

Critical Review: Is Parent Based Intervention an Effective Service Delivery Model?

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This systematic review examines the effectiveness of parent based intervention as a viable service delivery model for preschoolers with language delays. Study designs appraised include mixed (between and within groups) randomized clinical trials (4) and mixed nonrandomized clinical trials (2). There is a sufficient evidence base for Speech-Language Pathologists to use parent based intervention in clinical practice with a fair degree of confidence. Implications on clinical practice are discussed.

Introduction

Language delay during the preschool years is a chronic problem with both immediate and long term permeating effects on academic success, behaviour, literacy, socio-emotional development and vocational success (Law et al., 2004; Bexendale & Hesketh, 2003). Language development is largely variable in typically developing children during this time allowing some to argue for a 'wait and see' policy. However for many children, language delays do not resolve spontaneously necessitating intervention (Bushman et al., 2009; Girolametto, 2004). There is a clinical need for intervention for the preschool population to be timely, cost effective and ecologically valid to maximize the potential gains and minimize chronic effects (Baxendale & Hesketh, 2003; Gibbard, 2004; Girolametto, 2004; Girolametto et al., 1996; Law et al., 2004).

For preschoolers, typical service delivery models for intervention include parent based intervention (PBI) and clinician based intervention (CBI). The main difference between these models is the agent of administration, the former being the parent or caregiver and the latter being the Speech-Language Pathologist (SLP) (Fey et al., 1993). There is a significant body of empirical support for effectiveness of CBI, but it has been described as costly in both clinicians' time and healthcare resources, and the breadth of generalization has been questioned (Fey et al., 1993; Gibbard et al., 2004; Girolametto, 2004). Conversely, there is a growing body of evidence to support the use of PBI for preschoolers with language delays. PBIs has been advocated in the literature as they meet the clinical need for timely, cost effective and ecologically valid interventions for this population (Fey et al., 1994; Girolametto et al., 1996).

Whether one model is empirically or practically superior to the other has yet to be definitively answered in the literature. The widespread use of PBI has been precluded by a lack of evidence (Girolametto et al., 1996). From a clinical perspective, SLPs need to make

recommendations that are grounded in a strong evidence base. With growing waitlists and increasing financial constraints it is crucial to explore PBI as a viable service delivery model (Bushman et al., 2009; Gibbard et al., 2004). Therefore the purpose of this systematic review is to determine the effectiveness of PBI as a service delivery model for preschoolers with language delays.

Objectives

The primary objective of this paper is to critically evaluate the available literature regarding the effectiveness of PBI for preschoolers with language delays. The secondary objective is to provide evidence based recommendations for clinical practice about using this service delivery model with the preschool population.

Methods

Search Strategy

Computerized databases, including CINAHL, PUBMED and SCOPUS, were searched using the following strategies:

((Language disorders) OR (language delay) OR (early childhood intervention) AND (early intervention) OR (rehabilitation) OR (speech and language) OR (parent intervention) OR intervention)).

The search was limited to articles, reviews and reports written in English between 1985 and 2009. Articles were also located using references of published meta-analyses.

Selection Criteria

Studies chosen to be included in this critical review met the following criteria: full or partial randomization of participants, included PBI as a service delivery, participants' mean age was between 2; 0 and 4; 6, participants had an expressive or receptive and expressive language delay, and no known aetiology for the language delay. No limits were set on the

demographics of the participants, specific intervention procedures, or outcome measures.

Data Collection

Results of the literature search yielded the following types of articles consistent with the aforementioned selection criteria: mixed (between and within groups) randomised control trial (RCT) (4) and mixed nonrandomized clinical trial (2).

Results

Studies establishing a treatment effect for PBI

Bushmann and colleagues (2009) examined the effectiveness of the Heidelberg Parent-Based Language Intervention (HPLI). The German HPLI is similar to the well established Hanen Parent Program (HPP) but is shorter, more structured, less expensive and less time consuming. Unlike the HPP there are no home sessions; all sessions are in a clinic setting.

