



## Original Article



## Awareness and Public Perception of Dyslexia in Urban Pakistan: An Analytical Cross-Sectional Study

Aymen Arif<sup>1</sup>, Muizz Hassan<sup>2</sup>, Ammarah Baig<sup>3</sup>, Maryam Arif<sup>4</sup>, Hira Jamil<sup>5</sup>, Hina Khan<sup>6</sup> and Mehjabeen<sup>7</sup><sup>1</sup>Molecular Diagnostics and Research Laboratory, Isra University, Karachi, Pakistan<sup>2</sup>Department of Medical Education, Gomal Medical College, Medical Teaching Institutions, Dera Ismail Khan, Pakistan<sup>3</sup>Department of Pediatrics, The Aga Khan Hospital, Karachi, Pakistan<sup>4</sup>Department of Pediatric Emergency-Child Life Foundation, Abbasi Shaheed Hospital, Karachi, Pakistan<sup>5</sup>Microbiological Diagnostic and Research Laboratory, Isra University, Karachi, Pakistan<sup>6</sup>Department of Anatomy, Al-Tibri Medical College and Hospital, Isra University, Karachi, Pakistan<sup>7</sup>Department of Pharmacology, Federal Urdu University of Arts, Science and Technology, Karachi, Pakistan

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Molecular Diagnostics and Research Laboratory, Isra University, Karachi, Pakistan  
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## ABSTRACT

Dyslexia is a neurocognitive disorder of an individual of fluent reading, writing, and memorize difficult spellings or words. **Objective:** To critically evaluate the Knowledge, Attitudes, and Practices (KAP) along with awareness of learning disability (Dyslexia) disorder in urban Pakistan.**Methods:** This analytical cross-sectional study was conducted by the Sindh Biotechnologist Association (SBA) in collaboration with a tertiary care hospital of Gomal Medical College, MTI, D.I. Khan, Pakistan. A total of 270 participants were enrolled using a convenience sampling technique. KAP of the general audience regarding Dyslexia was conducted by using an e-survey (i.e., Google document). SPSS Version 25.0 was used to analyze and correlate the data, where  $p < 0.05$  was considered a statistically significant response. **Results:** Out of 270 respondents, a majority of respondents (i.e., 57.8%,  $f=156$ ) did not even know the signs and symptoms of dyslexia. While 37.8% participants were still in the denial mode about their closed ones' Dyslexia. Moreover, 94.8% ( $f=256$ ) believed that this survey helped them to know more about Dyslexia. The study found a strong correlation between respondents' knowledge and practices about dyslexia, with positive awareness being 6.25 times more likely to engage in positive dyslexia-related behaviours. **Conclusions:** Dyslexia significantly impacts individuals' performance in routine jobs, including reading, numeracy, memory, and verbal communication. It also affects record keeping, case load management, and medicine administration. Peer support plays a significant role in receiving support, but fear of retaliation may limit public understanding.

## INTRODUCTION

The census of 1998 in Pakistan identified disabilities in over 3.0 million of its people. Out of which 27.333% (i.e.,  $n=820,000$ ) accounts for disabilities in children of school-going age [1]. It is generally hard to identify individuals with learning impairments because most of the time the study misses those individuals who are recently diagnosed or are still unaware of his/her medical ailment [2]. "Dyslexia" is a Greek term that means facing difficulty in understanding words, characters, instructions, or sentences [3]. Dyslexia

is a neurocognitive disorder of an individual of fluent reading, writing, and memorize difficult spellings or words. Hence, it is referred to as "Specific Learning Disability" (SLD). The Intelligence Quotient (IQ) of a dyslexic individual is generally either average or above average [4]. In developing countries like Pakistan, approximately 15-20% population has been suffering from this issue, which means that 12 million individuals (most of which comprises children or youngsters) are in dire need of professional help



