DOI: http://dx.doi.org/10.17576/JSKM-2023-2101-04

Jurnal Sains Kesihatan Malaysia 21 (1) 2023: 29-49

Kertas Asli/*Original Articles*

Parent-Implemented Language Intervention for Late Talkers: A Scoping Review

(Intervensi Bahasa Dilaksanakan Ibu Bapa untuk Kanak-kanak Lambat Bercakap: Satu Tinjauan Skop)

ABSTRACT

Parent-implemented language intervention (PILI) is one of the intervention approaches used in managing late talkers (LTs). Yet, there are few evidence-based PILI programs available for parents of LTs. This scoping review aimed to (a) assess the characteristics of participants depicted in the literature related to PILI programs for parents of LTs, (b) provide an overview of the structure and design of the available PILI programs for parents of LTs, and (c) explore the effectiveness of the programs in relation to the characteristics of reviewed studies. The scoping review was performed by adhering to the general principles prescribed by Arksey and O'Malley (2005). Articles that fulfilled the inclusion criteria and were published from 1980 to 2018 were selected. Two reviewers independently charted the information from the identified articles. A total of 15 articles were selected. The results were reviewed in terms of participant characteristics, intervention characteristics, and effectiveness of PILI programs. Most adult participants in PILI studies were mothers and included child participants with either expressive language delay or receptive and expressive language delay. Moreover, there were different structures and designs of PILI programs for parents of LTs. Preliminary evidence indicated that PILI was more effective than no/delayed intervention and could be as effective as direct therapy provided by clinicians. A discussion related to the findings was also presented.

Keywords: parent-implemented language intervention, late talkers, parent training, language intervention

ABSTRAK

Intervensi bahasa yang dilaksanakan oleh ibu bapa (PILI) merupakan salah satu pendekatan intervensi yang digunakan ketika menguruskan kes kanak-kanak lambat bercakap (LTs). Terdapat beberapa program PILI yang boleh digunakan untuk melatih ibu bapa yang mempunyai anak LTs. Tujuan tinjauan skop ini dijalankan adalah untuk; a) menilai ciri-ciri peserta yang menyertai kajian berasaskan PILI, b) memberi gambaran tentang struktur dan reka bentuk program-program PILI yang ada khusus untuk ibu bapa yang mempunyai anak LTs dan c) meneroka keberkesanan program-program PILI. Tinjuan skop ini dijalankan berdasarkan garis panduan yang diperkenalkan oleh Arksey dan O'Malley (2005). Artikel-artikel yang memenuhi kriteria dan diterbitkan di antara tahun 1980 hingga 2018 dipilih. Pada peringkat akhir, 15 artikel telah dipilih. Dua orang penilai mencartakan maklumat-maklumat berkaitan daripada artikel-artikel yang telah dipilih secara berasingan. Maklumat-maklumat yang diekstrak daripada artikel-artikel ini adalah ciri-ciri peserta dan intervensi dan keberkesanan program-program PILI. Kebanyakan peserta dewasa di dalam kajian PILI adalah ibu dan peserta kanak-kanak mempunyai kelambatan bahasa ekspresif sahaja atau ekspresif dan kefahaman. Selain daripada itu, terdapat pelbagai reka bentuk dan struktur program PILI. Bukti awal menujukkan bahawa PILI adalah lebih berkesan daripada tiada/melewatkan intervensi dan efektif sama seperti terapi yang diberikan secara terus. Perbincangan berkaitan dengan penemuan tinjaun skop ini juga disertakan di dalam artikel ini.

Kata kunci: intervensi bahasa dilaksanakan ibu bapa, kanak-kanak lambat bercakap, latihan ibu bapa, intervensi bahasa

INTRODUCTION

LATE TALKERS (LTS)

Late talkers (LTs) refer to toddlers who acquire language slower than their typically developing peers, despite normal cognition, sensory, motor, and neurological systems (Rescorla 2009). The age of LTs described in the literature varies from 18 to 42 months (Cable & Domsch 2011; Deveney et al. 2017; Hawa & Spanoudis 2014; Rescorla 2009; Roberts & Kaiser 2012). Desmarais and colleagues (2008) highlighted two sets of criteria available in the literature to describe LTs. Although there is a similarity in the cause of the problem, there is a fine line distinguishing these criteria sets. In the first classification, the criteria are more restrictive. To be identified as LT, a child needs to have limited expressive vocabulary, characterized by either vocabulary size falls below the 10th percentile of a normative sample (Henrichs et al. 2011) or less than 50 words or no word combination at the age of two, with intact comprehension abilities (Rescorla 1989). On the contrary, the second classification is much broader than the first, as it only includes the criterion of limited expressive vocabulary mentioned above but not the comprehension abilities part (e.g., Horwitz et al. 2003). Therefore, a larger proportion of children can meet the criteria, including children with comprehension problems. Other terms used to describe the conditions mentioned above are 'early language delay' (Scarborough & Dobrich 1990), 'late language emergence' (Zubrick et al. 2007), and 'expressive language delay' (Hawa & Spanoudis 2014).

For children whose language delay is secondary to developmental deficits, further assessment or intervention is integral. In the case of LTs, appropriate clinical management is still debated. Upon anticipating that most LTs outgrow the issue at hand, the 'watch and see' approach has been prescribed, where the LTs are monitored regularly (Paul 2001). The main reason for this recommendation is that although language problems are not resolved for some LTs by the time they reach school age, they are able to keep up with the curriculum demands and will not suffer serious academic difficulties. The reason is in accord with that reported by Dale *et al*. (2014). They discovered that recovered LTs possess comparable language and reading abilities at ages 7 and 12, although the mean for language measures for the recovered group was below the mean for the total sample. In addition, Rescorla (2009) revealed that at the age of 17, LTs and typical comparison children in her study did not differ significantly in mathematics, reading, and writing abilities.

Despite the abovementioned research findings that indicated that LTs might not suffer from significant academic difficulties, LTs are at risk for language disorder. Leonard (2014) stated that at least one in five LTs would be diagnosed with developmental language disorder (DLD) as their language problems persisted until school age and could not be linked to any biomedical etiologies. Children with DLD usually have morphosyntax, semantic, and pragmatic problems, which are crucial for social and academic success (Kaderavek 2011). The finding of the longitudinal study by Armstrong *et al.* (2016), which investigated educational, employment, and mental health outcomes of young adults with and without a history of language problems, showed that at the age of 21 years old, adults with a history of deteriorated or persistent language problems were less likely to engage in education, employment, or training, including apprenticeships. They also exhibited a greater risk for alcohol and substance abuse/misuse, as well as affective disorders. In a similar vein, St Clair *et al.* (2019) emphasized that children at risk for DLD had increased levels of emotional difficulties at 11 years of age compared to the general population group. Clinically, the aforementioned arguments highlighted the significance of early identification and intervention of LTs.

