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Validation of Learning Disabilities Checklist in Public Sector Schools of Pakistan

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In the current decade, learning disabilities are recognized as significant disturbance and hindrance in child's academic and overall development. Assessment of these disturbances is a challenge for teachers, parents, and school counselors. This study was designed to validate a screening tool Learning Disabilities Checklist (National Center for Learning Disabilities, 2007) for assessment of learning disabilities among children. Sample of the study was 427 students from 6th to 10th grade. Participants were recruited from four government schools of Lahore through systematic random sampling technique. Initially, validation was restricted to public sector schools as the structure of education system at public school lacks mandatory administration of any screening tool to asses these difficulties. Cronbach's alpha reliability and exploratory factor analysis indicated that this checklist is valid screening tool of assessing learning disabilities among girls and boys. Teachers and school authorities are suggested to administer these kinds of screening tools to assess childrens' learning difficulties in order to improve their academic functioning.

Keywords: Learning disabilities, reading disability, writing disability, mathematical disability, public schools

Learning disabilities (LDs) have a significant impact on the lives of many students as it affects their academic performance and causes behavioral and cognitive malfunctioning and poor adjustment (Minister of Education, 2011). World Health Organization (WHO, 1993) defined LDs as a generic term that refers to a heterogeneous group of problems manifested by significant, unexpected, specific, and persistent difficulties in the acquisition of and efficient reading,

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writing, and mathematical abilities. Generally, there is limited understanding that adolescents' behavioral, health, and adjustment problems could be a consequence of LDs particularly in developing countries such as Pakistan where childrens' learning problems are not assessed and dealt properly. Manifestation of LDs varies across various children's developmental phases. Along with social, cognitive, and emotional malfunctioning, learning difficulties in academia are also observed (Geary, Hamson, & Hoard, 2000).

LDs cannot be attributed to mental retardation, emotional disturbance, cultural difference or disadvantage. Direct and indirect impact of LDs in childhood and adolescence continue into adulthood and affect their general physical and mental health. In the last fifteen years, emergence of psychological and health problems of LDs have caught the attention of health psychologists, school counselors, educators, and researchers across multiple disciplines, particularly, those who deal with cases of dysfunctional learning behavior and cognitive impairment in this population (Al-Yagon & Mikulincer, 2004; Beena, 2005; Keyser & Mathiesen, 2010; Miller & Kiani, 2008; Smiley, 2005; Wilson, Armstrong, Furrie, & Walcot, 2009).

LDs deal with one/more of the basic psychological processes involved in understanding of spoken or written language that influence child's ability to write, read, speak, think, listen, spell, or doing mathematical calculations. LDs do not include learning problems that are primarily the result of visual, motor, hearing, and emotional disturbances; mental retardation; and environmental/ cultural disadvantages (American Psychological Association, 2004; WHO, 1993). A disability is generally a restriction or lack of ability to perform any activity in a way considered normal for human beings. Therefore, LDs are intrinsic to the individual and presumed to be due to deficits in central nervous system functioning and vital to academic achievement and successful functioning of children and adolescents (Demonet, Taylor, & Chaix, 2004).

Colorado Department of Education (2004) identified eight specific areas that are considered when eligibility for LDs is determined. These include reading comprehension; fluency and decoding; written and oral expression; mathematical calculation and problem solving and listening. Reading, writing, and mathematical disabilities are most common and widely studied form of LDs among school children and adolescents (Adi-Japha, et al., 2007; Becketta, Ellisona, Barretta, & Shaha, 2010; Blackburn, Spencer, & Read, 2010; Brinton, Fujiki, Montague, & Hanton, 2000; Callens & Brysbaert, 2012; Callens, Tops, & Brysbaert, 2012; Casalis, Deacon, & Pacton, 2011; De Pessemier & Andries, 2009; Engel-Yeger, Nagauker-Yanuv,

& Rosenblum, 2009; Knox & Conti-Ramsden, 2003; Liiva & Cleave, 2005; Miceli & Capasso, 2006; Paul, 2006; Tainturier & Rapp, 2004). So, in the present study, these three forms of LDs were addressed.