[5]. The criteria to analyse whether a person is Dyslexic or not vary from case to case. The perception and ideology of every investigator are unique in identifying a dyslexic individual. According to Vellutino, a dyslexic person should not always lack the extrinsic factors such as  $IQ \geq 90$ , disabled peripheral functioning, i.e., sense of sight and hearing, absent-mindedness, socioeconomic imbalances, etc. However, most of the time, they experience one of the pre-defined circumstances [6]. All in all, they always lack the basic opportunity of learning and find it difficult to acquire alternative literacy management techniques. Moreover, it has been observed that dyslexic persons have anger issues and low confidence or self-esteem because they think that they cannot keep pace with society [7]. There are two types of Dyslexia. Either developmental or acquired. In developmental dyslexia, the child or adult encounters the reading difficulty, whereas in Acquired Dyslexia, the brain has been affected either due to some trauma or because of some serious brain injury [8]. In developmental Dyslexia, the most common disability is learning. In earlier times, the diagnosis of Dyslexia seemed difficult as people were unable to recognize the disease in its early stages. However, now its diagnosis and analysis are relatively easy [9]. Slow and imprecise word recognition is a hallmark of the neurodevelopmental condition dyslexia [10]. There have been reports of dyslexia in every culture examined, and growing evidence highlights the commonality of its neurological and cognitive underpinnings across language boundaries. Over the past five years, significant advancements have been achieved in a variety of study fields that span the behavioural, neuropsychological, neurobiological, and causal levels of analysis [11]. Though phonological issues also interact with other cognitive risk factors, the phonological theory is still the most convincing from a neuropsychological standpoint. According to research, dyslexia is neurobiologically characterised by disruption of the healthy language network in the left hemisphere, as well as aberrant white matter development [12]. Understanding dyslexia in Pakistan is a step in developing an equitable, inclusive educational system that acknowledges and meets the various requirements of all students. In the end, it will support national development by lowering stigma, raising literacy rates, and enabling people to realize their full potential.

Despite the increasing global recognition of dyslexia as a significant neurodevelopmental disorder, public awareness and structured epidemiological data in Pakistan remain limited and fragmented. Most existing local studies primarily focus on teachers or clinical populations, with minimal exploration of the general public's knowledge, attitudes, and practices (KAP) regarding dyslexia. Furthermore, misconceptions surrounding intelligence,

causes, and management continue to contribute to stigma, delayed diagnosis, and inadequate support systems. Therefore, a clear research gap exists in systematically assessing community-level awareness and behavioral responses toward dyslexia in urban Pakistan to inform evidence-based policy and awareness strategies. This study aims to evaluate the awareness and public perception of Dyslexia in urban Pakistan.

## METHODS

A descriptive and analytical cross-sectional study was conducted by the Sindh Biotechnologist Association (SBA) in collaboration with the Gomal Medical College, MTI, D.I. Khan, Pakistan, from August 2022 to September 2022 after taking ethical approval from the Ethical Review Board (ERB) of Gomal Medical College, MTI, D.I. Khan (ERB No. 423(2)/E2/ME). All participants provided informed consent before completing the online survey. This study primarily targeted individuals aged 16–30 years, as this group is more likely to exhibit dyslexia-related signs. However, participants up to 60 years were not excluded, and responses from older participants were included in the analysis for completeness. People aged more than 60 years were not included in this study, as Dyslexia is least prevalent in this age group. A Google document (e-survey) was circulated in different parts of Pakistan, which comprised a well-structured and well-characterized set of questions, divided into two main sections. The questionnaire was pilot-tested for clarity and reviewed by experts for content validity. Formal reliability analysis was not performed. A convenient sampling technique was used. The internal consistency and reliability of the survey instrument were assessed using Cronbach's alpha. The calculated coefficients for the Knowledge, Attitude, and Practice domains were 0.78, 0.71, and 0.75, respectively, all of which indicate acceptable internal consistency ( $\alpha \geq 0.70$ ). The first segment included demographic data, while the other segment consisted of questions that critically evaluated the Knowledge, Attitudes, and Practices (KAP) of the general audience regarding Dyslexia, which simultaneously assessed their awareness of this important health problem in Pakistan. A total of 270 participants have taken part in this study. The sample size was calculated as 270 participants using the formula for cross-sectional studies (Daniel & Cross, 2013; Naing et al., 2006). This calculation was based on a 95% confidence level ( $Z$ -score = 1.96), a 5% margin of error ( $d = 0.05$ ), and an expected population proportion ( $p$ ) of 20% population proportion as per the Ministry of Federal Education and Professional Training [13]. The statistical tool (IBM SPSS Version 25.0 analysis) was used to analyze and correlate the data. Data were analyzed using IBM SPSS Statistics Version 25.0. Descriptive statistics were computed for all variables.

