Evidence-Based Parenting Interventions to Promote Secure Attachment: Findings From a Systematic Review and Meta-Analysis

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Abstract

Various interventions are used in clinical practice to address insecure or disorganized attachment patterns and attachment disorders. The most common of these are parenting interventions, but not all have a robust empirical evidence base. We undertook a systematic review of randomized trials comparing a parenting intervention with a control, where these used a validated attachment instrument, in order to evaluate the clinical and cost-effectiveness of interventions aiming to improve attachment in children with severe attachment problems (mean age <13 years). This article aims to inform clinicians about the parenting interventions included in our systematic review that were clinically effective in promoting secure attachment. For completeness, we also briefly discuss other interventions without randomized controlled trial evidence, identified in Patient Public Involvement workshops and expert groups at the point our review was completed as being used or recommended. We outline the key implications of our findings for clinical practice and future research.

Keywords

attachment, disorganized, insecure, interventions, systematic review

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Introduction

Disorganized attachment patterns in infants are associated with subsequent psychopathology and poor long-term outcomes, including educational, social, physical, and ongoing mental health problems.[1-4] Attachment disorders are also associated with poor outcomes.[5] The promotion of healthy attachments is therefore an important clinical aim.

We wanted to find out which interventions aiming to promote secure attachment between parents or carers and children with, or at risk of, severe attachment problems (including disorganized attachment patterns and attachment disorders) had been shown to be clinically effective in randomized controlled trials (RCTs). This article aims to outline the interventions included in a systematic review published in the United Kingdom by the National Institute of Health Research.[6] For completeness, we describe other interventions highlighted by our Patient Public Involvement (PPI) group and our clinical expert group, where there was no RCT evidence at the point that this systematic review was conducted. For each study included

below, we have focused only on the findings for attachment. If we state that a finding is not statistically significant for attachment, the study might nevertheless have statistically significant results for other outcomes. We hope that this scoping review will assist clinicians in selecting the currently most effective treatments for children with, or at risk of, attachment difficulties.

Method

Search Strategy

We performed a comprehensive search of relevant databases and organizational websites, including databases of

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peer-reviewed citations and grey literature, as described in our published protocol,[7] without language restriction (see full list of search strategies and search terms in the National Institute of Health Research final report).[6]

Inclusion Criteria

The population of interest was parents or carers of children with, or at risk of, severe attachment problems, defined as disorganized attachment patterns or attachment disorders, where the mean age of the study sample was under 13 years. Interventions of interest were treatments for parents or carers, including foster carers. Those for teachers or teaching assistants, or not aiming to promote change at the individual level (eg, aiming to promote organizational change in care settings) were not included. Relevant comparators were no intervention, an attention control, or treatment as usual. The outcome of interest was the child's attachment to the primary caregiver, as measured by either a validated attachment instrument or by a validated instrument including an attachment subscale. The study design of interest was RCT with random allocation of the full sample only. The methods we employed followed the Centre for Reviews and Dissemination and Cochrane guidelines, and are outlined more completely in the final report.[6]

Results

Systematic Review

Extensive and comprehensive searches identified 10 167 potentially relevant papers once duplicates were removed, including 39 papers reporting 30 studies that met our criteria. The majority of studies were conducted in the United States (n = 14), the United Kingdom (n = 5), Canada (n = 3), the Netherlands (n = 3), and then Australia, Finland, Italy, Germany, and Lithuania (n = 1).

The largest category of study population was low socioeconomic group (n = 10), with the other categories being approximately equally represented. Of the 30 studies included, 29 delivered an intervention to a population hypothesized to be at risk of severe attachment problems, 8 of which evaluated an intervention using a measure assessing disorganized attachment, and 21 of which used a measure assessing secure/insecure attachment. In the majority of the 8 studies investigating disorganized attachment and one paper on reactive attachment disorder (RAD), the participants were parents who were at increased risk of having children with poor developmental outcomes. The characteristics of the populations in each study were classified as follows: parental mental health difficulties, low socioeconomic group, potentially disruptive life events/homelessness, child behavior problems/disability/high irritability levels, middle-class, poor parenting or parental sensitivity, single/first-time/adolescent mother, low-birth-weight/preterm infant, foster placement/child welfare/child with history of maltreatment.