Reading Disability (RD) is a common behavioral and cognitive heterogeneous developmental condition that is characterized primarily by a severe difficulty in mastering reading despite average intelligence and adequate education (Grigorenko, 2001). Students with RD are seen with difficulties in naming and writing automatic letters that may explain their spelling learning and writing problem (Berninger, Nielsen, Abbott, Wijsman, & Raskindc, 2008). Individuals with RD also report deficiencies in word recognition. RD is reported as the most prevalent form of LDs among school children. Majority of the children with LDs reported primary deficits in basic reading skills (Blackburn et al., 2010; Lyon, 1996) that is primarily derived from psychological rather than biological causes. Wadsworth, Olson, Pennington, and DeFries (2000) found significant individual differences were reported within a group of children with RD regarding the influence of genetic factor compared to environmental.

Snowling (2000) claimed that 5% of school children report RD and it affected 80% of children identified with LDs. They also have specific deficits in comprehension and difficulties in word recognition. In Pakistan, there is very limited research in this area. Malik, Mufti, and Akhtar (2013) observed prevalence of 5.57% in children (6 to 12 years of age) of private schools in Rawalpindi. For children in public sector, prevalence of RD is yet to be explored.

School children typically spend up to 50% of the school day engaged in writing skills and tasks (Tseng & Chow, 2000). *Writing Disability* (WD) may hinder his/her other functioning. WD is explained as a child's difficulties/problems with written words and deficiency in the ability to write in term of coherence and these deficiencies are not because of intellectual impairments (Berninger & Amtmann, 2003). It involves difficulties/problems in storing and processing of written words and letters and could be explained as automaticity in the production and retrieval of alphabet letters (Berninger et al., 2008). Spelling errors and illegible handwriting found were most significant factors contributing to LDs (Deuel, 2001).

Prevalence of WD across various countries had been observed ranging from 1% to 6.5% (Adi-Japha et al., 2007; Ramaa & Gowramma, 2002). In India, it was observed 14% (Ramaa & Gowramma, 2002). Prevalence of WD among Pakistani children is yet to be explored as per available literature and research on LDs in

Pakistan. In previous literature, greater comorbidity between WD mastering basic arithmetic facts was observed which may consequently result in MD (Hanich, Jordan, Kaplan, & Dick, 2001).

Mathematical Disability (MD) is reported as difficulties/ problems in learning basic mathematical skills (Shalev & Gross-Tsur, 2001; Wilson & Dehaene, 2007). The concept of MD is well-known as compare to RD and WD (Munro, 2003). Students identified with MD manifested difficulties in applying mathematical procedures correctly; recognizing number symbols; naming out written numerical; completing calculations involving addition, subtraction, and multiplication. In a recent study, students with MD were observed with difficulties in naming and writing letters, recognizing number and symbols (Omoniyi & Olubunmi, 2014). Geary's (2004) research documented that 5 - 8% of children have an arithmetic disability such as MD. He further suggested that a semantic memory in MD was reflected by inaccurate and variable response times for mathematical fact retrieval, while, a procedural MD resulted in procedural errors in calculations such as errors in carrying or borrowing.

