Reading Literacy Development of Deaf Students in Special Schools in Iran

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Abstract: Reading literacy is one of the most important abilities acquired by students at school. The aim of this study was to compare the development of reading ability of deaf and hearing students in Iran. A retrospective study was done through "Progress in International Reading Literacy Study scale with a cross sectional design. Participants were 80 students with congenital profound hearing loss in primary, middle, and secondary schools for the deaf, as well as 80 hearing peers in regular schools. The results revealed a significant difference in reading literacy between deaf and hearing students in all educational grades. However, no development in reading skills of deaf students was seen after primary schools; denoting that reading skills have not been developing through middle and secondary schools in the deaf students. The mean scores of female students were higher than male students.

*Keywords**:** Reading literacy, Deaf student, Normal hearing*

Reading is a cognitive skill, developed as the result of the interaction between the nervous system and cultural experience (Cohen, 2001). "Reading literacy is the ability to understand and use those written language forms required by society and or valued by the individual. Readers can construct meaning from texts in a variety of forms. They read to learn, to participate in communities of readers in school and everyday life, for enjoyment" (Mullis & Martin, 2015, p.12). Reading literacy enables individuals to deal with life more efficiently and grants them a better understanding of the world in general. Literacy is the right of every human being; readers are more aware of their human rights, the opportunity to study, and development.

Development of reading literacy in deaf children without age-appropriate spoken language skills will be difficult and slow (Musselman, 2000). Access to auditory information will lead to the use of the letter to sound correspondences and a basis for phonological decoding. Deaf children have problems with fundamental skills such as phonology and decoding that will affect word recognition (Kyle & Harris, 2011; Waters & Doehring, 1990), and also language skills such as syntax and grammar that influence sentence comprehension (Bishop, 1983; Kelly, 1996).

As noted, deaf children demonstrate poor word reading, so it is expected that their reading comprehension skills will also be poor. Many studies on the reading skills in deaf students indicate a considerable delay in comparison with their normal-hearing peers (Dillon, Jong & Pisoni, 2011; Wauters, van Bon, & Tellings, 2006; Musselman, 2000; Traxler, 2000). These delays culminate in deaf adolescents leaving school with reading comprehension levels equivalent to those of 9-year-old normal-hearing children (Allen, 1986; Conrad, 1979; Qi & Mitchell, 2011).

Reading literacy is one of the essential abilities acquired by students at school; therefore, it is necessary to be assessed regularly in all students, especially deaf ones. The reading skills of many deaf students lag several years behind normal-hearing students, so it is necessary to identify reading difficulties and implement effective reading support strategies in this population (van Staden, 2013). As children grow older, reading takes on an increasingly important role in enabling them to access the curriculum; they move from 'learning to read' to 'reading to learn' stage (Worsfold, Mahon, Pimperton, Stevenson & Kennedy, 2018). Thus the reading deficits shown by the deaf population are likely to have an increasingly significant impact on their educational attainment and future occupational status (Walter & Dirmyer, 2013).

Education of deaf students has always faced various approaches to the appropriate teaching methods; however, teachers are more contented with the oral or verbal method and sign language than other methods (Alpiner & Mc Carthy, 2002). While some experts focus on using sign language, the proponents of oral or verbal method use the residual-hearing ability and lip-reading in teaching deaf students.

In Iran, education for the deaf dates back to 1925, since Jabbar Baghchebaan opened the first class for deaf children in a kindergarten for normal-hearing students. He also developed his unique method based on the oral method and "Persian finger spelling" which was similar to Cued Speech (Hassanzadeh, 2009). Now oral approach and using hearing aids or cochlear implantation is the main dealing and therapeutic method with deaf education in Iran. Persian Sign Language is not taught in rehabilitation centers and schools. Many studies indicate that

deaf children who have learned sign language in early childhood demonstrate greater advancement in reading skills (Easterbrooks & Huston, 2008; Harris & Beach, 1998; Miller, 2007; Hassanzadeh, 2011).

