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Learning Disability- A Systematic Review

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ABSTRACT

Background and aim: Despite the fact that learning disabilities are chronic disorders that cannot be cured, individuals with these conditions can succeed in their studies, careers, and communities with the help of appropriate diagnosis, treatment, and care. The aim of this paper is to review risks, emerging issues, adjustments, and educational interventions for individuals with learning disabilities. **Methods:** 504 articles were searched (Google Scholar, PubMed), 49 were selected based on quality and relevance, published between 2005-2022. Additional materials were obtained from the bibliographies, and titles and abstracts were reviewed to ensure they met inclusion/exclusion criteria. **Results:** This paper reports the findings of 49 studies reviewed which state the following: Individuals with learning disabilities have low self-esteem, cognitive impulsivity, and difficulties in selective attention tasks. Poor academic performance and bullying are linked to emotional problems in children with LD. Mindfulness meditation has been shown to help reduce anxiety and promote social skills and academic outcomes in this population. Teachers need to broaden their teaching strategies to better meet the needs of students with learning disabilities, and technology can improve academic performance for these students. Teachers play a vital role in recognising patterns of learning disabilities and providing personalized intervention, and counselling initiatives and equal treatment from teachers can help minimize bullying. **Conclusion:** This study offers an up-to-date, thorough assessment of the literature on persons with learning disabilities that will be helpful to organizations who offer psychological support to people with learning disabilities.

Keywords*: Cause, Prevalence, Teaching Strategies, Intervention.*

INTRODUCTION

Specific learning disorder in children is a neurodevelopmental disorder caused by the combinations of heritable and environmental factors that alter the brain's ability to perceive or process spoken and nonverbal information efficiently. Beginning in early childhood, children with the disease have ongoing trouble mastering academic abilities in reading, written expression, or mathematics, which is incongruous with a child's general intellectual aptitude. Children with certain learning disorders may struggle to keep up with their peers in certain academic disciplines, while excelling in others. Several academic skills, including reading single words and sentences fluently, written expression, spelling, calculations, and problem solving, may be hampered in SLD. A specific learning problem causes unanticipated underachievement given the child's aptitude and the chance to have learnt more. Reading, spelling, and math-specific learning disabilities seem to pass down in families. Compared to the general population, first degree relatives are four to eight times more likely to have reading and five to ten times more likely to have math deficiencies. When learning difficulties in children or adolescents are discovered in this way, it can be determined whether they are eligible for academic services offered by the public school system. Specific learning deficit has a moderate to high heritability component, and it indicates that many cognitive features are polygenic. There is also pleiotropy, which means that the same genes may alter the skills required for various learning tasks. Perinatal damage and particular neurologic disorders may play a role in the development of a specific learning problem. Increased rates of SLD have also been linked to conditions such as lead poisoning, FAS, and in utero drug exposure.

The DSM-5, published by the American Psychiatric Association, merges the DSM-IV diagnoses of reading disorder, mathematics disorder, disorder of written expression, and learning disorder not otherwise specified into a single diagnosis: SLD. Specifiers are used in the DSM 5 to identify learning deficiencies in reading, written expression, and mathematics. ICD continues to distinguish the disease. The DSM-5 defines dyslexia as a pattern of learning impairments that includes deficits in accurate or fluent word identification, poor decoding, and poor spelling skills. A pattern of deficiencies in learning arithmetic facts, processing numerical information, and completing accurate computations is referred to as dyscalculia. Children with specific learning disorders in the area of reading can be identified by poor word recognition, slow reading rate, and impaired comprehension when compared to most children of the same age. Severe