Literature on LDs documents significant relationship between RD, WD, and MD (Ehri, 2000; Fitzgerald & Shanahan, 2000; Geary, 2001; Pape, 2004; Passolunghi & Pazzaglia, 2005). Geary's (2001) study clarified relationship between MD and RD as both forms of LDs involve same cognitive processes; ability to learn and use alphanumeric symbols; and retaining it in memory. So, there is possibility that the memory processes involved in learning letter clusters are also used to learn arithmetic symbolism. Difficulties in reading and in math often co-occur (Geary, et al., 2000; Jordan, Kaplan, & Hanich, 2002). Students' performance in context of faced problems and difficulties in mathematics (Geary, 2004) and reading capacity (Ehri, 2000; Fitzgerald & Shanahan, 2000) has grasped attention in latest research on LDs. So, need of screening and assessment of LDs among school children in order to improve their general and academic functioning is much required. It's one of the major problems in public sector schools of Pakistan that children with and without LD are not properly assessed. As a result they face difficulties that consequently result into academic and other malfunctioning. Children with LD put more effort and struggle to cope with these difficulties and as a result of poor performance, they may experience low confidence, poor self-esteem, depression, anxiety, embarrassment, confusion, anger, and unpleasant emotions (Elbaum, Vaughn, Hughes, Moody, & Schumm, 2000).

These three difficulties occupy major and important part of child's academics. There is not any formally documented data or

researches addressing these three types of disabilities, simultaneously. There are no exact statistics for prevalence of RD, WD, and MD among children in public sector schools of Pakistan. One possible reason of this is unavailability of suitable, comprehensive, and easily administered tool of assessment that could facilitate in identification of these disabilities. There is need of standardized measures for identification of these hindrances in learning processes of children according to local norms.

Present research is an effort of validating a checklist assessing reading, writing, and mathematical disabilities. This will help teachers and instructors in identifying LDs and structuring remedial teaching practices and programs for children with LDs. This checklist was developed by National Center for Learning Disabilities (NCLD; 2007). This checklist consists of 91 items, describing eight subscales related to reading; writing; mathematics; gross and fine motor skills; language; attention; social/emotional disabilities; and Others. As the previous literature indicated that RD, WD, and MD were most prevalent and dominant for LDs, so initially, these three types of LDs were selected.

Method

Participants

Participants of the study were 427 students including boys (n = 261) and girls (n = 166) selected from 4 public schools (girls = 2; boys = 2) with age range from 10 to 18 years (M = 13.23, SD = 1.47). Participants were students of grades 6-10 and selected through systematic random sampling technique. Every third child from all grades in four schools was selected. In case of child's absence from school at the day of administration, next to that targeted child was selected. Only those students were selected who never attended a private school and were in the same school from at least last one year. Teachers of these students reported about students' difficulties/ problems in reading, writing, and mathematics domains observed in class during last one month. One month before administration of Learning Disabilities Checklist, teachers were instructed to observe students in reading, writing, and mathematical domains. Criteria for teachers' and students' selection were at least 6 months of class interaction on regular/daily basis. Teachers were requested to report about students' difficulties as checklist requires class-teachers to respond about children difficulties and problems observed during their

communication and class interaction. This method of screening for LD has been previously followed by researchers across Pakistan and other countries (Chouhadary, 2010; Malik et al., 2013).

Table 1

Sample Distribution along Gender and Age

	Girls	Boys	Total
Ages in years	*n*	*n*	*n*
10	0	1	1
11	8	28	36
12	44	71	115
13	42	72	114
14	39	43	82
15	26	16	42
16	6	20	26
17	1	8	9
18	0	2	2

Table 1 represents distribution of girls and boys across ages. Further, frequencies also show that sample is well representative and comparable and majority of participants belong to early years of adolescence.

Tools of Measurement and Item Selection

For factor analysis, 39 items were selected from Learning Disabilities Checklist (NCLD, 2007). This checklist consists of 91 items measuring six domains of LDs; Gross and Fine Motor Skills (8 items), Language (17 items), Reading (15 items), Writing (12 items), Mathematics (12 items), Social Emotional Functioning (10 items), Attention (8 items), and others (10 items). Selected 39 items measured Reading (15 items), Writing (12 items), and Mathematical Disabilities (12 items). These 39 statements measure presence or absence of LDs. Instructions of reading statements carefully and respond accordingly were added. Learning Disabilities Checklist items were answered on *Yes*/*No* (absence or presence of problem) format. Presence or absence of difficulties was labeled as 1 and 0, respectively. Higher scores reveal more learning problems. Scores on overall checklist ranged from 0-39 (RD = 0-15; WD = 0-12; MD = 0-12). Participant having overall score of 19 or above was categorized as having LDs and a

score at or below 10 as without LDs. There was not any item with reverse scoring.

