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Home based child development interventions for pre-school children from socially disadvantaged families

PROTOCOL

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History

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8 May 2008	Amended	Converted to new review format.
11 May 2007	New citation: major change	Substantive amendment

Abstract

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Background

Description of the condition

Social disadvantage is not simply a question of income poverty but is a combination of deprivation and social

exclusion ([Saunders 2006](#)). Those living in poverty, lone parents ([Saunders 2006](#)) and minority ethnic groups (which is often confounded with poverty) are all at risk of social disadvantage ([Bradley 2001a](#)).

Social disadvantage can have a significant impact on early child development, health and well being ([Siddiqi 2007](#); [Lucas 2008](#)) and what happens during this critical period is important for all aspects of development ([Thompson 2001](#)). Access to resources ([Evans 2004](#)) and the quality of care giving ([Olds 2006](#)) and the home learning environment have been highlighted as crucial elements in the intellectual and social development of children ([Thompson 2001](#); [Waterston 2003](#); [Siddiqi 2007](#); [Sammons 2004](#); [Bradley 2001a](#); [Bradley 2001b](#)). The developmental deficits that may be experienced by children from socially disadvantaged backgrounds can have implications for their life course, including their social and cognitive functioning in adulthood ([Najman 2004](#); [Schoon 2003](#); [Kaplan 2001](#)).

Children who grow up in poverty – a significant dimension of social disadvantage – are more likely to be exposed to cumulative, multiple stressors. Their housing is more likely to be noisy, overcrowded and of poor quality; they are at higher risk of experiencing more family turmoil, greater child–family separation and higher levels of violence ([Evans 2002](#); [Evans 2004](#)). Socially disadvantaged children are at greater risk of a chaotic family life that can lack stability and structure with fewer supportive networks ([Bradley 2001a](#)). They are likely to be exposed to fewer developmentally enriching materials and opportunities, have fewer books and are less likely to be read to or taught school related concepts than non–socially disadvantaged children. As conditions associated with living in poverty worsen, and stress mounts, home environments can become less stimulating ([Ramey 2004](#)).

Children are at increased risk of adverse outcomes as a consequence of social disadvantage but there is also an impact mediated by parent behaviour ([Eckenrode 2001](#); [Repetti 2002](#)). Parents living in poverty are at increased risk of mental health problems and their parenting behaviours tend to be less consistent, less stimulating and more punitive than those not living in poverty. Socially disadvantaged mothers are less likely than their better off peers to communicate effectively with their children or show affection, either verbally or physically ([Crosier 2007](#); [Kohen 2008](#); [Bradley 2001a](#); [McLoyd 1998](#)), and they are more likely to perceive themselves as having less social support. Bronfenbrenners and Morris' bio–ecological Person–Process–Context–Time (PPCT) model posits that parental processes interact with child characteristics to influence development. According to this model, proximal processes (activities in which the child interacts with people, objects or symbols, for example, mealtimes, being read a story, parenting) and the quality of such processes influence developmental outcomes. Proximal processes vary according to the child (Person), their environment (Context) and duration and historical setting (Time) and are considered to be 'the primary engines of development' ([Bronfenbrenner 1998](#)). As such, proximal processes such as parenting are at risk of being less than optimal in the context of poverty and social disadvantage.

Adverse child outcomes associated with social disadvantage are wide ranging and can include: poorer physical health ([Seguin 2007](#); [Bauman 2006](#)); emotional dysregulation; poorer or fewer social skills; more behavioural difficulties ([Webster–Stratton 2008](#)); cognitive delay ([Dowdney 1998](#)), impaired intellectual development ([Croft 2001](#); [Otero 2003](#)), poor language skills ([McPhillips 2007](#)) and low educational attainment ([Sammons 1995](#)). The focus of this review is the specific impact of an impoverished intellectual environment on cognitive and socio–emotional development. There is a strong relationship between cognitive and emotional functions and this is an area of study that is increasingly receiving much attention. It is not yet fully understood, but it is thought that emotional processes underpin decision making and learning. Learning to control impulses related to negative emotions, as well as encouraging helpful, healthy emotions, is a crucial aspect of development. A lack of emotional regulation can impair learning and social judgements through reducing the ability to attend to the learning task and inadequately assessing the 'value' of incoming information ([Immordino–Yang 2007](#); [Diamond 2007](#); [Goswami 2004](#); [Blair 2002](#); [Lewis 2006](#)).

