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REVIEW ARTICLE

A systematic review of narrative-based language intervention with children who have language disorders caused by hearing impairments

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Abstract

Background and Aim: This article carries out a literature review of the quality and limitations of the narrative-based language intervention (NBLI) for preschool and school-age hearing aided and cochlear implanted children.

Recent Findings: The authors conducted a comprehensive search of electronic databases such as Web of Science, Scopus, Pubmed, Google Scholar, Cochrane, and ProQuest from 1980 to 2015 for studies using all research designs except non-experimental studies. Of 1095 potentially relevant articles evaluated by two reviewers independently, eight trials met inclusion criteria.

Findings: At least eight studies to date have reported findings for the efficacy of NBLI in this population. The current review involves a description of these studies. The review shows that all of the eight studies have limitations methodologically and preliminary results. Although the results of the studies were generally positive, each of the studies had a limited number of participants, limited experimental control, and considerable variation in the procedures and materials used.

Conclusion: It would appear that to determine the efficacy of NBLI approach in hearing aided and cochlear implanted children we should investigate in more depth in studies with higher methodological rigor, more sample size, and clear therapy protocol. Clinicians should be cautious when interpreting the results of these studies. Narrative intervention is at an emerging stage of evidence and need to further investigations.

Keywords: Narrative; language intervention; cochlear implant; hearing loss

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Introduction

Narrative language is generally defined as a type of discourse during which a fictional story, a real event, or a movie is narrated orally or in written form. Narrations seem to integrate both linguistic and pragmatic aspects of language; therefore, researchers offered it as a rich domain of connected speech for assessment and intervention in discourse-level skills [1]. These skills pervade in our all communicative daily life, such as sharing of past experiences with others, recounting events or expressing, our hopes and plans for the future. Narratives enable us to make and maintain communication with our

around by disclosing stories about ourselves. In early developing language acquisition, narratives provide a bridge between home's conceptualized language and the decontextualized language in academic settings [2]. Narrative ability contains information component skills such as semantics, syntax, working memory, and general knowledge base [3]. According to claim of researchers, narrative generation is more difficult than participating in conversation. The storyteller must formulate sentences that relate to a central theme or topic and follow it up temporally or logically (centering and chaining). These mental operations must be performed simultaneously. Also, the narrator does not receive the same kind of support from listeners during storytelling as from a speaking partner in a conversation compulsorily. It means, narration is a kind of monolog and conversation is dialog. Moreover, during narration, cues from the environment are less readily available so that narrator usually generates sentences and connected speech. Thus a narrative task is an example of a higher level language skill which requires considerable amount of cognitive resources [4].

Assessment of child's narrative skills typically divided into narrative macrostructure and microstructure. Narrative macrostructure refers to the general and global characteristics of narrative such as the thematic organization of main ideas. When we talk about children's narratives, the first components that come to our mind are features of macrostructure (e.g. whether narrative includes traditional story grammar elements of setting, character, and plot). Macrostructure features of narrative influenced by general language ability, a variety of cognitive processes (e.g. event recall, causal thinking), social and cultural experiences. It is also possible to assess narratives for containment micro-level properties, often referred to as narrative microstructure. To assess narrative's microstructure we must investigate its more internal properties, such as the number of words and sentences it contains, the way in which specific cohesive ties or cohesive markers (e.g. conjunctions) are used to link words and sentences, and its overall grammatical complexity (e.g. number of complex sentences). This is sometimes referred to as form/function analysis; because it concerns how developing language forms in children (e.g. sentences, words) are used to meet narrative functions [5].

The importance of narrative abilities in developing period of language acquisition is to predict of language disorders and learning disabilities in next periods of language development. Narrative language appraisal is a main part of language development assessments in pre-school and school-age children. Clinicians can identify disorders that the standard language measures miss them by testing narrative skills, because these abilities require the integration of a variety of linguistic, cognitive and social skills. Research has demonstrated that oral narrative score in preschool-age period is a good predictive factor of academic achievement [6], as well as reading comprehension [7], and social communication success [8] in school-aged stage. Proficient storytellers attract more sustained attention and have more opportunities to practice language in social contexts [9]. Also, storytelling with high validity can serve as an authentic, developmentally appropriate, and enjoyable context for increasing language productivity and complexity (e.g. past tense, subordination clauses, lengthening utterances) [10]. With due attention to these important instances about narrative skills, widespread studies have been done in field of narrative-based language intervention (NBLI) approach in children with various causes-induce language disorders such as autism [11], specific language impairment [12], and environment poverty [13]. Johnston [14] specifies six reasons to target narrative skills in intervention for school-age children with language impairment: to explore processing deficits, to increase decontextualized language, to help children's communication, to improve listening skills, to improve reading comprehension, and to reveal language learning strengths and weaknesses.