Procedure

Before administration of checklist, due consent/permission of school authorities was obtained. Parents' consent was also obtained, as this study was part of an ongoing investigation of health, behavioral, cognitive, and adjustment problems among children and adolescents. Students were observed in reading, writing, and mathematical domains. Class-teachers of these children reported about students' problems/difficulties in these three domains. Data were collected and processed for further analysis using SPSS 16.

Results

Preliminary Analysis

Some of the participants did not respond to one/ more items. Instead of deleting these items/cases from the analysis, missing value analysis was performed to these specific items. Values to these items were imputed with a missing value analysis in SPSS Version 16. Series Mean Method was selected that replaces data missing values with its mean values. Exploratory Factor Analysis (EFA) was run as the Learning Disabilities Checklist has been widely used, but not validated yet by NCLD (2007) or any other source. Further, present study was part of an ongoing research investigating prevalence of reading, writing, and mathematical disabilities among school children, so EFA was preferred to use with restricting analysis to three factors.

Exploratory Factor Analysis

The Kaiser–Meyer–Olkin was run to check the sample adequacy. KMO measure was .93, which was, much more than the suggested minimum of .5 (Kaiser, 1974) and .6 (Tabachnick & Fidell, 1996). It indicated that the correlation matrix was indeed suitable for factoring. Further, Bartlett's test of sphericity was observed to be highly significant, $\chi^2(741) = 6193.41$, $p = .00$, which indicated that correlations between items were sufficiently large for Principal Component Analysis (PCA). PCA was run to explore the factor loadings. The factor loadings are reported in Table 2.

An initial analysis was run to obtain Eigen values for each component in data. There were eight components that had Eigen values over Kaiser's criteria of 1 and in combination explained 56.88% of the variance. As this analysis was intended to validate pre-defined components, number of component was restricted to 3 (Component 1 = RD; Component 2 = WD; Component 3 = MD). In later analysis, eigen values were also > 1 and explained 40.82 % of the variance. Inter-item correlation ranges from .21 to .66, which means items are fairly correlated and contribute to same construct. Direct Oblimin of Oblique rotation method is chosen as this method is preferred when there are strong theoretical grounds to believe that factors might correlate (Field, 2007).

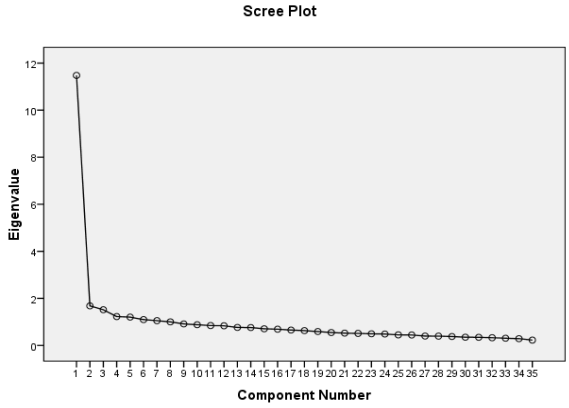

Figure 1. Scree Plot for factor matrix of Learning Disabilities Checklist (*N* = 427)

Figure 1 indicates Scree plot of factors. For the present study, two points of inflexions were considered as it's suitable when sample size is greater than 250, number of items to be validated more than 30 and level of factor loadings is adjusted (Field, 2007). According to this criterion, line seems to represent clear solution of three dominant factors. Further, it appears that all three components could be retained and interpreted as reading, writing, and mathematical disability.