Teaching reading skills are the main problem in the education of deaf students in Iran (Nikkhoo & Hassanzadeh, 2011), also teaching reading literacy to hear students is the main challenge. The Progress in International Reading Literacy Study (PIRLS) is an international comparative assessment that measures student's learning in reading worldwide. Since 2001, PIRLS has been administered every 5 years. Iran participated in all four previous assessments of PIRLS in 2001, 2006, 2011, and 2016. In all assessments, Iranian students were ranked below the average although their ranking has increased somewhat over the years.

The present study addressed the reading literacy development of deaf students at elementary and high schools in the 4^{th}, 9^{th} and 12^{th} grades. The research aimed at examining the development of reading skill as the educational degrees rise, comparing the reading literacy skill between normal-hearing and impaired-hearing students, as well as comparing the reading abilities in female and male students.

Method

Participants

The study was conducted in Tehran, the capital of Iran. Participants consisted of 80 deaf students who were studying in the end of primary (Fourth grade), end of middle grade (ninth grade), and the end of secondary schools for the deaf (twelfth grade). Also 80 hearing peers from regular school participated in this study. Subjects in two groups were similar in age, school grade, gender and Socioeconomic Status. Demographic information is presented in Table 1.

Table 1. Demographic Characteristic of Participants

	Primary School (Fourth Grade)	Middle School (Ninth Grade)	Secondary School (Twelfth Grade)
Deaf students	23	29	28
Mean(SD) age (years)	10.8(0.73)	15.8(0.61)	18.7(0.72)
Sex			
Male	13	16	16
Female	10	13	12

Socioeconomic class			
Low	11	17	15
Middle	9	7	9
Upper	3	5	4
Hearing students	27	26	27
Mean(SD) age (years)	10.2(0.54)	15.1(0.62)	18.3(0.43)
Sex			
Male	15	15	14
Female	12	13	11
Socioeconomic class			
Low	14	11	16
Middle	8	6	6
Upper	5	9	5

Material and Procedure

PIRLS: The Progress in International Reading Literacy Study (PIRLS, 2016) is an international comparative study for assessment of reading achievement in students at fourth grade of primary school. The fourth grade is a transition point in students reading development, in this grade; students have learned reading and in next year's reading could be a tool for learning on knowledge.

Iran started its coordination officially with International Association of Education Advancement (IEA) from 1991 and participated in four studies of PIRLS in the years of 2001, 2006, 2011 and 2016. In all reports, the performance of Iranian students was lower than the international average (500). PIRLS 2016 is the fourth assessment in the current trend series. There were 61 participants in PIRLS 2016, including 50 countries and 11 benchmarking entities. For countries that have participated in a previous assessment since 2001, the PIRLS 2016 results provide an opportunity to evaluate progress in reading achievement across four time points.

The framework is organized around two overarching purposes for reading for literary experience and to acquire and use information. PIRLS 2016 complete examination booklet contains five literary and five informational passages, but we modified PIRLS examination booklet in the present study due to the difficulty of the whole test for deaf students, we used one literacy and one informative text texts. All deaf and hearing students in three school grades completed a Persian version of those texts, the test was implemented individually.

Results

A total of 80 deaf students and 80 hearing students in the fourth, ninth and twelfth grade replied to the questions of two informative and literary texts. The scores of deaf students on each three grades in informative text, literary text, and overall scores were presented in Table 2. An independent-samples t-test was conducted to compare overall scores in both groups. There was a significant difference in the scores based on hearing ($P<0.001$). A one-way analysis of variance was conducted to compare effect of educational grade (Fourth, ninth, and twelfth grades) on reading literacy of deaf students. (Table 3). The dependent variable was the overall reading scores of PIRLS. An analysis of variance showed that the effect of educational grade on reading literacy of deaf students wasn't significant, $F (2, 77) =1.63$, $P>0.05$ (Table 3). In other words, despite the rise of the class base, the reading grades of these students did not show a growth (Figure 1). In deaf and hearing groups, the average scores of reading literacy in both informative and literary texts, as well as the overall scores of girls were higher than those of boys (Table 4).

