Interventions with fathers of young children: systematic literature review

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Aim. This paper reports a systematic review of the effectiveness of interventions for fathers with infants or toddlers.

Background. Nurses and other healthcare professionals work closely with families of infants and young children. This contact provides an opportunity to promote positive parent–child interactions and optimal child development. Previous research has demonstrated that interventions with mothers of infants can be effective in promoting sensitive, responsive parent–child interactions and positive child development. Recent research has indicated that fathers also contribute to child development, but little is known about what types of interventions with fathers are effective in promoting sensitive, responsive father–child interactions.

Methods. Literature from 1983 to 2003 in the Medline, CINAHL, and PsycINFO databases was searched to locate intervention studies published in English that included a control group or used a pretest and post-test design; measured an aspect of father–child interaction; analysed father outcomes separately from mother outcomes; had a sample greater than one; and included infants or toddlers. Additional studies were located by cross-checking reference lists.

Results. Fourteen papers describing 12 interventions met the inclusion criteria. The interventions included infant massage, observation and modelling of behaviour with infant, kangaroo care, participation with child in a preschool programme, discussion groups, and parent training programmes.

Conclusion. Although the number of intervention studies is limited, there is evidence that, if interventions involve active participation with or observation of the father's own child, the intervention may be effective in enhancing the father's interactions with the child and a positive perception of the child. There is less information on how interventions influence child development. More research is needed to determine the influence of interventions over time, the

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differential influence on mothers and fathers, and the optimal dose of intervention required.

Keywords: father–child interaction, fathers, infants, intervention study, nursing, preschool age children, systematic literature review

Introduction

During the past decade, there has been increased interest in supporting the relationship between fathers and their young children. In North America, considerable effort has been directed towards keeping fathers connected with their children to provide a more stable environment for the child's development [e.g. United States (US) Families and Work Institute (Levine 1995) and Canadian Father Involvement Network (Wolpert 2002)].

It is well-known that maternal interactions with infants are related to child development (e.g. Huttenlocher 1998, Poehlmann & Fiese 2001, Tamis-LeMonda *et al.* 2001) and recent research indicates that sensitive, responsive father–infant interactions also are related to more optimal child development (Graham 1993, Gable *et al.* 1994, Magill-Evans & Harrison 1999, 2001, Shannon *et al.* 2002). In particular, a father's sensitivity to infant behaviour and his ability to engage the infant in interactions is associated with emotion regulation in 12-month-old infants (Crockenberg & Leerkes 2000) and in language development at 18 months (Magill-Evans & Harrison 1999). Additionally, low-income fathers who are more responsive in free play with their child are nearly five times more likely to have children within the normal range in cognitive development at 24 months (Shannon *et al.* 2002).

Most intervention studies and many health and social service programmes have targeted mothers with the assumption that mothers provide the majority of care to infants. In a review of prevention programmes with mothers, Beckwith (2000) noted that short, behaviourally focused interventions are effective in promoting child attachment and development in relatively well-functioning families and that longer, more intensive interventions are sometimes effective in families with multiple social and health risks.

Less is known about the effectiveness of interventions with fathers. In order to plan a community-based intervention programme for fathers of young children, a systematic literature review was completed to identify interventions that had been tested with fathers and that measured paternal and child outcomes. Integrative research reviews are effective in identifying consistency of findings, relationships among interventions and outcomes and the gaps in knowledge (Naylor 2003) and provide a foundation for further research.

Aim

The aim of this systematic literature review was to identify, categorize and evaluate interventions for fathers with infants or toddlers. The research questions were:

- What were the content, timing and method of delivery of the interventions to fathers of infants or toddlers?
- What was the influence of the intervention on fathers and their children?

Search methods

A search was carried out using the Medline, CINAHL and PsycINFO databases from 1983 to 2003 and limited to peer-reviewed publications in English. In constructing a strategy that would ensure comprehensive retrieval of relevant studies, subject headings and text words representing the following concepts were identified for each database as appropriate: (1) father terms such as fathers, paternal behaviour, father–child relations, and parent; (2) age limiting terms such as infants, preschool child, child aged 0–5 years; (3) intervention terms such as treatment, programs, education, prevention; and (4) study type terms such as controlled trials, pretest, post-test, random assignment, and comparative study. See Table 1 for the detailed terms and strategies used for each database. The search located 1649 studies.

Inclusion criteria

Studies were only included in the review if they addressed interventions with fathers of children 5 years old or younger and were published in English between 1983 and 2003. Other inclusion criteria were the use of a control group or a pretest and post-test design. Conference abstracts, unpublished research reports and dissertations were not included.

Data analysis

Citation information, including abstracts, for the 1649 studies was downloaded into ProCite5 computer software (ProCite5 1999) and reviewed to ensure that each reference met the inclusion criteria. At this stage, 102 articles met the screening criteria and were retrieved. These articles were

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Table 1 Search strategies for systematic review

