Journal of Communication Disorders, Deaf Studies & Hearing Aids

Hadley and Kimberlin, Commun Disord Deaf Stud Hearing Aids 2016, 4:3
DOI: 10.4172/2375-4427.1000162

Research Article Open Access

Piloting an Early Identification Protocol for Reading Disabilities

Amy J Hadley* **and Karen T Kimberlin**

School of Health Sciences, Stockton University, 101 Vera King Farris Drive, Galloway, New Jersey, USA

***Corresponding author:** Amy J Hadley, Stockton University, School of Health Sciences, 101 Vera King Farris Drive, Galloway, NJ-08205, USA, Tel: (609) 626-3531; Fax: (609) 652-4858; E-mail: amy.hadley@stockton.edu

Received date: August 31, 2015; **Accepted date:** July 13, 2016; **Published date:** July 20, 2016

Abstract

Background: Several U.S. states have mandated screening procedures for the early identification of children with reading disorders. This study describes a protocol for identifying students at risk for reading difficulty during the kindergarten year.

Methods: The authors piloted a protocol that included two reading screening instruments, a teacher questionnaire, a parent questionnaire and an oral language screening tool. Kindergarten children in two divergent elementary schools were screened.

Results: Fifty-nine percent of the children screened demonstrated at least one warning sign warranting follow-up. The authors also found agreement among the results obtained through the various screening tools. Results were provided to first grade teachers the following year so that skill deficits could be addressed. Repeat screening of the children showed gains in skill development for 64% of the children in the follow-up phase.

Conclusion: Children at risk for early reading difficulties can be identified as early as during the kindergarten year. Early identification allows teachers to employ instructional techniques and strategies in an effort to remediate deficits before children demonstrate greater lags in skill development. While early identification is important for all children, it may be an even greater advantage for children entering school with the additional risk factors of social and economic disadvantage.

Keywords: Dyslexia; Reading; Screening; Response to Intervention; Early Identification

Background

In 2014, three new laws were enacted in New Jersey focusing on the early identification of children with dyslexia or other reading disabilities. One of the laws called for the New Jersey Department of Education to incorporate the International Dyslexia Association's definition of dyslexia into special education regulations. A second mandated annual professional development for educational personnel. The third piece of legislation required that school districts screen children for dyslexia and other reading disabilities at an early age [1]. According to the International Dyslexia Association (IDA):

Dyslexia is a specific learning disability that is neurological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction. Secondary consequences may include problems in reading comprehension and reduced reading experience that can impede growth of vocabulary and background knowledge [2].

The 2014 legislation also requires that a screening program for children who exhibit warning signs of dyslexia or other reading disabilities be completed by the mid-point of second grade. Rather than prescribe screening instruments or procedures, the legislation allows individual school districts to determine identification methods that work best with local needs.

Several other states have also enacted early identification and screening programs. In addition to New Jersey, these states include: Arkansas, Louisiana, Mississippi, Texas and Wyoming [3]. Additional states are in the process of piloting programs for early identification of children with reading disorders. For example, in Pennsylvania, ACT 69 mandated that the Pennsylvania Department of Education establish a dyslexia screening and early literacy intervention pilot program. The Pennsylvania pilot program began in September 2015 and will run for three years, collecting data from six districts [4].

In 2011, per Senate Joint Resolution 87, the Virginia Department of Education published "*The Study of Dyslexia Screening for Kindergarteners: State Document Number 4*" [5]. The Virginia Department of Education was charged with examining existing evidence on the success of early screening for dyslexia, considering the cost effectiveness of early screening and making subsequent recommendations. Virginia implemented a kindergarten screening program utilizing the PALS-K: Phonological Awareness Literacy Screening (Kindergarten). The PALS-K probes the areas of phonological awareness, alphabet awareness, letter sound knowledge, spelling, concept of word, word recognition in isolation, and oral passage reading. According to the Center on Response to Intervention, the PALS-K costs about $7 per student the first year of administration the online scoring and reporting tool is used or about $5 without the online tool) [6]. The authors of the Virginia Department of Education report concluded:

Based on this review of literature, analysis of most frequently identified screening tools, and the positive trends in assessment data, the committee concluded that the state's current practice of screening all kindergarten students for reading weaknesses using the PALS-K is an effective method of initially identifying students at-risk for reading disabilities.