Narrative ability in children with hearing loss and cochlear implanted children

Generally, children learn narrative production through incidental exposure, but some children such as those with HL benefit from explicit learning narrative exposure [15]. Although there is a paucity of research on the narrative ability of children with hearing loss (HL) specifically, investigators agree that without intervention, children with HL tend to use fewer story grammar elements and produce less-sophisticated narratives [4]. It has been postulated that when HL exists, children's narrative ability may be negatively impacted by: a) a lack of background knowledge and vocabulary; b) issues of access to the phonology of spoken language which may reduce the capacity of working memory, and c) a lack schemata of story [16].

Along with narrative production deficits, children with hearing loss also frequently demonstrate weaknesses in narrative comprehension tasks [4], such as inferential comprehension in some settings [17]. Narrative comprehension is described as the active process of constructing meaning from narrative discourse using the listeners' knowledge of vocabulary, concepts, and story grammar to make inferences and link key ideas [18]. An individual who understands the story grammar sequence is more likely to comprehend the story sequence and retain information presented with in the narrative. Meta-awareness of story grammar improves comprehension of narrative stories [18]. A number of studies have reported on the narrative ability and outcomes of narrative interventions with a focus on improving the quality of complex, cohesive narratives of children with language delays [19,20]. Although less research is available regarding narrative interventions for children with HL, there is a consensus that building students' understanding of story grammar positively impacts narrative quality in students with HL [16,18,21].

The cochlear implant (CI), an electronic device by means of which some totally deaf people can be provided with a form of hearing, has been increasingly used since the early 1980s. Although, French and Netherlands physicians, as in many others countries, have protested the technology since the early 1990s [22], but remarkable successes have been reported of this modern technological medicine for speech-language development in children who have hearing loss during the past 35 years. Body of evidence does emphasis on the emergence of early-developing speech and language skills of cochlear implanted children than peer hearing aided, including increased comprehend and expressive vocabulary [23], mean length of utterance [24], syntactic complexity [11], improved vowel space [25], and increased auditory perception [26]. Despite these progresses, children with cochlear implants (CIs) have delay on narrative production development. Some researchers believe that in comparison with aged-match normal hearing peers, children with CIs have poorer oral narrative skills. For example, researchers observed that children with CIs demonstrate good results on quantity and coherence of the utterances, but problematic outcomes on quality, content and efficiency of retold stories. Indeed, children with CIs are classified as discourse language delayed group [27].

In spite of all that, narrative intervention studies with hearing impairments and CIs children are sparse [16]. Unfortunately, much of the available information related to these interventions is anecdotal in nature; relatively few research studies specifically addressed intervention or instructional techniques to improve narrative ability and story comprehension for children with hearing impairment [28]. These limitations lead us into a deeper investigation of the methods and results of NBLI approach in children with hearing impairments. Therefore, the aim of this study was to assess qualitatively the advantages and limitations of NBLI approach in these populations based on the available scientific literature.

Search strategy

Narrative intervention was defined as an intervention procedure that used oral narratives as a medium whereby language related features, which were modeled by the clinician and practiced by the participant. Only studies that employed a narrative intervention procedure with preschool or school-age children who had

hearing loss or cochlear implantation were included. Studies that required only one narrative retelling were not included because these studies typically described the effect of differing narrative elicitation procedures on narrative production for assessment purposes. It means intervention was not the aim of these studies. All research studies conducted from 1980 to October 2015 were considered with the exception of non-experimental studies.