Medline
1. exp FATHERS/or exp paternal behaviour/
2. FATHER-CHILD RELATIONS/
3. 1 or 2
4. (father$ or paternal).mp.
5. exp Parents/or exp Child Rearing/or exp PARENTING/or exp Parent-Child Relations/or exp child development/
6. exp Child Care/
7. exp infant care/
8. (parent$ adj5 train$).ti,ab.
9. (parent$ adj5 skill$).ti,ab.
10. (parent$ adj5 child$ adj5 relation$).ti,ab.
11. (child$ adj5 rear$).ti,ab.
12. parenting.ti,ab.
13. (child$ adj5 care).ti,ab.
14. (infant$ adj5 care).ti,ab.
15. (newborn$ adj5 care).ti,ab.
16. (child$ adj5 caring).ti,ab.
17. (infant adj5 caring).ti,ab.
18. (newborn$ adj5 caring).ti,ab.
19. or/5–18
20. 4 and 19
21. 3 or 20
22. limit 21 to (all infant or preschool child < 2–5 years >)
23. (child$ adj5 age$1 adj3 '0').ti,ab.
24. (child$ adj5 age$1 adj3 '1').ti,ab.
25. (child$ adj5 age$1 adj3 '2').ti,ab.
26. (child$ adj5 age$1 adj3 '3').ti,ab.
27. (child$ adj5 age$1 adj3 '4').ti,ab.
28. (child$ adj5 age$1 adj3 '5').ti,ab.
29. (neonat$ or newborn$ or infant$ or preschool$ or toddler$ or baby or babies).ti,ab.
30. (child$ adj5 mo).ti,ab.
31. (child$ adj5 month$1).ti,ab.
32. (young adj child$).ti,ab.
33. early intervention.mp. or exp 'Early Intervention (Education)'/
34. or/23–33
35. 21 and 34
36. 22 or 35
37. (treat$ or therap$ or intervention$ or program$ or counsel$ or prevent$).mp.
38. (outcome$ or clinical).mp.
39. (ed or th).fs.
40. (train$ or educat$).mp. [mp = title, original title,abstract, name of substance, mesh subject heading]
41. or/37–40
42. 36 and 41
43. RANDOMIZED CONTROLLED TRIAL.pt.
44. CONTROLLED CLINICAL TRIAL.pt.
45. RANDOMIZED CONTROLLED TRIALS/
46. RANDOM ALLOCATION/
47. DOUBLE BLIND METHOD/
48. SINGLE-BLIND METHOD/
49. CLINICAL TRIAL.pt.
50. exp CLINICAL TRIALS/
51. (clin$ adj5 trial$).ti,ab.
52. ((singl$ or doubl$ or trebl$ or tripl$) adj5 (blind$ or mask$)).ti,ab.
53. random$.ti,ab.
54. RESEARCH DESIGN/
55. COMPARATIVE STUDY/
56. exp EVALUATION STUDIES/or evaluation studies.pt.
57. FOLLOW UP STUDIES/
58. PROSPECTIVE STUDIES/
59. (control$ or prospectiv$ or volunteer$).ti,ab.
60. or/43–59
61. 42 and 60
62. 36 and 60
63. 61 or 62
64. limit 63 to yr = 1983–2003
65. limit 64 to English language
66. limit 65 to human

CINAHL
1. exp FATHERS/or exp paternal behaviour/
2. FATHER-CHILD RELATIONS/
3. 1 or 2
4. (father$ or paternal).mp.
5. 3 or 4
6. exp early intervention/or early intervention.mp.
7. parents/or adolescent parents/or adoptive parents/or biological parents/or single parent/
8. exp Child Rearing/
9. exp PARENTING EDUCATION/or exp PARENTING/
10. parent-child relations/or parent-infant relations/
11. or/7–10
12. (intervention$ or program$ or counsel$).mp.
13. (train$ or educat$).mp.
14. (th or rh or pf or ed).fs.
15. or/12–14
16. 5 or 11
17. 6 and 16
18. limit 17 to English
19. 5 and 15
20. random assignment/
21. random sample/
22. crossover design/
23. exp clinical trials/
24. exp comparative studies/
25. 'control (research)'/
26. control group/
27. factorial design/
28. quasi-experimental studies/
29. non-randomized trials/
30. placebos/
31. meta analysis/
32. clinical nursing research/or clinical research/
33. community trials/or experimental studies/or one-shot case study/
34. community trials/or experimental studies/or one-shot case study/or pretest-posttest design/or solomon four-group design/or static group comparison/or study design/
35. (clinical trial or systematic review).pt.
36. random$.mp.

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Table 1 (*Continued*)

37. ((singl$ or doubl$ or tripl$ or trebl$) adj10 (blind$ or mask$)).mp.
38. (cross?over or placebo$ or control$ or factorial or sham$).mp.
39. ((clin$ or intervention$ or compar$ or experiment$ or preventive or therapeutic) adj10 trial$).mp.
40. (meta?analy$ or systematic review$).mp.
41. convenience sample/
42. exp research, allied health/or research, medical/or research, nursing/
43. research question/
44. nursing practice, research-based/
45. research methodology/
46. exp evaluation research/
47. concurrent prospective studies/or prospective studies/
48. (nursing interventions or research).pt.
49. (prospective or follow-up or follow up).mp.
50. or/20–49
51. 19 and 50
52. limit 51 to (newborn infant or infant <1 to 23 months> or preschool child <2–5 years>)
53. (child$ adj5 age$1 adj3 '0').ti,ab,id.
54. (child$ adj5 age$1 adj3 '1').ti,ab,id.
55. (child$ adj5 age$1 adj3 '2').ti,ab,id.
56. (child$ adj5 age$1 adj3 '3').ti,ab,id.
57. (child$ adj5 age$1 adj3 '4').ti,ab,id.
58. (child$ adj5 age$1 adj3 '5').ti,ab,id.
59. (neonat$ or newborn$ or infant$ or preschool$ or toddler$ or baby or babies).ti,ab,id.
60. (child$ adj5 mo).ti,ab,id.
61. (child$ adj5 month$1).ti,ab,id.
62. (young adj child$).ti,ab,id.
63. (fives or early bird$).ti,ab,id.
64. or/53–63
65. 51 and 64
66. 52 or 65
67. 18 or 66
68. limit 67 to yr = 1983–2003
69. 16 and 50 and 64
70. 16 and 50
71. limit 70 to (newborn infant or infant <1 to 23 months> or preschool child <2–5 years>)
72. 69 or 71
73. 72 and 15
74. limit 73 to (English and yr = 1983–2003)
75. 74 not 68

PsycInfo

1. **exp fathers/**
2. exp Father child relations/
3. exp Adolescent fathers/
4. (father$ adj3 child$ adj3 interact$).mp.
5. (father$ adj3 child$ adj3 relation$).mp.
6. or/1–5
7. exp Childrearing practices/or exp parents/
8. Parent training/or parenting skills/or parental role/
9. exp Parental investment/or exp parental attitudes/
10. Parent child relations/or childrearing practices/

Table 1 (*Continued*)