The goals of Virginia's screening program were not specifically to identify children at risk for dyslexia but to identify children who would benefit from early literacy intervention, assist teachers in developing instructional strategies and "to document the effectiveness of early literacy instruction for children identified as needing intervention".

The literature strongly supports early identification and intervention [7,8]. According to Justice, Invernizzi and Meier, an effective screening tool for detection of early literacy deficits must encompass: phonological awareness, alphabet knowledge, concept of word, and grapheme-phoneme correspondence.

In the current study, the authors utilized screening procedures to identify kindergarten children who might be at risk for dyslexia or other reading disabilities. A combination of screening tools was utilized on a pilot basis. An aim of the study was to provide guidance to school districts interested in developing screening programs under current New Jersey educational law.

Methods

Screening instruments

The authors administered a series of screening tools to identify children who might be at risk for dyslexia or other reading disabilities from among a pool of kindergarten students. The authors were both speech-language pathologists, certified by the American Speech-Language Hearing Association, each having over twenty years of experience in diagnostic testing. Each child was screened individually in a quiet area away from the classroom.

The instruments utilized included:

- The Predictive Assessment of Reading (PAR) [9] which required a paid subscription,
- The Mississippi Dyslexia Screener (MDS) which is a free, online tool,
- The Colorado Learning Disabilities Questionnaire- Reading Subscale (CLDQ-R),
- The Answering Questions and Following Directions subtest of the Fluharty Preschool Speech and Language Screening Test-Second Edition (Fluharty-2).
- A parent questionnaire developed by one of the authors.

The PAR has a predictive validity of 0.90, is administered individually, and screens the areas of: phonemic awareness, fluency (rapid naming), alphabetic knowledge/single-word reading, and picture vocabulary knowledge [10]. The PAR, published by Red-e-Set-Grow costs $7 per student for the first 250 students tested. The cost is prorated as additional tests are purchased. The PAR was selected because it is one of the instruments listed in the annual review of screening tools compiled by the National Center on Response to Intervention at American Institutes for Research (National Center on Response to Intervention, 2011). The PAR was also selected because it was appropriate for early literacy screening in kindergarten, was categorized as a having convincing evidence with regard to classification accuracy rating, could be administered individually, and took less than 20 minutes to administer per child. The National Center on Response to Intervention defines classification accuracy as "the extent to which a screening tool is able to accurately classify students into 'at risk for reading/math disability' and 'not at risk for reading/math disability' categories [11]. The PAR screens the areas of: letter-word calling, picture naming, phonemic awareness, and rapid naming. The PAR utilizes an online tool that calculates a standard score for each section completed, an overall standard score, a remediation code and an intensity of remediation code. The mean standard score for the PAR is 100 with a standard deviation of ± 15 points.

The MDS was developed and distributed by Lexercise.com for free distribution to schools seeking to comply with Mississippi's universal screening legislation. The MDS has an inter-scorer reliability of 0.90 [12]. The MDS screens the areas of: encoding, alphabet knowledge, nonsense word fluency, phoneme segmentation fluency, and rapid automatized naming. The MDS was selected because it was appropriate for kindergarten students and had been used successfully in Mississippi's dyslexia screening program. The MDS is administered individually to the child as the examiner enters responses into an Internet capable device. When the responses have been successfully entered for an individual student, a report is generated which classifies the student's performance into one of the following categories: low risk, some risk, at risk [13].

The CLDQ-R is a screening tool designed to measure risk of reading disability in school-age children [14]. Normative scores were originally obtained based on parent responses. The internal consistency of the CLDQ-R has been determined (Chronbach's *a* 0.90) and significant correlations (overall r=0.64) with standardized measures of reading achievement have been measured.

