Original Article

Supporting caregivers of children born prematurely in the development of language: A scoping review

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Abstract

Background: Infants born prematurely can display impairments that negatively impact the early years of their development. Compared to their peers born at term, preterm children have higher risks of cerebral palsy, sensory deficits, learning disabilities, cognitive and language deficits, as well as difficulties related to attention and behaviour. Following discharge, parents of preterm children are often supported through neonatal follow-up programs or by community health care practitioners. Through assessment and consultation, professionals foster parental resilience by teaching them about their child's development. Research shows a large volume of literature on improving outcomes for preterm infants, but less attention has been given to the impact and potential importance of education of parents regarding the care they provide from the home.

Objective: A scoping review was completed to determine the best practices for early intervention in premature children regarding the development of language skills during the preschool years.

Methods: The review followed the guidelines for the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA).

Results: Four general themes emerged from the review and included the importance of providing (1) parental training in the care of an infant born prematurely during neonatal intensive care unit stay; (2) education on the development of language and the importance of parental responsiveness; (3) provision of activities to support child language learning; and (4) overall and ongoing monitoring and support by qualified health professionals.

Conclusions: The conclusions drawn will provide guidance to health care professionals regarding the education of parents on best practices for stimulating language development in their child.

Keywords: *Language development; Neonatal follow-up program; Parental education; Prematurity; Scoping review*

Infants born prematurely can display impairments that negatively impact their development (1–3). When compared to their peers born at term, preterm children have higher risks of delays in all developmental domains (4,5). Consequently, monitoring of premature infants and provision of early intervention is vital to public health (6,7). Regarding delays in language, timely detection may also prevent social and learning deficits, thus improving outcomes and reducing the need for special education (8–10). This

is especially important given that intervention prior to kindergarten has academic, social, and economic benefits (11). There is a large volume of published literature on improving outcomes for preterm infants, and some attention has been given to the impact and potential importance of education of parents regarding the care they provide from the home (12). However, regarding child language development surveillance, knowledge and referral practices vary among health care practitioners (13,14). Education in

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this domain is therefore important given that health professionals play an important role by improving parents' knowledge and skills regarding their child's development.

DEVELOPMENTAL SURVEILLANCE OF INFANTS BORN PREMATURELY

In Canada, many preterm infants are followed by a neonatal follow-up program (NFUP) after discharge from the neonatal intensive care unit (NICU) (15). These programs serve several purposes, one of which is to provide anticipatory guidance and teaching to parents regarding their child's developmental pattern, thereby fostering parental resilience (16). Paediatricians and family practitioners also provide developmental follow-up for children born prematurely. This is especially true for infants born moderately (32 to 33 weeks' gestation) or late preterm (34 to 36 week's gestation) and who do not qualify NFUP care (17). These infants have been historically perceived to have similar risks of delays as neonates born at term (17). However, more recently, it has been shown that they are more likely to have developmental delays at preschool age (18–20). This information is important given that these infants account for the majority of preterm births (20).

LANGUAGE DEVELOPMENT AND STIMULATION IN CHILDREN BORN PRETERM

It has been well established that early brain development is a strong foundation for long-term success in education (21). Equally important is early language exposure, as it strongly influences literacy skills, educational achievement, and health outcomes (22). As the quality of language stimulation has been shown to overcome many risk factors, caregivers remain a powerful and vital support to change (23–27). Early interactions and regular conversations between caregiver and infant are key (28,29). In fact, one of the major barriers to early language acquisition is insufficient early language exposure (30–34).

Health professionals have an obligation to increase parents' understanding of the developmental course of language function in children born prematurely (8,10,34). Through regular contact with families, these professionals are able to develop relationships with parents and can better help them recognize their infant's cues and respond in ways that nurture development (35–37). A scoping review was completed to determine the best practices for early intervention in premature children regarding the development of language skills during the preschool years.

METHODS

Protocol and registration

The current study followed the guidelines for the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) (38). The method used for the collection of articles

and analysis were specified in advance and documented in a protocol. The protocol used in the context of this systematic review was not registered in any library.

Eligibility criteria

For inclusion, the articles had to meet the following criteria: (1) include children born prematurely (gestational age <37 weeks or with low birth weight); (2) be published between 1987 and 2018; (3) be published in English or in French; (4) report on outcomes of early interventions with parents on their child's language development; (5) be primarily a research article, secondary data analysis, meta-analysis, or a systematic review; and (6) be published in a peer-reviewed journal. Studies were excluded if they did not meet all of these criteria.