This study utilized a RCT with two post-test reassessments at 6 and 12 months pre-test. Assessors were blind during testing. Forty seven participants from German speaking homes with an expressive language delay were recruited from general paediatric checkups. They were randomly assigned to an intervention group (n = 24) or a matched delayed treatment control. No significant group differences were reported. Intervention in the experimental group spanned 3 months. Post-test results indicated that the intervention group had made significantly greater gains than the control group. Language gains were across multiple domains, as measured by a German standardized test of language. In the follow up analysis, significant group differences were reported in vocabulary and morphology. At 12 months 75% of children in the experimental group scored within normal limits, compared to only 43.5% of children in the control group. The authors compared HPLI to the average cost of an individual speech and language intervention session. Anecdotal evidence suggests that PBI is less expensive than CBI and may help optimize mothers' interaction styles.

This well designed study provides level Ib research evidence. Bushmann et al (2009) used appropriate statistics for between and within group comparisons as well as appropriate standardized measures. Limitations of this study include not using parent factors as covariates in statistical analysis. The intervention used in this study was more economical in terms of time and resources when compared to the HPP, and had a significant treatment effect. The treatment effect was also noted at the 12 month follow up. Bushmann et al (2009) lend support to PBI as an effective service

delivery model for preschoolers with an expressive language delay.

Girolametto et al (1996) investigated the effects that focused stimulation models have on vocabulary and language development in children with expressive vocabulary delays. A RCT pre-test – post-test control group design was used. Twenty-five English speaking participants were recruited from waiting lists for PBI. They were randomly assigned to an experimental group (n = 12) or a delayed treatment control group. All participants scored within the 5th percentile on the MacArthur Communicative Development Inventories (CDI). Participants in both groups were well matched and no significant differences between the groups were reported on standardized measures of speech and language abilities.

The 3 week intervention consisted of a modified version of the HPP. Modifications were consistent with a focused stimulation approach for target words. Words from the participants' inventory were randomly assigned as either target or control words (n = 10). Parents were blind to the presence of control words. Outcome measures included parent reports, direct observations of parent-child dyad and semi-structured probes, and a spontaneous language sample. Assessors of the language sample were blind. Results indicated that mothers in the experimental group adapted intervention techniques. Children in the experimental group produced a significantly greater number of different words, target words and control words. In addition, the experimental group used more structurally complete utterances than the control group.

This well designed study used procedures that were well controlled and defined. The study provides level Ib research evidence. Intervention generalized to control words and syntax, during a comparably short intervention period. The authors used the appropriate parametric statistics for repeated measures and between and within group analysis. However, there are three primary limitations in this study. First, there is a clear selection bias in the mothers used in this study. Although mothers were randomly allocated, all mothers were selected from a waitlist for PBI and were self-referred. Consequently these mothers may represent a particularly keen and committed subset that may not be representative of the population. Secondly, the authors used a screening tool to distinguish participants as delayed. The CDI may be used for screening and pre-selection of participants in research but should not be solely used to identify a language delay in clinical practice (Fenson et al., 1993). Therefore, the participants may not have been representative of typical language delayed preschool children. Finally the sample

size was small, decreasing the power of these findings. Due to these shortcomings, these results should be interpreted with caution. These suggestive findings indicate PBI is an effective service delivery model with short term efficacy.

Studies comparing PBI and CBI

Baxendale & Hesketh (2003) compared the effectiveness of the Hanen Parent Program, a well established PBI, to CBI for inner city children with expressive or expressive/receptive language impairments using a nonrandomized clinical trial. From over 1000 referrals, 37 English speaking participants were allocated to the PBI group (n = 19) or CBI group based on geographical location. With the exception of age (the PBI group had younger participants) there were no significant differences reported between groups on standardized measures of speech and language abilities. Assessments were done pre-test, 6 months post-test, and 12 month pre-test follow up. Experimenters in this study were not blind.

Intervention for the CBI group was between 8 and 12 weeks and was 11 weeks for the PBI group. Although parents were required to be present for CBI sessions, the focus of intervention was the child's language, whereas the focus in PBI was the parent's language. Outcome measures included criterion referenced measures from a spontaneous language sample and standardized scores from the Preschool Language Scale (PLS). Analysis with non-parametric measures revealed both groups improved relative to pre-test measures and standardized scores. There was no significant difference between the two groups on PLS scores or criterion referenced scores. Descriptive analysis of costs revealed PBI to be more costly than CBI in terms of clinical time.