Interventions

The studies included in the systematic review identified the following interventions, which have been subdivided below into those aimed at children without a disorganized (D) attachment classification or diagnosis of RAD and those with a D classification or diagnosis of RAD, both organized by age of child at time of commencement of the intervention, with studies with statistically significant findings (first postintervention assessment only) listed first. Only studies with sufficient descriptive detail of the intervention have been included below.

Interventions for Infants, Toddlers, and Children Without Disorganized Attachment or RAD

Preterm Babies

Interventions showing a statistically significant improvement in secure attachment. *The Home Visiting Program*, used in a study (n = 110) undertaken by Ammaniti and colleagues,[8] targeted mothers with high trait anxiety (ethnicity and socioeconomic status [SES] not reported). It involved home visits (number and duration of sessions not reported), initiated prenatally and continued after the baby's birth, versus scheduled visits for data collection purposes only. Delivered by psychologists, the intervention aimed to assist mothers in developing sensitivity by learning to "read" their child's signals, focusing on their interactions and understanding their impact on the child's development. Child attachment was rated during feeding at 3 months, 6 months, and 12 months, using the Feeding Scale-Observational Scale for Mother-Infant Interaction During Feeding[9] at 3 months, the Face-to-Face-Still-Face Paradigm[10] at 6 months, and the Strange Situation Procedure (SSP)[11] at 12 months. These were rated using an attachment-based observational system, the Scales of Mother-Infant Interactional System,[12] using 5 different 9-point scales: sensitivity, interference, affective state of the mother, cooperation, and self-regulation behaviors.

At 3 months, no significant differences in the impact of the program on the parent-infant relationship were found between the depressive risk, psychosocial risk, and low risk mothers. At 6 months, all mothers in the Home Visiting Program showed higher rates on the

sensitivity and cooperation scales ($t = 3.28$, $P < .002$; $t = 2.05$, $P < .04$), and lower rates on the interference and negative affective state scales ($t = 2.17$, $P < .03$; $t = 3.22$, $P < .003$). At 12 months, no direct SSP results were reported; however, mothers in the Home Visiting Program tended to show more sensitivity ($P < .03$) and cooperation ($P < .06$), with more positive affective states ($P < .06$), although results were not statistically significant overall at the $P < .05$ level.

The Preventive Psychotherapeutic Intervention Program[13] (n = 87) was used with middle-class, white parents of preterm babies, with parents' mean age 30.9 years (SD 4.3 for intervention, range 23-42 years; SD 4.9 for control, range 18-40 years) and babies' mean age 27 weeks (SD 2.3, range 24-33 weeks' gestation for intervention; SD 2.7, range 24-35 weeks for control). This involved fortnightly parent groups and individual psychotherapy sessions delivered prenatally in hospital, a 1-day video-feedback sensitivity session and home visits, versus usual hospital nursing care. Parents received 1 to 8 parent group sessions (SD 2.2 sessions), as well as 1 to 10 fortnightly individual psychotherapy sessions (SD 1.4 sessions) for both parents.

Using the Strange Situation Procedure,[11] Brisch and colleagues[13] found that there was a significant correlation between neurological development and attachment development in the control group ($P = .049$ [2-tailed], Fisher's Exact Test [1-tailed] $P = .058$), with 64.3% of secure infants showing healthy neurological development, 75% of insecure infants showing impaired neurological development, and no significant correlation between attachment quality and neurological development in the intervention group. The authors concluded that the intervention protected neurologically unhealthy children from forming insecure attachments, odds ratio (OR) 0.42 (95% confidence interval [CI] 0.15, 1.20).

The *Perinatal Coaching Program*, in the study (n = 61) undertaken by Jacobson and Frye,[14] was used with first-time mothers (mean age of mothers 21.5 years, SD 3.1, range 17-32) who were participating in a federally funded food supplementation program. This intervention used a specific, trained volunteer for each participant to provide information about pregnancy, child care, and development, as well as understanding and empathy similar to that which might ordinarily develop with a friend or family member, versus control (details not reported). Periodic visits commenced in the third trimester of pregnancy, increased in frequency toward the date of delivery, continued weekly for 2 to 3 months following birth, and then continued monthly until the infant was 12 months old.