11. (parent$ adj3 child$ adj3 interact$).ti,ab,id.
12. (parent$ adj3 child$ adj3 relation$).ti,ab,id.
13. parent$.mp.
14. or/7–13
15. (Father$ or paternal).mp.
16. 14 and 15
17. 6 or 16
18. limit 17 to (120 neonatal or 140 infancy or 160 preschool age)
19. (child$ adj5 age$1 adj3 '0').ti,ab,id.
20. (child$ adj5 age$1 adj3 '1').ti,ab,id.
21. (child$ adj5 age$1 adj3 '2').ti,ab,id.
22. (child$ adj5 age$1 adj3 '3').ti,ab,id.
23. (child$ adj5 age$1 adj3 '4').ti,ab,id.
24. (child$ adj5 age$1 adj3 '5').ti,ab,id.
25. (neonat$ or newborn$ or infant$ or preschool$ or toddler$ or baby or babies).ti,ab,id.
26. (child$ adj5 mo).ti,ab,id.
27. (child$ adj5 month$1).ti,ab,id.
28. (young adj child$).ti,ab,id.
29. exp early intervention/or early intervention.mp.
30. (fives or early bird$).ti,ab,id.
31. or/19–30
32. 17 and 31
33. 18 or 32
34. (treat$ or therap$ or intervention$ or program$ or counsel$ or prevent$).mp.
35. (outcome$ or clinical or training).mp.
36. 34 or 35
37. (Control$ or Pre-test or Post-test).mp.
38. Random$.mp.
39. Empirical Study.fc.
40. (research or study or trial$).ti,ab.
41. or/37–40
42. 33 and 36 and 41
43. limit 42 to (human and English language and yr = 1983–2004)
44. exp *Childrearing practices/or exp *parents/
45. *Parent training/or *parenting skills/or *parental role/
46. exp *Parental investment/or exp *parental attitudes/
47. *Parent child relations/
48. (parent$ adj3 child$ adj3 interact$).ti,ab,id.
49. (parent$ adj3 child$ adj3 relation$).ti,ab,id.
50. (parent$ adj3 skill$1).ti,ab,id.
51. (parent$ adj3 training).ti,ab,id.
52. or/44–51
53. limit 52 to (120 neonatal or 140 infancy or 160 preschool age)
54. 31 and 52
55. 53 or 54
56. 36 and 41 and 55
57. limit 56 to (human and English language and yr = 1983–2004)
58. 57 not 43

reviewed to ensure that the study measured an aspect of father–child interaction, analysed father outcomes separately from mother outcomes, had a sample of greater than one and included only children under 5 years. Fourteen articles met all these inclusion criteria.

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The final 14 articles were reviewed independently by two of the authors and data extracted using purpose-designed forms. One form summarized the study by sample size, population, research design, type of intervention, method of analysis, bias sources, outcome measures and evidence of their reliability and validity, findings, power, and effect size. The second form rated the quality of important aspects of the study using a 3-point scale (pass, moderate and fail). Inclusion/exclusion criteria, attrition rate, control for potential bias, completeness of the description of the intervention, reliability and validity of measures, description of data collection, report of findings including mean scores and standard deviations, appropriate statistical evaluation and power calculations were rated. The first three authors met to discuss the studies and to reach consensus on a final rating of strong, moderate, or weak for each article. There were an inadequate number of studies to conduct a meta-analysis of the findings due to the diversity of interventions.

Results

Table 2 lists the 14 papers that were included in the final review. Two were follow-up reports of the same intervention by the same group of researchers and are placed together in Table 2. In the following description of the interventions, we refer to 12 interventions.

Description of interventions

The majority of the interventions (9/12) targeted fathers of newborns or infants. Of these interventions, four were for fathers during the prenatal period or infancy and addressed awareness of or sensitivity to infant behaviour (Belsky 1985, Beal 1989, Culp *et al.* 1989, Pfannenstiel & Honig 1991,1995); four interventions taught specific skills such as infant massage (Scholz & Samuels 1992, Cullen *et al.* 2000), kangaroo care (Feldman *et al.* 2002), or infant-care skills (Dachman *et al.* 1986). One study addressed the social and physical environment for labour and delivery (Westreich *et al.* 1991). The earlier studies of interventions for fathers of infants (Belsky 1985, Beal 1989, Culp *et al.* 1989) described interventions that were brief and included only one dose. Most of the interventions in later studies included repeated exposure to the intervention ranging from two doses (e.g. Pfannenstiel & Honig 1991,1995) to daily for 1 month (Cullen *et al.* 2000).

The remaining three interventions were for fathers of toddlers or preschool age children. These studies (McBride 1991, Gross *et al.* 1995, Tucker *et al.* 1998, Fagan & Iglesias 1999) all had multiple exposure of the father to an intervention that included participation in a group with other fathers. These interventions had multiple components. Fagan and Iglesias (1999) included opportunities for father–child interaction in a play or recreation setting as well as sensitivity training on fathering to Head Start programme staff. McBride (1991) included structured and unstructured father–child playtime along with parent education groups for fathers. The intervention for fathers and mothers reported by Gross *et al.* (1995) and Tucker *et al.* (1998) was a parent training programme with group discussions and weekly written homework. The latter intervention was the only one that included both mothers and fathers of toddlers.

Study samples were predominantly middle class families who were recruited from either the community or health and social services. Two interventions specifically addressed low income families (Pfannenstiel & Honig 1991,1995, Fagan & Iglesias 1999). The mothers of the infants were included as a separate group or jointly with the father in 7/12 interventions (Belsky 1985, Beal 1989, Culp *et al.* 1989, Westreich *et al.* 1991, Scholz & Samuels 1992, Gross *et al.* 1995, Feldman *et al.* 2002). Many of the interventions (6/12) had fewer than 20 individuals per group. In studies with small sample sizes, efforts were made to address attrition that ranged from zero to 34%. Most of the interventions included children who were healthy and developing normally. Parents of premature infants were involved in two interventions – guided observation of infant behaviour (Culp *et al.* 1989) and kangaroo care (Feldman *et al.* 2002) – while parents of children who were behaviourally difficult participated in a parent education intervention (Gross *et al.* 1995, Tucker *et al.* 1998).