Baxendale & Hesketh's (2003) study provided level IIa evidence. There are several limitations in design that should be considered. Experimenter biases and group allocation biases are clear. Most notably the lack of a control group makes progress difficult to interpret and limits any conclusions about the effectiveness of either intervention. Appropriate statistical analysis for the sample size and types of measure were used, except age was not included as a covariate factor in the analysis and may have confounded the results. Overall, this study contributes to the evidence base by illustrating comparable effects of PBI and CBI. However based on the aforementioned limitations, these suggestive findings should be interpreted with caution.

Fey et al (2004) sought to compare PBI and CBI using focused stimulation and cyclic goal attack strategy for morphological goals over 4 ½ months. Participants were

preschoolers with an expressive grammar impairment based on clinical observation and performance on standardized tests. A RCT pre-test post-test control group design was employed. Participants were randomly assigned in two waves to a PBI (n = 10), CBI (n = 11) or delayed treatment control (n = 8) group. Participants were referred by local Speech-Language Pathologists or by self-referrals following local media coverage. Considerable within-group differences in receptive language, phonological skills and performance intelligence were reported. The only between group difference on statistical comparison was in parents' years of education.

Several procedural differences between the two experimental groups were described. PBI was more intensive and occurred in more contexts than the CBI. CBI began each session with a highly structured contrastive imitation drill. The Developmental Sentence Scale (DSS) was used as an outcome measure and was calculated from a spontaneous language sample using blind evaluators. Only one dependent variable (DSS) was used in the statistical analysis to minimize experimental error and maintain statistical power. Results of statistical analysis indicated a significant improvement in DSS for both experimental groups. No change was reported in the control group. Descriptive analysis revealed that treatment effects in the PBI group were less consistent than the CBI group, and the authors suggest if PBI is used in clinical practice they should be monitored carefully. Descriptive analysis of DDS also suggested PBI required a significant amount of parent commitment and clinician's time but required half of the time as CBI, with respect to clinical planning and direct contact time.

Fey and colleagues' (2004) well designed study created relatively comparable PBI and CBI programs and provides level Ib evidence for a treatment effect for PBI. Fey et al. (2004) targeted an area of language typically not included in parent based service delivery models, adding to the evidence base for PBI as an effective and cost-effective option for preschoolers with language delays. However due to the small sample size, these results are tentative and should be interpreted with caution. The systematic differences between groups were not included as covariates in statistical analysis therefore treatment effects may be confounded. Furthermore, the descriptive analysis is exploratory limiting its application to clinical practice.

Law et al (1999) investigated the effectiveness of CBI and PBI for preschoolers with expressive and receptive language impairments from areas of high social deprivation. A RCT, with a pre-test – post-test design with 6 month follow up, randomly assigned participants

to a CBI (n = 17), PBI (n = 11) and delayed treatment control (n = 10) group. Participants ranged in socioeconomic status and ethnic backgrounds. Several significant differences were noted between the groups including mother's self esteem, and participants' behaviour and ordinal position.

Several procedural differences between the two experimental groups were described by Law et al (1999). In the CBI group, emphasis was placed on structured daily routines with no redundant language, focusing the child's attention and clear non-verbal prompts, as well as fostering non-verbal listening and auditory speech sound discrimination. Intervention totalled 27.4 hours over 6 weeks. The PBI group received a condensed and modified version of HPP which totalled 25 hours over 10 weeks. Participants were assessed using the PLS during the study: pre-test, post test and 6 months pre-test. Repeated measures analysis of variance revealed no significant treatment effects for either experimental group compared to the control, and any effects were not retained at the 6 month re-assessment. Descriptive analysis also revealed PBI is less expensive by a factor of 1.37 to 1.