At first, the search strategy was based on selecting terms for narrative-based language intervention concept by consultation with experts and to rely on text books about advanced language development. Several basic and advanced searching techniques were used, based on the following keywords: narrative intervention, narrative quality, macro- and microstructure of narrative, storytelling, and decontextualized language. Each of these keywords was settled accompanying by cochlear implant and hearing loss terms with word /AND/ through advanced search menu of electronic databases containing; Web of Science, Scopus, Pubmed, Google Scholar, Cochrane, and ProQuest databases. Regarding the selection criteria, any information related to the narrative skills in hearing aided and CIs children was collected. Totally, 2465 articles were obtained from which 1095 records remained after duplicates and similarities subtracted, because some of the articles had been indexed on two or three electronic databases. Previously, based on abstracts of some high-related articles to subject of this review, another two keywords including narrative assessment protocol (NAP), stories/narrative assessment procedure (SNAP) had been entered and searching had been accomplished. 31 records were identified in this stage.

Indeed, the NAP, a language assessment tool, designed for early educators and other professionals to use to assess children's expressive language skills within the context of a narrative task (e.g. the telling of a story). Use of the NAP involves eliciting a fictional narrative from a child using a wordless picture book, and coding the spoken narrative on a standardized score form for inclusion of specific features representing sentence structure, phrase structure, modifiers, nouns, and verbs [16]. The SNAP, a language assessment tool, consists of a set of 14 picture based stories which includes an introductory book, five assessment stories and eight practice stories, written and illustrated specifically for preschool deaf children. The books feature a family of dragons involved in every day events throughout the year, which are familiar and appealing to this age group [2].

At the next stage of article selection, type of research design of studies has been considered. Any article that carried out as experimental-interventional research, whether single-subject or group research design, included and other non-experimental issues (such as case report, dissertation, and correlation researches) excluded. With respect to reliability, goals of this research included determining whether selected articles can be reliably determined across different coders (inter-rater reliability) was calculated that. An agreement percentage has been computed for selected articles that agreement scores ranged from 95% to 100%. Finally, eight articles were eligible for qualitative analysis in this review (Fig. 1).

Findings on narrative-based language intervention

A total of eight studies about NBLI in hearing loss and cochlear implanted children were chosen and used for the review. The summary of characteristics of these selected articles is shown in Table 1. Of the eight studies under consideration, seven articles made use a kind of NBLI methods. These studies were accomplished in UK (two articles) and USA (four articles) on English-speaking children, and in Iran (one article) on Persian-speaking children. Also, a review article was selected because of its importance and relationship with the title of this article. At this article intensity and dose parameters concepts about narrative language intervention were introduced with school-age children who have language disorders [29]. Findings showed that not all studies included in the review were of equal quality and not all of them have randomized clinical trial (RCT)

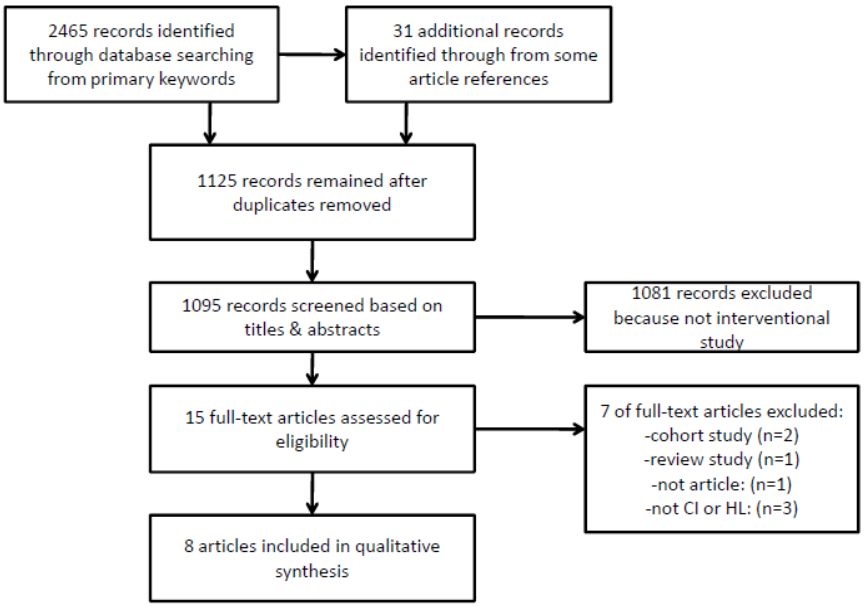

Fig. 1. Flow chart of information through the literature review.

design study. The methodology of the most of these articles is single-subject research design or without control group. The range of sample size in the reviewed studies is varied between 1 to 35 participants, but the studies with more sample size have no control group. Petersen introduced critical parameters for group and single-subject research studies that is shown in Table 2. Seven of the eight studies was coded for internal and external validity using the methods proposed by Petersen [30].