Information sources

Studies were identified by searching through electronic databases and scanning reference lists of articles. English and French were applied when searching. This search was applied to PubMed and CINAHL databases. In addition, references of published articles were hand-searched to find additional studies applicable to this review. The literature search was performed from September 9, 2017, to January 2, 2018. See Appendices A and B for full electronic search strategies.

Study selection, data collection, analyses, and risk of bias

Eligibility assessment was performed independently in a standardized manner by two reviewers; studies that did not meet the inclusion criteria were excluded. Where there was disagreement, the two reviewers met to agree upon the articles included for full-text screening. This process was repeated for the selection of full-text articles. The articles were also hand-searched for words like: recommendation(s), suggestion(s), guide (guidance), advice, support, and future direction.

A data extraction sheet was developed and pilot-tested on ten randomly selected studies and refined accordingly. The following information was extracted: (1) study type; (2) participant characteristics (including number and age); (3) study objectives/goals (4) results; (5) recommendations; and (6) article summary. Thematic analysis and extraction of core themes was completed by two independent reviewers. Again, where there was disagreement, the two reviewers met. Risk of bias was then informally evaluated by both reviewers; in all cases, assessment tools and key elements of interventions were judged to be adequate and developmentally appropriate for the population served.

RESULTS

Study selection

PubMed and CINAHL database searches provided a total of 209 citations; these were organized through the reference

manager Zotero (39). Once 95 duplicates were extracted, 114 articles remained for the initial review. Titles and abstracts were checked for inclusion or exclusion by the primary reviewer using the above-mentioned criteria. Eighty-five studies were excluded. After the title and abstract reviewing, 29 articles were recognized as relevant and were included for full-text review. Following this review, 23 articles were recognized as meeting all of the desired criteria (Table 1). A flow diagram of the study selection is shown in Figure 1.

Characteristics of included studies

All 23 studies selected described early intervention practices provided to parents regarding their premature child's language development. These studies were published in English (some were translated) and carried out between 1990 and 2016 in various countries using hospital-, home-, and centre-based interventions (Supplementary Tables 2–24).

After data extraction and analysis, four general themes emerged from the review: (1) parental training in the care of an infant born prematurely during NICU stay; (2) education on the development of language and the importance of parental responsiveness; (3) provision of activities to support child language learning; and (4) the importance of overall and ongoing monitoring and support by qualified health professionals. It should be noted that often, multiple themes were reported in one article.

Theme 1: Caregiver training in infant care during NICU stay

Five studies reported evidence on the use of caregiver training during NICU stay and their impact on language outcomes at a later age (40–44). All studies advocated for family nurturing, parental guidance and infant stimulation. Interventions varied widely but the reported goals were the same: education regarding (1) stimulus overload and distress in the infant; (2) appropriate and timely interaction and responsiveness; and (3) the importance of more regular, close contact and interaction with their infant.

Improved outcomes in a variety of domains were reported and authors hypothesized that targeting the emotional interactions between parents and infants in the NICU was essential to the developmental course of the participants. For example, Caskey et al. (2014) reported that increasing the quantity of parent talk was associated with higher 7- and 18-months corrected age language and cognitive scores on the Bayley-III. In a randomized controlled trial (RCT), Milgrom et al. (2013) used the Mother-Infant Transaction Program (MIPT) to provide mothers with education regarding infant cues. Results at 6 months corrected age showed increased sensitivity in providing care, greater awareness of, and more appropriate responses to negative infant cues, which in turn significantly lowered infant stress.

Taken together, the results of these studies demonstrate that parent-training interventions provided during NICU stay that aimed to reduce stress exposure in the very early newborn period and stimulate social interactions can, in the short-term, improve the negative outcomes reported in preterm children.

Theme 2: Parental education on the development of language

Fourteen studies including two RCT reported evidence on the use of parent education following NICU discharge and aimed at increasing parent responsiveness and knowledge of their child's development (22,29,33,35–37,40,42,45–50). In these studies, caregiver education was provided regarding the characteristics of positive interactions and the importance of language stimulation, and led to improved caregiver sensitivity as well as the use of attention-maintaining strategies with their child. Parents also consistently demonstrated increased quantity and quality of talking, interacting and reading from 0 to 3 years; these were later strongly associated with improved language and cognitive development at 6 and 12 months, decreased externalizing and dysregulation behaviours at 2 years, and decreased parental anxiety and depression at 2 years.