Table 2. Mean and SD scores for the Reading Literacy Development in Deaf and Hearing Students

	Deaf Students			Hearing Students		
	Informative Text	Literary Text	Overall Score	Informative Text	Literary text	Overall Score
Fourth Grade	3.61 (2.03)	2.96 (1.79)	6.57 (2.88)	8.67 (3.71)	10.48 (3.45)	19.15 (3.66)
Ninth Grade	4.24 (2.76)	3.31 (2.26)	7.55 (4.62)	11.31 (3.86)	13.23 (3.21)	24.54 (6.41)
Twelfth Grade	5.07 (3.19)	3.89 (3.65)	8.96 (6.00)	10.63 (1.11)	13.41 (2.50)	24.04 (4.98)

Table 3. ANOVA for the Reading Literacy Development in Deaf Students in Three Educational Grades

	Sum of Squares	df	Mean Squares	F
Between Groups	74.69	2	37.34	1.63
Within Groups	1757.78	77	22.82	
Total	1832.47	79		

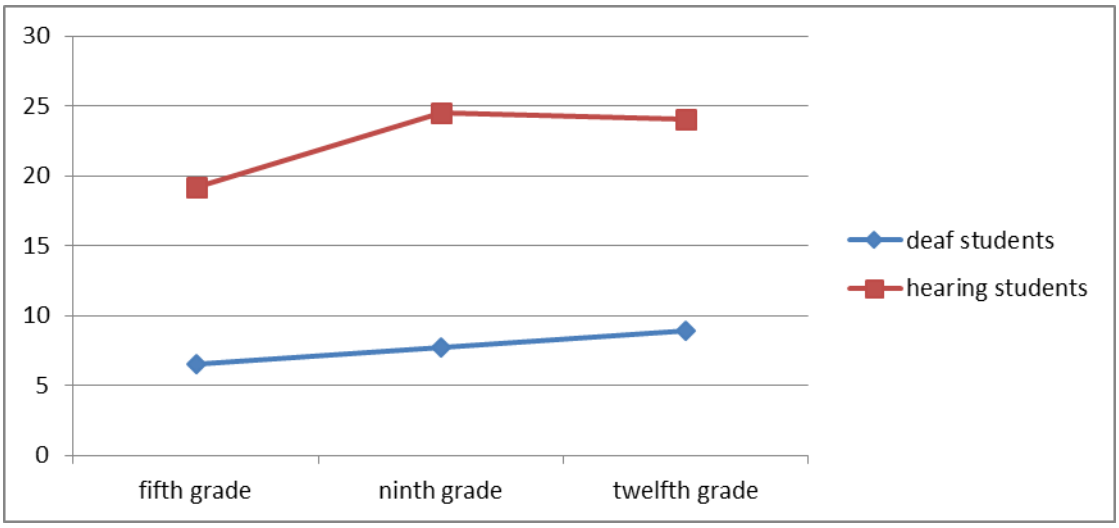

Figure 1. Reading Literacy Development in Deaf and Hearing Students in Three Grades

Table 4. Mean, SD and Overall Score of Deaf Students Regarding Gender

	Female	Male	df	t
Test score	Mean (SD)	Mean (SD)		
Informative text	5.31 (3.00)	3.60 (2.34)	78	2.86
Literary text	4.20 (2.91)	2.80 (4.48)	78	2.31
Overall score	9.51 (5.26)	6.40 (3.99)	78	3.01

Discussion

The objective of present study was to investigate reading literacy development of deaf student in elementary, middle and high schools. To evaluate this, the reading literacy in deaf students who

educated in Fourth grade, ninth grade and twelfth grade was compared to normally hearing peers. In addition, to gain further insight, present research investigated the relation between reading skills and educational grades in deaf and hearing students. The results indicated no significant difference in reading literacy among the deaf students of the mentioned educational grades (mean: Fourth grade (6.57), ninth grade (7.55), and twelfth grade (8.98)). Moreover, findings indicated that girls score significantly higher on average in informative and literary texts and also in their overall performance than boys ($P<0.001$).