INTERVENTIONS FOR LTS

One important factor that may affect the outcome of intervention for children with primary language problems is suitable service delivery (Law et al. 2017). Ebbels et al. (2019) discussed three different tiers in speech-language therapy service delivery for children with language problems: Tier 1, Tier 2, Tier 3A, Tier 3B. Tier 1 may involve training other professionals and conducting parenting education programs to promote the development of speech, language, and communication in general. Tier 2, 3A, and 3B focus on intervention for children at risk or with language problems. Therefore, intervention for LTs can be spread across Tier 2, 3A, and 3B where parental group training (Tier 2), individual parental training (Tier 3A), and direct clinician-led intervention (Tier 3B) can be administered. However, changes in the clinical landscape can be seen as indirect approaches such as parental training are more preferred in younger children (Law et al. 2019). This transition can be linked with the general awareness that children's environment is associated with their language learning abilities and recommendations by the policy drivers (Deveney et al. 2017; Law et al. 2019; Roberts & Kaiser 2011). Due to that, this study will only focus on Tier 2 and Tier 3A, where parent-implemented language intervention (PILI) is applied.

The PILI is underpinned by principles of family-centred care (Espe-sherwindt & Serrano 2016). Based on this approach, therefore, the role of speech-language

pathologists (SLPs) reflects more as parents' educators, facilitators, and/or consultants (American Speech-Language-Hearing Association [ASHA] 2008) to empower parents to be the primary interventionist via structured teaching programs and coaching (see Buschmann *et al.* 2009, Whitehurst *et al.* 1991) .A recent study reported that 45% of 4020 SLPs conducted PILI when managing children with language problems using evidence-based or non-evidence-based programs (Law *et al.* 2019). They spent 12.70% of their time training parents besides training professionals, conducting assessments and direct therapy, and doing other administration works (Pring et al. 2012).

Several lines of evidence had suggested the effectiveness of PILI. A recent retrospective study investigating PILI's effects on LTs' language abilities found that LTs' communicative participation and expressive and receptive skills significantly increased following the intervention (Kwok *et al*. 2019). Concerning parents' communication skills following PILI, Sokmum *et al.* (2017) reported that parents in the PILI group showed an increase in using facilitative communication strategies during parent-child interaction, while the parents in the one-to-one speech therapy group remained consistent throughout the intervention processes. Besides, vocabulary, communication, and social skills were also improved in the PILI group (Sokmum et al. 2017).

A few reviews have also been conducted to examine the outcomes of PILI for children with language problems. Two meta-analysis studies highlighted that PILI had a significant, positive impact on young children's language abilities, both with and without cognitive issues (Heidlage *et al.* 2019; Roberts & Kaiser 2011). Moreover, Tosh *et al.* (2017), in their systematic review, reported that PILI was more effective in improving children's speech and language skills than no intervention. Although the studies mentioned earlier successfully confirmed PILI's effectiveness, there were a few limitations. The reviews included children with various speech and language problems, and the explanation about the effects of the structure and design of PILI programs was not offered. Available systematic review studies which focused on interventions for LTs (i.e., Cable & Domsch 2011; Deveney *et al.* 2017), on the other hand, discussed only different types of intervention approaches (i.e., PILI and clinician-directed intervention) and their effect on LTs' language skills.

Due to the gap mentioned above, factors related to the design of each PILI program that may affect the effectiveness of the programs are unidentified. Heidlage *et al.* (2019) argued that it was essential to examine and describe PILI programs' active ingredients to advance both research and practice. Furthermore, as there are two classifications of LTs available in the literature, it highlights the need to look in detail at the participants' characteristics in PILI studies to aid the researchers' and clinicians' evaluation in choosing the appropriate PILI programs to be used.

The current work responds to the above needs by reviewing and discussing PILI programs' characteristics, including the design and structure, participants' criteria, and PILI programs' effectiveness. Therefore, the aims of the current scoping review are threefold. The first aim is to identify and describe the characteristics of participants in the reviewed studies. The second aim is to explore the design of the available PILI programs used explicitly in the intervention of LTs in terms of; a) intervention approaches, b) teaching strategies, c) duration of intervention, e) level of intervention, and f) intervention setting. The final aim is to explore the effectiveness of the PILI programs in relation to the characteristics of the studies.

METHOD

The scoping review was performed by adhering to the framework proposed by Arksey and O'Malley (2005). This framework was selected as it offered a rigorous and transparent method throughout the reviewing process that could increase the reliability of the study outcomes. The stages of the framework were: 1) identifying research question(s), 2) identifying relevant studies, 3) study selection, 4) charting the data, and lastly, 5) collating, summarizing, and reporting the results.

IDENTIFYING THE RESEARCH QUESTION(S)

The following questions guided this scoping review:

1. What are the characteristics of the participants in PILI studies?

2. What are the different approaches used in the available PILI programs?

3. What teaching strategies have been used in the available PILI programs?

4. What is the duration of the available PILI programs?

5. What are the levels of intervention used in the available PILI programs?

6. What intervention settings have been applied in the available PILI programs?

7. Are the available PILI programs effective in improving LTs' language abilities?

IDENTIFYING RELEVANT STUDIES

Arksey and O'Malley (2005) asserted the significance of being as comprehensive as possible in identifying relevant studies to be embedded in a scoping review. In order to achieve this, inclusion and exclusion criteria were listed.

INCLUSION AND EXCLUSION CRITERION

Prior to the identification of studies, the following inclusion and exclusion criteria were selected:

1. *Article*. As the study was conducted in 2018, only articles published between 1980 and 2018 and written in English or Malay language with full text available were selected. The time frame was considered appropriate as PILI gained popularity among professionals at the end of the 1970s (Mahoney et al. 1999). Unpublished dissertations, conference presentations, concept papers, and review articles, nonetheless, were omitted.

2. *Participant.* The child participants included in the studies were identified as late talking or having language delay or expressive language delay despite normal cognition, motor, sensory, and neurological systems, and aged between 18 and 42 months. Studies that included children with language problems associated with any known etiologies were discarded.

3. *Intervention*. Studies that used parents as the main interventionist were included. The parents must receive direct training or consultation from professionals. The PILI programs used were described in detail that they could potentially be replicated.

SEARCH STRATEGY

The five databases selected for this review, namely ProQuest, Science Direct, Scopus, Taylor & Francis, and Wiley Online Library, were searched in July 2018. The following search terms were applied: parent* AND intervention OR therap* AND "late talk*" OR "late language emergence" OR "early language delay" OR "expressive language delay". The reference lists of prior meta-analyses and systematic reviews (see Cable & Domsch 2011; Deveney *et al.* 2017; Roberts & Kaiser 2011; Tosh *et al.* 2017) were reviewed to identify studies that met the inclusion criteria but were missed by the searches.

STUDY SELECTION

Figure 1 illustrates the process of searching and reviewing the articles across the five selected databases. The search yielded 940 articles for review. The search results were then transferred into a Microsoft Excel document for comparison to identify duplicate articles. Following that, duplicate articles were excluded (n= 21). Next, the first and second reviewers independently selected the articles based on the inclusion criteria. Any emerging discrepancy during this process was discussed to reach a consensus. The first selection step was solely based on the titles of the articles listed in the earlier Microsoft Excel document. The titles were screened based on the inclusion and exclusion criteria. Therefore, the title that was clearly out of the scope of this study or mentioned the involvement of children with speech disorders and other developmental disorders and older children were removed. In addition, review articles also were discarded. A total of 60 articles were retained after this selection process. After that, the selection process involved abstract screening. The abstracts of the articles were collected in the same Excel document. The articles were then selected solely based on information from the abstract by again adhering to the inclusion and exclusion criteria. As a result, 38 articles were excluded as they did not fulfill the inclusion criteria. Hence, 22 relevant articles were retained and included in the full-text screening. An additional four articles from reference lists of past reviews, two each from Roberts and Kaiser (2011) and Tosh et al. (2016), were included in this final screening. Hence, 26 articles were screened from this, and only 15 studies were accepted for data extraction.