Study design and outcomes

Table 3 summarizes the studies by research design, outcome measures, findings and quality of the study. Articles that addressed follow-up of the same intervention are summarized individually as they report different outcomes or the same outcomes at a different time, bringing the total to 14 articles. Seven articles describe a randomized control trial, six describe a cohort study and one article describes a before-and-after case study. Two studies (Fagan & Iglesias 1999, Feldman *et al.* 2002) were rated as strong; eight were rated as medium quality and four were rated weak.

All studies except Belsky (1985) reported at least one significant finding for either mothers or fathers. As shown on Table 3, there were few studies that used the same outcome measures. Outcome measures were frequently developed for specific studies and there was limited information on reliability or validity of the measures. This diversity of outcome

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Table 2 Summary of studies by age of child, type and duration of intervention, population and sample size

Study	Intervention	Treatment (Rx) duration	Control (Ctrl) intervention	Population	Rx in Ctrl n Attrition	Age of child at intervention
Prenatal studies or studies with infants (n = 9)						
Beal (1989)	Demonstration of a BNBAS by certified interventionist to father and mother in hospital prior to infant's discharge	One observation on 1 day	Interventionist completed a BNBAS on infant that parents did not observe. A summary given to the parents	Community sample of first time fathers who attended prenatal classes, were present during labour and delivery, infant healthy at birth	Rx = 22 Ctrl = 22 No attrition	Newborn 2–3 days
Belsky (1985)	Participation in eliciting infant behaviour under guidance of interventionist in hospital. (Two groups: Moms only, moms and dads together)	One observation on 1 day	Listened to description of infant's behaviour during BNBAS (two groups: moms only, moms and dads together)	Community sample of first time parents in intact marriages recruited from one obstetrical practice	Rx = 15 per group Ctrl = 15 per group Recruited 67; 60 families had data on two of three outcomes	Newborn 2–4 days
Cullen *et al.* (2000)	Father taught by massage therapist to massage his infant at home for 15 minutes before bedtime for 1 month. Used training videotape and written instructions at home	15 minutes nightly for 1 month	Father followed usual bedtime routine and read a story to child	Community sample of fathers recruited from a university family centre	Rx = 11 Ctrl = 11 No attrition	3–14 months
Culp *et al.* (1989)	Observation of their baby's behaviour in hospital while a trained interventionist administered the APIB and gave parent verbal feedback prior to outcome measures	One observation on 1 day	Completed outcome measures prior to observing the APIB	Mothers and fathers recruited while their premature infant in NICU. GA at birth 26–32 weeks	Rx = 7 couples Ctrl = 7 couples No attrition	When infant's health was stable, approximately 37 weeks GA
Dachman *et al.* (1986)	Study 1: manual, individual role modelling of infant care and stimulation activities using newborn size doll prenatally	Initial training session 90 minutes with one or more follow-up sessions (30–60 minutes)	None	Community sample of first time fathers	*N* = 3 No attrition	Prenatal

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Table 2 (*Continued*)

Study	Intervention	Treatment (Rx) duration	Control (Ctrl) intervention	Population	Rx in Ctrl n Attrition	Age of child at intervention
Study 2: manual, individual role modelling of infant care and stimulation activities prenatally with doll and postnatally in the home with father's newborn infant	Same as above	None	Community sample of first time fathers	$N = 3$ No attrition	Training in the home at 2, 6 or 8 weeks postnatally	
Feldman *et al.* (2002)	Mother gave kangaroo care to premature infant and father allowed to participate	1 hour daily for 14 consecutive days	Mother did not use kangaroo care with premature infant	Mothers recruited from Level Three NICUs. GA at birth 25–34 weeks Exclusion criteria: infant medical condition, maternal drug use, recent immigrant	Rx = 73 Ctrl = 73 At 6 months: Rx = 66, Ctrl = 67 Attrition <20% and balanced	In NICU
Pfannenstiel and Honig (1991, 1995)	Prenatal education for fathers using a booklet on capabilities of fetus/newborn and modelling of sensitive responsiveness to fetal/newborn. Done in groups or individually	Two $1\frac{1}{2}$ hour sessions	Fathers received an information booklet summarizing content of the intervention after outcomes were measured	Low socioeconomic, first time fathers whose partner had a low- or high-risk pregnancy. Recruited through hospital prenatal clinics	Rx = 3 groups with 11, 11 and 12 Ctrl = 3 groups with 11, 11, 11. No attrition	Prenatal
Scholz and Samuels (1992)	Demonstration of baby massage and the Burleigh Relaxation Bath technique to mothers and fathers with a follow-up brochure	1-hour home visit	No instruction on either the massage or bath technique. Had a general discussion with home visitor on infant development in home visit lasting 45 minutes	First time parents (mother and father) recruited through hospital antenatal classes	Rx = 16 Ctrl = 16 No attrition	4 weeks

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Table 2 (*Continued*)