Ramey and Ramey ([Ramey 2004](#)) have summarised the crucial experiences that are necessary to provide opportunities for stimulating learning and required for normal early brain development and improving the quality of the parent–child interaction:

1. encourage exploration
2. mentor in basic skills
3. celebrate developmental advances
4. rehearse and extend new skills
5. protect from inappropriate disapproval, teasing and punishment
6. communicate richly and responsively
7. guide and limit behaviour

Caregiving competence and the quality of the environment play an important role in supporting the development (including emotional regulation) in young children ([Blair 2002](#)). Improved parenting skills and patterns that are highly supportive and as well as provision of appropriate developmental stimulation in the home are related to improved development in children ([Ryan 2006](#); [Bradley 2001b](#); [Croft 2001](#); [Herbst 2000](#); [Bronfenbrenner 1998](#); [Blair 2002](#)) and can ameliorate the differences in academic achievement within and between income groups ([McLoyd 1998](#)). It is clear that what happens in the home and with the caregivers is an important aspect of limiting the impact of deprivation and promoting child development.

Description of the intervention

Home based child development programmes aim to optimise children's developmental outcomes through educating, training and supporting parents in their own home to provide a more nurturing and stimulating environment for their child. Many disadvantaged parents have less understanding or time to provide the emotional support and types of stimulation that are important to their child's development. Some interventions are broad based and others, such as those which are the focus of this review, try to remedy this information gap by equipping parents with information, resources and support.

The intervention is delivered by a family visitor or practitioner directly to parents in their own home and consists of:

- age appropriate information (either written, verbal or both) related to child development and competent care giving
- age appropriate resources which might include books, puzzles, art materials, nursery rhyme tapes etc.
- general support to the parent in relation to parenting and child development

The family visitor provides information that addresses children's physical, intellectual, social and emotional development, explains it to the parent and helps them to use it in their everyday parenting. Parents are encouraged by the family visitor to engage in practical activities with their child that will reinforce the parent-child relationship, provide new learning experiences and thereby promote development. Parents are shown how to make best use of any resources provided and how they can be used to aid activities including reading to the child, singing nursery rhymes or playing games with household objects.

The information that the practitioner gives can also include advice and support that targets parental attitudes, knowledge and skills to promote parental behaviours that will facilitate child development. Such information includes specific knowledge related to child development appropriate to their child's age so that parents know what to expect at different stages of their child's development. The family visitor provides support to the parent through the discussion of child development and other child related issues that may be raised by the parent and will often signpost the parent to appropriate support agencies or additional programmes.

The practitioners who deliver the programme can be professional, para-professional or lay people and the parent is typically the recipient of the intervention (Olds 2006; Korfmacher 1999; Johnson 1993). The type of home visitor and their background, whether it is professional or para-professional, can have an impact on: how the programme is delivered; home visitors' engagement with families; and attrition of parents from the programme (Korfmacher 1999). However, while professional home visitors can achieve larger gains in some parent and child outcomes this is not thought to be due to differences in programme delivery. Instead it may be due to the perceived legitimacy of the home visitor by the parent during pregnancy and infancy (Olds 2006).

How the intervention might work

Programmes directly target parents' knowledge and skills, seeking to enhance their ability to facilitate and encourage their child's development and provide enriched learning opportunities. The family visitor is the primary mechanism through which the programme is delivered to the parent and is an important element of programme delivery as the success of such interventions has been linked to the skill and ability of the staff to motivate and empower the parent to change (Olds 2007; Sweet 2004). It is through changes in parental attitudes and behaviour that changes in child outcomes are achieved. Furthermore the link between the number of visits a parent receives and the success of the programme in achieving its goals is not thought to be a simple dose-response relationship. While intensive programmes are considered to be important there is no accepted threshold number of visits that should be completed by parents to ensure success (Olds 2007).