The CLDQ-R includes six items to which respondents respond using a 5-point Likert scale. The points for the ratings are tallied and are interpreted as indicating: minimal risk, moderate risk, or significant risk. The scale has been included in the IDA publication, Dyslexia in the classroom: What every teacher needs to know for use by teachers. In the current study, classroom teachers rated the children's skills using the CLDQ-R. After obtaining permission from the primary author of the CLDQ-R, the scale was reproduced for the present study at no cost.

The Fluharty-2 is a valid and reliable tool normed for children aged 3 years, 0 months to 6 years, 11 months [15]. Inter-rater reliability has been measured as .87 to 1.00. According to the publisher, "content validity studies related the test's content to current developmental studies and provided thorough individual item analysis" [16]. The Fluharty-2 is administered on an individual basis. The Fluharty-2 subtests yield scaled scores with a mean of 10 and a standard deviation of ±3 points.

An oral language screening tool was selected because many children with reading disabilities also demonstrate underlying oral language deficits [6]. In the interest of keeping the time required for screening to a minimum, only one subtest of the Fluharty-2, the Answering Questions and Following Directions subtest was administered. This subtest was selected because it probes both receptive and expressive language and yields a scaled score for normative comparison.

Finally, the questions included in the parent/caregiver questionnaire probed typical reading readiness skills that a parent or caregiver might observe at home. The items were developed based upon input from parents and specialists who served on the New Jersey Governor's task

force on dyslexia and other reading disabilities during the development of the dyslexia-related legislation. Questionnaires were sent home to parents of children participating in the study. Responses to eleven parent/caregiver questions were analyzed for the current study. The parent/caregiver questionnaire was scored using raw scores as the instrument has not been standardized. The utility of the parent questionnaire was being explored in the current study. The items on the parent questionnaire are summarized in Table 1.

Please put an "X" next to the items that describe what your child can do:
Does your child:
_____Remember simple sequences such as counting to 20, naming the days of the week, or reciting the alphabet?
_____Have an understanding of rhyming words, such as knowing that fat rhymes with cat?
_____Recognize words that begin with the same sound (that bird, baby, and big all start with b)?
_____Easily clap hands to the rhythm of a song?
_____Frequently use specific words to name objects rather than words like "stuff" and "thing"?
_____ Easily remember spoken directions?
_____Remember names of places and people?
_____Show understanding of "up-down" and "front-back"?
_____Sit still for a reasonable period of time?
_____Enjoy looking at books?
_____Enjoy listening to stories?

Table 1: Parent Questionnaire.

Participants

Because the literature strongly supports early identification and intervention [6,7] the authors recruited kindergarten children from two school districts for the pilot study. The districts were selected partially by convenience as the authors had existing relationships with the schools. In addition, the schools represented divergent populations in terms of ethnic and economic diversity. The districts were located in two different parts of the state. Thirty-two children participated in the screening during the latter part of the first semester of kindergarten. An additional twenty-five children participated during the early part of the spring semester of kindergarten. Bishop found "no practical, significant difference between fall and winter testing times" in a study involving kindergarten screening of phonological skills with follow-up intervention and retesting in first grade [17].

The "fall group" of children was enrolled in an elementary school (School A) in which 74% of the students represent an ethnicity other than "white". The school receives Title I targeted assistance. The students in the "spring group" attended a school (School B) in which only 1% of students were eligible free or reduced lunch and 92% of the students were identified as "white". None of the children participating in the screening were receiving special education services at the time of the screening. All were recognized as fluent English speaking. All children enrolled in kindergarten during the 2013-2014 academic year at the two schools were invited to participate in the screening. Only children whose families returned the signed informed consent were able to participate in the screening program.

Procedures

The children in School A were screened by one of the authors, a certified speech-language pathologist with the assistance to three student clinicians who were trained in administration of the screening tools by the author. The children in school B were screened by the speech-language pathologist at the school who had been trained by one of the authors.