Study	Intervention	Treatment (Rx) duration	Control (Ctrl) intervention	Population	Rx in Ctrl n Attrition	Age of child at intervention
Westreich *et al.* (1991)	Couples admitted to a birthing room for labour and birth. Routine use of shaving, enema, intravenous drip and electronic fetal monitoring prohibited. Parents remained in room for one hour postpartum with their infant	During labour and birth	Couples admitted to traditional care for labour and birth with no restrictions on staff or parental behaviour	Mothers and father recruited from prenatal classes, doctors' offices. Women with 'some prenatal risk' were excluded. Included both primiparas and multiparas	Rx = 56 couples Ctrl = 58 couples Attrition > 20%	Newborn
Studies with toddlers or preschool children (n = 3)						
Fagan and Iglesias (1999)	Adaptation of traditional Head Start programme activities to increase meaningfulness for men (volunteering in class, Fathers' Day, monthly father support groups, father-child recreation and sensitivity training for staff)	8 months	Traditional Head Start programme activities	Community sample of men who were significantly involved in care and support of the child and whose child attends Head Start programme	Rx = 91 Ctrl = 55 Attrition > 20%	Preschool (mean age 53 months)
Gross *et al.* (1995) Follow-up study 1 year later: Tucker *et al.* (1998)	Parent training programme which included mothers and fathers in a group who viewed & discussed videotaped vignettes of parent–child interactions with feedback from nurse with graduate preparation in mental health. Programme manual for group leader. Weekly written homework for parents	Once weekly for 10 weeks	None	Mothers and fathers recruited from health centre and community who rated their toddler as behaviourally difficult (> 125 on Eyberg Child Behaviour Inventory intensity subscale or > 3·4 on Toddler Temperament Scale)	Rx = 11 families Ctrl no. 1 = 6 families; Ctrl no. 2 = 7 families randomly selected for intervention who chose not to participate in the intervention Attrition < 20%	24–36 months
McBride (1991)	Parent education for father and child; group discussions and father–child structured and unstructured playtime	Two-hour session once a week for 10 weeks	Fathers on the wait list for the programme	Fathers recruited from the community through preschools, paediatricians offices and family service organizations	Rx = 30 Ctrl = 30 No attrition	25–64 months

BNBAS, Brazilian Neonatal Behavioral Assessment Scale; APIB, Assessment of Preterm Infant Behavior; NICU, Neonatal Intensive Care Unit; GA, gestational age.

Table 3 Summary of outcomes, measures, results and quality of study

Study	Outcomes	Measures	Time since intervention	Finding (statistically significant unless indicated otherwise)	Quality rating	Comments
Randomized control studies (n = 7)						
Belsky (1985)	Mother–child interaction	O; unnamed	1, 3 and 9 months	NS change in either maternal involvement or infant behaviour	Moderate	1, 2, 6, 8
	Mother–father–child interaction	O; unnamed		NS change in reciprocal engagement for either mother–child or father–child dyad		
Cullen *et al.* (2000)	Father involvement in caregiving	Q; CCS	Immediate postintervention	Ctrl fathers became less involved in play with their infant and overall caregiving but fathers in massage group did not decrease their involvement in either activity	Moderate	1, 2, 6
	Child sleep latency time	Q; nightly diary		Sleep latency time decreased for both groups of infants NS difference between groups		
	Father–child play interaction	O; MBRS-R		Fathers in the massage group increased in expressiveness, enjoyment, warmth, and acceptance but not responsivity Fathers in the Ctrl decreased in expressiveness, warmth, responsivity, but not enjoyment or acceptance		
Gross *et al.* (1995)	Parental self-efficacy	Q; TCQ	Immediate postintervention and 3 months later	NS change in fathers' self-efficacy but the parent training intervention resulted in increases in maternal self-esteem	Moderate	2, 4, 6
	Parenting stress	Q; PSI		NS change in fathers' parenting stress in either the Parent Domain or the Child Domain subsales; mothers in the parent training intervention reported less stress on the Parent Domain subscale but not on the Child Domain subscale		
	Depression	Q; CESD		NS change for either fathers or mothers		
	Child behavioural difficulty	Q: ECBI		NS change for fathers in either child intensity and child problems subscales. Mothers in the parent training intervention reported fewer child problems after selection but before participation in the intervention		
	Child temperament	Q; TTS		NS change reported by either fathers or mothers		
	Parent–toddler interaction	O; DPICS		NS change for father behaviours but children in one control group became more difficult with their father over time. Mothers in the parent training intervention used more praise while mothers in the Ctrl groups used significantly more critical statements		
Pfannenstiel and Honig (1995)	Knowledge of infant capabilities	Q; KIS	12–20 weeks	Fathers who participated in classes on infant care and behaviour gave more correct responses to questions on infant capabilities than Ctrl fathers	**Weak**	2, 8, 9

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Table 3 (*Continued*)

Study	Outcomes	Measures	Time since intervention	Finding (statistically significant unless indicated otherwise)	Quality rating	Comments
Pfannenstiel and Honig (1991)	Father–infant interaction during a feeding	O; AFIS	In hospital and 1 month later	Immediately after the classes, fathers in the intervention and their infants interacted more sensitively than Ctrl father–infant dyads; there were NS differences between the groups 1 month later	Moderate	1, 2, 5, 6
Scholz and Samuels (1992)	Time in activities	Q: diary	8 weeks	Fathers who were taught infant massage and relaxation bath gave their infants more baths and massages in study period than Ctrl fathers	Moderate	1, 2, 6
	Infant greeting response	O; unnamed		Infants of fathers in the intervention showed more positive behaviours to their father than infants of Ctrl fathers		
	Family dynamics	O; unnamed		Infants of fathers in the intervention made more positive overtures to their fathers, showed more positive moods; their fathers had more involvement with the infant than Ctrl father–infant dyads		
Tucker *et al.* (1998)	Parental self-efficacy	Q; TCQ	12 months	NS change in fathers' self-efficacy but the increase in maternal self-esteem for mothers in the parent training group was maintained for 1 year	Moderate	2, 7
	Parenting stress	Q; PSI		NS change in fathers' parenting stress in either the Parent Domain or the Child Domain subscales; the decrease in stress in the parent domain subscale for mothers in the parent training group was maintained for 1 year		
	Child behavioural difficulty	Q: ECBI		Fathers in the parent training group reported lower intensity of Child Problems than Ctrl fathers postintervention and this difference was maintained over 1 year. NS change for mothers in either Child Intensity or Child Problems subscales		
	Child temperament	Q; TTS		NS change reported by either fathers or mothers		
	Parent–toddler interaction	O; DPICS		NS change in father–child behaviours. Mothers in the parent training group used fewer critical statements at 1 year and maintained their increase in labelled and unlabelled praise from postintervention		
Cohort studies with control (n = 6)						
Beal (1989)	Interaction with child	O; unnamed	8 weeks	More mutuality between infant and father and more infant eye contact with father who observed infant behaviour during a BNBAS	Moderate	1, 6, 9
	Attitude to parenting	Q; PAS		NS changes in attitude to parenting		
	Involvement in caretaking	Q; unnamed		NS differences between groups in involvement in caretaking		
	Perception of infant	Q; ICQ		Fathers in Ctrl reported child more unpredictable		