This study by Law and colleagues (1999) is the only available literature consistent with the selection criteria of this critical review that has culturally and linguistically diverse participants. Although it should offer a high level of evidence, there are multiple shortcomings in the procedures and statistical analysis. Firstly the study had a small sample size making it underpowered, despite appropriate statistical analysis for repeated measures between and within groups. Secondly, assessors were not always blind, suggesting an experimenter bias. Thirdly, systematic differences between participants and procedures were not included as covariates in the analysis. Similarly, the authors reported compliance in the PBI group was an issue, but did not include that as a factor in statistical analysis. It is plausible that condensing and modifying the procedures of the HPP may have resulted in a loss of treatment effect. Similarly, the structured approach to clinical intervention is not consistent with the other reviewed procedures of CBI which may have also resulted in a loss of treatment effect. Finally Law et al (1999) used the PLS thrice within a 6 month period. This alone may negate these findings. Standardized tests are not designed for repeated measures over short periods of time as test performance will likely be inaccurate due to the standard measurement of error (Paul, 2007). Overall these equivocal findings should be interpreted with extreme caution.

A study examining the costs of PBI

Gibbard et al (2004) completed a cost effective analysis of PBI compared to CBI for preschoolers with an expressive language delay. A nonrandomized clinical trial was employed. Participants were assigned to a PBI group (n = 12) or a general care control group (n = 26). Six participants in the control group did not complete the study and one participant did not complete all outcome measures and cost data in the PBI group. The first 14 participants were assigned to one of the groups based on parent's preference and the remaining were assigned to either the PBI or control group. The only significant difference between groups was participants' age, which was included as a covariate in statistical analysis. Emphasis in the PBI was placed on developing language using natural routines and contexts. Participants in the control group received non-specific verbal and written advice on methods to stimulate language development. Experimenters throughout the 6 month study were not blind.

Cost data for both groups included direct treatment, capital, labour/salary, administration, overhead, out of pocket expenses (i.e. travel costs) and miscellaneous costs (i.e. stationary). Data from both groups were pooled to alleviate the small sample size problem under the assumption parents were homogenous. Results indicate cost per gain varies with the outcome measure, ranging from £0.18 for increased vocabulary to £10.97 for increased mean length of utterance. Gibbard et al (2004) state that if group size is ten or less, PBI would incur less cost and be the most clinically effective, making it more attractive than general care.

There are several considerations to make before applying this level IIa evidence to clinical practice. Without statistically demonstrating any significant differences between parents, they should not be assumed homogeneous. Lack of randomization presents an allocation bias and lack of blinding presents an experimenter bias. Participant mortality was not compensated by an intention to treat analysis, which may skew the results. Generalization of these results to Canada may not be possible, as general care and cost data may not be equivalent. This study is an acceptable attempt at illustrating resource implications for PBI as a service delivery model in clinical practice. However, these results would be more compelling had the authors compared PBI versus CBI versus general care/control. These considerations in combination with a small sample size suggest these results should be interpreted with caution.

Discussion

There was a considerable amount of support in the reviewed literature for the effectiveness of PBI as a service delivery model for preschoolers with language delays. A treatment effect for PBI was demonstrated using multiple treatment approaches, including the Hanen Parent Program, cyclic goal attach strategy and focused stimulation (Baxendale & Hesketh 2003; Bushmann et al., 2009; Girolametto et al., 1996; Fey et al., 1993). Furthermore a comparable treatment effect was seen in PBI and CBI (Baxendale & Hesketh, 2003) although the effects may be less consistent in PBI (Fey et al., 1993). The descriptive or anecdotal evidence regarding the costs of CBI and PBI was conflicting depending on how cost was reported (i.e. in dollars versus clinician's time). However, a detailed cost effective analysis concluded that if group size was less than ten, PBI costs less than CBI, making it a more attractive service delivery model (Gibbard et al., 2004). Overall the level Ia and IIb evidence contributes a strong evidence base that PBI is a effective and viable service delivery model.

Common limitations in the literature may reduce the ability to confidently apply the findings to clinical practice. Blinding may not always be possible, as clinicians and/or parents need to know their target goals. Small sample sizes are a recurring problem, which may be reflective of the prevalence of language delays in this population. Results may not be generalized to preschoolers who are culturally or linguistically diverse, as the majority of participants in the reviewed literature were Caucasian English speakers. The available literature also does not include preschoolers with receptive language delays. The only exception to this was Law et al (1999), however the lengthy limitations of this study limit any applicability these results may have. Currently there is no available literature that examines the long term treatment effects of PBI. Girolametto (2004) suggests that this may not be possible, as it is unethical to have long term controls. However without long term data, it is difficult to make definitive statements about generalization and effectiveness of PBI. Future research needs to take these limitations into consideration.