At the completion of the screenings, a database was compiled so that the authors could analyze the scores for each child across the various screening instruments. The authors identified "red flag" scores for any of the children across all of the various screening tools. A "red flag" was interpreted as a score at least one standard deviation below the mean score for the standardized instruments, the PAR and the Fluharty-2. A red flag on the Mississippi meant a rating of "some risk", or "at risk" according to the computerized scoring. The ratings of "moderate risk" or "significant risk" were used as red flag scores for the CLDQ-R. For the purposes of this study, if the parent/caregiver indicated that a child was demonstrating 9 or fewer of the 11 behaviors/skills asked about on the parent/caregiver questionnaire, the authors considered the questionnaire results to be a "red flag". A score between 6 and 9 was interpreted as "some concern" and a score of 5 or below was interpreted as "increased concern".

During the following academic year, 2014-2015, follow-up intervention and screening were conducted at School A, the Title I school. Follow through with School A was conducted because the administration and teaching staff welcomed the input and follow up screening. The first grade teachers were provided with screening results for the children who participated in the screening during kindergarten as well as resources guiding them to intervention methods for the areas of weakness identified by the kindergarten screenings. None of the children had been retained, but one had been moved to a class for children with special learning needs. For the re-screening, there were 14 children still residing in the district who had been screened in

kindergarten and who demonstrated at least one area on the MDS in the "some risk" or "at risk" results disposition.

The 14 children from School A were then rescreened using only the Mississippi Dyslexia Screener to see if any changes had occurred in performance since kindergarten. The first grade version of the MDS was administered during the spring semester, allowing teachers time to implement recommended interventions. The MDS was selected as a sole screening instrument because it contained both kindergarten and first grade versions. The MDS contained three categories of outcome: low risk, some risk, at risk. The authors were interested in measuring if any change in ratings for individual children might be observed having provided the teachers with the screening results and suggested interventions.

The MDS instrument was free and the intention of the current study was to pilot a procedure that might be replicated by school-based personnel, thus the monetary cost factor was eliminated from the re-screening. In addition, utilizing only one individually administered screener decreased the amount of time that children were removed from the classroom. The questionnaires were not re-administered because: a) the parent/guardian questionnaire has not yet been standardized and b) having only six items, the CLDQ-R may not have been sensitive enough to detect changes.

Kindergarten and first grade performance on each of the sections of the MDS as well as the overall risk level assigned to each student was compared to determine if any changes had occurred the children's performances in the areas addressed by the MDS.

Analysis

A Spearman's rank-order correlation (Spearman's rho) was utilized to determine if there was a correlation among the results of the various screening tools. A Spearman's rho correlation was utilized because it uses ranks instead of continuous-level data. In the current study, the various types of screening tools provided different types of data. The PAR and Fluharty-2 provided equal interval scores while the other tools did not. The interval scores were converted to ranks. For the MDS, the CLDQ-R, and the parent/caregiver questionnaire the ratings were converted to ranks based on assigned points.

As only 14 children were in the group that was re-screened in first grade, a statistical comparison of scores was not conducted. Instead, bar graphs comparing the performance of each child in kindergarten and to the same child's first grade performance are included in the Appendix A for: encoding, alphabet knowledge, nonsense word fluency, phoneme segmentation, rapid automatic naming, and overall risk level.

Results

Of the 57 children screened in kindergarten, 59.6% had at least one "red flag" result on at least one of the selected screening tools. Thirty-three percent had a "red flag" score on two or more of the screening tools. Results were shared with parents and teachers. For the 14 children rescreened in first grade, when comparing the overall risk rankings on the MDS, three children maintained the same risk level, two children increased in overall risk level, but nine children decreased in overall risk level. Appendices B and C summarize the performance of the children in Schools A and B respectively on each of the measures. It was noted that none of the children obtained an "at risk" score on the PAR in this study.

A summary of the Spearman's rank-order correlation among the various screening instrument results are summarized below in Table 2. The directionality of the correlations is indicative of how the scores were obtained on the screening tools. For example, a higher point value on the CLDQ-R yielded a higher level of risk while a lower point value on the parent questionnaire resulted in a higher level of risk. Thus, a high score on the teacher ranking (CLDQ-R) correlated to a low score on the parent questionnaire, both indicators of "red flags".

