

## Identification of Learning Disabilities in Students: A Gender Perspective

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There has been seen a growing concern given to learning disabilities (LDs) in students at school level. There is empirical evidence that explain prevalence of in boys and girls. The aim of present study was to identify and replicate this difference in LDs in girls and boys in 6<sup>th</sup> to 10<sup>th</sup> grades. We sampled 226 girls and 314 boys aged between 11 to 18 years. For this study, we administered Learning Disabilities Checklist (2007) to assess the differences (Ashraf & Najam, 2014). A  $2 \times 5$  (Gender  $\times$  Academic Levels) MANOVA was applied to determine the mean differences in LDs between girls and boys across their academic levels. In the current study, no significant gender differences in LDs and their sub-types were observed. However, gender differences in context of academic levels were significant. Boys report significantly more LD in grade 7<sup>th</sup> whereas girls manifest significantly higher LD in grade 8<sup>th</sup>. Overall, students at grade 7<sup>th</sup> report more LD in comparison of other grades. The present study highlights the importance of assessing presence of in middle and high school students. Present research also suggested that early identification of learning disabilities may guide teachers and school psychologists to develop plans and psychological interventions to help students.

*Keywords:* gender, learning disabilities, reading disability, writing disability, mathematical disability

In recent years, research in school psychology has examined the nature and prevalence of various learning difficulties/disabilities (LDs) in school and college levels students (Gebhardt, Zehner, & Hesselsb, 2014; Wilson, Armstrong, Furrer & Walcott, 2009). The term learning difficulty/disability (LD) refers to significant malfunctioning of psychological processes, which are responsible for understanding reading, writing, speaking, thinking, listening and mathematical calculations. These disabilities exclude learning challenges that result from intellectual deficiency, emotional disturbances, visual, hearing or motor impairments (Individual with Disability Education Act, 2004). LDs are manifested in several forms and include reading, writing and mathematics difficulties, observed in students (Barbarese, Katusic, Colligan, Weaver & Jacobsen, 2005).

American Psychiatric Association (APA, 2013) delineate reading, writing and mathematical disabilities into reading disorders (dyslexia), disorders of written expression (dysgraphia) and math disabilities (dyscalculia) respectively. Reading disability is most common form of LD and 70 to 80 percent of students demonstrate problems in this domain. These students experience difficulties in basic reading process including reading comprehension, rate of speech, decoding and fluent word recognition. Further, they also manifest difficulties in matching letter combinations and phonetic awareness. On the other hand, writing disability is described as difficulties in written expression accompanied by punctuations and

grammatical errors within sentences, multiple spelling errors, poor paragraph organization and excessively poor hand writing. Handwriting deficits due to impaired motor movement or any other motor coordination dysfunctioning are excluded from writing disability criterion (APA, 2013).

Although mathematical disability is less known and comparatively inadequately investigated, considerable work has been carried out in terms of identifying mathematical deficits documenting about 7 percent of students with such difficulties (Barbarese et al., 2005; Shalev, Manor, & Gross-Tsur, 2005). Mathematical disability is often used synonymously to mathematical deficits, math disability and dyscalculia (Geary, Hoard, Nugent & Bailey, 2012). This form of LD is characterized as difficulties in learning mathematical concepts, equations, values, organizing numbers, memorizing mathematical facts and problems in understanding how problems are organized (APA, 2013).

### **Learning Disabilities across Genders and Academic Levels**

Previously, gender differences in LDs among students at different academic levels had been explored for example, Smith (2004) reported that girls were 1.5 to 6 times less likely to be identified with reading and writing difficulties than their counterparts (also see Balkhande & Damle, 2012). In other research, LDs in boys was 6.1% than girls (1.5%); particularly writing errors, which prevailed more in boys than girls (Dilshad, 2006). Overall, LDs were observed 3 to 4 times higher in boys than girls.

Within the broader domain of LD, gender differences are also examined in sub-types of LDs i.e., reading, writing and mathematical disabilities. Stein (2001) found significant dominance of reading disability (5% to 10%) higher in boys as compared to girls. Rutter, Caspi and Fergusson (2004) supplements these results in which boys are characterized with more LDs than their opposite gender and in overall, among 2.6% of students, 5% to 17.5 %

screened out with LDs were identified with dominance of RD. Further, the prevalence of reading disability was 3 to 4 times more in boys (Shaywitz, 2003).