Absolute factor loading value of .30 was specified to make data more interpretable. This value .30 was determined according to the Stevens' (2002) table of critical values against which factor loadings in a specified sample can be compared.

Table 2

Factor Loadings for EFA with Oblique Rotation (Direct Oblimin) of Learning Disabilities Checklist (N = 427)

Item no. in original version	Item no. in final version	Statements	Factor Loadings		
			RD	WD	MD
1	1	Confuses similar-looking letters and numbers	**.74**	-.45	-.42
2	2	Has difficulty recognizing and remembering sight words	**.75**	-.40	-.40
3	3	Frequently loses place while reading	**.75**	-.41	-.40
4	4	Confuses similar-looking words (i.e., beard/bread)	**.61**	-.31	-.35
5	5	Reverses letter order in words (i.e., saw/was)	**.64**	-.38	-.43
6	6	Demonstrates poor memory for printed words	**.57**	-.52	-.31
7	7	Has weak comprehension of ideas and themes	**.40**	-.67	-.35
8	8	Has significant trouble learning to read	**.50**	-.43	-.38
9	9	Has trouble naming letters	**.58**	-.33	-.53
10*	*	Has problems associating letter and sounds	.23	**.59**	-.23
11	10	Guesses at unfamiliar words rather than using word analysis skills	**.40**	-.49	-.37
12	11	Reads slowly	**.42**	-.54	-.29
13	12	Substitutes or leaves out words while reading	**.53**	-.46	-.36
14	13	Has poor retention of new vocabulary	**.34**	-.67	-.21
15	14	Dislikes and avoids reading or reads reluctantly	**.45**	.28	-.24
16	16	Dislikes and avoids writing and copying	.40	**.44**	-.34
17	17	Demonstrates delays in learning to copy and write	.45	**.51**	-.50
18*	*	Writing is messy and incomplete, with many cross outstand erasures	.52	.25	-.25

Continued…

Item no. in original version	Item no. in final version	Statements	Factor Loadings		
			RD	WD	MD
19	18	Has difficulty remembering shapes of letter and numerals	.58	**.32**	-.37
20	15	Frequently reverses letters, numbers and symbols	**.50**	.12	-.31
21	19	Uses uneven spacing between letters and words, and has trouble staying 'on the line'	.29	**.39**	-.36
22	20	Copies inaccurately (i.e., confuses similar-looking letters and numbers)	.52	**.52**	-.32
23	21	Spells poorly and inconsistently	.50	**.52**	-.43
24	22	Has difficulty proofreading and self-correcting work	.31	**.63**	-.42
25	23	Has difficulty preparing outlines and organizing written assignments	.39	**.71**	-.38
26	24	Fails to develop ideas in writing so written work is incomplete and too brief	.46	**.63**	-.51
27	25	Expresses written ideas in a disorganized way	.35	**.66**	-.37
28*	*	Has difficulty with simple counting and one-to-one correspondence	.45	.24	-.24
29*	*	Difficulty mastering number knowledge	.33	.46	-.32
30	26	Has difficulty with learning and memorizing basic addition and subtraction facts	.44	-.30	**.65**
31	27	Has difficulty learning strategic counting principles	.39	-.36	**.70**
32	28	Poorly aligns numbers resulting in computation errors	.37	-.45	**.59**
33	29	Has difficulty estimating quantity	.42	-.41	**.66**
34	30	Has difficulty with comparisons	.47	-.30	**.72**
35	31	Has trouble telling time	.40	.17	**.60**
36	32	Has trouble conceptualizing the passage of time	.31	-.32	**.60**

Continued…

Item no. in original version	Item no. in final version	Statements	Factor Loadings		
			RD	WD	MD
37	33	Has difficulty counting rapidly or making calculations	.21	-.59	**.56**
38	34	Has trouble learning multiplication tables, formulas, and rules	.27	-.61	**.60**
39	35	Has trouble interpreting graphs and charts	.41	-.46	**.58**
		Eigen Values	4.36	4.23	4.04
		% of Variance	14.06	13.66	13.05
		Cumulative %	14.06	27.73	40.82

Note. Boldface represent that item was retained for that component under which it is reflected.
* represent that items were removed from final version.