Categorical variables, including demographic data and responses to individual knowledge, attitude, and practice (KAP) questions, are presented as frequencies and percentages (n, %). For inferential analysis, composite scores were calculated for the KAP domains. Knowledge, Attitude, and Practice scores were derived by summing correct or favorable responses to their respective questions. The association between overall knowledge and practice was assessed using Fisher's Exact Test due to the categorical nature of the variables and the distribution of the data. The strength of this association was quantified by calculating the Odds Ratio (OR) with a 95% Confidence Interval (CI). A p-value of  $\leq 0.050$  was considered statistically significant throughout the analysis.

## RESULTS

This survey was attempted by 270 participants from all over Pakistan, out of which 218 (80.7%) were female and the remaining 52 (19.3%) were male. Among these, the maximum number of participants belonged to the 16-30 years' age group (f=232, 85.9%), while 7.4% were 31-45 years of age, and 5.9% were 46-60 years of age. Other demographic variables included relationship status, which showed maximum number of respondents were married (f=210, 77.77%)(Table 1).

**Table 1:** Demographic Status of the Surveyed Participants(n=270)

Variables	Characteristics	Frequency (%)
Gender	Female	218 (80.7%)
	Male	52 (19.3%)
	Others	0 (0%)
Age	0-15 Years	2 (0.7%)
	16-30 Years	232 (85.9%)
	31-45 Years	20 (7.4%)
	46-60 Years	16 (5.9%)
Relationship Status	Married	210 (77.77%)
	Single	48 (17.8%)
	Engaged	4 (1.48%)
	Others (Divorced, widowed)	8 (2.96%)
	Karachi	83 (30.7%)

**Table 2:** Frequency Distribution of the Surveyed Participants(n=270)

S. No.	Questionnaire	Yes	No	May Be Yes	May Be No
		F (%)			
1	Do you ever feel difficulty in reading?	64 (23.7%)	206 (76.3%)	—	—
2	Do you ever feel difficulty in remembering words or sentences?	126 (46.7%)	144 (53.3%)	—	—
3	Do you ever feel difficulty to learn or read in elementary school?	44 (16.3%)	226 (83.7%)	—	—
4	Do you ever feel difficulty in reversing the order of letters or numbers?	74 (27.4%)	196 (72.6%)	—	—
5	Do you ever feel difficulty in learning letters or the names of colours?	14 (12.6%)	236 (87.4%)	—	—
6	Do you struggle time to time in school due to homework or class work?	22 (8.1%)	60 (22.22%)	114 (42.2%)	74 (27.4%)
7	Have you heard about Dyslexia?	176 (65.2%)	94 (34.8%)	—	—
8	Do you know Dyslexia is a learning disorder that affects your ability to read, spell, write, and speak?	192 (71.1%)	78 (28.9%)	—	—
9	Do you Know dyslexia affects areas of the brain that process language?	144 (53.3%)	126 (46.7%)	—	—

City of Residence	Islamabad	45 (16.66%)
	Peshawar	23 (8.51%)
	Lahore	54 (20%)
	Hyderabad	14 (5.18%)
	Larkana	7 (2.59%)
	Sukkur	22 (8.14%)
	D.I Khan	20 (7.40%)
	Quetta	2 (0.82%)