Table 3 (*Continued*)

Study	Outcomes	Measures	Time since intervention	Finding (statistically significant unless indicated otherwise)	Quality rating	Comments
Culp *et al.* (1989)	Anxiety	Q; STAI	2 weeks	Fathers who observed their child's response to an APIB with feedback were less anxious than Ctrl fathers; NS change in anxiety for mothers	Weak	1, 2, 6, 8, 9, 10
	Perception of infant	Q; NPI		Parents in the intervention had more realistic perceptions than Ctrl group		
	Knowledge of infant behaviour	Q; unnamed		NS differences between fathers in intervention and Ctrl in rating of infant's initial and continued response to noise and light. Mothers in the intervention more aware of their infant's attempt to shut out stimulation		
Fagan and Iglesias (1999)	Father involvement at home	In; unnamed	Postintervention	Intervention fathers who participated in >21·5 hours of the programme (high-dose) had the greatest positive change in direct interaction and the greatest increase in accessibility to their child but changes in amount of care giving were NS	**Strong**	3
	Support of learning	In; unnamed		High-dose intervention fathers had the greatest increase in support for learning		
	Child rearing behaviour	Q; PDI (Nurturance)		NS differences in nurturance behaviour		
		O; PCIS(Play)		NS differences in quality of involvement during play activities		
	Child's academic readiness	O; WJTA-R		Children of high-dose intervention fathers had the highest scores in Applied Problems but there were NS differences in Letter-word identification		
	Child's social skills	Q; SSRS		Parents in low-dose Ctrl (1–4 hours in the programme) reported an increase in child behaviour problem scores while parents in low dose intervention group reported a decrease. Teacher reports were NS. There were NS differences in parent report of prosocial behaviour		
Feldman *et al.* (2002)	Home environment	O; HOME	3 months	Mothers and fathers whose premature infant received kangaroo care had better scores on emotional and verbal responsiveness, and were more adept at organizing the child's home environment.	**Strong**	None
	Infant temperament	Q: ICQ	3 months	NS differences in infant fussy-difficult temperament as reported by mothers or fathers.		

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Table 3 (*Continued*)

Study	Outcomes	Measures	Time since intervention	Finding (statistically significant unless indicated otherwise)	Quality rating	Comments
	Infant development	Bayley MDI Bayley PDI	6 months	Controlling for either fathers' or mothers' HOME scores, cognitive development of infants who had kangaroo care was significantly higher. Kangaroo care had a positive impact on the motor development of infants who were at high medical risk but not those at low medical risk.		
	Mother–infant interaction	O; CIB	6 months	Fathers were not observed. Maternal sensitivity was higher among mothers who provided kangaroo care; medical risk did not affect interaction scores		
McBride (1991)	Responsibility	Q; CCTC	Not given	Fathers in the parent education/support group reported more child care tasks for which they were responsible	**Moderate**	1, 5, 6, 7
	Accessibility	Q; ITC		On non-work days, fathers in the intervention reported more time when they were accessible to their child		
	Interaction	Q; ITC		On non-work days, fathers in the intervention spent more time interacting with their child		
	Sense of Competence	Q; PSOC		Fathers in the intervention reported higher levels of competence on the Skill/Knowledge and Value/Comfort subscales		
Westreich *et al.* (1991)	Helping and affectionate behaviour during labour	O; unnamed	Concurrent	Fathers in a conventional hospital setting (Ctrl) more involved in coaching breathing, verbally encouraging and touching their partner during labor than fathers whose partner was in a birthing room (Intervention)	Weak	1, 3, 5, 6, 8, 9
	Maternal Satisfaction with birth	Q; unnamed	At birth	No information provided on group differences. Negative correlation between father's involvement with child at 3 months (affectionate physical contact, verbal contact and play) and mother's satisfaction with childbirth		
	Father involvement in feeding	O: unnamed	3 months	NS differences between fathers in their involvement with infant during feeding		
	Father involvement in play	O; unnamed	12 months	NS differences between fathers in their involvement with infant during play		
	Father participation in child care, mutual support and parental competence	Q; unnamed	3 & 12 months	No group comparisons reported		

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Table 3 (*Continued*)

Study	Outcomes	Measures	Time since intervention	Finding (statistically significant unless indicated otherwise)	Quality rating	Comments
Before and After Case Series ($n = 1$)						
Dachman *et al.* (1986)	Study 1: Infant care Infant stimulation	O; infant care and stimulation	At end of training and 1 mo	Fathers increased in care skills after completing a programmed instruction manual & increased in stimulation of their infant after role modelling but not after review of manual	Weak	1, 2, 4, 7, 9
	Study 2: Infant care Infant stimulation	Same as above	At either 2, 6 or 8 weeks	Fathers increased in care skills & increased in physical stimulation but there was little effect on verbal stimulation	Weak	1, 2, 4, 7, 9