Out of 39 items, four items i.e., 10, 18, 28, and 29 are deleted as these items do not statistically match and fall under the factors as in original checklist. Further, no strong theoretical explanation can be given to retain these items under factors as revealed by EFA. After deletion of poor items, finalized factor analysis yields 35 items (see Table 2). Negative factor loadings of items with factors are also observed which means that these items are opposite of what positive factor loading items are measuring. Some of the loadings (items 7, 11, 12, 14, 19, 37, & 38) are also observed representing high negative than positive factor loadings. In that case, negative factor loadings are ignored as they represent to measure opposite of what a certain factor measures. Table 2 represents factor loadings along with Eigen values, percentages of variance, and cumulative percentages of variance. As results indicate, Factor 1 has an Eigen value of 4.36 which explains 14.06 percent of total variance. Factor 2 and 3 have eigen values 4.23 and 4.04, respectively, and explain 13.66 and 13.05 percentages of variance, respectively. Table 2 represents items falling under certain component according to factor loading values.

Although, item 7 has poor loading on RD as compared to WD and MD, it is retained on RD as item content is more related to RD. Item 10 originally belongs to RD, whereas, item loading value categorized is under WD. Item removed from factor analysis as item does not relate to WD. In original version, item 11, 12, and 14 are presented under RD component. These items load high on WD than RD; content of items is more related to RD, so are retained on RD.

Item 18 originally falls under WD sub-scale, whereas factor loading is shown under RD subscale. Item is removed from factor analysis as its content does not relate to WD. In original version of checklist, item 19 belongs to WD, whereas, factor loadings in present study show it under RD. This item is retained under WD as memorizing and reproducing shapes and numerical seems more of a written activity than reading task. The same item contains high negative factor loading under MD factor and it is ignored as negative loading represents opposite of a particular factor. Table 2 is formatted to emphasize the structure of the factors.

Item 20 shows high loadings on RD, low at MD, and no loadings on WD. Reversing letters (beard/bread, was/saw), numbers (6/9), and symbols (</>) seems more related to RD, so item is retained on RD. Has difficulty with simple counting and one-to-one correspondence (item 28), was originally categorized under MD subscale. This item is removed from factor analysis, as factor loadings categorize it under RD subscale. Final checklist comprises of 35 items orderly representing reading (n = 15), writing (n = 10), and mathematical disabilities (n = 10).

This factor structure is also supported by Cronbach alpha coefficients and subscale-total correlations (see Table 3).

Table 3

Alpha Coefficients and Correlation between Reading, Writing, and Mathematical Disability

Variables	No. of Items	α	*M*	*SD*	RD	WD	MD	LD
RD	15	.84	7.12	4.50	-	.79**	.69**	.93**
WD	10	.81	4.88	3.10		-	.73**	.92**
MD	10	.86	4.42	3.22			-	.86**
LD	35	.94	16.31	9.96				-

**p = .01.

Alpha coefficients for total and subscales in Table 3 range from .81 to .94 which is far above the minimum level of .70 Cronbach's alpha level. Inter-subscale and total-subscale correlations are also significant at $p < .01$.

Independent sample *t*-test and *Cohen's d* were also applied to identify mean differences in LDs among participants. Participants obtaining at least 50 percent scores on checklist were categorized as with LD and scoring at most 25 percent as without LD. Same criteria

were followed for screening participants with and without reading, writing, and mathematical disability (see Table 4, 5, and 6).