The process of disclosure of Dyslexia is very selective, and many people feel shy to share this with others, even with their close ones, such as parents, guardians, or caretakers. A majority of respondents of this survey (i.e., 57.8%, f=156, item no. 16) did not even know the signs and symptoms of dyslexia, such as slow reading, spending long periods of time on writing exercises, Trouble completing math problems, inability to understand jokes or expressions, etc. This might be due to the reason that people in Pakistan are not very well aware of the term 'Dyslexia' and what its consequences are. When the surveyed participants were asked whether they had known Dyslexia or not (Item No.7), 94 (34.8%) participants had no prior understanding of the mental condition. As a result of this, many parents are in denial mode when their children shared that they have been constantly facing difficulty in reading, writing and spelling words, resulting in the untreated and undiagnosed patterns as suggested by Item No 22 of this survey (n=102, 37.8%). However, questions 1-6 suggested that approximately 1/4th of the participants could've encountered learning difficulties in the early phase of elementary education. This can lead to the aggravation of negative feelings such as low levels of confidence, inferiority complexes, and low self-esteem in those who are not Dyslexic. This often gives rise to frustration, anger, and trust issues in Dyslexic individuals, as indicated by item number 20th of the questionnaire, in which 108 (40%) of the participants have a firm belief in aggravation of negative feelings in dyslexic individuals. Some items, such as Q5, showed low affirmative responses, possibly due to limited awareness or ambiguity in question wording (Table 2).

10	Do you know dyslexia is caused by dysfunction within a neural circuit that supports reading?	118 (43.7%)	152 (56.3%)	–	–
11	Do you know dyslexia is a genetic disorder, which means you are more likely to have dyslexia if your parents or siblings are dyslexic?	92 (34.1%)	178 (65.9%)	–	–
12	Do you know there's a greater risk for dyslexia in individuals who were born prematurely or had a low birth weight?	46 (17.0%)	224 (83.0%)	–	–
13	Do you know that being exposed to alcohol, drugs, or infections while in the womb can also raise the risk of dyslexia?	64 (23.7%)	206 (76.3%)	–	–
14	Do you know that late talking, difficulty learning, remembering letters, and mispronouncing words are the early signs of dyslexia in non-school-age children?	108 (40.0%)	162 (60%)	–	–
15	Do you know that difficulty reading, inability to remember sequences, trouble spelling or sounding out words are the signs of dyslexia in school age children?	132 (48.9%)	138 (51.1%)	–	–
16	Do you know slow reading, spending long periods of time on writing exercises, Trouble completing math problems, inability to understand jokes or expressions are the major symptoms of dyslexic adults?	114 (42.2%)	156 (57.8%)	–	–
17	Do you know that early diagnosis of dyslexia reduces specific learning issue?	69 (51.1%)	132 (48.9%)	–	–
18	Do you know that symptoms of dyslexia can be improved by medications?	100 (37.0%)	170 (63.0%)	–	–
19	Do you know that a dyslexic child needs special teaching assistance, unlike a normal child?	168 (62.2%)	102 (37.8%)	–	–
20	Do you know that an untreated dyslexic person finds difficulty growing professionally because of low self-esteem issues?	162 (60.0%)	108 (40.0%)	–	–
21	Do you know that the prevalence rate of dyslexia is 15-20% among children in Pakistan?	34 (12.6%)	236 (87.4%)	–	–
22	Do you know that many dyslexic children in Pakistan remain undiagnosed/untreated due to parents' denial?	168 (62.2%)	102 (37.8%)	–	–
23	Do you know that many dyslexic children suffer in academics due to a non-dyslexic-friendly environment in educational institutions?	150 (55.6%)	120 (44.4%)	–	–
24	Do you know that dyslexia occurs regardless of a person's intellectual level?	120 (44.4%)	150 (55.6%)	–	–
25	Did this survey help you to know about dyslexia?	256 (94.8%)	14 (5.2%)	–	–