1, Inclusion and/or exclusion criteria unclear; 2, Group size <20; 3, attrition >20%, not reported or no information on drop outs; 4, lack of control for potential confounders; 5, description of intervention inadequate for replication; 6, limited information on reliability and/or validity of measure(s); 7, unknown whether coders of behaviour blind to group assignment; 8, means and/or standard deviations of data not reported on measure(s); 9, inappropriate statistical analysis; 10, mother and father scores on measure(s) not analysed separately.
CCS, Child Care Scale; MBRS-R, Maternal Behaviour Rating Scale-revised; TCQ, Toddler Care Questionnaire; PSI, Parenting Stress Index; CESD, Center for Epidemiologic Studies Depression Scale; ECBI, Eyberg Child Behaviour Inventory; TTS, Toddler Temperament Scale; DPICS, Dyadic Parent–child Interaction Coding System; KIS, Knowledge of Infant Scale; AFIS, Assessment of Father–Infant sensitivity; ICQ, Bates Infant Characteristics Questionnaire; PAS, Parenting Attitude Scale, unpublished, developed by Boyd; STAI, State-Trait Anxiety Inventory; NPI, Neonatal Perception Inventory; PDI, Parenting Dimensions Inventory; PCIS, Parent/Caregiver Involvement Scale; WJTA-R, Woodcock-Johnson Tests of Achievement-Revised; SSRS, Social Skills Rating System; HOME, Home Observation for Measurement of the Environment Inventory; Bayley MDI, Bayley Mental Development Index; Bayley PDI, Bayley Psychomotor Development Index; CBI, Coding Interactive Behaviour; CCTC, Child Care Task Checklist; ITC, Interaction Time Chart; PSOC, Parenting Sense of Competence Scale; O, observation of behaviour; Q, questionnaire measure; In, interview measure; NS, non-significant; Ctrl, control group.

measures and the weakness of some of the articles make it difficult to synthesize the findings. As caution should be used in accepting the findings of studies that were rated weak, the following summary of findings includes only the 10 articles that were rated as medium or strong in our review.

Effects of interventions on fathers' behaviour

Those interventions that showed a significant influence on the father's behaviour with his child were: infant massage (Scholz & Samuels 1992, Cullen *et al.* 2000); prenatal education about infant behaviour directed to fathers and modelling of this behaviour with the newborn (Pfannenstiel & Honig 1995); observation of infant behaviour by mother and father together during a structured physical examination of the infant (Beal 1989); enhanced participation for fathers in a Head Start programme including support group and father–child recreation activities (Fagan & Iglesias 1999); kangaroo care to their infant in NICU by mother and father (Feldman *et al.* 2002); and a discussion group for fathers of toddlers accompanied by father-child playtime (McBride 1991). In all these interventions, there was the opportunity for fathers to learn how to observe and interpret child behaviour. Most of the interventions gave the father multiple opportunities to interact with or observe his own child in a setting that provided feedback about child behaviour. In Beal's study, however, the father had only one guided observation of his child's behaviour when the child was 2–3 days old. Even with this small dose of the intervention, there was more mutuality and eye contact between the father and child measured 8 weeks later.

Some caution should be used in interpreting Beal's (1989) intervention as effective. Belsky (1985) used a similar intervention with mothers and fathers of infants 2–4 days old but found no significant effects on father–child interactions measured in the home at 1, 3 and 9 months. The difference in findings between these two studies might be explained by differences in the measures used to analyse father–child behaviour. Beal (1989) used an unpublished measure devised by Pepi (1981) to rate a 2 minute videotape of the father playing with his child in the home using scores based on frequency of observed behaviours per 15 seconds and well as reciprocal behaviour of parent and child. With a measure that he developed, Belsky (1985) analysed 64 minutes of interaction between father–infant, mother–infant and father–mother coded in the home on a 15-seconds observe, 5-seconds record basis by observers blind to the intervention and group assignment. The articles do not provide enough information on the behavioural measures to make detailed comparisons. The difference in findings on the effectiveness of the intervention might relate to different behaviours

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chosen for observation, differences in the length of time that the father and child were observed or to different methods used to calculate and analyse scores.

Effect of interventions on fathers' perceptions or knowledge
Four studies showed that the intervention influenced father perception or knowledge. Three of these interventions also influenced father behaviour as described above. In general, the interventions assisted fathers to perceive their child more positively or to feel more self confident in fathering. Fathers in the control group in Beal's (1989) study perceived their child as more unpredictable at 8 weeks than fathers who observed their infant's behaviour in company with the child's mother during a structured physical examination of the infant. Fathers in the low dose control group in the study of enhanced participation in a Head Start programme (Fagan & Iglesias 1999) viewed their children as having more behaviour problems than fathers who received the intervention. In a study of a 10-week parent training programme, which included discussion of videotape vignettes for mothers and fathers of toddlers, Tucker *et al.* (1998) reported that fathers in the intervention group perceived their child to have less intense behaviour problems postintervention than fathers in the control group. Fathers who participated in a discussion group for fathers of toddlers accompanied by father–child playtime (McBride 1991) reported higher levels of self-competence.

Effects of interventions on the children
Although it is reasonable to expect that an intervention directed towards fathers would influence father behaviour or perceptions and knowledge before changes would appear in the child, four studies did report an impact on the child's behaviour or development. Using infant massage as the intervention, Scholz and Samuels (1992) found that infants became more positive in mood and behaviour and made more overtures to the father while Beal (1989) found that an infant made more eye contact with his or her father after the father observed a structured physical examination of his infant at 2–3 days of age. Feldman *et al.* (2002) found that kangaroo care by mothers and fathers in NICU resulted in better motor development and cognitive skills at 3 months. As the study by Feldman *et al.* included only seven fathers in the intervention, it is possible that the positive outcomes are related to the impact of the intervention on the mothers who were the primary providers of kangaroo care. Fagan and Iglesias (1999) found that preschool children of fathers with high levels of participation in an 8-month intervention had better skills in solving applied math problems. None of the studies measured child language development.

Effects for fathers and mothers
There is some evidence that interventions that have an impact on mothers may not be the same as those that have an impact on fathers. In their research with parents of behaviourally difficult toddlers, Gross *et al.* (1995) and Tucker *et al.* (1998) report that a parent education intervention which included discussion of videotaped vignettes of parent–child interactions and weekly written homework was more effective for mothers. Mothers receiving the intervention had an increase in self-efficacy, less parenting stress, and used more praise in interactions with the child but there was no significant influence on fathers at 3 months (Gross *et al.* 1995) or at 1 year (Tucker *et al.* 1998). One of the difficulties with this intervention was the lower level of participation by the fathers; 40% of fathers compared to 10% of mothers missed more than half of the parenting discussions and 50% of fathers, but no mothers, completed none of the homework assignments (Gross *et al.* 1995). No explanation is suggested by the researchers for the lower level of participation by fathers but others (Turbiville & Marquis 2001) have suggested that fathers have a preference for active involvement in activities with their child as opposed to informational meetings or support groups.