CHARTING THE DATA

The first and second reviewers agreed upon a template created on Microsoft Excel for data charting purposes. Both reviewers independently charted relevant information on participant and intervention characteristics. The description of the charted information is shown in Table 1. Other data items that were considered during the charting process were; year, country of origin, and research design. These data items were incorporated as they gave vital information about the study. A meeting was convened to resolve disagreements by coming to a consensus.

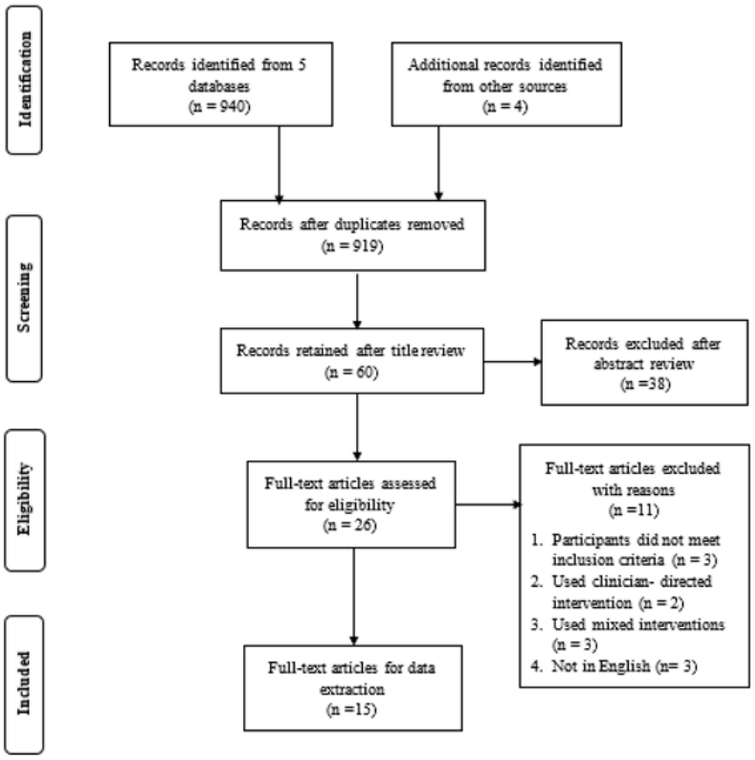

Figure 1. Flow diagram illustrating the scoping review process

Table 1. Charted information for the reviewed studies.

	Charted Information
Participant' Characteristics	Child's participant • Age • Gender • Types of language problems: expressive language delay or receptive and expressive language delay • Primary language Adult's participant • Gender • Ethnicity • Education level • Socioeconomic status
Intervention' Characteristics	Intervention approaches • Child-led: promote language learning in naturalistic contexts and responsive interaction • Adult-led: promote structured activities prepared by adults • Hybrid: promote language learning in naturalistic contexts, responsive interaction, and prompting strategies to encourage speech and language development. Teaching strategies • Strategies used to deliver the intervention. It may include lectures, demonstration (i.e., live, video), practical, discussion, and delivery of assignment Duration of intervention • Duration of each training session • Total duration of intervention

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	Level of intervention • Individual • Group Intervention setting • Clinic • Home
Effectiveness of PILI programs	Design of the studies • Groups used for comparison (e.g., PILI and no/delayed intervention, PILI and direct therapy, • PILI, and other intervention) • Results of the reviewed studies • Effect size

COLLATING, SUMMARIZING, AND REPORTING RESULTS

The first and second reviewers scrutinized the 15 selected articles to answer the research questions. From these 15 articles, two studies were linked with several publications (see Buschmann *et al.* 2009, 2015; Girolametto *et al.* 1996a, 1997), while another article probed into two related studies that involved different participants (see Gibbard 1994). Although articles by Buschmann *et al.* (2009, 2015) involved different authors, the study in those articles had used the same participants and intervention program. This was a similar case with articles by Girolametto *et al.* (1996a, 1997). Thus, in order to ensure that the number of publications did not affect the review findings, the two publications by Buschmann *et al.* (2009, 2015) and Girolametto *et al.* (1996a, 1997) were considered as one each. Meanwhile, the article by Gibbard (1994) was treated as two studies.

FINDINGS

A total of 14 studies from five countries were identified for this review. Of these, five studies were conducted in the United States, five in the United Kingdom, two in Canada, and one in the Netherlands and Germany. Table 2 presents the summative descriptions of the 14 studies. In this section, the findings are presented based on the research questions outlined in Section 2. 1 and described in three sub-sections: (i) characteristics of participants; (ii) characteristics of PILI programs; and (iii) effectiveness of PILI programs.

CHARACTERISTICS OF PARTICIPANTS

The families of LTs receiving PILI in the reviewed studies were culturally and economically diverse. A summary of participants' characteristics is also given in Table 2, and further explained in the following subsection.

CHILD PARTICIPANTS

Across the 14 selected studies, there were 519 child participants; 280 males and 102 females. Information about gender, however, was not provided for 137 children in five studies. In addition, two studies failed to report the exact age of the participating children (i.e., Girolametto *et al.* 1996b; McDade & McCartan 1998). Both studies only mentioned the inclusion criteria for child participants, which was between 24 and 42 months old. The mean age of the participating children in the remaining reviewed studies ranged from 26 to 35 months old at the beginning of the studies.

Of the 519 child participants, there were 455 LTs and 64 typical children. Eight studies only included children with expressive language delay, while five studies included children with either expressive language delay or receptive and expressive language delay, and one study included children with either language delay or speech and language delay. Typical children were only included in two studies as the control group. Although the diagnosis of the participating children differed from one study to another, all the studies incorporated similar inclusion criteria, whereby the children were at a specific age range, and their language problem was not secondary to other issues. As for language use, six studies focused on children with English as their primary language (i.e., Baxendale & Hesketh 2003; Girolametto *et al.* 1996b; Littleton Jr. 2004; Roberts *et al.* 2014; Roberts & Kaiser 2012), one study focused on German-speaking children (i.e., Buschmann *et al.* 2009), and the remaining seven studies did not include information regarding the language use of the participating children.