Previous literature on LDs suggests that its prevalence varies across genders and grades level in school students (Rutter et al., 2004; Dilshad, 2006; Balkhande & Damle, 2012). These studies document diverse results concerning differences in reading, writing and mathematical disabilities. Stein (2001) reports that 10 percent boy and 5 percent girls suffer from reading difficulties. Shaywitz (2003) supports these results, and suggests that reading disability was three to four times more dominant in boys than girls. Rutter and colleagues (2004) demonstrated 4 to 8 percent prevalence of reading disability in school students. In addition, his research reported that girls are less likely to be identified with LDs than boys.

Although a major part of research on identification and prevalence of LDs is accumulated in western countries, there is considerable number of studies carried out in eastern part of world (Haynes, Hook, Muta, Hayashi, Kato, Sasaki, 2000; Wheldall, 2010). For example, in a research conducted in India (Dilshad, 2006), boys were observed with 3 to 4 times more writing errors than girls when assessed on writing disabilities. In Pakistan, in a sample of 700 school level students, 5.57% participants were identified with reading disability. In addition, reading disability in boys was 71.8% in comparison of 28.2% in girls (Malik, Mufti & Akhtar, 2013). Overall, boys are observed more likely to be identified with LDs than girls of same group. Boys are 1.5 to 6 times more likely to be identified with LDs than girls (but see Balkhande & Damle, 2012).

Although, a large amount of studies examined variations in LDs across developmental phases (e.g., Dilshad, 2006; Balkhande & Damle, 2012; Rutter, Caspi & Fergusson, 2004; Shaywitz, 2003; Smith, 2004; in, 2001), yet fail to identify differences across various academic levels. In a larger sample of participants, reading and writing assessments were made for 13 to 17 years old school students. These assessment show 36 percent of 4<sup>th</sup> grades and 27 percent of 8<sup>th</sup> grades scored below basic level of reading proficiency. Further, these students report difficulties in understanding reading material, overall meaning of text, relating text extensions and drawing simple inferences from text (Persky, Daane, & Jin, 2003; Perie, Grigg, & Donahue, 2005; Grigg, Donahue, & Dion, 2007).

#### Theories Explaining Gender Differences in Learning Disabilities

Previously, multiple theories (e.g., biological vulnerability, referral bias, phonological processing, and test bias) have been presented to clarify the context in which girls and boys differ on measures of different forms of LDs (e.g., reading, writing, arithmetic, speech, language, attention etc). Rescorla (2002) strongly ascertains that biological proneness plays a significant role in the development of LDs which implies that students might have a tendency of developing these disabilities. In addition, gender difference in LDS might be attributed toward these vulnerabilities.

Different studies recommend that the disparity in recognition of LDs in boys and girls may be directed toward the referral bias. There is seen a general tendency of referring boys more often to special educationist, psychologists or counselors when they exhibit academic underachievement or others apparent problematic behaviors. Frequent referral may also be mediated by boys' general behaviors of impulsivity, hyperactivity and disruption in class. In the other hand, as girls show comparatively lower signs of obvious

behaviors, may let them be a cause of low referral to special services (Rescorla, 2000).

The genuine recurrence of LDs in both genders is also subjected to certain other diverse causes. Some researchers believe that the absence of a general and agreed definition of LDs and absence of exact, target testing criteria to gauge LDs specifically correspond to erroneous identification of LDs in students (Haddad, 2005).

Moreover, differences in prevalence of various LDs between girls and boys may be attributed to the referral bias in favor of either of the genders. Further, social pressure may also contribute in this context as Froschl, Rubin and Sprung (1999) suggest that girls are less likely to be signified with LDs because society sets high standard of achievement for boys than for girls.

There are numerous findings unfolding gender differences in prevalence of LDs generally and forms of LDs particularly. However, there is insufficient literature comparing prevalence of LDs between girls and boys across various academic levels. Therefore, it seems very interesting to explore that how LDs vary and manifested differently while gender interacts with academic levels. This aspect of research hasn't been adequately explored particularly in local perspective, therefore no research evidence exists. Keeping in view the diversity of findings related to prevalence, identification and gender differences in LDs across various academic levels, present study is an effort of examining gender differences in LDs in students of academic levels of 6<sup>th</sup> to 10<sup>th</sup>.

On the basis of afore mentioned literature and theoretical statements it is hypothesized that;

- (i) girls and boys are likely to differ on scores of LDs,
- (ii) LDs likely to prevail differently across academic levels
- (iii) There will be a significant interactive effect of gender and academic levels on LDs.