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SLD can make it difficult for a child to succeed in school, often leading to demoralization, low self-esteem, chronic frustration, and compromised peer relationships. ADHD, communication problems, conduct disorders, and depressive disorders are all connected with an elevated risk of comorbid disorders. Adolescents with SLD are at least 1.5 times more likely to drop out of school, with rates approaching 40%. Adults with SLD are more likely to struggle with job and social adjustment. SLD frequently leads to skill impairments in numerous areas, including reading, writing, and arithmetic.There are numerous types of learning Disabilities which can be recognized. Reading disability affects up to 75% of children and adolescents with a specific learning problem. Unable to recognize words, reading slowly and incorrectly, having trouble understanding what is being read, and having trouble spelling are all symptoms of reading impairment. Children with reading impairments can usually be identified by the age of seven (second grade). When a child's reading achievement falls significantly below that of a youngster of the same age, reading impairment is identified. Reading disabilities are frequently accompanied by comorbid disorders such as language disorder, written expression difficulty, and ADHD. Children who struggle with reading are more likely to struggle with other areas of learning, such as mathematics and written language.

Mathematics impairment is another kind of learning disability. Children that struggle with math have problems learning and retaining digits, can't recall basic facts regarding numbers, and compute slowly and incorrectly. In actuality, reading, writing, coordination, and language impairments frequently coexist with math difficulties. There could be issues with spelling, memory, or attention, as well as emotional or behavioral issues. We must distinguish between specific causes of reduced functioning, such as intellectual disability, and deficiencies in mathematics. An inadequate education may have an impact on a child's ability to do math. When conduct disorder or ADHD coexists with a specific learning problem in mathematics, we would diagnose both conditions. The most difficult ability to learn in order to communicate language comprehension and articulate thoughts and ideas is written expression. For the majority of kids, reading and writing skills go hand in hand, but for certain kids, reading comprehension may be much more powerful than their capacity to articulate complicated ideas. Writing abilities that are significantly below the standard for a child's age and schooling are considered a written expression deficit. In more severe situations, a written expression issue may not become obvious until age 10 (fifth grade) or later; in less severe cases, it may take longer. Between 5 and 15 percent of school-age children have a specific learning disability with impairment in written expression.

METHODS

For the systematic review, 504 research articles were searched using electronic databases such as (google scholar, PubMed) and other additional sources out of which 49 articles were selected on the basis of quality and keywords after which the articles were thoroughly read in detail and later reviewed. Selected articles were the articles published from the year 2005-2022.Furthermore, additional published materials were screened from the bibliographies of the studies which were relevant to the topic of learning disabilities. We examined the titles of all citations and retrieved pertinent abstracts using the inclusion and exclusion criteria listed below for a more thorough evaluation.

Inclusion criteria:

- Studies examining risks, types, characteristics, adjustment, emerging trends, modifications, interventions and mental health issues related to learning disabilities
- Studies included sample participants from age groups of children, adolescents, and adults.
- Studies published from the year 2005 to 2022 were reviewed
- Studies in English language only have been reviewed.

Exclusion criteria:

- Studies beyond the periods mentioned were not included since examining current data was taken into consideration
- Case studies were not reviewed
- Studies that focus on interventions that are not related to learning disabilities

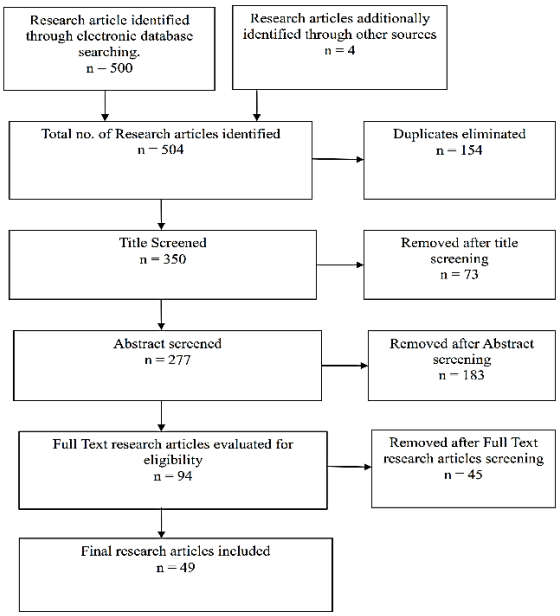

Figure 1: Flowchart displaying study selection.