The results of the study quality appraisals are found in Tables 3 and 4. Generally speaking, the greater the number of appraisal points awarded a study, the greater confidence one can have in the causal relationship between the intervention and study outcomes. The seven experimental studies reviewed in this article received an average of 5.2 out of 8 appraisal points (ranging from 3 to 6). Low to moderately high confidence can be placed in the results of the studies reviewed (based on Tables 3 and 4).

Intervention-intensity parameters

Intervention-intensity parameters for NBLI with children are too important concepts to analyze components of articles, which are done about NBLI. Hoffman [29] believes that methodology of articles about narratives language intervention must be including dose and intensity of the intervention concepts as other treatment approaches and methods. Researchers and clinicians reveal their detail treatment procedure by introducing these parameters and allow the inter-study comparisons and support evidence-based practice. Hoffman introduced four main concepts about dosage and intensity of narrative intervention including dosage, dose frequency, total intervention duration, and cumulative intervention intensity. Dose is defined as the number of properly administrated teaching episodes during a single intervention session, while dose frequency is the number of times a dose of intervention is provided per day or week. Total intervention duration is the period over which therapy is provided. Finally, cumulative intervention intensity is the calculation of dose × dose frequency × total intervention duration [29]. He proposed less than five properly administrated teaching story grammars per intervention session should be used with children with narrative skills disorder because ordinarily each simple and complete story has less than five story grammars. Also, he suggested that specific target forms of each episode should be repeated approximately 15 times in each session

Table 1. Summary of selected literature studies on narrative-based language intervention in hearing loss and cochlear implanted children

Authors	Title	Journal, (year)	Study design	Country	Intervention	Conclusions
Starczewski and Lloyd [31]	Using the SNAP to monitor language and communication changes after a cochlear implant: a case study	Deaf Educat Int (1999)	A case study (multiple measurements) (n=1)	UK	Cochlear implantation and story retelling with action pictures as prop	Changes were seen between 12-36 months after CI in communication mode from non-verbal to speech/sign. Also, the number of story grammars was increased.
Luetke-Stahlman et al. [32]	A deaf child's language acquisition verified through text retelling	Am Ann Deaf (1999)	Single-subject design (ABAB Replication) (n=1)	USA	Cochlear implantation. Story retelling with and without reading mediation settings	Narrative-retell tasks in mediated and non-mediated settings could be efficacious and they recommended further use of narrative retelling in children with HL
Nikolopoulos et al. [2]	Using SNAP dragons to monitor narrative abilities in young deaf children following cochlear implantation	Int J Pediatr Otorhinolaryngol (2003)	Prospective cohort design without control group (n=35)	UK	Cochlear implantation and story retelling with picture book as prop	Progress in narrative abilities through time. Significant shifting in the mode of communication from gestures towards more speech
Pakulski and Kaderavek [21]	Narrative production by children who are deaf or hard of hearing: The effect of role-play	Volta Rev (2003)	Pre/post test design without control group (n=14)	USA	Book reading + role playing	Deaf or hard of hearing children are capable of story retelling. The quality and complexity of those retellings improve with role playing
Justice et al. [16]	Use of NBLI with children who have cochlear implants	Top Lang Disord (2008)	ABA single-subject design (n=3)	USA	Narrative-based language lntervention procedure	Gains in narrative quality as well as syntax were observed in children with CI. They concluded NBLI techniques is feasible for CI and HL children
Pakulski and Kaderavek [28]	Reading intervention to improve narrative production, narrative comprehension, and motivation and interest of children with HL	Volta Rev (2012)	Single-group pre/post test design (n=7)	USA	Story retelling with reading-only vs. reading/role play as prop	Preliminary support for across age reading program to improve the narrative production and comprehension in students with HL and CI
Mirza-Aghabeyk et al. [33]	The effect of Cued Speech on story retelling in late implanted prelingual hearing impaired students	Aud Vest Res (2015)	Single-group pre/post test design (n=9)	Iran	Conventional speech therapy accompanied by Cued Speech methods	Narrative macrostructures (topic maintenance, event sequencing, main information), and micro-structures (referents, MLU) items were improved; but did no changes two micro-structure items (conjunction cohesion, syntax complexity)
Hoffman [29]	Narrative language intervention intensity and dosage; telling the whole story	Top Lang Disord (2009)	A review study	USA	_	He introduced intervention intensity and dose parameters to narrative language intervention with school-age children