#### Method

##### *Design and Sample*

A cross sectional study design (2 × 5 between-subject design) is used to assess LDs in girls and boys across five academic levels (6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup>). The study was carried out on two boys and two girls, government schools of Lahore. The students from academic levels of grades 6<sup>th</sup> to 10<sup>th</sup> were selected as participants because the selected tool administered to identify LDs characterizes only these academic levels to be assessed. There were 540 students who participated in the study. In order to avoid researchers' selection bias, they were selected through systematic random sampling technique. In the first step of participant selection process, a list of students enrolled in all sections of relevant grades in the selected schools was obtained. Next, keeping in mind the total number of students in each section in proportion to the total number of students in schools, every 5<sup>th</sup> student of a section from each grade (6<sup>th</sup> to 10<sup>th</sup> grades) was selected. In case of an absent student in the selected order, next student of that grade was selected. Though, it was made sure that every grade gets proportionate representation, yet due to the annual examination preparation holidays, proportionate sample from 8<sup>th</sup> and 10<sup>th</sup> grades could not be obtained (see table 1). Participants' age ranges from 10 years to 18 years ( $M = 13.26$ ,  $SD = 1.36$ ). Participants with any visual/hearing impairment, intellectual disabilities, motor handicapped or other disability were excluded from sample in order to keep data normally

distributed.

Table 1 shows details of demographic characteristics of sample.

Table 1  
Demographic Characteristics of Sample (N=540)

Variables	f	%
Gender		
Girls	226	42 %
Boys	314	58 %
Academic Levels		
6 <sup>th</sup>	95	18 %
7 <sup>th</sup>	161	30 %
8 <sup>th</sup>	81	15 %
9 <sup>th</sup>	170	31 %
10 <sup>th</sup>	33	6 %
Ages in years		
10 – 12	317	59 %
13 – 15	188	35 %
16 – 18	35	6 %

Measures

Learning Disabilities Checklist developed by National Center for Learning Disabilities (2007) and validated by Ashraf and Najam (2014) was administered to assess LDs in study participants. The validated checklist comprised of 35 items measuring reading (n = 15), writing (n = 10) and mathematical (n = 10) disabilities in students. The checklist measures participants’ responses in presence or absence of LDs as each statement represents a particular learning difficulty such as “confuses similar looking letters or numbers”. Present of a particular difficulty is denoted as 1 (yes) and absence is shown as 0 (no). Participants’ accumulative scores on this checklist can range from 0-35; high scores indicate more learning difficulties and problems. Alpha reliability of checklist for present study was obtained 0.90 that is consistent with previously validated study (Ashraf & Najam. 2014)’ alpha coefficients (α = .94).

Procedure

A preliminary discussion on purpose of the study was held with concerned school authorities and parents. Prior to the administration of assessment tool, approval of data collection from the school administration and parents of participants was obtained in monthly parent teacher meeting to meet ethical considerations. Attendance registers of students were consulted to select study sample in order to determine adequate representation of targeted population. While selecting participants, a well proportionate gender composition was tried to make sure to select a representative sample. After delivering the instructions, Learning Disabilities Checklist was administered and obtained data was processed for further analysis.

Data Analysis

Multivariate analysis of variance (MANOVA) was applied to examine the main effect as well as interactive effect of gender and academic levels on LDs and its sub types. The prevalence of LDs was analyzed by categorization of three forms; reading, writing and mathematical disability. An alpha value of less than .05 was considered as significant for mean differences.

Results

In the present study, data was analyzed by using 2 × 5 (gender × academic levels) multiple analysis of variance (MANOVA). Table 1 represents distribution of sample across genders and academic levels. Gender distribution in sample is well proportionate whereas in case of academic levels, participants at grade 10<sup>th</sup> and age group of 16 to 18 are bit disproportionate to rest of academic levels and age groups due to pre board exam holidays in schools.