Deafness may lead to serious deficiencies in children's linguistic development and their relations with others. Because of the difficulties that deaf children confront with in auditory discrimination (Cheung , Leung & McPherson, 2013) and consequent deficiencies in phonological awareness (Ziegler & Goswami, 2005) and since phonological awareness is a predictor of reading ability (Boscardin, Muthen, Francis, & Baker, 2008; Bryant, 1989; Zhang et al, 2013), it is reasonable to suggest that poor auditory discrimination will lead to reading deficiencies.

The study carried out by Wauters, van Bon and Tellings (2006) approved that deaf children who have better skills in sign language score higher on average in reading c literacy. This finding imply a role for language skills on development of reading skills in deaf children (Moeller, Tomblin, Yoshinaga-Itano, McDonald & Jerger, 2007; Archbold et al, 2008).
The current research did not confirm the results of the above-mentioned study; one major reason might be that sign language is not properly used by Persian speaking deaf individuals. Most of these individuals do not master the rules and principles of this language. In fact, they have not learnt it as their first communication language. The negative attitude of families and teachers toward sign language has highlighted other communication methods in educational settings of Iran. Attempts to establish communication through lip-reading or verbal method with the purpose of approximating deaf children to normal-hearing ones, often denies the former group the opportunity of learning proper speech; the fact that results in their inadequacy in social, educational, and occupational skills. Moreover, findings indicated that girls score significantly higher on average in informative and literary texts and also in their overall performance than boys ($P<0.001$).

These results are in accordance with the results of the reports with PIRLS in 2001 and 2006, 2011 and 2016 administered on normal fourth grade students in various countries including Iran except for Spain and Luxemburg, where the average performance of boys and girls was the same (Paul, 2001). Many results indicate the superiority of girls over boys in productive vocabulary, combining word (Eriksson et al, 2012), syntax (Morisset, Barnard & Booth, 1995), grammar and reading tasks (Jaeger,, Lockwood, Van Valin, Kemmerer & Murphy, 1998); the differences arising from different performance of brain hemispheres in boys and girls. Bilateral activation in the inferior frontal and superior temporal gyri and activation in the left fusiform gyrus of girls was greater than in boys (Bitan, Lifshitz, Breznitz & Booth, 2010). Psychological factors, such as greater internal motivation in girls, as well as social expectations regarding their role as 'mothers' and higher emotional/social involvements with others, all help girls perform better than boys in reading literacy and linguistic skills.

These results are in conformity with the results of the previous research done by Parault and Williams (2009). The research conducted by Gallaudet University in 1996 on 8 to 17-year-old deaf students, partly confirms the obtained results.

It is important to discuss the limitations of our study. First, all deaf students participated in this research were hearing aid users that educated in special schools. We hope that further research investigates the effect of cochlear implant on reading literacy in Iranian deaf students. Second, all deaf student had hearing parents, thus this research didn't investigate the relation between parent hearing statues and reading literacy in deaf students. We suggest further research evaluate the effect of parent deaf communication style on reading literacy.

Conclusion

Regarding the importance of reading literacy in personal, academic and vocational life, it is essential to lay more emphasis on acquisition of comprehension and inference skills by deaf students in Iran. Modification of the educational methods and revising the contents of the textbooks seem to be the initial steps toward this objective. Also, since sign language highly influences reading literacy and academic achievement of deaf students as proven in many studies, its teaching is recommended as an essential component of education for the deaf.

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