Table 1: Characteristics of studies reviewed

Author, Year	Place of conduct	No of respondents	Participant	Measures
Miller-Shaul, 2005	Israel	100	Children & Adult	Raven Standard Progressive Matrices, Word list test for children, connected text test, Israeli psychometric test, Reading comprehension test Ministry of Education,
Sáenz et.al, 2005	Texas	142	132- Children & 12-reading teacher	Reading: The Comprehensive Reading Assessment Battery, Teacher and Student Questionnaires.
DeSimone et al. 2006	United States.	228	Teachers	The Survey on Teaching Mathematics to Students with Learning Disabilities in Middle School and Interview.
Heiman, 2006	Israel	381	Students	Multidimensional Scale for Social Support (MSPSS), Sense of Coherence (SOC), Academic Success and Lack of Academic Success Questionnaire
Van Garderen, 2006	South Florida	66	Students	Mathematical Processing Instrument (MPI)
Lackaye et al. 2006	Israel	571	Students	Meltzer scale for effort, Academic Self Efficacy, Loneliness and Social Dissatisfaction Questionnaire, The Children's Sense of Coherence Scale, Moos Scale, The Children's Hope Scale (Snyder, 2002).
Hoeft et al. (2006)	Pittsburgh	30	Students	A word-rhyme task, The MRI imaging and imaging-related procedures.
Walker &Nabuzoka, 2007	Northeast of England	236	Students	Stoichiometric and peer behavioral attribute checklist.
Swanson &Jerman 2007	Southern California	84	Children	Wide Range Achievement Test-3 (WRAT-3),Raven Progressive Matrices test, Wechsler Intelligence Scales for Children–Third Edition(WISC-III)
Rousselle et al. 2007	Belgium	90	Children	A composite test battery devised for mathematics level assessment, Similarity and Picture Completion subtests of the Wechsler Intelligence Scale for Children-III
Al-Yagon et al, 2007	Israel	100	Children-Mother	Loneliness and Social Dissatisfaction Questionnaire, Children's Sense of Coherence Scale, Attachment Security Style, Children's Hope Scale, Coping scale, Affect scale, Experiences in Close Relationships Scale, Child Behavior Checklist.
Snowling et al. 2007	UK	70	Young People	A battery of tests of literacy and language skills and questionnaire
Beauchemin et al. 2008	Vermont	34	Students	Social Skills Rating System (SSRS), Attitudinal questions
Wilson et al. 2008	Canada	36,984 (National data sample)	Adolescents and adults	Self-reported measures and Mental health measures
Estell et al. 2008	Mid-western city	1361	Students	Social Cognitive Mapping (SCM), Best Friend Nominations, Peer-Perceived Popularity, Social Preference
Terras et al, 2009	Scotland	68	Children	Self-perception Profile for Children, Strengths and Difficulties Questionnaire, Understanding and Perceived Impact of Dyslexia Scale (UPIDS).
Rubinsten et al. 2010	Israel	36	Children	Arithmetic-affective priming task
Grills-Taquechel, 2011	Houston	153	Children	The Multidimensional Anxiety Scale for Children (MASC), Woodcock-JohnsonPsychoeducational Test Battery-III, Continuous Monitoring of Early Reading Skills (CMERS)
Westendorp et al. 2011	Northern Netherlands	104	Children	Analysis of IndividualWord Forms ,Improvements in Spelling Skills, WIG, The Test of Gross Motor Development-2
Pimperton, & Nation , 2012	UK	244	Children	The Matrix Reasoning subtest of theWechsler Abbreviated Scale of Intelligence Efficiency, the Neale Analysis of Reading Ability–II , WMRS
Hen& Goroshit, 2012	Israel	287	Students	The Schutte Self Report Emotional Intelligence Test, College Academic Self-Efficacy Scale, Academic procrastination scale.
Xiao et al. 2013	Hong Kong	90	Children	The Raven's Standard Progressive Matrices, Chinese word-reading subtestof the HKT-SpLD
Moll et al. 2014	North Yorkshire	99	Children	Wechsler Individual AchievementTest, SWAN (Strengths and Weaknesses of ADHD Symptoms andNormal Behavior Scale, Wechsler Abbreviated Scale of Intelligence.
Gaetano Rappo, (2014).	Italy	132	Children	Raven's Progressive Matrices, The Self Administrated Psychiatric Scales for Children andAdolescents (SAFA) test, "School Self-Esteem" - Multidimensional Self-Concept Test
Tanimoto et al. 2015.	USA	21	Students	Detailed assessment of speed of handwriting (DASH)best and fast, Test of orthographic competence (TOC) ,Wechsler individual achievement