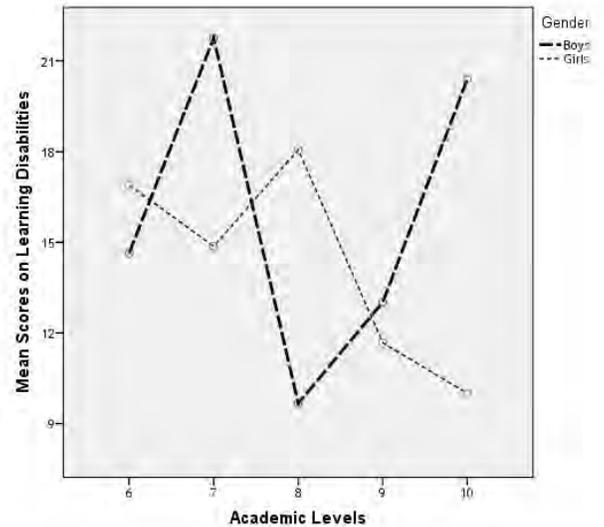


Figure 1: Showing the interactive effect of gender and academic levels on learning disabilities

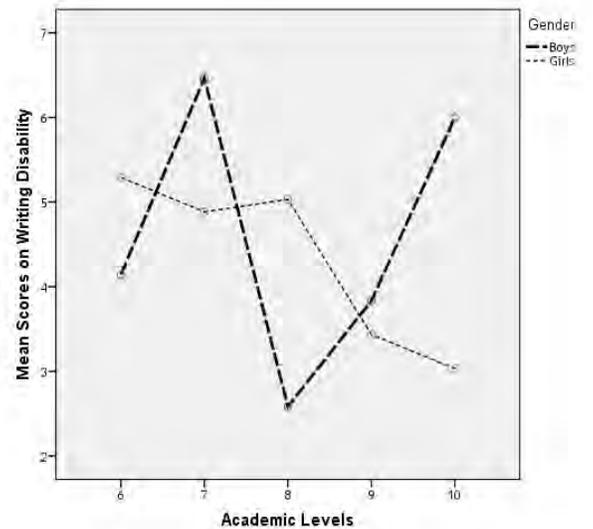


Figure 2: Showing the interactive effect of gender and academic levels on reading disability

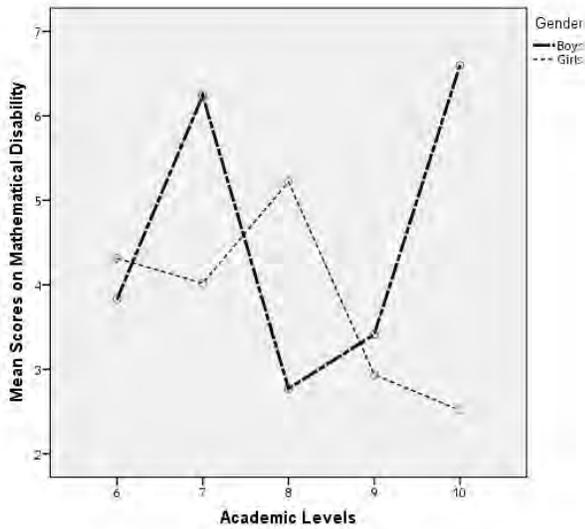


Figure 3: Showing the interactive effect of gender and academic levels on writing disability

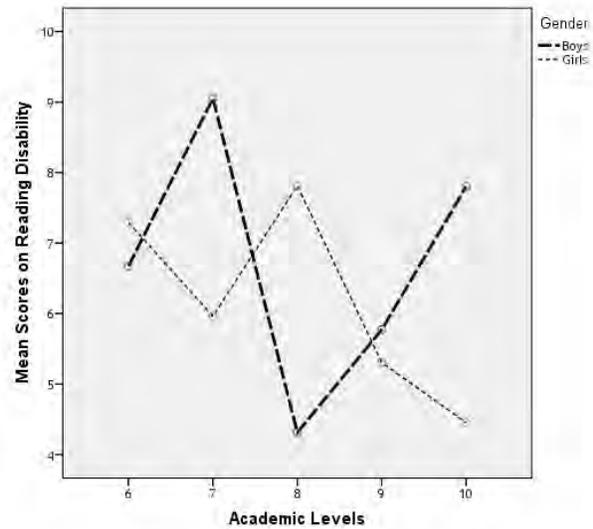


Figure 4: Showing the interactive effect of gender and academic levels on mathematical disability

Table 2

Mean Differences in Learning Disabilities and Sub Types across Gender and Academic Levels (N=540)