Theme 3: Providing parents with activities to support cognitive/language learning

Three studies reported evidence on the importance of providing parents with activities to promote cognitive and language learning in preterm infants (22,46,51). In these studies, caregivers were shown how to scaffold language by providing their child with information about objects and actions, how to include age-appropriate problem-solving strategies during play and how to engage in shared reading experiences. Results showed that even with healthy preterm infants, parenting behaviour that encouraged language development was a key factor in improving short-term developmental outcomes.

Theme 4: Ongoing monitoring and early intervention by health professionals

Nine studies reported evidence on the importance of ongoing monitoring and evaluation of preterm infants, as well as the provision of early intervention by health professionals (29,46,49,52–57). It was reported that professionals who specialize in preterm child development are more aware that parenting babies born prematurely can be more difficult than those born full-term and consequently, better prepare parents for the challenges ahead (35,37). Given the importance of communication skills in social and educational setting, it was broadly recommended that infants be offered access to regular monitoring and early intervention services (46,52,53,55). When possible and where appropriate, this included comprehensive

Table 1. Study characteristics

Study	Dates	Country	Setting	Support/Funding
Benzies et al., 2013	2008–2011	Canada	Home visit	Alberta Centre for Child, Family, and Community Research and the Pre-term Birth and Healthy Outcomes Team (PreHOT)
Bühler et al., 2009	2005–2008	Brazil	Outpatient Clinic, Day Care Centre or both (at the University Hospital)	Not stated
Caskey et al., 2014	2008–2009	USA	NICU	Department of Pediatrics, Women and Infants Hospital, Providence, Rhode Island
Censullo, 1994	Not stated	USA	Home visit	National Centre for Nursing Research Grant
Colditz et al., 2015	Not stated	Australia	Hospital-based and Community-based	National Health and Medical Research Council and for a Career Development Grant; a Royal Brisbane and Woman's Hospital Foundation Grant
Flierman et al., 2016	2013–2014	Netherlands	Home visit	Zorg Onderzoek Nederland
Foster-Cohen et al., 2016	Not stated	New Zealand	Not stated	Neurological Foundation of New Zealand, Health Research Council of New Zealand, Canterbury Medical Research Foundation and the Lottery Grants Board of New Zealand
Gabis et al., 2015	Not stated	Israel	NICU and Home visit	None
Guarini et al., 2016	2007–2012	Italy	Day Hospital of the Neonatology Unit and School-based	Italian Ministry of Education, University and Research
Magill-Evans et al., 2002	Not stated	Canada	Home visit	Alberta Foundation for Nursing Research, the Alberta Association of Registered Nurses, and the Medical Research Council/National Health and Research Development Program, Health Scholar Award to M. Harrison
Mahoney et al., 2017	2006–2016	USA	Review	Not stated
Milgrom et al., 2013	2007–2009	Australia	NICU and home visit (after discharge)	National Health and Medical Research Council
Nepomnyaschy et al., 2012	2001–?	USA	Not stated	Based on the Early Childhood Longitudinal Survey-Birth Cohort
Putnick et al., 2017	2014–2016	Germany	NICU and home visit	National Institutes of Health, <i>Eunice Kennedy Shriver</i> National Institute of Child Health and Human Development; German Federal Ministry of Education and Science
Rechia et al., 2016	2011–2015	Brazil	Review	Not stated
Ross et al., 2016	2006–2012	USA	Neurodevelopmental Follow-Up Clinic	Not stated

Table 1. *Continued*

Study	Dates	Country	Setting	Support/Funding
Sansavini et al., 2015	2011–2014	Italy	Unit of Neonatology of Bologna University	Italian Ministry of Education, University and Research, University of Bologna, Association in Bologna of parents of preterm children
Smith et al., 1996	1990–1992	USA	Home visit	Eunice Kennedy Shriver National Institute of Child Health and Human Development
Spittle et al., 2010	2005–2009	Australia	Home visit and occasional hospital-based	National Health and Medical Council, the Cerebral Palsy Foundation, the Murdoch Children's Research Institute, the Myer Foundation, Allens Arthur Robinson, and the Thyne Reid Foundation
Suttora et al., 2011	Not stated	Italy	Laboratory for infant observation at the Macedonio Melloni Maternity Hospital of Milan	Not stated
Vohr et al., 2012	2006–2011	USA	Not stated	National Institutes of Health and the Eunice Kennedy Shriver National Institute of Child Health and Human Development
Welch et al., 2015	Not stated	USA	NICU	The Einhorn Family Charitable Trust, The Fleur Fairman Family and Mary Dexter Stephenson; Columbia University's CTSA
Wu et al., 2016	2006–2008	Taiwan	Hospital-based interventions and neonatal clinic visits	National Health Research Institute and National Science Council

NICU Neonatal intensive care unit.

developmental evaluations involving standardized tests, and direct observation, as well as family psychosocial assessments.