ADULT PARTICIPANTS

Across the 13 studies, 205 adult participants were reported as directly involved in the intervention. Nonetheless, one study failed to report the number of adult participants

Table 2. Summative descriptions of the reviewed studies

Author (s)	Participants	Intervention	Outcome Measure (s)	Standardised Measure(s) Used	Results
Baxendale and Hesketh (2003)	Child *Population*: Expressive language delay or receptive and expressive language delay *Age*: 29-41 months *Gender:* 7 females; 30 males *Primary Language*: English Adult *Ethnicity*: Caucasian *School leaving age*: 16 years (16), 18 years (1), further education (2) *Social/socioeconomic status:* 'high level of social deprivation.	*Design:* Non-randomized controlled *Program*: Hanen Program *Groups*: intervention and direct therapy	Child: Receptive and expressive language skills, MLU Parent: Parent language-modeling techniques	Child: PLS-3-UK Parent: NA	Children in both groups improved their receptive and expressive abilities at post-test. The mean of the PLS-3 scores and MLU was higher in the intervention group than in the direct therapy group after 6 and 12-month, but the differences were not significant. The mean of parent responses to child utterances for both groups increased after 6 months but decreased after 12 months—no significant difference between the groups in the percentage of parent responses at any assessment points.
Buschmann *et al.* (2009; 2015) n = 20 control	Child *Population*: Typical language development or expressive language delay *Age*: 24-27 months *Gender*: 39 females; 44 males *Primary Language:* German Adult *Ethnicity:* NR *Education level:* No graduation (3), middle school (9), high school (12) *Social/socioeconomic status:* NR	*Design:* Randomised controlled trial *Program*: Heidelberg Parent-Based Language Intervention *Groups*: intervention, no intervention, normal language	Child: Receptive and expressive language skills (2009); working memory (2015) Parent: NA	Child: CDI-German, SETK (2009); AWST-R, K-ABC (2015) Parent: NA	The normal language group had significantly higher scores than the intervention and no intervention groups in all post-test language measures ($p < 0.05$). Children in the intervention group showed a significantly higher gain in both receptive and expressive language skills than children in the no intervention group with small to large effects ($p < 0.05$; d=. 0.23-1.16) (2009). Children in the intervention group had significantly better language comprehension ($p<0.05$; d=0.68), phonological memory ($p<0.05$; d=0.61-1.44), and episodic buffer than in the no intervention group ($p<0.05$; d=0.74) at post-test (2015).

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Gibbard (1994), Experiment 1	Child *Population*: No or little expressive language *Age*: 27-39 months *Gender*: 11 females, 25 males *Primary Language:* NR Adult *Ethnicity:* NR *Education level:* NR *Social class*: I (3), II (2), IIIM (8), IV (1), V (1), and unemployed (3)	*Design:* Randomised controlled trial *Program*: Parent Based Intervention *Groups*: intervention and no intervention	Child: Receptive and expressive language skills, MLU, grammatical ability, expressive vocabulary Parent: NA	Child: RDLS, Renfrew Action Picture Test, DLSPT Parent: NA	The mean score of expressive language skills for both groups improved at post-test. Children in the intervention group significantly showed greater gain than children in the no intervention group ($p<0.01$)—effect size n.s.
Gibbard (1994), Experiment 2	Child *Population*: No or little expressive language *Age*: 27-39 months *Gender*: 6 females, 19 males *Primary Language:* NR Adult *Ethnicity:* NR *Education level:* NR *Social class:* II (4), IIIM (4), IIIN (4), IV (2), unemployed (2), and forces (1)	*Design:* Randomised controlled trial *Program*: Parent Based Intervention *Groups*: intervention 1, intervention 2 (control), direct therapy	Child: Receptive and expressive language skills, MLU, grammatical ability, expressive vocabulary Parent: NA	Child: RDLS, Renfrew Action Picture Test, DLSPT Parent: NA	There were differences in the expressive language gain between children in the intervention 1 group and the direct therapy group, with those from the intervention 1 group being higher. However, the differences were not significant. The gain made (i.e., MLU, total score DLSPT) by the direct therapy group was significantly higher than those made by the intervention 2 (control) group ($p<0.05$)-effect size n.s.
Gibbard *et al.* (2004)	Child *Population*: Language delay or speech and language delay *Age*: 22-32 months *Gender*: 5 females, 17 males *Language:* NR *Total number:* 12 parents Adult *Ethnicity:* NR *Education level:* NR *Social class:* II (3), IIIM (1), IV (4), V (1), unemployed (1), and armed forces (2)	*Design:* Non-randomized controlled trial *Program*: Parent Based Intervention (PBI) *Groups*: PBI and general care group	Child: Receptive, expressive language skills; expressive vocabulary, MLU Parent: NA	Child: RDLS; PLS-3 UK Parent: NA	The differences between the post-test scores of the intervention and general care group were significant (<0.05), with those in the intervention group showing higher scores in all language measures except for estimated vocabulary than in the direct therapy group—effect size n.s.

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Girolametto *et al.* (1996a)	Child *Population*: Expressive language delay *Age of inclusion criteria*: 24-42 months *Gender*: 5 females, 11 males *Primary Language:* English Adult *Ethnicity:* NR *Education level:* High school and post-secondary school *Social/socioeconomic status:* NR	*Design:* Randomised controlled trial *Program*: Hanen Program with focused stimulation *Groups*: Intervention and delayed intervention	Child: Expressive vocabulary (target words), play gesture, behavioral/emotional development Parent: NA	Child: CDI CBCL Parent: NA	Children in the intervention group significantly used more target words in a semi-structured task and increased use of symbolic play gestures than children in the delayed intervention group during post-test ($p<0.03$)—effect size n.s. Parents in the intervention group reduced ratings for their children's aggressive/destructive behavior, whereas no rating reduction was observed among parents in the delayed treatment group. The differences were statistically significant ($p<0.02$)—effect size n.s.
Girolametto *et al.* (1996b; 1997)	Child *Population*: Expressive language delay *Age*: 23-33 months *Gender*: NR *Primary Language:* English Adult *Ethnicity:* Asian Canadian (1) and Caucasian (11) *Education level:* High school (4) and post-secondary school (21) *Social/socioeconomic status:* Middle class	*Design:* Randomised controlled trial *Program*: Hanen Program with focused stimulation *Groups*: Intervention and delayed intervention	Child: Expressive vocabulary, 'talkativeness,' structural complexity (1996), consonant inventory, syllable structure levels, consonants correctly produced (1997) Parent: Parents' language - modeling techniques (1996)	Child: CDI (1996) Parent: NA	Mothers in the intervention group significantly ($p<0.01$) gave slower, less complicated, and used a greater number of target words and more focused stimulation than mothers in the delayed treatment group following intervention (1996). Effect size n.s. Children in intervention groups had larger vocabularies ($p<0.02$) and used more different words in interaction ($p<0.01$) than those in the delayed-intervention group at post-test. Effect size n.s. Children in the intervention group exhibited more phonological diversity ($p< 0.05$; $d=0.6$-1.1) following intervention than those in the delayed-intervention group, but there was no effect of treatment on the accuracy of speech production (1997)
Littleton Jr. (2004)	Child *Population*: Expressive language delay *Age*: 22-30 months *Gender*: NR *Primary Language:* English Adult *Ethnicity:* NR *Education level:* Post-secondary education (8) *Social/socioeconomic status:* NR	*Design:* Randomised controlled trial *Program*: Parent ACTION for Language Program (PALP) Groups: PALP and traditional early intervention	Child: Expressive vocabulary, talkativeness, and structural complexity. Parent: Talkativeness, complexity of language input, and use of labels	Child: SICD, CDI Parent: NA	Children in the PALP group significantly increased their symbolic play skills to a greater degree than those in the traditional early intervention group ($p<0.05$). The gain in language measures was not significant at post-test between the groups. The decrease in mean of parents' talkativeness and sentence complexity in both groups decreased following intervention were not significantly different between both groups.