SNAP; stories narrative assessment procedure, CI; cochlear implantation, HL; hearing loss, NBLI; narrative-based language intervention, MLU; mean length of utterance

Table 2. Critical appraisal parameters for group and single subject research studies

Critical considerations for group research studies	Critical considerations for single-subject research studies
Control group	Description of participants and settings
Random assignment	Dependent variable
Participants	Independent variable
Initial group similarity	Baseline
Blinding	Blinding
Measures	Internal validity
Statistical significance	External validity
Practical significance	Social validity

as dose frequency. Total intervention duration, on the other hand, is the sole dosage factor that does not require re-conceptualization due to the variability of narrative skills teaching episode boundaries when narrative abilities are the target of language intervention. Individual therapy sessions could be conducted for 1.5 hour each day and five days per week (as dose frequency), for six weeks during intervention program as total intervention duration. Hoffman [29] emphases that researchers and clinicians must describe at least dose, dose frequency, and total intervention duration concepts in their narrative based language intervention studies.

Narrative intervention studies

The seven experimental studies under review are summarized according to the date of publication. Starczewski and Lloyd [31] used the stories narrative assessment procedure (SNAP) to monitor language and communication changes after cochlear implantation in one child. They tried to follow story telling skills development in one implanted child and found that if action pictures have been used as story retelling prompts, changes would be seen between 12-36 months after CI in communication mode from non-verbal to speech/sign, and the number of story grammars in story telling would be increased. In fact, they assessed efficacy of cochlear implantation accompanying with story retelling with action pictures as prop on narrative skills development. The study received a study quality appraisal score of 3, indicating that multiple threats to the validity of the study findings are plausible (Table 4).

Luetke-Stahlman et al. [32] compared the effect of story retelling with and without reading mediation settings on the macrostructure and microstructure language features of the oral narratives produced by one cochlear implanted girl, with no developmental disabilities and comorbid receptive and expressive language impairment. They found narrative-retell tasks in mediated and non-mediated settings could be efficacious and they recommended further use of narrative retelling in children with hearing impairments. The study appraisal score was six out of eight suggesting that moderate confidence can be placed in the results (Table 4).

Nikolopoulos et al. [2] assessed the narrative abilities of 35 young deaf children by SNAP test before cochlear implantation, one and two years following implantation and explored possible changes in the implanted children's preferred mode of communication in the narrative abilities task. They used story retelling methods with sign supported via hand puppets or the introductory book as cues for enhancing the narrative abilities. Their study design was prospective longitudinal study for assessing the narrative abilities before and after cochlear implantation.

Table 3. Group study quality appraisal

Study	Control group	Random assignment	Participants	Group similarity	Blinding	Measures	Statistical significance	Practical significance	Appraisal points
Nikolopoulos et al. [2]	No	Yes	Yes	No	Yes	Yes	Yes	No	5
Pakulski and Kaderavek [21]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	6
Pakulski and Kaderavek [28]	No	Yes	Yes	Yes	Yes	Yes	Yes	No	6
Mirza-Aghabeyk et al. [33]	No	Yes	Yes	Yes	No	Yes	Yes	No	5