Why it is important to do this review

Parents have an important role to play in optimising child development and mitigating the negative effects of social disadvantage. As such, there is a need to examine the specific effects and benefits of interventions targeted at pre-school disadvantaged children that are delivered in the home and seek to provide parents with the requisite skills to achieve a nurturing and stimulating home environment that promotes child development, specifically their cognitive and socio-emotional development.

Objectives

To ascertain the effects of home-based programmes aimed at improving developmental outcomes for pre-school children from disadvantaged families.

Methods

Criteria for considering studies for this review

Types of studies

Randomised controlled trials. The control group will either receive no intervention or standard care. Studies comparing two different types of home based programme without a control group will be excluded.

This is an area where randomised controlled trials are technically and ethically possible. As such this review is confined to RCTs as they provide the best evidence of effectiveness.

Types of participants

Parents with children up to the age of school entry and who are socially disadvantaged in respect of poverty, lone parenthood or ethnic minority status. Age of school entry can vary between countries (4 to 7 years) and so the upper age range for this review will be the school entry age for the country in which the trial took place.

Studies will be excluded if they aim to recruit particular clinical subgroups of parents.

Types of interventions

1. Home based interventions designed to improve child intellectual and socio-emotional development through the provision of relevant knowledge and skills to the parent.
2. The intervention is delivered by trained lay or professional family visitors.

Types of outcome measures

Primary outcomes

The following child outcomes will be included:

- Cognitive development (including language development and attention)
- Socio-emotional development (including self regulation and behavioural development)

Adverse outcomes:

- Parents feel disempowered

Secondary outcomes

The following secondary outcomes will be included:

Child outcomes:

- Physical development

Parent outcomes:

- Parenting behaviour
- Parenting attitudes
- Quality of the home environment

Outcome measures vary widely in terms of quality and validity. The minimum standard will be that for any instruments used in included studies, there is a full description of the scale and its scoring is available.

Outcomes will be assessed immediately upon programme completion with longer-term follow-up where possible at 1 year, 2 years, 3 years, 4 years and 5 years and then at five yearly intervals.

The main outcomes, ordered in importance as above, will form the basis of the Summary of Findings Table in the completed review.

Search methods for identification of studies

Electronic searches

The following databases will be searched:

- Cochrane Library
- MEDLINE
- EMBASE
- CINAHL
- PsycINFO
- ERIC
- ASSIA
- SOCIOLOGICAL ABSTRACTS
- Dissertation Abstracts

The following search strategy will be used to search MEDLINE:

- 1 exp POVERTY/
- 2 poor.mp.
- 3 (social\$ adj disadvant\$).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
- 4 disadvantaged.tw.
- 5 (low adj income\$).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
- 6 (social adj problem\$).mp. [mp=title, original title, abstract, name of substance word, subject heading word]
- 7 impover\$.tw.
- 8 socio-economic.tw.
- 9 indigen\$.tw.

- 10 (social\$ adj3 disadvantage\$).tw.
- 11 Minority Groups/
- 12 exp Ethnic Groups/
- 13 (ethnic adj3 minorit\$).tw.
- 14 (ethnic adj3 group).tw.
- 15 Vulnerable Populations/
- 16 Socioeconomic Factors/
- 17 exp Continental Population Groups/
- 18 Population Groups/
- 19 ((multi?ethnic\$ or multi ethnic\$) adj3 (group\$ or population\$)).tw.
- 20 (multi?racial\$ or multi racial\$).tw.
- 21 ((underserve\$ or disadvantage\$) adj3 (group\$ or population\$)).tw.
- 22 or/1–21
- 23 child/ or child, preschool/ or infant/
- 24 (baby or babies or infant\$ or toddler\$ or pre?school\$ or pre school\$ or kindergarten\$).tw.
- 25 24 or 23
- 26 parents/ or fathers/ or mothers/ or single parent/
- 27 (lone adj3 parent\$).tw.
- 28 (single adj3 parent\$).tw.
- 29 (parent\$ or mother\$ or father\$ or carer\$).tw.
- 30 (one adj parent\$).tw.
- 31 or/26–30
- 32 Community Health Nursing/
- 33 Social Support/
- 34 (home–based or home based).tw.
- 35 (Home adj5 (support\$ or program\$ or intervention\$)).tw.
- 36 ((health or home) adj5 visit\$).tw.
- 37 or/32–36
- 38 25 and 22 and 37 and 31

It will be modified, where necessary, for the other databases listed. Preliminary searches indicated that limiting the strategy using terms to identify particular methodologies, for example, randomised controlled trials, resulted in the exclusion of potentially relevant studies. As such a broad search strategy will be employed to ensure no relevant studies are missed. No language or date restrictions will be applied to the searches.