DISCUSSION AND RECOMMENDATIONS

As parents are poised to be their child's first and best teachers, it is not surprising that all studies highlighted the importance of involving caregivers and providing education on language milestones, as well as ways in which language can be stimulated within the home. In this review, interventions were provided to families during NICU stay, at surveillance visits or through home visits. Though long-term studies are required in order to determine if these gains were maintained, they provide evidence for the importance of supporting parents regarding their child's language development. Unfortunately, not all families

have access to health professionals that specialize in the development of children born preterm or to NFUPs.

Most health professionals have adequate knowledge regarding major milestones in children's language development and can refer parents to the appropriate services when these milestones are not being met. However, health professionals are less likely to provide information to caregivers regarding stress and readiness cues. Given that these cues are the basis of all caregiver–child interactions, health professionals must become familiar with the characteristics of stimulus overload and distress in preterm infants and teach parents to recognize their child's cues with the goal of providing appropriate responses and tailoring interactions to their child's tolerance.

Similarly, health professionals may not regularly provide caregivers with language stimulation techniques. It is

Figure 1. Flow of information through the different phases of the systematic review. Adapted from ref. (59). Copyright 2009 by the Moher et al. Adapted with permission.

important to educate caregivers regarding the critical role they play in shaping their child's brain development (58). They must understand that regular, close interactions are crucial to language development and that being a responsive caregiver leads to better outcomes. More specifically, caregivers must be coached to follow their child's lead, to consistently and positively respond to their child's cues, to provide words that build on their child's focus of attention and finally, to scaffold verbal behaviours. Activities to support learning in their child, such as social games, singing, and reading, should also be provided. It is recommended that health professionals model these behaviours to parents by talking to every child during surveillance visits.

This information is especially important given that preterm infants require more specialized support to help them organize responses; this is due to the fact that, during the first year of life,

their difficulty in shifting attention is often reported. Interactive strategies that maintains interest infants' in objects and conversations will help them maintain active involvement with toys, thereby decreasing the demands placed on the attentional system and thus facilitating toy exploration.

Many studies reported on the importance of long-term follow-up after NICU discharge and the support of qualified health professionals because these professionals specialize in preterm child development and are more aware of the short- and long-term consequences. Consequently, they can better monitor these children and prepare parents for the challenges ahead. However, the need for systematic follow-up evaluation protocols that provide qualitative and quantitative information was highlighted; these would help define the true needs of preterm infants and identify the ideal moment for speech-language intervention.

In communities where monitoring and early intervention is not routinely provided to caregivers, some of these strategies could be provided during NICU stay, or during surveillance visits. This information would be most beneficial to families when a child is identified with delays and is being referred to speech language therapy. As families are waiting longer before receiving most early intervention services, health professionals have an increasing role to play in providing caregivers with evidence-based early intervention practices.

LIMITATIONS

Limitations of this review include the lack of rigorous evaluation of bias. Also, data analysis was performed by two reviewers on the same research team.

CONCLUSIONS

Given that preterm children have higher risks of delays in all domains, developmental monitoring is vital to support their development. Regarding language, timely detection of delays in language will help prevent social and learning deficits. Though NFUPs specialize in preterm child development and are best positioned to prepare parents for the challenges ahead, many preterm children do not qualify for these services. Consequently, paediatricians and family practitioners fulfill this role in many cases. Education regarding best practices for this population is important given that these professionals play an important role by improving parents' knowledge and skills regarding their child's development.

A scoping review was completed to determine the best practices for early intervention in premature children regarding the development of language skills during the preschool years. Themes that emerged included the importance of providing parental training in the care of an infant born prematurely during NICU stay, as well as education following discharge and monitoring and support by qualified health professionals. The conclusions drawn will provide guidance to health care professionals regarding the education of parents on best practices for stimulating language development in their child.

SUPPLEMENTARY DATA

Supplementary data are available at *Paediatrics & Child Health* Online.

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