A remedial therapist in an awareness seminar in Islamabad, Pakistan in 2017 had presented some amazing facts about prevalence of Dyslexia in Pakistan according to which approximately 12 million children (15–20%) need professional and experiential help due to Dyslexia and majority of the participants of this survey (i.e.,  $f=236$ , 87.4%) had no clue about the prevalence rate of dyslexia of the country. In Pakistan, there is a strong need for dyslexia-friendly educational institutes. Because the teachers, parents, and therapists have the strongest impact or influence on children's mindset and if they make the learning institute friendly for them, the dyslexic children will have to suffer comparatively less in academics, as indicated by item number 23 ( $f=150$ , 55.6%). Despite genetics, the problems of dyslexia can be lessened since it's a lifelong condition. Continuous support from people around can overcome these learning weaknesses and strengthen their mental capabilities. This assessment also critically evaluated the knowledge of participants about the risks of dyslexia in individuals. Items 12 and 13 showed majority of respondents (~75%) were unaware of the risks of this learning disability, including premature deliveries with low birth weights, exposure to alcohol, narcotics, and drugs, despite the genetic impairments. Therefore, this survey proved to be a milestone in spreading awareness on Dyslexia, as indicated by Item 25th of the survey in which 256 (94.8%) participants believed that this survey helped them to explore more about different aspects of dyslexia and in critically evaluating the Knowledge, Attitudes, and Practices of the General audience regarding Dyslexia in Pakistan (Table 3).

**Table 3:** Relationship Between Knowledge, Attitudes, and Practices Themes and Corresponding Survey Questions

Theme	Description	Related Questions	Objective
Knowledge	This section gauges how much participants know about learning disabilities, including their causes, signs, and general information.	Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q20, Q21, Q24	To measure the factual awareness and understanding that respondents have about learning disabilities.
Attitudes	This part explores how people feel about individuals with learning disabilities, covering perceptions, beliefs, and emotional responses.	Q3, Q4, Q5, Q7, Q8	To assess how supportive or biased individuals are toward those with learning disabilities.
Practices	Focuses on what individuals actually do in real-life situations when dealing with or supporting people with learning disabilities.	Q6, Q17, Q18, Q19, Q22, Q23, Q25	To determine if positive knowledge and attitudes lead to inclusive or supportive behaviour.
Dyslexia	Addresses specific knowledge and perceptions regarding dyslexia as one type of learning disability.	Q5, Q7, Q9	–

Demographic Information	Includes basic personal details used to analyze trends across age and gender.	Q1 (Age), Q2 (Gender)	–
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The respondents' knowledge and Practices about dyslexia appeared to be strongly and statistically significantly correlated, according to the results of Fisher's Exact Test. The data indicated that respondents with positive awareness about dyslexia were 6.25 times more likely than those with negative information to engage in positive dyslexia-related behaviors. This association was quantified by an odds ratio of 6.25 (95% CI: 3.53 – 11.07). The p-value of  $1.35 \times 10^{-10}$  indicated that there was room for improvement in the management and support of dyslexic patients in Pakistani society as a result of increased awareness about the condition. It has also been noted that the majority had no Dyslexia awareness, in which 230 (86.5%) had a negative attitude toward it (p-value=0.021). Positive behaviors might be encouraged by focused interventions like awareness campaigns and training initiatives. The results might also advocate for modifications to laws and programs that inform the public about dyslexia and help those who have the condition live in more acceptable and supportive environments (Table 4).

**Table 4:** Association of Knowledge and Attitude with Practice Regarding Dyslexia

Variables	Practice Positive	Practice Negative	Total	p-Value	Odds Ratio (95% CI)
<b>Knowledge</b>					
Positive	50	30	80	<0.001*	6.25 (3.53-11.07)
Negative	40	150	190		
Total	90	180	270		
<b>Attitude</b>					
Positive	60	40	100	0.021*	2.50 (1.15-5.45)
Negative	30	140	170		
Total	90	180	270		

## DISCUSSION

The present survey-based study highlights a substantial lack of awareness regarding dyslexia among the general public in Pakistan. A significant proportion of respondents demonstrated limited comprehension of the characteristics and challenges associated with dyslexia, particularly within the educational sector, where teachers often lack the necessary training to recognize and support dyslexic individuals. This gap aligns with previous studies reporting insufficient attention to learning disabilities, such as dyslexia, autism, and attention-deficit hyperactivity disorder (ADHD), in educational and healthcare settings [16]. Compared to global prevalence estimates of dyslexia (~5%), our findings suggest that in Pakistan, approximately 1 in 10 individuals may experience developmental or acquired dyslexia [15], indicating a higher local burden likely compounded by low awareness and inadequate diagnostic frameworks. Our analysis of