Author, Year	Place of conduct	No of respondents	Participant	Measures
				test, 3rd edition(WIAT 3), Test of word reading efficiency (TOWRE), Test of silent word reading fluency (TOSWRF), WJ3 oral comprehension, Clinical evaluation of language function, 4th edition, WJ3 passage comprehension, PAL II sentence sense accuracy, WIAT III sentence combining), WJ3 writing fluency
Padhy, 2016	India	3600	School students	Specific Learning Disorder-Screening Questionnaire (SLD-SQ), Brigance Diagnostic Inventory (BDI)
Satsangi, 2016	USA	3	secondary students	Wechsler Abbreviated Scale of Intelligence, Wechsler Intelligence Scale for Children (WISC; 4th ed.),
Min Wook Ok, 2016	USA	4	School students	Pre-test, Progress monitoring daily probes, Strategy use test, Maintenance tests, Inter-scorer agreement, Social validity interview
Maehler, 2016	Germany	2195	School students	Culture Fair Intelligence Test 1, ELFE 1–6, WRT 2+, DEMAT 2+, d Working Memory Test Battery for Children aged Five to Twelve Years,
Ghimire, 2017	Nepal	150	School teachers	A structured knowledge questionnaire
Kaur, 2017	USA	20	School students and teachers	Measures of Academic Progress (MAP),
Allison, 2017	USA	10	School students and teachers	Student portfolio, observations, Student interviews, educator interviews
Zhang, 2018	Finland	1880	School students	a battery of cognitive and mathematical tests
Terrazas-Arellanes, 2018	USA	2303	School students and teachers	Pre-implementation readiness inventory, Implementation and post implementation logs, Post-implementation teacher and students survey
Meifang Yu, 2018	USA	150	College students	Parent and youth interviews/surveys,
Lipka, 2019	Israel	8	College students and instructors	semi-structured interviews,
Satsangi, 2019	USA	4	School students	pre-assessments, assessments, problem-solving accuracy, session duration, independence, social validity
Ouherrou, 2019	Morocco	42	School students	facial expression recognition system based on convolutional neural networks (CNN), Camtasia Studio's Screen Recorder
Ciullo, 2019	USA	20	College students	Live observation, Text reading documentation and coding, Focus groups,
Young, 2019	USA	11	School students	Reading comprehension assessment, Oral Reading Fluency, Social validity, interobserver agreement
Khouri, 2019	Israel	53	Faculty members	Demographic questionnaire, Faculty Willingness to Provide Accommodations questionnaire
Garcia, 2019	Spain	44	School students	Wechsler Intelligence Scale for Children–IV, D2 Attention Test, EDAH scale
Atanga, 2019	USA	62	School teachers	conformity versus nonconformity framing scale, self-ratings of AT competencies, iPad app proficiency ratings, demographic questionnaire
Morina, 2019	Spain	119	Faculty members	Semi structured interviews
Lipka, 2020	Israel	200	Faculty members	Demographic questionnaire, Faculty experience/contact with people with disabilities and Faculty attitudes towards students with LD with a Likert scale questionnaire, Faculty topics of interest with a checklist-type MCQs
Khasawneh, 2020	Saudi Arabia	104	School students	Reading Comprehension Achievement Test, training program for developing reading comprehension skills
Alkhawaldeh, 2021	Saudi Arabia	20	School students	semi-structured interviews
Ibrahim, 2021	Malaysia	584	Parents and teachers	questionnaire developed by Williams (2013) to describe the perceptions of parents and teachers on SDL
Yang, 2021	USA	3	School students	Criterion word problem solving test, Problem-posing test, Problem-solving transfer test, COMPS-based problem-posing instruction