Another common limitation is not including parental factors as a confounding factor to treatment effectiveness. Gibbard (1994) found that PBI and CBI are comparably effective, but some mother/child dyads may be better suited to certain forms of intervention. Preliminary research has found PBI can be effective in facilitating language development in children with mothers with low IQ (Feldman, Sparks & Case, 1993) and homeless mothers (O'Neil-Pirozzi, 2009). The

optimal parent/child dyads have yet to be identified in the literature. The contributing factors or dyads that are best suited for PBI would be valuable clinical knowledge and needs to be addressed in future research.

Clinical Implications

Overall there is a sufficient evidence base to support the effectiveness of PBI as a service delivery model for the preschool population. Despite limitations and the need for future research, SLPs can use PBI in clinical practice with a fair degree of confidence. As suggested by Gibbard (1994) there seems to be no blanket approach to intervention with the preschool population and many factors need to be considered when making recommendations. Given CBI and PBI have comparable effectiveness, SLPs should consider the following when recommending which service delivery model to use for intervention:

- PBI are most effective for preschool children with expressive language or expressive and receptive language delays.
- When considering resource implications in terms of financial and time costs, group sizes should be less than ten
- A variety of approaches are suited for PBI from structured programs to highly individualized and flexible programs

References

- Baxendale, J., & Hesketh, A. (2003). Comparison of the effectiveness of the Hanen Parent Programme and traditional clinic therapy. *International Journal of Language & Communication Disorders, 38*(4), 397 – 415.
- Buschmann, A., Jooss, B., Rupp, A., Feldhusen, F., Pietz, J., & Phillippi, H. (2009). Parent based language intervention for 2-year-old children with specific expressive language delay: A randomized controlled trial. *Achieves of disease in Childhood, 94*(2), 110 – 116.
- Feldman, M. A., Sparks, B. & Case, L. (1993). Effectiveness of home-based early intervention of the language development of children of mothers with mental retardation. *Research in Developmental Disabilities, 14*, 387 – 408
- Fenson, L., Dale, P., Reznick, S., Thai, D., Bates, D., Hartung, J., Pethick, S., Reilly, J. (1993). *MacArthur Communicative Development Inventories*. San Diego, CA: Singular Publishing Group Inc.
- Fey, M. E., Cleave, P. L., Long, S. H., & Hughes, D. L. (1993). Two approaches for the facilitation of grammar in children with language impairment: An experimental evaluation. *Journal of Speech and Hearing Research, 3*, 141 – 157.

- Gibbard, D. (1994). Parental-based intervention with pre-school language-delayed children. *European Journal of Disorders of Communication*, 29, 131 – 150.
- Gibbard, D., Coglan, L., & MacDonald, J. (2004). Cost-effectiveness analysis of current practice and parent intervention for children under 3 years presenting with expressive language delay. *International Journal of Language & Communication disorders*, 39(2), 229 – 244.
- Girolametto, L. (2004). Services and programs supporting young children's language development. *Encyclopedia of Early Childhood Development*. From <http://www.enfant-encyclopedie.com/Pages/PDF/GirolamettoANGxp.pdf>
- Girolametto, L., Pearce, P. S., & Weitzman, E. (1996). Interactive focused stimulation for toddlers with expressive vocabulary delays. *Journal of Speech and Hearing Research*, 39(6), 1274 – 1283.
- Law, J., Garrett, Z., Nye, C. (2004). The efficacy of treatment for children with developmental speech and language delay/disorder: A meta-analysis. *Journal of Speech, Language, and Hearing Research*, 47, 924 – 943.
- Law, J., Kot, A., & Barnett, G. (1999). A comparison of two methods for providing intervention to three year old children with expressive/receptive language impairment. London: City University, London
- O'Neil-Pirozzi, T. M. (2009). Feasibility and benefit of parent participation in a program emphasizing *American Journal of Speech-Language Pathology*, 18, 252 – 263.
- Paul, R. (2007) *Language Disorders from Infancy through Adolescence, 3rd Ed Assessment and Intervention*. St. Louis: Mosby