Children with age implantation less than six years were included in the study (mean implantation age was 3.5 years). All children were filled with the Nucleus multichannel cochlear implant system. With respect to their communication modes, they had come from a wide range of backgrounds and all children were encouraged to use their preferred mode of communication during the narrative task. Their data showed that there was a statistically significant increase in narrative abilities across the three data points. Language levels of children before receiving the cochlear implant were mostly in the pre-structural words, good receptive language and picture labeling. But, children were mostly using one or two categories or one complete episode with spontaneous retelling after two years. Although children were not pressured to use any particular communication mode, a shift to speech mode was found following implantation and this was statistically significant. They concluded that young implanted deaf children showed a significant progress in their narrative abilities through time with narrative intervention and a significant shift in the predominant mode of communication towards more speech orientated communication modes following cochlear implantation. This study is the first group research design to assess developing the narrative abilities of young deaf children who received cochlear implantation. This study has some weaknesses (e.g. authors did not report percentage of variance accounted for or standardized d values, heterogeny of children's age implantation, not to have control group, and to do simple treatment methods for improving high complex spoken narrative skills). The study appraisal score was five out of eight possible points, suggesting that a low to moderate degree of confidence can be placed in the validity of the findings (Table 3).

Pakulski and Kaderavek [21], in a quasi-experimental study, investigated the effect of role playing and book reading on narrative production improvement by children who used hearing aid or cochlear implantation. Following three days of repeated book reading of stories, the 14 children being studied were engaged in the story role play skit. Assignment to the role play was made by randomly dividing the children into groups by cabin assignment. For the role playing interaction, materials were designed by the investigators in order to carry out similar skits for each book. Materials included simple costumes and puppets to represent each character illustrated in the stories. Props were used to represent important objects or major events in each episode. They concluded that role playing can be a vehicle through which the comprehension of story grammar elements can be studied and enhanced in children who are hard of hearing. The use of role playing and imaginary play provides an opportunity for a child to fine-tune story schemata. They claimed that through role playing, children can begin to actualize thoughts about story structure. Because their study has no control group and they did not report practical significances such as Eta

Table 4. Single subject study quality appraisal

Study	Description	Dependent variable	Independent variable	Baseline	Blinding	Internal validity	External validity	Social validity	Appraisal points
Starczewski and Lloyd [31]	No	Yes	Yes	No	No	Yes	No	No	3
Luetke-Stahlman et al. [32]	Yes	Yes	Yes	Yes	No	Yes	No	Yes	6
Justice et al. [16]	Yes	Yes	Yes	No	No	Yes	No	Yes	5

squared values (percentage of variance accounted for) or standardized d values, so the study appraisal score was six out of eight, suggesting that a moderate degree of confidence can be placed in the causal (positive and negative) effect of the intervention (Table 3).

The purpose of Justice et al.'s [16] study was to examine the feasibility of NBLI with three children who had cochlear implantation. This preliminary study was designed to determine whether a six-week production-based intervention approach focusing on production of grammatical structure, as well as narrative content and form would produce similar results in children with cochlear implantation as previously shown in children with specific language impairment. Narratives were measured with regard to syntax (targeted grammatical forms in story-retell and sentence-imitation tasks) and narrative quality (i.e. story grammar components). The participants were three Caucasian girls, aged five years four months to eight years, who all had a diagnosis of severe to profound sensorineural hearing loss (SNHL) and a minimum of two years CI experience. Two sets of goals were chosen for each child, three syntactic goals and three story grammar goals. Of the many grammatical forms occurring less than three times, the three that were clinically judged to be hindering functional communication the most were selected as targets. The story grammar goals were selected on the basis of the child's performance on the test of narrative language (TNL). During each 2 weeks of NBLI, one syntactic goal and one story grammar goal were targeted. Results from the present study show that NBLI can improve the narrative quality and syntax of children with hearing impairment. All three subjects showed increased production of syntactic targets from the pre-intervention conversational samples to the three-month follow up samples. They concluded that NBLI can be an effective and feasible intervention for five to eight year old children with severe to profound hearing impairment who have used at least two years of CI. But these investigators said that it would be necessary to include a greater number of participants in further studies, and to control the language level of the participants. The study appraisal score was five out of eight possible points, suggesting that a low to moderate degree of confidence can be placed in the validity of the findings (Table 4).