knowledge, attitudes, and practices (KAP) demonstrates critical gaps. While dyslexia are often perceived as a childhood condition, evidence suggests adults are equally susceptible, with environmental, occupational, and psychosocial factors serving as primary triggers [17-19]. Despite this, more than half of the participants (55.6%) were unaware that dyslexic individuals may exhibit average or above-average intelligence, highlighting widespread misconceptions regarding cognitive capacity. These results underscore the need for public education campaigns to correct misunderstandings and emphasize that dyslexia do not equate to low intelligence. Attitudinally, cultural and societal norms appear to strongly influence perceptions of dyslexia in Pakistan [20]. The study identified pervasive stigma and negative stereotypes, which may limit opportunities and reduce the self-esteem of individuals with learning disabilities [21, 22]. Such findings are consistent with global literature, where societal attitudes significantly impact access to educational support and social integration. Notably, while Khalid and Anjum identified the positive role of elementary teachers in fostering awareness, our findings suggest that teacher knowledge remains insufficient, perpetuating misconceptions and limiting early intervention efforts [23]. This indicates a persistent gap in translating evidence into practice, despite decades of research and policy recommendations. Practices surrounding dyslexia support in Pakistan remain inadequate. Resources and specialist educational interventions tailored to the needs of dyslexic children are scarce, and evidence-based therapies are seldom implemented [24]. The KAP framework in this context demonstrates a clear cycle: limited knowledge fosters negative attitudes, which in turn constrain practical interventions. To disrupt this cycle, it is imperative to integrate targeted teacher training, parental workshops, and community awareness programs into national educational strategies. Moreover, the survey identified that 98.5% of participants were unaware of the basic concepts of dyslexia, reflecting the urgent need for public health campaigns, media engagement, and school-based initiatives to promote awareness and reduce stigma. Comparisons with international literature reinforce that adult dyslexia are frequently overlooked, underscoring the importance of lifelong awareness and support systems [25]. The use of convenience sampling may limit the generalizability of these findings to the broader population of Pakistan. Our analysis of composite KAP scores revealed a clear pattern: while attitudes towards dyslexia were generally positive, the level of factual knowledge was only moderate, and this translated into notably poor practice scores. This suggests a concerning "know-do" gap, where

positive intentions are not being realized in supportive actions, likely due to a lack of deep understanding and resources. Furthermore, the use of convenience sampling, while practical for data collection, limits the generalizability of these findings to the broader population of Pakistan, as the sample may not be fully representative of the entire societal demographic.

This study has certain limitations, including the use of convenience sampling and an online survey approach, which may limit the generalizability of findings to the broader Pakistani population. The predominance of young and female participants may also introduce demographic bias. Additionally, reliance on self-reported responses may be subject to recall and social desirability bias. Future research should employ larger, randomized, and nationally representative samples, incorporate rural populations, and utilize mixed-method designs for deeper insight. Long-term interventional studies and structured public awareness programs are also recommended to evaluate their effectiveness in improving dyslexia-related knowledge, attitudes, and supportive practices across Pakistan.

## CONCLUSION

This study reveals a critical gap in dyslexia awareness in Pakistan, with 86.5% of participants demonstrating poor awareness. A significant association was found between knowledge and practice, as individuals with good awareness were 6.25 times more likely to exhibit supportive behaviors. The condition profoundly impacts essential skills like reading, writing, and memory, often exacerbating professional challenges and self-esteem due to societal stigma and a lack of supportive environments. These findings underscore the urgent need for nationwide awareness campaigns and the development of inclusive educational and workplace policies to support individuals with dyslexia.

## Authors' Contribution

Conceptualization: AA, AB

Methodology: AA, MH, AB, MA, HJ, M

Formal analysis: AA, HJ

Writing and Drafting: HK

Review and Editing: HK, AA, MH, AB, MA, HJ, M

All authors approved the final manuscript and take responsibility for the integrity of the work.

## Conflicts of Interest

All the authors declare no conflict of interest.

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