RESULT

Poor Academic performance

A learning-disabled child's struggle in school persists through their entire life and children and adolescents with learning difficulties find it difficult to succeed in academics. It has been found that children have trouble adjusting to normal school environments. Adults frequently have weak arithmetic skills, which can make it difficult to get work and to complete many regular daily tasks. They also have issues understanding and representing numerical magnitude. They display higher degrees of learned helplessness than students without Learning Disability (LD), which includes decreased tenacity, lowered academic expectations. (Hen &Goroshit, 2012). Certain children stop trying new things because they accept failure in the classroom. Academic procrastination has long been regarded as a barrier to students' academic progress. According to research, it is associated with poorer levels of self-regulated learning and academic self-efficacy. Structured approaches to simplifying concepts

employed in cognitive therapy, as well as methods of socialization and education, will be beneficial to people with learning disability.

Low Self-esteem and difficulty with social adjustment

A child's social acceptance is important, but it can be challenging to achieve if they have a learning disability (LD). Peers often exclude them, insult and characterize people with learning disabilities as being stupid, and slow learners and they are frequently stigmatized and usually people around associate them as failure. Individuals with learning disabilities have a very low level of self-esteem compared to typically developing children because they often felt down and less confident when experiencing difficulties during reading and writing which had an impact on their attitude. Also, students with learning disability compared with their typically achieving peers were viewed as lower in social standing among their classmates. It has been found that students with LD thought they had less social support than students without LD. According to research on the social functioning of kids with learning disabilities (LD), while the majority are a part of peer groups, a higher percentage are lonely, and most have lower social standing among peers overall than their counterparts who are generally successful.

Mental illness in individuals with learning disability

Evidence suggests that individuals with learning disabilities may experience more mental health issues than those without learning disabilities and also there is a high prevalence of behavioral issues in people with learning disabilities. The individual emotional wellbeing could deteriorate when there is no emotional support available. When possibilities seem restricted when attempting to achieve one's personal and academic goals, depression may become apparent. People with LD report high levels of distress, depression, anxiety disorders, suicidal thoughts, visits to mental health professionals, and poorer overall mental health than persons without learning disabilities.

Neurological Basis and family risk of learning disabilities

Children with dyslexia showed less activation in the left parietotemporal cortex, including the right parietotemporal cortex, compared to children who were both age and reading-matched (younger normal readers who were equivalent to the dyslexic children in terms of reading ability or scanner performance). Reduced parietotemporal activity is seen in functional neuroimaging investigations of phonological processing in adults and children with developmental dyslexia (Hoeft et al., 2006). Children at family-risk for dyslexia had long-standing LD issues. The gene-environment interactions play a significant role in determining dyslexia.

Working Memory deficit

Children with learning disability have verbal working memory and numerical working memory loss. Many research outlined that children with learning disabilities are slower at processing verbal and visuospatial information, and were impaired in the ability to remember verbal material, compared with same-age peers. These points imply that working memory functions deficits, represent a significant barrier to learning, reading and math skills in LD people.

Effective teaching approaches

Plenty of studies examined at teaching-related areas include enhancing teaching strategies, introducing interventions, and assessing instructors' knowledge of learning difficulties. One significant conclusion in Ciullo's study in 2019 on reading instructions provided to children with learning disabilities indicates that teachers aimed to provide a complete approach to addressing student needs by teaching foundational skills. Small-group instruction for children with learning disabilities has also been identified as a successful technique. It has also been noted that teachers encourage peer help for students with learning disabilities. Peers can provide academic assistance by clarifying topics, offering study advice, and participating in collaborative learning activities. Differentiated teaching has been identified as an essential method for improving the learning of children with LD. Tasks may be tailored to their ability levels, ensuring that kids are not overburdened or bored. This promotes confidence and a good attitude towards learning.