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McDade and McCartan (1998)	Child *Population*: Expressive language delay *Age*: referred at 24 months *Gender*: NR *Primary Language:* NR Adult *Ethnicity:* NR *Education level:* NR *Social/socioeconomic status:* NR	*Design:* Non-randomized controlled trial *Program:* Hanen Program *Groups*: intervention and no intervention	Child: Receptive and expressive language skills, joint engagement	Child: PLS-3, Engagement States Coding Scheme	Children's language scores in the intervention group increased significantly at post-test ($p \leq 0.01$), whereas no significant differences were found for the children in the no-intervention group. Effect size n.s. Significantly increased of time spent on interactive engagement and decreased of actual time for unengagement ($p \leq 0.05$) in the intervention group following the intervention. No changes occurred in the no-intervention group—effect size n.s.
Roberts and Kaiser (2012)	Child *Population*: Typical language development or receptive and expressive language delay *Mean age*: 29.86 – 31 months *Gender*: 9 females, 53 males *Primary Language:* English Adult *Ethnicity:* African American (3), Caucasian (12), other (1) *Education level:* College (2), Degree (6), Master (7), not respond (1) *Social/socioeconomic status:* Middle class	*Design:* Randomized controlled trial *Program*: Enhanced Milieu Teaching (EMT) *Groups*: intervention, no intervention, normal language	Child: Receptive and expressive language skills, NDW, MLUm, TNW Parent: Parents' use of language facilitation strategies	Child: PLS-4 Parent: NA	Children in the intervention group had greater gain than children in the no intervention group on the PLS-4 total ($p=0.03$; $d=0.60$) and expressive communication ($p=0.04$; $d=0.67$) score and TNW ($p=0.02$; 0.75) following the intervention. Parents in the intervention group had a significantly higher percentage of EMT strategies usage than parents in the no-intervention group ($p<0.01$; $d=1.81$-3.19).
Roberts *et al.* (2014)	Child *Population*: Receptive and expressive language delay *Age:* 25-38 months *Gender*: 2 females, 2 males *Primary Language:* English Adult *Ethnicity:* White *Education level:* High School (1), college (2), Master (1) *Family annual income: USD*50,000 - > USD100,000	*Design:* Single subject design *Program*: Enhanced Milieu Teaching *Groups*: NA	Child: Receptive and expressive language skills, NDW, MLUm, TNW Parent: Parents' use of language facilitation strategies	Child: PLS- 4, EOWPVT Parent: NA	Three of four children showed improvement across all language measures. Parents demonstrated increases in their use of language facilitation strategy after instruction.

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Roberts and Kaiser (2015)	Child *Population*: Receptive and expressive language delay *Age*: 24-42 months *Gender*: 18 females, 79 males *Primary Language:* NR *Groups*: 45 PILI, 52 usual-care Adult *Ethnicity:* African American (8), White (35), other (2) *Education level:* High school (18), Undergraduate degree (17), Graduate degree (10) *Family annual income:USD* 60,000-USD 71,000	*Design:* Randomized controlled trial *Program*: Enhanced Milieu Teaching (EMT) *Groups*: EMT and no intervention	Child: Receptive and expressive language skills, receptive and expressive vocabulary, NDW Parent: Parents' use of language facilitation strategies	Child: PLS- 4, CDI, EOWPVT, PPVT Parent: NA	There were significant differences of all measures in receptive language (p=0.04; d=0.27-0.35) and expressive vocabulary (p=0.01; d=0.38) following intervention between EMT and no intervention group Parents in the intervention groups improved their use of all language facilitation strategies. The differences between the EMT and no intervention group were significant (p<0.01; p=0.43-3.19)
Van Balkom *et al.* (2010)	Child *Population*: Receptive and expressive language delay *Age*: 26-37 months *Gender*: NR *Primary Language:* NR Adult *Ethnicity:* NR *Education level:* NR *Social/socioeconomic status:* Middle class	*Design:* Randomized controlled trial *Program*: Parent Based Video Home Training (PVHT) *Groups*: PVHT and direct therapy	Child: MLU, grammaticality (syntax and morphology), receptive skills, conversational coherence Parent: NA	Child: Dutch version of LARSP and RLDS Parent: NA	Children in the PVHT group showed significant short-term and long-term improvement in grammar (p=0.015) and conversation coherence (p=0.008) as compared to children in the direct therapy group post-intervention and after three months. Effect size n.s.
Whitehurst *et al.* (1991)	Child *Population*: Expressive language disorder *Mean age*: 27.95 months *Gender*: NR *Language:* NR Adult *Ethnicity:* NR *Education level:* NR *Social/socioeconomic status:* NR	*Design:* Randomized controlled trial *Program*: Home-Based Intervention *Duration*: 7 biweekly sessions clinic visit (30 minutes/session) *Groups*: intervention and no intervention	Child: Receptive and expressive vocabulary, expressive verbal fluency, articulation Parent: NA	Child: PPVT, ITPA, EOWPVT, Templin-Darley Tests of Articulation Parent: NA	Children in the intervention group had a significantly better score on the language measures than the no intervention group following intervention (p<0.05)—effect size n.s.

Note: PLS: Pre-school Language Scales; CDI: Communicative Development Inventories; SETK: standardised and norm-referenced instrument to examine the language status of German-speaking children; AWST-R: Expressive Vocabulary" Year-Old Children, Revision; K-ABC: Kaufman Assessment Battery for Children; RDLS/RLDS: Reynell Developmental Language Scales; DLSPT: Derbyshire Language Scheme Picture Test; CBCL: Child Behavior Checklist;-٥ to -٣ Test for Primary; REC: Revised Experiencer Constraint; PLAI: Preschool Language Assessment Instrument; SICD: Sequenced Inventory of Communicative Development; EOWPVT: Expressive One-Word ٢-Test of Language Development :٢-TOLD Picture Vocabulary Test–Fourth Edition; MLUm: mean length of utterance in morphemes; NDW: number of different words; TNW: number of total words; PPVT: Peabody Picture Vocabulary Test; LARSP: Language Assessment, Remediation, "and Screening Procedure; ITPA: Illinois Test of Psycholinguistic Abilities; NR: not reported; NA: not applicable; n.s: not specified

involved in the treatment and no treatment groups (i.e., Whitehurst *et al.* 1991). Out of 205, 189 were mothers, three were fathers, and one was a grandmother. Information about gender was omitted for 12 adult participants in a study (i.e., Gibbard *et al.* 2004). Only five of the 14 selected studies gave information about the participants' ethnicities (i.e., Baxendale & Hesketh 2003; Girolametto *et al.* 1996a; Roberts & Kaiser 2015, 2012; Roberts *et al.* 2014). Among the included ethnicities were Caucasian/White (n=81), African American (n=11), Asian Canadian (n= 1), and others (n=3). As most of the adult participants were parents, the term 'parents' was used to describe and discuss the reviewed studies.