Measures	Gender		$\lambda$	Academic Levels					$\lambda$
	Boys <i>M(SD)</i>	Girls <i>M(SD)</i>		6 <sup>th</sup> <i>M(SD)</i>	7 <sup>th</sup> <i>M(SD)</i>	8 <sup>th</sup> <i>M(SD)</i>	9 <sup>th</sup> <i>M(SD)</i>	10 <sup>th</sup> <i>M(SD)</i>	
LDs	15.58 (9.99)	14.40 (10.43)	.98	15.61 (9.45)	19.32 (10.77)	13.02 (10.12)	12.63 (8.12)	12.54 (12.38)	.92*
(i) RD	6.74 (4.59)	6.18 (4.58)		6.94 (4.48)	7.96 (4.83)	5.71 (4.49)	5.64 (4.03)	5.27 (5.07)	
(ii)WD	4.53 (3.04)	4.41 (3.37)		4.63 (3.06)	5.90 (3.27)	3.56 (2.97)	3.72 (2.61)	3.76 (3.75)	
(iii) MD	4.31 (3.31)	4.09 (3.30)		4.04 (2.85)	5.46 (3.55)	3.75 (3.28)	3.27 (2.89)	3.51 (3.86)	

df: gender=1, academic levels= 4, \*\* $p < .005$ , \*\*\* $p < .0001$

Table 3

Mean Scores for Interaction of Gender and Academic Levels across Learning Disabilities and Sub-type (N=540)

Measures	Gender × Academic Levels										$\lambda$
	Boys (n=314)					Girls (n=226)					
	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	
LDs	14.64 (9.03)	21.76 (9.92)	9.67 (9.25)	13.02 (7.71)	20.40 (12.75)	16.90 (9.93)	14.87 (10.90)	18.06 (9.36)	11.67 (9.06)	10.01 (11.32)	.94*
(i) RD	6.67 (4.44)	9.05 (4.62)	4.31 (4.13)	5.77 (3.96)	7.80 (5.09)	7.29 (4.53)	5.96 (4.59)	7.81 (4.23)	5.30 (4.22)	4.45 (4.86)	
(ii)WD	4.14 (2.88)	6.46 (2.94)	2.58 (2.65)	3.83 (2.40)	6.01 (3.55)	5.29 (3.20)	4.88 (3.60)	5.03 (2.86)	3.43 (3.07)	3.03 (3.11)	
(iii) MD	3.83 (2.67)	6.24 (3.42)	2.77 (3.19)	3.41 (2.63)	6.60 (4.37)	4.31 (3.08)	4.02 (3.36)	5.22 (2.85)	2.93 (3.44)	2.52 (3.15)	

df= 4, \*\*\* $p < .0001$ , n=sub sample size

The results in Table 2 shows that there is no significant gender differences in LDs ( $F(1, 539) = 2.53, p > .05$ , Wilks'  $\lambda = .98$ ), related to reading, writing and mathematical disabilities. MANOVA pertaining to LDs and sub types across various academic levels revealed significant mean differences (Wilks'  $\lambda = .92^*$ ) in study variables i.e., LDs ( $F(4, 536) = 7.98, p < .001$ ), reading disability ( $F(4, 536) = 3.93, p < .0001$ ), writing disability ( $F(4, 536) = 9.29, p < .0001$ ), and mathematical disability ( $F(4, 536) = 6.81, p < .0001$ ). Results suggested that students of grades 7<sup>th</sup> significantly exhibited more LDs including reading, writing and mathematical disabilities compare to the students in other grades. Students of 8<sup>th</sup> grade demonstrated relatively significantly less learning disabilities, reading, writing and mathematical disabilities than students in other grades (see Table 3).

Although no gender differences are observed in LDs and its sub types. However, when comparing girls and boys at various academic levels (interaction), significant results are observed in LDs and its sub types as MANOVA revealed that boys demonstrated significantly more LDs in grade 7<sup>th</sup> whereas girls manifest significantly higher LDs in grade 8<sup>th</sup> (see Figure 1). At measures of reading disability, boys reported more reading difficulties at grade 7<sup>th</sup> contrary to girls who manifest more reading problems in grade 8<sup>th</sup> (see Figure 2). In case of writing disability, boys were observed with higher scores in 7<sup>th</sup> and 9<sup>th</sup> grades as compare to their counterparts who report significantly more writing problems in grade 8<sup>th</sup> (see Figure 3). In table 4, Mathematical disability is reported significantly dominant in boys at grade 7<sup>th</sup> and girls at grade 8<sup>th</sup> than their peers in same grades (see Figure 3).