Table 4

Mean and Standard Deviations of LDs among Students

	With Disability (n = 180)	Without Disability (n = 126)			95% CI		
Variables	*M(SD)*	*M(SD)*	*t(304)*	*p*	*UL*	*LL*	*Cohen's d*
RD	10.90(2.48)	1.79(1.77)	35.26	.00	-9.62	-8.60	4.28
WD	7.56(1.65)	1.26(1.45)	34.44	.00	-6.65	-5.93	4.05
MD	6.21(2.03)	.75(1.25)	26.74	.00	-5.86	-5.06	3.23
LD	24.68(4.28)	3.81(3.12)	46.65	.00	-21.75	- 19.99	5.57

Note. CI = Confidence Interval; UL = Upper Limit; LL = Lower Limit.

Independent sample *t*-test and Cohen's *d* in Table 4 also reflect that checklist clearly differentiates between LD and nonLD participants. Group with LD significantly obtains high scores than their peers with no LDs.

Prevalence of LDs (reading, writing, and mathematical) was also examined among girls and boys in Table 5.

Table 5

Prevalence of LDs across Gender

	Boys (n = 261)				Girls (n =166)			
Variables	With	%	Without	%	With	%	Without	%
RD	154	36	69	16	80	18	62	14
WD	70	16	73	17	33	7	69	16
MD	42	9	93	21	17	3	85	19
LD	120	28	64	14	60	14	62	14

Results in Table 5 show RD as more prevalent form of disabilities and 36% of boys and 18% of girls are screened with

reading difficulties. Overall, 28% of boys have LDs than 14% of their counterparts.

In Table 6, co-occurrence of all three forms of disabilities was also examined.

Table 6

Co-existence of Reading, Writing, and Mathematical Disability across Sample (N = 427)

Variables	With WD *f*(%)	Without WD *f*(%)	With MD *f*(%)	Without MD *f*(%)
With RD	93(22)	16(4)	51(12)	36(8)
Without RD	3(1)	104(24)	4(1)	115(28)
With MD	41(10)	4(1)	-	-
Without MD	6(1)	125(29)	-	-

Table 6 indicates coexistence of reading, writing, and mathematical disabilities among participants. In the present study, RD has dominant coexistence with WD which is 22% followed by MD (12%). Further, 10% of participants with MD also report WD. These results also supplement justifications of selecting oblique method of rotation and relationships between reading, writing, and mathematical disabilities.

Discussion

LDs among children have emerged as area that needed to be taken care of properly. Present study revealed that both girls and boys significantly face learning problems and difficulties. Individual screening of LDs among children in mainstream schools is complicated task because screening a large number of children demands trained individuals and resources. So, institutions dealing with children's education in government sector need to be updated about the dangerously emerging LDs. Further, teachers and concerned authorities dealing with school children must screen children at the start and end of academic session in order to cope well with future difficulties. Present study also draws the attention toward the dire need of developing special educational services for this neglected group of children.

Reading, writing, and mathematical difficulties are basic component of LDs. To identify these disabilities among children,

screening checklist was used in this study. Learning Disabilities Checklist significantly differentiated children with and without disabilities. Initially, Learning Disabilities Checklist was administered on 427 participants. Out of 427 students, 306 were selected as they were screened out with or without LD. From total sample, 42% of participants were identified with reading, writing, or mathematical disability. Further, this prevalence was dominant for boys (28%) than girls (14%) and it could be attributed to dominance of boys (61%) in total sample size. This finding is consistent with the observations of Rutter et al. (2004), who found out that boys have more prevalence of LDs as compared to girls. Boys also reported high prevalence of RD, WD, and MD than their counterparts that is in support of many previous studies (Dilshad, 2006; Jordan & Hanich, 2000; Shaywitz, et al., 2003; Smith, 2004) and in contradiction with few (Damle & Balkhande, 2012).