Six of 14 studies reported that most parents were high school graduates or higher (i.e., bachelor's and graduate degrees) (Girolametto *et al.* 1996a, 1996b; Littleton Jr. 2004; Roberts & Kaiser 2015, 2012; Roberts *et al.* 2014). On the contrary, most parents in two studies by Baxendale and Hesketh (2003) and Buschmann *et al.* (2009, 2015) did not complete high school education. As for annual family income, only two studies provided the information (i.e., Roberts & Kaiser 2015; Roberts *et al.* 2014). The reported family annual income in both studies ranged from an average of USD 50,000 to more than USD 100,000. Although three studies did not mention in detail the socioeconomic status of their participants, they claimed that either majority or all of the participants were from a middle-class family (Girolametto *et al.* 1996a; Roberts & Kaiser 2012; Van Balkom *et al.* 2010).

In general, most studies conducted before the 2000s gave incomplete demographic information, which hindered one from drawing a valid and definitive conclusion. Only three studies provided complete demographic information (i.e., Baxendale & Hesketh 2003; Roberts *et al.* 2014; Roberts & Kaiser 2012). Moreover, it was apparent from this limited demographic information that most mothers would join the intervention. Furthermore, although there were standard criteria to identify LTs, language problems faced by the child participants were still varied.

CHARACTERISTICS OF PILI PROGRAMS

CONTENT AND APPROACHES OF PILI PROGRAMS

There were eight PILI programs used across the studies. The programs were; (1) Hanen Program (HP), (2) adapted HP with Focused Language Stimulation (FLS), (3) Parent ACTION for Language Program (PALP), (4) Heidelberg Parent-Based Language Intervention (HPLI), (5) Parent-based Video Home Training (PVHT), (6) Enhanced Milieu Teaching (EMT), (7) Home-Based Treatment (HBT) and, (8) Parent-Based Intervention (PBI). Most programs promoted teaching strategies in naturalistic contexts and responsive interaction and trained parents to adapt learned strategies in singing, shared games and reading books activities, except for the PBI. Moreover, other elements were included in the programs, such as discussing the types of play and children's play skills, dealing with media, and steps to improve children's auditory discrimination abilities and imitation skills. Interestingly, the PILI programs could also be further classified into three different approaches; i) child-led, ii) adult-led, and iii) hybrid approaches. A summary of the contents and intervention approaches for each PILI program is given in Table 3.

CHILD-LED APPROACH

Seven studies employed the child-led approach in their PILI programs. The programs were HP (Baxendale & Hesketh 2003; McDade & McCartan 1998), FLS (Girolametto et al. 1996b, 1996a, 1997), PALP (Littleton Jr. 2004), PVHT (Van Balkom *et al.* 2010), and HPLI (Buschmann et al. 2009, 2015). These programs promoted parents to allow their children to lead the activities and trained the parents to use suitable language facilitation techniques while interacting with the children. The techniques included observing, waiting for a response, emphasizing keywords, and repeating and responding to the children's communication attempts. Moreover, the parents were taught to imply the techniques in their daily routine activities.

ADULT-LED APPROACH

Amongst the 14 studies, three studies applied the adult-led approach in the PILI program; PBI (Gibbard 1994; Gibbard *et al.* 2004). The main objectives of PBI were to; i) increase a child's linguistic complexity from one-word level to three to four words per utterance; ii) improve a child's listening skills and auditory discrimination abilities; iii) increase a child's imitation skills; iv) educate parents on the importance of play, and v) develop the parents' ability and confidence to be the main therapist for their children (Gibbard 1998). In line with the concept of adult-led approach, whereby activities were selected by adults based on the child's interest to encourage learning, parents in this program were exposed to structured teaching situations and possible games to be conducted at home in order to meet the program's objectives. The parents were advised to encourage children to imitate (i.e., actions and/or speech) and use techniques, such as prompting, modelling, and forced alternatives, during the activities (Gibbard 1998).

HYBRID APPROACH

Table 3. Content and duration of the parent-implemented language intervention (PILI) programs for late talkers (LTs)

Hanen Program (HP)	Hanen Program + Focused language stimulation (FLS)	Parent ACTION for Language Program (PALP)	Heidelberg Parent-Based Language Intervention (HPLI)	Parent-based Video Home Training (PVHT)	Enhanced Milieu Teaching (EMT)	Home-Based Treatment (HBT)	Parent Based Intervention (PBI)
		Child-led approach			Hybrid approach		Adult-led approach
1. Teaching strategies in naturalistic contexts & responsive interaction 2. Types of play and children's play skills 3. Adaptation of learned strategies in singing, shared games, and reading activities	1. Teaching strategies in naturalistic contexts & responsive interaction 2. Types of play and children's play skills 3. Adaptation of learned strategies in singing, shared games, and reading activities 4. Frequently model selected target words	1. Teaching strategies in naturalistic contexts & responsive interaction 2. Adaptation of learned strategies in singing, shared games, and reading activities 3. Frequently model selected target words	1. Normal language development and language delay 2. Teaching strategies in naturalistic contexts & responsive interaction 3. Adaptation of learned strategies in singing and dancing, games, reading, and daily routine activities 4. Dealing with media	1. Strategies to create conversational coherence	1. Teaching strategies in naturalistic contexts & responsive interaction 2. Prompting strategies 3. Adaptation of learned strategies in reading, eating snacks, and daily routine activities	1. Teaching strategies in naturalistic contexts & responsive interaction 2. Prompting strategies 3. Adaptation of learned strategies during story-time	1. The importance of play to child's language development 2. Auditory discrimination abilities 3. Imitation skills 4. Structured language teaching strategies
Duration							
11-12 weeks treatment - 8-9 group sessions: 2 hours 15 minutes - 3 home visits	10-11 weeks treatment - 7-8 group sessions: 2 hours 30 minutes - 3 home visits	12 weeks treatment - Once a week home visit: 60-90minutes	6 months treatment - 7 sessions within 3 months: 2 hours - 1 session 6 months later: 3 hours	13 weeks treatment - 6 home visits fortnightly: 90 minutes	3 months treatment - 4 workshops: 1hour - 24 practice sessions twice per week: 40 -60 minutes	7 biweekly sessions: 30 minutes	6 months treatment - 11 sessions fortnightly: 60-75 minutes

Four studies had implemented the hybrid approach in their PILI programs, namely the EMT (Roberts & Kaiser 2015, 2012; Roberts *et al.* 2014) and HBT (Whitehurst *et al.* 1991). Both programs trained the parents to manipulate the children's natural environment and use milieu teaching procedures (i.e., model, mand-model, incidental teaching, and time delay) during their interactions. Response demands from children were not required during the procedure. Other responsive interaction strategies, such as expanding children's utterances and balancing verbal turn-taking, were also emphasised in the programs. In the EMT, parents were required to practice all the learnt interaction strategies while eating snacks, reading books, and while performing common household activities during home visit.

