests that reading development is influenced by socio-environmental factors.

Similarly, children whose fathers had barely completed middle school demonstrated higher levels of risk. Parental education is intimately related to the home literacy environment (Sénéchal & LeFevre, 2002). Parents with limited educational backgrounds may be less able to help their children's reading development at home, putting them at danger.

Results of the figure 6 showed that participants fall in the normal or mild at risk category have superior or above average intelligence. It can also been seen that most children moderately at risk also fall in superior above average, and average intelligence whereas children severely at risk are rare in all intelligence categories. These results are in consistent with the results of a meta-analysis (Hoskyn & Swanson, 2000). The meta-analysis of nineteen studies indicated that children with reading difficulties showed better cognitive functioning compared to low achievers on reading tasks like pseudo-word reading and real word reading etc. These researchers concluded that children with high IQ and poor reading performed better on tasks related to intelligence (Hoskyn & Swanson, 2000). Thus, higher IQ and poor readers were identified as dyslexic whereas low IQ were recognized as poor readers having weaker cognitive processes (Elliot & Resing, 2000).

Implications for Practice

Improving Tuition Programs: Offering additional academic support outside of school hours can reduce academic risk, particularly for low-income students. Parent Involvement Programs: Encouraging and equipping parents, particularly those with middle-level education, can improve children's academic performance (Jeynes, 2005). Equity-focused policies can help reduce inequities between school types and

improve access to academic resources for impoverished children. Targeted interventions can benefit at-risk groups, such as low-income individuals, private school pupils, and urban youngsters.

Limitations and Future suggestions

The study was limited to one city (Gujarat), which reduced the generalizability of the findings. Some students may have been apprehensive during the test, which affected the outcomes. The study was based on instructor observations, which could involve subjectivity. While this study provides valuable insights on the prevalence and screening of dyslexia in Gujarat's primary school children, it has several drawbacks. First of all, the study was restricted geographically to a single city, making it challenging to apply the findings to a wider population of Pakistanis. Purposive sampling may have introduced selection bias and reduced representation of the entire student population, even though it was helpful in identifying at-risk children. The reliance on teacher-reported checklists and observations may have harmed the impartiality of the screening process, as personal biases and varying levels of instructor awareness of dyslexia may have influenced the identification of difficult students. In addition, the study's cross-sectional design made it difficult to monitor students' development over time. Despite the fact that the methods were the same, they were not culturally adapted to the Pakistani context, which may have affected how accurately the risks were classified. In addition, parental agreement and participation were difficult to get in certain situations, which may have influenced the sample size and data completion.

CONCLUSION

The findings of this study demonstrate that approximately 13% of primary school children in Gujrat are at risk of dyslexia, reflecting prevalence rates reported in similar contexts. The observed gender and grade-level differences highlight the significance of early, systematic screening to identify affected children prior to the escalation of academic difficulties. While school type did not show a significant effect, the higher prevalence in urban areas suggests disparities in awareness and resources that must be addressed. Overall, this study highlights the urgent need to develop culturally relevant screening protocols, enhance teacher training, and increase parental awareness to support early identification and intervention, thereby improving educational outcomes for dyslexic children in Pakistan’s mainstream schools.

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