Early detection and management

Early detection and intervention are critical in assisting individuals with learning impairments and fostering academic achievement. According to research conducted by Padhy (2016), most teachers detect the frequency of among children by seeing impairments such as missing words or sentences when reading, missing letters or phrases while attempting to read or write, and making frequent spelling mistakes while writing or reading. Visual memory, gross motor coordination, and visual-motor skills were similarly shown to be the most typically impaired domains in persons with learning impairments.. Working memory problems were seen in children with below-average academic success. Working memory deficiencies can make it difficult for kids with learning disabilities to comprehend and remember knowledge properly. Therefore, early detection and intervention for learning disorders are critical variables in ensuring better outcomes for children who face learning disabilities.

Technological Interventions

Technology integration in education has shown enormous promise in assisting children with learning

difficulties (LD). Atanga (2019) conducted a study to determine the prevalence of assistive technology expertise among teachers. Young (2019) investigated the impact of text-to-speech technology on reading outcomes in kids with learning difficulties. Text-to-Speech (TTS) technology is regarded as an important assistive technology tool for students with learning disabilities (LD) who struggle with reading and comprehension activities. Garcia's 2019 study on the influence of serious games on increasing attention of students with LD found that serious games in VLE improve students' visual attention. Min Wok Ok (2016) investigated the effect of a strategic intervention using iPad practise on students with learning disabilities. The students enjoyed using the iPad, found it helpful, and recommended it to their peers. To summarise, technology in education has enormous promise for assisting children with learning disabilities.

Teacher's awareness and attitudes

Teachers play an important role in assisting children with learning impairments (LD) in their social and academic growth. According to Khouri's investigation into university faculty perceptions of accommodations for students with learning disabilities, faculty members saw themselves as agents of support through personal assistance and modified teaching methods, which included not only academic support but also emotional support and empathy. In a 2019 study on university faculty attitudes and understanding on learning disabilities, Lipika discovered that the majority of participants claimed no engagement in training activities and inadequate awareness of patterns of students with LD. They did, however, have generally positive attitudes about LD and thought that individuals with LD might succeed at the university level. In conclusion, instructors' viewpoints and attitudes towards students with learning difficulties have a major influence on their educational experiences.

DISCUSSION AND FUTURE DIRECTION

In spite of having a lot of literature related to learning disabilities there is no proper direction with which family member (Especially parents) of people with LD can have access to helpful material related to LD. Our review contributes towards the understanding of difficulties and issues faced by people with learning disabilities and providing information about various interventions that can be used by teachers, parents and organizations, NGO. From many studies reviewed it has been found that teachers usually are unaware about the dilemmas faced by children with LD which creates a problem for inclusion of people with LD so for future implications proper training of teacher with the understanding of the concepts such as dyslexia, dysgraphia, dyscalculia will be resourceful in helping LD students in adjustment in schools. Major issues faced by LD people is social adjustment, emotional problems, academic failure and poor working memory functioning which has been linked to lower self-esteem, negative self-concept, loneliness, depression, anxiety. This review mentions a lot of intervention programs which will be crucial in dealing with such difficulties faced by individuals with learning disabilities. In today's modern world where technology usage is on rise, using technology for the betterment will be beneficial for LD people. Research studies states that having computer knowledge (ICT), using e-learning, use of ipad, applications, and educational games can improve the academic performance of children with LD. Mental illness in LD is common for which cognitive therapy can be useful. Simplifying the concepts used in education, socialization can be helpful for LD people. Future implication- Our review will be helpful for clinical psychologist, occupational therapist, psychiatrist in providing information regarding various concepts related to learning disabilities, a proper direction in the following field and various interventions which will be useful in treating people learning disabilities.

CONCLUSION

In a nutshell learning disability is neurological conditions that impair a person's ability to learn and successfully process, receive, retain, recall, and convey knowledge to others. There is an inconsistency between the potential and accomplishment. Individuals with learning disabilities face numerous difficulties throughout their lives. Few limitations of the following systematic review are that it does not include any case studies related to learning disabilities. Future investigation can include research studies with the following criteria. This review includes many of the studies that gathered data using self-report measures. These studies dependence on self-report measures may introduce social desirability bias since participants may not correctly remember or represent their beliefs or experiences. Future investigation should include studies that acquire data that avoids biases and social desirability.

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