Searching other resources

The reference lists from relevant review articles and any study chosen for potential inclusion in this review will be searched to identify further relevant studies. A draft list of included studies will be prepared and circulated to experts (as well as the authors of the studies on the list) requesting information relating to any ongoing, published or unpublished studies that have been missed by the methods described above.

Data collection and analysis

Selection of studies

All titles identified through the search strategy will be independently assessed and screened by two authors (SM and AE) to determine whether they meet the inclusion criteria. Hard copies of all reports of studies which appear to meet eligibility criteria will be obtained (AE) and assessed. Disagreement over inclusion will be resolved through discussion or independently judged by a third person (GM) if consensus cannot be reached. Details of all reasons for exclusion will be documented in a 'Table of Excluded Studies' in RevMan 5.

Data extraction and management

Data will be extracted independently by two authors (SM and AE) according to a piloted pro forma developed and tested for this review. Information will be extracted pertaining to study location, sample sizes, participant characteristics (e.g. age, gender, ethnicity/race), intervention characteristics (including intensity and duration,

implementation integrity and details of any intervention offered to the control group), outcomes and outcome measures at post treatment and follow-up, attrition rates and methods (including sequence generation, method of allocation concealment and methods of analysis). Data will be entered into Review Manager 5.0 by one author (AE) and checked by the other (SM).

Assessment of risk of bias in included studies

Included studies will be independently appraised by two authors (SM and AE) and assessed for risk of bias using the Risk of Bias tool in RevMan. Studies will be assessed according to the six domains specified in the Risk of Bias table and will be judged according to the criteria laid out in the handbook ([Higgins 2008](#)). For each study and domain of bias the following questions will be answered:

1. Sequence generation: was the allocation sequence adequately generated?
2. Allocation concealment: was allocation adequately concealed?
3. Blinding of participants, personnel and outcome assessors: was knowledge of the allocated intervention adequately prevented during the study?
4. Incomplete outcome data: were incomplete outcome data adequately addressed?
5. Selective outcome reporting: are reports of the study free of suggestion of selective outcome reporting?
6. Recruitment of participants: did the method of recruitment favour or hinder any particular groups of parents?
7. Other sources of bias: was the study apparently free of other problems that could put it at a high risk of bias?

An answer of 'Yes' indicates a low risk of bias, 'No' indicates a high risk of bias and an answer of 'Unclear' indicates uncertain risk of bias in that either insufficient detail is reported; sufficient detail is reported but the risk of bias is unknown; or that the study did not address the outcome.

The overall risk of bias within each study will be summarised across domains. Forest plots, stratified according to risk of bias, will be used to visually explore: the relative contributions of the studies at the different levels of risk of bias and differences in intervention effect estimates between studies at different levels of risk of bias (high, low, unclear).

Due to the difficulty in blinding participants to group allocation in such interventions, studies may end up being assessed at high or unclear risk of bias in the blinding domain. These studies will be included in the meta-analysis if the outcome assessor was blind to group allocation and they were otherwise at low risk of bias.

Measures of treatment effect

Dichotomous data

The outcomes of any study reporting binary/dichotomous data will be analysed by calculation of the risk ratio for the occurrence of an event (rather than a non-event) for its consistency as a summary statistic and ease of interpretation.

Continuous data

Weighted mean differences will be used for studies reporting continuous data and similar outcome measures with a 95% confidence interval. If outcome measures differ between studies the standardised mean differences (effect size) will be calculated in order to combine results across scales.