Pakulski and Kaderavek [28] examined the effects of a reading intervention on narrative production, narrative comprehension, and reading motivation interest in children with hearing loss. Seven school children between the ages of 9 to 11 were paired with younger "reading buddies" (without hearing loss). The children with HL read story books to an assigned reading buddy including one narrative-style book and a matched story book with manipulative (i.e. felt board cutouts). Readings occurred for four days. Following the dyadic story readings, narrative production and comprehension were compared across the reading only versus reading + manipulative conditions. Data demonstrated that the reading + manipulative condition resulted in significantly improved narrative quality and comprehension. Pre- and post assessment of the students' self-ranking of reading motivation and interest were also gathered and revealed a significant improvement in motivation and interest following the intervention. The authors conclude that data provide preliminary

evidence that across-age reading intervention utilizing manipulative features in dyadic reading can improve the narrative ability, narrative comprehension, and reading motivation and interest of school age students with hearing loss. In addition, the study appraisal score was six, lending a moderate degree of validity to the causal nature of the intervention (Table 3).

Mirza-Aghabeyk et al. [33] investigated the effect of using cued speech method on macrostructure and microstructure narrative features of story retelling by nine students, ages 11 to 16 years, with late cochlear implantation. The Persian cued speech training program was conducted for eight weeks in sixteen 60-minute sessions. The participants were tested before (pretest) and immediately after the treatment (posttest). The Persian-revised story retelling test (SRT) was administered after treatment to provide evidence of narrative language growth. Results showed that all the narrative's macrostructure features (topic maintenance, event sequencing, and main information), and also, microstructure features (referencing and mean length of utterances) were significantly improved after the Persian cued speech intervention. There were no significant differences in two conjunction cohesion and syntax complexity as narrative microstructure features. The study appraisal score was five out of eight possible points, suggesting that a low to moderate degree of confidence can be placed in the validity of the findings (Table 3).

Discussion

The purpose of this report was to analyze qualitatively the clinical effectiveness of narrative based language intervention for cochlear implanted and hearing aided children, and to introduce a desired treatment protocol for their promotion narrative production and comprehension. It seems that, though cochlear implants have a significant positive effect on spoken narrative language development in severe to profound hearing loss children, but children with CIs performed significantly weaker than normal hearing peers on this language domain. Boons et al. [27,34] by study on improving of narrative spoken language skills in Dutch-speaking deaf children after cochlear implantation claimed that, in spite of good results on quantity and coherence of the utterances (narrative's microstructure), but there was difference between quality, content and efficiency of retold stories (macrostructure of narrative) comparing normal hearing peers, because they may have received extra lexical and sentence trainings in previous stages of speech therapies. So, they suggested that special therapeutic intervention focusing on specific weaknesses is necessary to optimize language development of children with CIs.

If we consider about narrative-based language intervention in these studies, we understand that NBLI experimental design studies with children who have hearing impairments (especially CIs children) are scattered. Only four studies were designed as group design. The other studies have been accomplished single-subject research manner. Although onset of cochlear implantation surgeries was early 1980s, clinicians didn't receive NBLI as a new language therapy method for children with CIs until 1999, and recently have tried to determine feasibility and efficacy of the narrative intervention in this population by manner of single-subject research studies. Beginning of studies about effects of NBLI on children with HL and CIs were at 1999, and it no experimental or quasi-experimental article(s) has been found by the proposed keywords before that date. These findings show that studies about language intervention in this population have focused mainly on the emergence of early language skills. Little is known about the effect of intervention approaches on more complex levels of language, such as narrative production and comprehension, which begins to emerge in the preschool years (between three to five years old) and continues to develop as children progress through school [27].

In these studies with purpose of improving narrative production and comprehension skills, clinicians used NBLI procedure [16], story retelling with action pictures as prop [31], and story retelling with/without reading mediation