Using Waters and Deane's Q-sort procedure,[15] Jacobson and Frye[14] found that infants of mothers who received the intervention were rated as more securely attached than controls on the Attachment Ratings Score. This was based on 21 Q-sort items indexing 2 components of secure attachment, namely, "Response to Comforting and Differential Responsiveness to Attachment Figure" and "Attachment/Exploration Balance," which were averaged. The intervention mean was 13.16 (SD 1.37) and the control mean 12.01 (SD 0.96), $t = 3.21$, $P < .005$. The Criterion Sort Score comprised each subject's 100 Q-scores correlated with scores generated by 8 experts for a hypothetically "most secure child" and produced a Pearson correlation coefficient for each child. The difference between intervention and control on this score was in the same direction (intervention mean 0.54 [SD 0.15], control mean 0.48 [SD 0.14], $t = 1.50$), but was not statistically significant.

An *Occupational Therapy* intervention used in a study (n = 115) from Sajaniemi and colleagues[16] targeted infants with extremely low birth weight (<1000 grams), commencing at age 6 months. The intervention involved weekly, 1-hour sessions of occupational therapy at home for 6 months (average number of sessions, 20). This was provided by occupational therapists experienced in treating infants, and included discussions with parents, teaching them how to adapt the home environment to their baby, and guiding them in how to handle their baby to promote normal sensorimotor development. The control was clinical visits as per the intervention group, but no home treatment.

Using the Preschool Assessment of Attachment,[17] there was a significantly different distribution of attachment patterns in the intervention group compared with the control group (Fisher's exact test, $P < .04$), with more normative attachment patterns in the intervention group than in the control group at age 4 years (ie, avoidant [A 1-2], secure [B], and resistant [C 1-2], as opposed to compulsive [A 3-4], aggressive [C 3-4], fluctuating [A/C], or disorganized).

Interventions not showing a statistically significant improvement in secure attachment. Supportive Home Visitor Services, used in the study (n = 92) by Beckwith,[18] aimed at low-income parents (mean age 24 years, range and SD not reported, ethnicity not reported), with sick, preterm, new born infants with a birth weight ≤2000 g, born at ≤35 weeks' gestation (mean weight <1500 g, mean gestational age <31 weeks). The intervention, which was delivered over 13 months, comprised an individualized, parent-directed intervention focusing on providing concrete help with clothes, toys, transportation, developing parents' observational skills, and helping them to contextualize their baby's development in

the context of normal development. It was delivered by a pediatric nurse and an early childhood educator in hospital or at home. The details of the control were not reported. There was 51% secure attachment in both groups at follow-up (the measure used was not reported).

Babies <12 Months

Interventions showing a statistically significant improvement in secure attachment. Infant carrying, used in the study (n = 60) by Anisfeld and colleagues,[19] targeted low SES, predominantly Hispanic and Black mothers (mean age 23.7 years for intervention, 24.5 years for control, SDs and ranges not reported) of new-born infants (mean age for both groups 2 days at start of intervention, SD and range not reported). The intervention involved using soft baby carriers daily, with the aim of promoting increased physical contact and encouraging greater maternal responsiveness, versus a control of an infant seat. The average length of usage was 8.5 months (range 4-13 months).

The study reported significantly more securely attached (B) infants in the experimental group than in the control group (83% vs 38%) using the Ainsworth Strange Situation Procedure[10] at 13 months, according to logistic regression analysis (β = 1.93, SE = 0.82, Z = 2.35, P = .019); OR 7.60 (95% CI 2.00, 28.93).

A *Massage Procedure* was used in the study (n = 19) by Hansen and Ulrey,[20] with predominantly Caucasian, low-middle SES parents (age not reported) of infants aged from 3 to 19 months at the start of the intervention (mean and SD not reported), with a diagnosed motor delay or neuromotor deficit. The intervention comprised twice weekly sessions of 3-hour sensorimotor stimulation programming (duration not reported), involving special handling and massage techniques to facilitate relaxation and pleasurable interaction between infant and caregiver. This was added to a standard early intervention program, all compared to the standard early intervention program only. Using an observation protocol adapted from the Foley and Hobin[21] attachment-separation-individuation profile, Hansen and Ulrey[20] rated sensory cueing, contact with people, behavior organization, and overall discrepancy/synchrony between parent and child, which was arrived at by comparing child and parent behaviors in each of these 3 domains.