TEACHING STRATEGIES

Some teaching strategies that were used in the PILI programs in most of the reviewed studies comprised of giving lectures, demonstration either live or using videos and allocating time for the practical session (Baxendale & Hesketh 2003; Buschmann *et al.* 2009; Gibbard 1994; Gibbard *et al.* 2004; Girolametto *et al.* 1996b, 1996a; McDade & McCartan 1998; Roberts & Kaiser 2015, 2012; Roberts *et al.* 2014; Van Balkom *et al.* 2010). During the practical session, the trainers asked the parents to practice in a group (role-play) or individually with their children. Corrective feedback was given to the parents immediately or at the end of the practical session. Some training sessions embedded discussion and delivery of assignments or homework (Baxendale & Hesketh 2003; Girolametto et al. 1996b, 1996a, 1997; Littleton Jr. 2004; McDade & McCartan 1998; Whitehurst et al. 1991). The elaborated teaching strategies were not limited to group training, as individual training was incorporated as well. The design and structure of each PILI program can be seen in Table 4.

DURATION OF INTERVENTION

Various durations were noted for the PILI programs across the reviewed studies. Most programs were conducted for 11-12 weeks (Baxendale & Hesketh 2003; Girolametto *et*

Table 4. Characteristics of the available parent-implemented language intervention (PILI) programs for late talkers (LTs)

	Program	Teaching Strategies					Level of Intervention		Intervention Setting		Effectiveness
		Lecture	Video /Live Demonstration	Practical	Discussion	Homework	Individual	Group	Clinic	Home	
Child-led Approach	Hanen Program (HP)	/	/	/	/	/	/	/	/	/	Increased children's language scores and their engagement in the intervention group. No changes were observed in the no intervention group (McDade & McCartan, 1998). When compared with the direct therapy group, no significant difference in children language abilities and percentage of parents' responses can be observed (Baxendale & Hesketh, 2003)

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	Hanen Program + Focused language stimulation (FLS)	/	/	/	/	/	/	/	/	/	Children in the FLS group significantly had better expressive skills and phonological skills and were rated lower for their aggressive behavior than those in the delayed intervention group (Girolametto et al., 1996b, 1996a, 1997)
											Mothers in the FLS group used more effective communication strategies than mothers in the delayed intervention group (Girolametto et al., 1996b)
	Parent ACTION for Language Program (PALP)		/	/	/	/	/			/	The PALP group significantly increased their symbolic play skills than those in the traditional early intervention group—no significant difference in mothers' communicative behaviors were observed between the groups (Littleton Jr., 2004).
	Heidelberg Parent-Based Language Intervention (HPLI)	/	/	/		/		/	/		Significantly higher gain in the intervention group in all language measures (Buschmann et al., 2009) and better phonological memory and episodic buffer than the no intervention group (Buschmann et al., 2015)
	Parent-based Video Home Training (PVHT)		/	/	/		/			/	The PVHT group significantly showed short-term and long-term improvement in grammar and conversation coherence (Van Balkom et al., 2010).
Adult-led Approach	Parent Based Intervention (PBI)	/	/	/	/			/	/		The PBI group significantly showed greater gain than the no intervention group in language measures. The differences in the gains between the PBI and direct therapy group were not significant (Gibbard, 1994). Study in 2004 revealed that The PBI group had higher scores in language measures than the direct therapy group (Gibbard et al., 2004)

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Hybrid Approach	Enhanced Milieu Teaching (EMT)		/		/		/	/		/		/	/	Children in the EMT showed improvement (Roberts et al., 2014) and had a greater gain in language measures than in the control group. Parents used on EMT strategies also increased significantly(Roberts & Kaiser, 2015; Roberts et al., 2014; Roberts & Kaiser, 2012)
	Home-Based Treatment (HBT)				/	/	/	/		/				Those in the HBT group had a significantly better score on the language measures than the no intervention group (Whitehurst et al., 1991)

al. 1996b, 1996a; Littleton Jr. 2004; McDade & McCartan 1998; Roberts & Kaiser 2015, 2012; Roberts *et al.* 2014; Van Balkom *et al.* 2010; Whitehurst *et al.* 1991), either once or twice a week or fortnightly. The longest programs were PBI (Gibbard 1994; Gibbard et al. 2004) and HPLI (Buschmann *et al.* 2009) that ran for six months. The duration for each individual session was between 30 to 90 minutes, with the shortest individual session in the HBT (Whitehurst et al. 1991) and the longest was in the PALP and PVHT (Littleton Jr. 2004; Van Balkom et al. 2010). As for the group session, the average duration was two hours per session. The shortest duration was one hour (Gibbard 1994; Gibbard et al. 2004), whereas the longest duration was three hours (Buschmann *et al.* 2009) for the group session. The EMT has the most number of training sessions and is conducted most frequently.

LEVEL OF INTERVENTION

From the review, it was noted that the interventions were performed as either individual or group training. Six studies conducted individual training only (Littleton 2004; Roberts & Kaiser 2015, 2012; Roberts *et al.* 2014; Van Balkom *et al.* 2010; Whitehurst *et al.* 1991), four studies conducted group training only (Buschmann *et al.* 2009; Gibbard 1994; Gibbard *et al.* 2004), and another four conducted both group and individual training (Baxendale & Hesketh 2003; Girolametto et al. 1996b, 1996a; McDade & McCartan 1998).

The number of parents per training group, nevertheless, was not provided in most studies. Baxendale and Hesketh (2003) only mentioned that 19 late-talking children and their families took part in one of the five HP groups assessed in the study, whereas Girolametto *et al.* (1996b, 1996a) asserted that the HP was administered to eight and 12 families, respectively, by two experienced SLPs. Although Buschmann *et al.* (2009) failed to specify the number of parents per training group in their study, their HPLI was designed for a group of five to 10 people. Gibbard *et al.* (2004), on the other hand, claimed that eight was the maximum number of parents per training group in their study as it was manageable in practice. In Gibbard's study, the parents were divided into two-parent training groups composed of eight and four parents.

INTERVENTION SETTING

Three of the PILI programs in the reviewed studies were conducted at clinics and required home visits (Baxendale & Hesketh 2003; Girolametto *et al.* 1996b, 1996a; McDade & McCartan 1998; Roberts & Kaiser 2015; 2012; Roberts *et al.* 2014). During the clinic visit, the trainers focused more on delivering new information, teaching new techniques or strategies, facilitating discussion, and holding practicals. During the home visit, the trainers emphasized helping the parents apply the learned techniques at home with their children. For programs conducted in a clinic setting only (n=3), the participating parents were exposed to lectures, videos, role play, and discussion (Buschmann *et al.* 2009; Gibbard 1994; Gibbard *et al.* 2004; Whitehurst *et al.* 1991). The same exposure (i.e., direct teaching, show and discuss video) was given to parents who participated in the program conducted in a home setting only (n=2) (Littleton 2004; Van Balkom *et al.* 2010).