settings [32]. Sim [35] believes one of the limitations of single-subject design studies is low generalizability, so that external validity of these studies may be low. In fact, group design proponents argue that single-subject research studies vary too greatly on subject features and on intervention approaches and generalization of their results are only case-by-case. So, clinicians tried to recognize efficacy of narrative based intervention in children with CIs by group research design after these two studies. The studies of Nikolopoulos et al. [2], Pakulski and Kaderavek [21,28], and Mirza-Aghabeyk et al. [33] were experimental group research design that they used a various narrative-based intervention approaches for improvement of macro- and microstructures of storytelling or story retelling in children who were hard of hearing. Although the authors emphasized that spoken narrative skills of children with CIs were significantly improved after interventions, but we could see deficits and limitations in these studies. Pakulski and Kaderavek's studies [21,28] have several weaknesses. Their studies: a) have no control group, b) error in research design, c) duration of their intervention was very short and pressed (only one week), d) their studies don't have generalizability (external validity) for preschool hearing loss and children with CIs, and e) finally they did not explain their treatment protocol clearly. In spite of all that, they -after a brief intervention with a group of 14 school-age children with HL who used listening and spoken language- demonstrated that role playing a story episode, in combination with repeated book readings, improves the quality of oral narratives. Also, Mirza-Aghabeyk et al. [33] used a kind of particular technique for improving spoken narrative skills in Persian students with CIs (without detailed explanations about their treatment protocol). The cued speech used by hearing aided children who use visual cues and manual signs during speech; instead the most of clinicians believe that speech therapists should focus on auditory skills rather than visual at higher levels of language therapy. Certainly, participants in this study consisted of hearing impaired children who had received cochlear implants on late time (after six years-old) and maybe the main reason why they used cued speech method was age at implantation of these children. Limited sample size, no control group, and low external validity are some of weaknesses of this study.

If we want to analyze these articles based on Hoffman statements, we will see the authors presented little information about dosage and intensity of their narrative intervention. The dose was designed one episode and three syntactic items for two weeks in Justice et al.'s article. Although they did not report dose frequency, but their total intervention duration lasted for six weeks. Investigation of Pakulski and Kaderavek [21] has only one week total intervention duration; their dose of therapy defined as training one simple story which each story has been practiced four times per session (dose frequency). Mirza-Aghabeyk et al. introduced only total intervention duration concept so that they carried out 16 one-hour sessions in 8 weeks for participants. Unfortunately, Starczewski and Lloyd [31], Luetke-Stahlman et al. [32], and Nikolopoulos et al. [2] did not report these concepts in their studies.

A comprehensive review of the research on narrative intervention with children who have language disorders resulting from hearing impairments revealed that the majority of the reviewed studies had limited number of participants and were considered lower quality. So, cautions should be taken when attributing the study outcomes to the intervention applied. Most of the studies included participants who were monolingual, English-speaking European American or Persian speaking. No research to date has investigated the effects of sustained narrative intervention on the macrostructure and microstructure of narratives produced by children with language disorders arising from hearing impairments that are culturally and linguistically diverse. Furthermore, no study that was reviewed included more than 35 participants in the treatment group, and most studies included fewer than 14 participants. This relatively homogeneous limited number of participants reduces the external validity of the research findings. Also, narrative ability contributes to social and

academic success. There is considerable social validity to improving narrative skills but none of the studies probed for the generalization of narrative skills acquired during intervention to the production of narratives generation. Thus far, studies have not investigated the extent to which narrative proficiency transfers to other language related academic skills such as writing in older participants.

Conclusion

The results of the research included in this review warrant further investigation into the effects of narrative intervention on the narrative macrostructure and microstructure of hearing aided and cochlear implanted children. This review of the literature which has been carried out up until now allows us to state that these investigations have weaknesses in methodology and therapy methods, have preliminary results, and are dispersion. So, it is suggest that researchers and clinicians designate high quality studies such as randomized controlled trial design studies to aim determination of efficacy of narrative-based language intervention for improving production and comprehension of narrative skills in hearing aided and cochlear implanted children.

To introduce a suitable narrative therapy protocol for deaf children who cochlear implanted or hearing aided children, we should consider all aspects of effectiveness, to be evidence-based practice, to observe principles of therapy, and treatment dosage and intensity. In fact, most of these parameters have been approved by research studies. More research is needed to establish the efficacy and effectiveness of NBLI in this population of children. Only Justice et al. [16] reported that a narrative-based language intervention (NBLI) improved the narrative quality and syntax of three school-age children who used cochlear implants and they claimed this approach is feasible with children who have cochlear implantation. In the meantime, clinicians can continue to treat narratives as a functional language target and as a medium whereby language features are modeled and practiced. Clinicians should provide multiple opportunities for participants to practice retelling and generating model narratives, when specifically targeting microstructure, strategically model and elicit correct language forms with considerable intensity. Clinicians should carefully monitor the progress of their clients by taking frequent, careful data and checking for the transfer of language features in spontaneous narrative and conversational discourse.

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