It is important to determine whether an intervention is more effective if both parents participate or if the intervention is directed to fathers only. This question was addressed by only one study. Belsky (1985) included two intervention groups, fathers and mothers versus mothers only as well as a control group and had no significant outcomes for either intervention group. The other interventions that were offered to both mothers and fathers did not include a father-only intervention group.

Amount of intervention (dose)
There is evidence that dosage of the intervention may be important. Fagan and Iglesias (1999) found that fathers with the most exposure to the intervention over 8 months had the greatest changes in behaviour. High-dose fathers ($>21{\cdot}5$ hours in the programme) had the greatest positive change in direct interaction with their child, the largest increase in accessibility to their child and provided the greatest increase in support to their child for learning. In contrast, Pfannenstiel and Honig (1991) found that immediately after one session in a parent education class, fathers interacted more sensitively with their infant but these changes were not present 1 month later.

Limitations of the studies

There were a variety of methodological weaknesses in the studies in this review (see Table 3). Common limitations were

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What is already known about this topic

- Sensitive, responsive parent–infant interactions are related to more optimal child development.
- Interventions with mothers of infants have been successful in increasing maternal sensitivity and responsiveness.
- Little is known about the effectiveness of interventions with fathers.

What this paper adds

- Some interventions for fathers that involve active participation with or observation of his child enhance father–child interactions.
- Intervention is more likely to be effective if the father has multiple exposures to the intervention.
- More research is needed to determine the appropriate dose of effective interventions, the impact of an intervention over time, and the differential impact of interventions with mothers and fathers.

lack of information on inclusion and/or exclusion criteria, small sample size (< 20 per group) and limited information on reliability and validity of outcome measures. No information was presented on effect size or statistical power in most of the articles reviewed which is of concern in light of the small sample sizes. Effect size and statistical power of the analysis were presented only by Fagan and Iglesias (1999) although the impact of having a small sample was acknowledged by Tucker *et al.* (1998). The study by Fagan and Iglesias (1999) was the only study that included statistical analyses of dosage or the number of contacts with the intervention.

The number of intervention studies in this review is small, with more studies of moderate rather than high quality. Information on interventions not presented in peer-reviewed journals was excluded. This exclusion may have biased the studies reviewed to those that demonstrated an effect. We also did not include articles published in languages other than English, and the majority of the intervention studies (11/14) were conducted in the United States of America (USA). The remaining three studies were conducted in Australia, Canada or Israel. It is unknown whether fathers from other cultural groups or settings would respond positively to the same interventions.

Implications for nursing

In many developed countries, nurses and other health professionals working in hospitals, community clinics, and family homes are encouraged to consider the parent–child interaction skills of both parents and identify parents who require intervention. In these contexts, nurses and other professionals who are interested in promoting positive father–child interactions and increased father involvement with either infants or toddlers can consider using the interventions reported in this review that have addressed these outcomes with encouraging results. For example, massage intervention for young infants and their fathers (Scholz & Samuels 1992, Cullen *et al.* 2000) appears promising. This intervention requires minimal input in terms of training, is practical to implement, and has positive effects on father–child interactions. Nurses interested in altering fathers' reports of depression, stress, or attitudes towards parenting need to develop alternative interventions as those reviewed here were not successful in these areas.

The cultural context of the interventions needs to be considered with care when implementing an intervention programme for fathers. None of the reviewed studies examined the impact of cultural values on the effectiveness of the intervention with non-English speaking fathers and most of the studies were conducted with fathers residing in the USA.

Cost is an important factor when considering interventions for use in service settings. Many of the studies reviewed had multiple components or more than one dose. Because of the small sample sizes in most of the studies, there were limited efforts to examine the impact of dosage of the intervention or to examine the effectiveness of different components in an intervention. It was unclear whether all components of the intervention were necessary for the intervention to be successful (i.e. for changes to occur in either the father or the child). There is a need in future research to examine the differential impact of the dose on effectiveness of the intervention and to examine the impact of each component of an intervention. This type of analysis would enable practitioners to selectively choose the components of an intervention that they wish to implement.

Other important questions for future nursing research are the differential effects of an intervention on mothers and fathers as well as the effect of targeting fathers alone or both mothers and fathers in the same intervention. There is some evidence that fathers and mothers respond differently to an intervention but there is little information on whether the presence of the other partner enhances or diminishes the influence of an intervention. As the family is the context in which fathering takes place, it is likely that other members of the family have an influence on whether fathers choose to participate in interventions and whether the intervention is effective.

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There is a need for more studies to examine sustained effects of an intervention to determine whether positive change can be maintained and when the effect of an intervention will diminish. Naylor (2003) suggests that multilevel interventions with integration of community level intervention and intervention at the individual level may be more effective over the long-term. Although some of the interventions reviewed for this article had multiple components, none of them addressed community level interventions such as paternal employment leave policies. Ongoing research is needed in other areas. Some of the questions to be addressed include the long-term impact of an intervention on family relationships and on child development as well as determination of the minimum level or dose of an effective intervention.

Conclusion

Despite the limitations discussed previously, there is evidence that interventions can be effective with fathers of infants and toddlers if the intervention involves active participation with or observation of the father's own child. The interventions in this systematic review that have the strongest potential for further implementation or research with different populations or settings are infant massage, kangaroo care, guided observation of one's own infant with modelling, and participation in a community programme for fathers which includes active interaction with the child along with discussion/support groups. Dosage of the intervention is also important; the intervention is more likely to be effective if the father has multiple exposures. More research is needed to determine the influence of interventions over time, the differential influence on mothers and fathers, the optimal dose of intervention required and the impact on child development.

Author contributions

JME, MJH and GR were responsible for the study conception and design and drafting of the manuscript; JME, MJH and GR performed the data collection and data analysis; JME, MJH, GR and LS made critical revisions to the paper; LS conducted an electronic literature search.

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