EFFECTIVENESS OF PILI PROGRAMS

Most of the reviewed studies evaluated the effectiveness of the PILI programs by comparing language measures of children in different groups, either 1) PILI group and no /

delayed intervention group or 2) PILI group and direct therapy group or 4) PILI group and other intervention. One study, however, applied a single subject design (i.e., Roberts et al. 2014). Regardless of the types of language problems, there were consistent findings across studies (n=8). LTs' language measures were significantly higher in the PILI group than the no/delayed intervention group with small to large effect sizes (i.e., Buschmann et al. 2009, 2015; Gibbard 1994; Girolametto et al. 1996a, 1996b, 1997; McDade & McCartan 1998; Roberts & Kaiser 2015; Roberts & Kaiser 2012; Whitehurst et al. 1991). Out of these eight studies, only two studies involved children with receptive and expressive language delay. These studies used the EMT, the individual basis PILI program, as their intervention. Other studies only involved children with expressive delay and used either group or individual and group (mixed) training.

When PILI was compared with direct therapy (n=3), mixed findings were found. Two studies found no significant difference between these groups following intervention (i.e., Baxendale & Hesketh 2003; Gibbard 1994). On the other hand, one study found that LTs' in the PILI groups had higher scores in grammatically correct utterances and conversation coherence than LTs' in the direct therapy group (i.e., Van Balkom et al. 2010). These findings suggest that PILI can be as effective as direct therapy. Similarly, findings from comparing the PILI and other intervention groups (n=2) were also varied. One study found superior effects of the PILI program (i.e., Gibbard et al. 2004), whereas another study found no significant effects of PILI from the traditional early intervention (non-SLP) (i.e., Littleton Jr. 2004). Although the control group in the study conducted by Gibbard (2004) had opportunities to meet speech therapists, they only received general verbal advice on language stimulation techniques to facilitate children's language development for two sessions. Thus, in the study, the PILI group was not compared with the direct therapy group; rather, the PILI group was compared with the 'other intervention' group. Out of eight PILI programs, only the PBI was conducted among children with only expressive delay (Gibbard 1994) and receptive and expressive delay (Gibbard et al. 2004). Other PILI programs, however, were evaluated only in one of the populations mentioned.

Interestingly only six of the reviewed studies included parents' communicative behaviors as their dependent variables. A similar pattern could be observed as studies comparing differences between parents in the PILI group and no/delay intervention group found a higher percentage of use of learned strategies in the PILI groups than the no/delay intervention group with medium to large effect sizes (i.e., Girolametto et al. 1996b; Roberts & Kaiser 2015; Roberts & Kaiser 2012). However, when compared with the direct therapy or other intervention groups, no significant differences were found, although the mean of targeted communicative behaviors increased following the intervention (i.e., Baxendale & Hesketh 2003; Littleton Jr. 2004)

DISCUSSION

The purposes of this scoping review study were to explore the studies' characteristics (i.e., participants, PILI programs) and describe the effectiveness of the PILI programs in relation to the characteristics. A systematic search of the literature from 1980 to 2018 yielded only 15 articles that fulfilled the predetermined inclusion criteria. Within these studies, eight different PILI programs were identified, and the characteristics of participants were varied. Six of the studies measured outcomes from both parents and children, while another half only measured the outcome of the children. Findings related to the effectiveness of the PILI programs also differed depending on the study design, type of PILI programs used, and involved participants.

The majority of the adult participants in all the reviewed studies were mothers. However, it was not clear whether the studies intended to involve only mothers during intervention or fathers themselves did not want to participate. This is noteworthy, as previous studies have shown many differences between mothers' and fathers' communication styles with their children. For instance, Leaper *et al.* (1998) found that fathers tended to talk less but used more directive and informing language than the mothers did. These differences occurred more likely among parents of younger children than for older children. Although fathers did not talk as much as mothers, their type-token ratio was denser than mothers (Kwon *et al.* 2013). These differences in communication style have been proven to have different effects on children's language development (Teufl et al. 2020). However, whether involving fathers during the intervention can replicate the effectiveness of the PILI programs is unknown.

Other than that, the child participants' language problems were varied, despite their criteria satisfying the characteristics of LTs. Some studies included children with both receptive and expressive language delay, whereas others included those with expressive language delay. The evaluation of the PILI programs interestingly showed that regardless of the differences in the language problems, the PILI programs were proven effective in improving children's language abilities and changing parents' communicative behaviors when comparisons were made between PILI and no/delayed intervention groups. The

findings were supported by other reviews that highlighted the positive effects of PILI on children's receptive and expressive language and parents' use of language facilitation strategies (e.g., Heidlage et al. 2019; Roberts et al. 2019).

Nevertheless, caution needs to be made in interpreting the findings. This is because studies involving children with receptive and expressive delay mainly implemented the EMT that consists of intensive individual training. A previous meta-analysis study revealed that individual parent training more benefited parents and children than group parent training (Lundahl et al. 2006). In addition, the larger intervention dosage of the EMT (measured by the total length of time receiving training) compared to other PILI programs might contribute to the effectiveness of the program among children with receptive and expressive delay (e.g., Maher et al. 2011). Interestingly, the effectiveness of other individual PILI programs was also observed in the PVHT, where the study that used the PVHT was the only study that found better effects of PILI than direct therapy conducted by clinicians. Although only half of the language measures were significant, the findings of the study were still promising. However, as individual PILI programs are usually conducted at home, they may cause higher costs and more time for the service provider (French & Yates 2018; Tosh et al. 2016).

Another important finding is that except for the PBI, other PILI programs were evaluated among children with either receptive and language delay or expressive delay only. Results of the studies indicate that the scores in language measures of children in the PBI group increased following the intervention (Gibbard 1994; Gibbard et al. 2004). However, the finding is just a piece of preliminary evidence, and a definite conclusion about the effectiveness of the PBI in both populations cannot be made. This is because only two studies were conducted among children with expressive delay, and one small study was conducted among children with both receptive and expressive delay using the PBI. Therefore, more studies are needed to evaluate whether the same PILI programs have similar effects on different child populations.

CONCLUSION

This scoping review examined the literature on PILI studies by narrowing its focus on LTs. Viewing the results altogether, it is apparent that participants of PILI studies are diverse, and the structure and design of the PILI programs seemed varied across studies. Current evidence indicates that PILI is more effective than no/delayed intervention and can be as effective as direct therapy provided by clinicians. It is hoped that researchers and clinicians can use findings from this study to evaluate and choose the appropriate PILI programs that are most suitable and cater to the parents of late-talking children in their settings. Moreover, the findings are also hoped to be useful in developing new programs, especially in countries where evidence-based parental training programs are not yet available.

LIMITATIONS

Although this scoping review was conducted by adhering to the framework prescribed by Arksey and O'Malley (2005), some noteworthy limitations must be highlighted. First, only English-language articles were reviewed in this study. The analysis omitted potentially relevant articles written in other languages. Secondly, the researchers in this study limited the searches to cover published articles only. Hence, any PILI program available in the grey literature was discarded during the review. Thirdly, only databases subscribed by the International Islamic University Malaysia (IIUM) were included. Fourth, it is possible that due to the selected terms used during searches, some articles on this topic were not identified, as the researchers might have overlooked some terms related to the study. Finally, there was also a risk of removing paper prematurely during the study selection as the first step involved screening articles solely based on titles.

ACKNOWLEDGMENTS

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article. This paper was supported by Fundamental Research Grant Scheme, Ministry of Higher Education Malaysia (FRGS/1/2019/SKK06/UIAM/03/1).

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