		Parent Questionnaire	CLDQ-R	Fluharty-2	MDS	PAR
Parent Questionnaire	Correlation Coefficient	1	-0.564**	0.497**	-0.624**	0.455**
	Sig. (2-tailed)		0.001	0.002	0.0	0.006
CLDQ-R	Correlation Coefficient	-0.564**	1	-0.490**	0.615**	-0.635**
	Sig. (2-tailed)	0.001		0.001	0.0	0.0
Fluharty-2	Correlation Coefficient	0.497**	-0.490**	1	-0.440**	0.511**
	Sig. (2-tailed)	0.002	0.001		0.001	0.0
MDS	Correlation Coefficient	-0.624**	0.615**	-0.440**	1	-0.553**
	Sig. (2-tailed)	0.0	0.0	0.001		0.0
PAR	Correlation Coefficient	0.455**	-0.635**	0.511**	-0.553**	1
	Sig. (2-tailed)	0.006	0.0	0.0	0.0	
**Correlation is significant at the 0.01 level (2-tailed)						

Table 2: Correlations among results of screening instruments (Spearman's rank order coefficient, r_s)

Discussion

The current study identified nearly 60% of kindergartners among a pool of 57 children who had some sort of early warning sign of a reading difficulty. Although New Jersey legislation calls for screening of children with indicators of reading difficulty by mid-year of second grade, the current study suggests that early screening can identify children in the formative year of kindergarten allowing teachers to intervene with classroom strategies in the areas of identified weakness. Bishop found that screening children for skills in letter identification, phonological awareness, and rapid automatized naming could be used to predict early reading achievement [17]. Schatschneider, Fletcher, Francis, Carlson, and Foorman, found measures of letter name and letter sound knowledge, naming speed, and phonological awareness to be good predictors of multiple reading outcomes in Grades 1 and 2 [18]. Studies conducted in Germany [19] and in The Netherlands [20] have also provided support for early screening, identification, and support of children in kindergarten with regard to early literacy skills such as phonological awareness and letter knowledge.

The results summarized by school in Appendices B and C suggest that more children in the lower SES school had "red flag" indicators than children in the higher SES school. Disparities in early school performance have been attributed to social and economic factors including socioeconomic status, race and ethnicity, and immigrant status [21]. This disparity supports the importance of screening children from socially and economically diverse children early in the educational process in order to minimize the effects of reduced readiness upon entering kindergarten.

Results of this pilot study support including input from parents and teachers in the early screening process. The strength of the correlations between the parent questionnaire and the CLDQ-R (r_s=-0.564) indicates a moderate level of agreement in the observations of teachers and parents. Input from both parents and teachers should be valued in the screening process and helps to confirm that items a child may struggle with on the screening instrument are indicative of difficulties observed at home and in school as well. Surveying parents and teachers is cost effective in both time and financial terms and helps to incorporate these valuable team members into the screening process.

Similar correlations were measured between the MDS and the parent questionnaire (r_s=-0.624) and the MDS and the CLDQ-R (r_s=0.615). For school districts with limited financial resources, use of these three measures, all currently free of cost, may be a viable method for early identification in kindergarten. Fawcett, Singleton, and Peer [22] cited cost-effectiveness as a barrier to universal screening in the United Kingdom. In the United States, while legislation at the state and federal levels has increased emphasis on early identification and remediation for children at risk for learning difficulties, such mandates are often not adequately funded [23].

During the second year of the study the first grade teachers were asked to report if having the results of the screening helped them to address the deficits for individual students in their classrooms. They reported that while they did find the information helpful several factors were still reported as "frustrating". These included: high adult to child ratios, limited time for small group or individualized instruction, and lack of input into reading curriculum selection.

According to Torgesen, Foorman and Wagner of the Florida Center for Reading Research [24], we can, using tests currently available, accurately identify students who are likely to struggle with reading starting in preschool or kindergarten. What these tests cannot do this early is to differentiate students with dyslexia from others who will struggle in learning to read for reasons other than dyslexia. The goal of every school should be to provide interventions for all struggling readers that are sufficiently powerful to bring reading skills up to grade level standards.