Present study also investigated the co-existence of various LDs among students. Findings show significant comorbidity of reading, writing, and mathematical disabilities that is in line with the previously documented studies. Geary's (2001) study clarified positive relationship between MD and RD. It could be justified to the fact that some aspects of both disabilities involve same cognitive processes. Both demand the ability to learn and use alpha-numeric symbols and retaining it in memory. It is possible that the memory processes involved in learning letter clusters are also used to learn arithmetic symbolism. Comorbidity of RD and MD has also been frequently highlighted. Geary's (2011) study claimed that 40-60% of students with RD have comorbidity with MD and 17% of children with MD comorbidity of RD. Results of present study, as well as previous researches, examining relationship between students' perceived difficulties in mathematics, writing (Geary, 2004), and reading (Ehri, 2000; Fitzgerald & Shanahan, 2000) have demonstrated the importance of identifying students with reading, writing, and mathematical disabilities and this area of research has grasped attention of researchers as well educationists.

Malik et al. (2013) carried out a study to examine children with and without dyslexia in public schools of Rawalpindi by using Dyslexia Screening Test (Nicolson & Fawcett, 1996). They asked teachers to identify those children from their classes who were having any sort of difficulties in reading, writing, spellings, and language. In another study by Couhadary (2010), Specific Learning Disabilities Screening Checklist was given to teachers to identify children with specific learning disabilities. Types of learning problems and disabilities were not classified in that research. Previously, this

method was also practiced by Jiménez and Cadena (2007) who carried out their study in Spain and Guatemala.

These children screened out with LD are at greater risk of being diagnosed with LDs according to DSM-V criteria for diagnosis. Findings also showed that Learning Disabilities Checklist is appropriate tool for screening children with and without LDs in mainstream schools. These three types of LDs could be measured simultaneously and comprehensively among children by using this checklist. Analysis revealed, this checklist is suitable to administer for both girls and boys in public sector schools of Pakistan.

Analysis indicated that this checklist will help teachers and schools counselor to examine and understand the difficulties/problems encountered in reading, writing, and mathematical domains. Further, it would be possible to assess children on these domains without administering individual diagnostic measures of dyslexia, dysgraphia, and dyscalculia. This checklist could be administered on both girls and boys in public sector schools that hold large number of students.

Conclusion

LDs have emerged as significant factor effecting students' overall functioning of life. Students in public sector schools of Pakistan have inadequate academic facilities, therefore, experience trouble in learning processes. As matter of great concern, there is dire need to assess and identify these learning difficulties/disabilities. So far, there is no assessment tools locally developed, adapted or translated to identify wide range of prevalence of LDs among school children and adolescents. Hence, present study was carried out to validate Learning Disabilities Checklist. Findings of this research helped in providing an estimation of prevalence of three types of LDs in girls and boys. The present study clarified that students do face learning difficulties in mainstream schools of Pakistan and certain LDs co-exist. It is concluded that Learning Disabilities Checklist is valid and reliable tool identifying and assessing LDs among school children and adolescents.

Limitations and Suggestions

Although, results showed that Learning Disabilities Checklist is precise and comprehensive measure of LDs, there are some recommendations concerning few limitations associated to this study. Only children from public sector schools were selected, administering

checklist and assessing prevalence of LDs among private sector schools will help to obtain a better comparison of LDs across both medium of education. Further, in this study assessment was made on basis of teachers' reports. By administering checklist on child directly may provide better, objective, and direct information could be ascertained.

In the present study, only three types of LDs i.e., reading, writing and mathematical disabilities were addressed. Adding other LDs i.e., gross and fine motor skills, language, social/emotional disabilities, attention and other (NCLD, 2007) may provide more clear understanding of children facing difficulties in broader perspective.

Parents' prefer sending their children to private sector schools rather than public sector schools. On the basis of findings of the present study, certain suggestions are given. Urdu is local/national language of Pakistan, so translating this checklist may enhance the validity of the checklist for measuring LDs among school children in Pakistan. Further, this checklist needs to be validated across both public and private schools. Reducing the minimum age range from 10 years to 5 years may also help to understand different levels of LDs/difficulties among young children.

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