### Discussion

LDs inhibit acquisition and use of oral language, written and expressive language, reading and mathematical calculations and vary in severity. Along with severity and its overall prevalence, differences do exist across genders (Stein, 2001; Shaywitz, 2003; Rutter et al., 2004). These variations are tried to explore in the present study by examining gender differences in LDs classified according to DSM- V criteria across various academic levels. In the present research, three hypotheses revolving around the overall gender differences in LDs as well as across various grades are tested. Contrary to previously documented results (Rutter et al., 2004; Dilshad, 2006; Balkhande & Damle, 2012), explaining that girls and boys do vary in reporting of LDs in general and its sub types in specific, finding of the study provided robust dimension pertaining to assumed gender differences in LDs as no significant gender differences are observed. Froschl and colleagues (1999) claimed that boys and girls differ in LDs due to social pressures imposed differently for both genders. In scenario of current study findings, it could be attributed to certain other factors that may intervene in mediating this difference particularly in local perspective. In Pakistan as girls are more passive, therefore feel more anxious, depressive and low in self-esteem than boys who are generally perceived as hyperactive, impulsive and aggressive. Therefore, these causes may possibly mediate the assumed differences and resulted in no significant difference.

Another aspect of the present study was to investigate comparisons in LDs and its subtypes in students of grades 6<sup>th</sup> to 10<sup>th</sup>. Results purported significant differences across these academic levels. According to provided empirical evidence, there is very little work done on exploring prevalence and comparison in LDs and its subtypes across middle and high school students (Moll, Kunze,

Neuhoff, Bruder & Schulte-Ko, 2014). In addition, majority of previous researches are conducted in elementary school students and adults in colleges (Rose, Espelage, Monda-Amaya, Shogren, Steven & Aragon, 2013). Therefore, previous literature lacks to provide findings in either of the directions in LDs across these academic grades. So, the current study finding could be considered as valuable addition to existing literature and unique to local context.

Another purpose of present study was to examine significant gender differences across academic levels of 6<sup>th</sup> to 10<sup>th</sup>. Although no significant gender differences are observed in overall comparisons, results are significant when comparing girls and boys independently on each academic level. This result also partially supported the first hypothesis and also supplements previously documented findings of (Haynes, Hook, Muta, Hayashi, Kato, Sasaki, 2000; Dilshad, 2006; Wheldall, 2010; Malik, Mufti & Akhtar, 2013) that LDs are manifested differently between girls and boys. In this research, mix findings were observed in LDs regarding gender dominance as boys show high scores on LDs measures, reading and mathematical disabilities at grade 7<sup>th</sup> contrary to their counterparts who reported more LDs and reading disability at grade 8<sup>th</sup>. Writing disability was significantly more prevalent in boys at grades 7<sup>th</sup> and 9<sup>th</sup> and in girls at grade 8<sup>th</sup>. These results are in support of previously documented results in the context that students of different grades exhibit different level of LDs (Perie, Grigg, & Donahue, 2005; Grigg, Donahue, & Dion, 2007).

### Limitation, Suggestions and Conclusion

As no research is without limitation, in context of the present research a few limitations need be taken care for future research in demand to obtain more diversified findings in this area of research. As findings lead, present research clarified the need for timely assessment and intervention for the students having learning problems as these students identified with certain LDs might be at risk of developing clinical level of learning disorders and other mental health problems i.e., depression, anxiety, stress disruptive and maladaptive behaviors. So in future researches, examining these factors in association with prevalence of LDs may provide more diverse results. Another limitation of the study is that LDs are assessed only using one method of obtaining data i.e., checklist. By using a mix method approach or adding qualitative approaches of data collection such as interviews, observations, and triangulation etc., may facilitate researchers to obtain more reliable perspectives in establishing findings. Further, participants are recruited from only four schools in Lahore, a city of Punjab that may minimize the generalizability of results in wider context. So, the present study may be replicated by recruiting participants from schools in other cities of Pakistan. Moreover, comparing students in public and private sectors of rural and urban areas of Pakistan may also provide a more empirical look into findings. In this cross sectional study, all possible effects within the sample characteristics were tried to explore. However, same phenomenon could be tested by controlling the other intervening factors in longitudinal studies.

The present study demonstrated gender differences in LDs across various academic levels. Moreover, findings of current research highlight importance of assessment of prevalence of LDs in girls and boys of grades 6<sup>th</sup> to 10<sup>th</sup>. By analyzing findings of this study in light of previous researches and theoretical aspects, it is concluded that gender plays a significant role in terms of prevalence and identification of LDs in students at various academic levels. By

gender comparison at various academic levels helps to further diversify and rule out the minor and significant differences. In conclusion, present study signifies the dire need of regular class room assessment by teachers and school psychologists/ counselors in order to identify presence of LDs.

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