Free instructional resources for teachers can be acquired on the Florida Center for Reading Resource webpage [25].

Limitations

The current study serves as a pilot for a protocol that might be adopted on a larger scale. The current study has limitations including small sample sizes and limited control of extraneous factors such as gender, ethnicity, second language exposure, and economic status.

Conclusion

While New Jersey has mandated that children who demonstrate early warning signs be screened no later than the end of the first half of second grade, the present study suggests that a cost-effective protocol can be developed to begin identifying children at risk for reading disabilities including dyslexia at the kindergarten level. Implementing evidence-based interventions early may decrease the number of children in need of costlier special education services in later grades. Additional research is needed on cost effective mechanisms for implementing follow-up intervention.

References

1. New Jersey School Boards Association (2014) Dyslexia bill signed into law. School Board Notes 38: 23.
2. International Dyslexia Association (2013) Dyslexia in the classroom: What every teacher needs to know. Baltimore: Author.
3. Decoding Dyslexia (2015) Dyslexia state legislative summary by category.
4. Pennsylvania Department of Education (2014) Act 69- Dyslexia screening and early literacy intervention program.
5. Virginia Department of Education (2011) The study of dyslexia screening for kindergarteners: State Document Number 4. Commonwealth of Virginia.
6. Center on Response to Intervention (2014) Screening tools chart. American Institutes for Research.
7. Justice LM, Invernizzi MA, Meier JD (2002) Designing and implementing an early literacy screening protocol: Suggestions for the speech-language pathologist. Language, Speech, and Hearing Services in Schools 33: 84-101.
8. Torgesen J (1998) Catch them before they fall: Identification and assessment to prevent reading failure in young children. American Educator.
9. Predictive Assessment of Reading (2012) Clemmons, N.C.: Red-e-Set-Grow.
10. Poole JI, Johnson ES. Screening for reading problems in preschool and kindergarten: An overview of select measures.
11. http://www.rti4success.org/screening-glossary-terms
12. Blackwell E, Durkee N, Flynn P, Barrie BS (2014) The Mississippi Dyslexia Screener: An inter-scorer reliability study. Poster presented at the American Speech-Language- Hearing Association Annual Convention.
13. https://app.lexercise.com/clinician/screener#info_page
14. Willcutt EG, Boada R, Riddle MW, Chhabildas, N, DeFries JC, et al. (2011) Colorado Learning Difficulties Questionnaire: Validation of a parent-report screening measure. Psychological Assessment 23: 778-791.

15. Fluharty NB (2000) Fluharty Speech and Language Screening Test-Second Edition. Greenville, S.C.: Super Duper Publications.
16. Super Duper Publications (2016) Fluharty-2.
17. Bishop A (2003) Predication of first-grade reading achievement: A comparison of fall and winter kindergarten screenings. Learning Disabilities Quarterly 26: 189-200.
18. Schatschneider C, Fletcher JM, Francis DJ, Carlson CD, Foorman BD (2004) Kindergarten Prediction of Reading Skills: A Longitudinal Comparative Analysis Journal of Educational Psychology 96: 265-282.
19. Schneider W, Roth E, Ennemoser M (2000) Training phonological skills and letter knowledge in children at risk for dyslexia: A comparison of three kindergarten intervention programs. Journal of Educational Psychology 92: 284-295.
20. Vloedgraven JM, Verhoeven L (2007) Screening of phonological awareness in the early elementary grades: an IRT approach. Ann Dyslexia 57: 33-50.
21. Waldfogel J (2012) The role of out-of-school factors in the literacy problem. Future Child 22: 39-54.
22. Fawcett AJ, Singleton CH, Peer L (1998) Advances in early years screening for dyslexia in the United Kingdom. Annals of Dyslexia 48: 57-88.
23. Council for Exceptional Children (2015) Federal outlook for exceptional education: Fiscal Year 2015.
24. Torgesen J, Foorman BR, Wagner RK (2010) FCRR Technical Report #8. Dyslexia: A brief for educators, parents, and legislators in Florida. The Florida Center for Reading Research.
25. Florida Center for Reading Research (2016) For Educators.