Unit of analysis issues

Where trials have used clustered randomisation, we anticipate that study investigators would have presented their results after appropriately controlling for clustering effects (robust standard errors or hierarchical linear models). If it is unclear whether a cluster randomised controlled trial has used appropriate controls for clustering, the study investigators will be contacted for further information. Where appropriate controls were not used, individual participant data will be requested and an estimate of the intraclass correlation coefficient will be calculated. The data will be re-analysed using multi-level models which control for clustering. Following this, effect sizes and standard errors will be meta-analysed in RevMan using the generic inverse method ([Higgins 2008](#)).

If appropriate controls were not used and individual participant data are not available, statistical guidance will be sought from the Cochrane Methods Group and external experts as to which method to apply to the published results in an attempt to control for clustering. If there is insufficient information to control for clustering, outcome data will be entered into RevMan using individuals as the units of analysis, and then sensitivity analysis will be used to assess the potential biasing effects of inadequately controlled cluster trials ([Donner 2001](#)).

Dealing with missing data

Authors will be contacted in the first instance to supply any missing or unreported data such as group means, standard deviations, details of attrition or details of interventions received by the control groups. If outcome data are only reported for participants completing the trial or who followed protocol then authors will be contacted for additional information to enable an intention-to-treat analysis. Missing data and attrition will be described for each included study in the Risk of Bias table. If missing data are unobtainable the extent to which the results or conclusions of the review might be affected by this will be assessed and discussed.

Assessment of heterogeneity

We will assess the extent of between trial differences and the consistency of results of any meta-analysis in three

ways:

- by visual inspection of the forest plots
- by performing the Chi^2 test of heterogeneity (where a significance level less than 0.10 will be interpreted as evidence of heterogeneity)
- by examining the I^2 statistic ([Higgins 2008](#); section 9.5.2)

The I^2 statistic describes approximately the proportion of variation in point estimates due to heterogeneity rather than sampling error. We will consider I^2 less than 35% as indicating low heterogeneity and values greater than 70% as indicating high heterogeneity. Because heterogeneity may well prove to be a significant problem we will carry out each analysis twice using fixed-effect and random-effects models.

Assessment of reporting biases

If sufficient studies are found, funnel plots (estimated differences in treatment effects against their standard error) will be drawn. If a relationship is found, the clinical diversity of the studies will be examined in order to determine whether the relationship is indicative of publication bias or a relationship between trial size and effect size ([Egger 1997](#)).

Data synthesis

Results will be synthesised into a meta-analysis if interventions are similar in terms of intensity, frequency and duration of home visiting. A fixed-effect and a random-effects model will be used and compared to assess the impact of heterogeneity. Unless funnel plot asymmetry suggests otherwise, the random-effects model will be presented.

Subgroup analysis and investigation of heterogeneity

If there are sufficient data a subgroup analysis will be performed to assess effects by:

- type of family visitor, that is, whether they are professional, paraprofessional or lay family visitor.
- context of intervention provision, that is, whether interventions are delivered in the presence or absence of universal services (including playgroups).

Sensitivity analysis

A sensitivity analysis will be performed by restricting the analysis to studies with only low risk of bias. Separate analysis will be conducted to determine the specific effects of selection bias, performance bias and attrition bias. Furthermore the sensitivity of findings to any imputed data will also be assessed.

Results

Description of studies

Risk of bias in included studies

Effects of interventions

Discussion

Authors' conclusions

Implications for practice

Implications for research

Acknowledgements

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Contributions of authors

Declarations of interest

The lead author of the review (SM) is a Principal Investigator of a randomised controlled trial evaluation of a home based intervention aimed at improving developmental outcomes of pre-school children. Potential conflicts of interest will be minimised by the assessment of eligibility and risk of bias by both authors, the second of whom (AE) has no conflict of interest.

Differences between protocol and review

Published notes

Characteristics of studies

Characteristics of included studies

Characteristics of included studies

Footnotes

Characteristics of excluded studies

Footnotes

Characteristics of studies awaiting classification

Footnotes

Characteristics of ongoing studies

Footnotes

Summary of findings tables

Additional tables

References to studies

Included studies

Excluded studies

Studies awaiting classification

Ongoing studies

Other references

Additional references

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