Both the control and intervention groups improved on cueing, contact, and organization behaviors, while the intervention group was reported as demonstrating significantly more progress on the combined behaviors and on the total discrepancy/synchrony score (P = .05).

The *Early Head Start home-based program* was used in a study (n = 201) by Roggman and colleagues[22] with families living in a semirural area. The exact age of the children at commencement of the intervention is not reported, but data were collected when the children were 14 months, 18 to 24 months, and 36 months old. The intervention was based on 3 years of weekly, home-based visits from a family educator and on socialization groups. It aimed to foster positive parent-child interaction, understanding of child development, engagement in children's activities, and assistance for parents in accessing community services, versus control (not reported). The Waters' Attachment Q-Set[23] was completed by mothers with assistance from a trained interviewer when children were aged 14 and 18 months old. The intervention made a statistically significant positive difference to attachment security at 18 months (β = 0.14, t[137] = 2.13, P < .05).

A *Home Visiting* intervention was used in a study (n = 85) by van Doesum and colleagues[24] with infants (mean age 5.5 months, SD 3.1 months, range 1-12 months) and mothers who met the *DSM-IV* criteria for major depressive disorder and were receiving outpatient treatment. The intervention involved 8 to 10, 60- to 90-minute home-based sessions over 3 to 4 months, delivered by graduates with master's degrees in psychology or social psychiatry who had received training in prevention or health education. This involved videoing of everyday activities, which were then reviewed and discussed with the mother or both parents, if present. Techniques used included use of modelling, cognitive restructuring, practical pedagogical support, and/or baby massage, depending on the needs of the parent(s). The control comparator was 3 telephone calls offering support and practical parenting advice.

Using the Attachment Q-Set (AQS) version 3,[25] an independent samples *t*-test showed that the children in the intervention group had significantly higher scores than the children in the control at 6-month follow-up (t[69] = 1.92, P < .05).

Interventions not showing a statistically significant improvement in secure attachment. Professional intervention by female social workers experienced in working with mothers and children was used in the study (n = 90) by Barnett and colleagues[26] and Barnett and Parker,[27] versus control. Participants were middle-class, highly anxious, and predominantly primiparae of infants whose exact age was not reported. The intervention aimed to lower the anxiety of mothers and to promote secure attachment. It included general support, anti-anxiety measures, promotion of self-esteem, encouragement of appropriate responsiveness to cues from the infant, and encouraging husbands to be involved with the baby and to be supportive toward their wives. The intervention was used over a period of 12 months (frequency not reported).

No significant differences were found in Strange Situation Procedure[11] classifications between infants of mothers with high anxiety who received the intervention and those in the control.

Interpersonal Psychotherapy was used in the study (n = 120) by Forman and colleagues[28] with European American mothers (SES not reported) with major postpartum depressive episodes, mean age 30.6 years (SD 4.5 years, range not reported), when their babies were mean age 6.1 months (SD 0.7 months, range not reported). The intervention comprised 12, weekly, 60-minute sessions delivered by an experienced psychotherapist (location not reported), aiming to address issues such as interpersonal conflict, loss, grief, and social role transitions. This was compared with a waiting list control.

Using mothers' ratings of their children's attachment on the Waters' AQS,[14] Forman and colleagues[28] found that treatment did not improve mothers' reports of the quality of the mother-child relationship (bias because of current depression was accounted for). The authors concluded that treatment of maternal depression alone was insufficient to improve mother-child attachment.

The *Video-feedback Intervention to promote Positive Parenting* (*VIPP*) was used in a study (n = 54) by Kalinauskiene and colleagues[29] with nonclinical, low-sensitivity, middle-class mothers when the baby was mean age 6.12 months old (SD 0.08 months, range not reported) and also included male caregivers. The intervention involved 5, monthly, 90-minute video feedback sessions delivered in the home by graduates with a master's degree in clinical psychology, alongside a parental report diary completed 3 days before each session, and booster sessions involving both parents. The control comparator was monthly telephone contacts asking for information on the infant's development. Parents and babies were videotaped in day-to-day situations with the tapes being reviewed by the deliverer, who prepared comments for the next visit. In the sessions, they then worked through the tape with the parent, focusing on positive interactions and aiming to improve observational skills and to reinforce sensitive behavior. The diary monitored the baby's sleeping, crying, "fussing," and states of satisfied behavior, as well as self-reported caregiver reactions.

Using Waters' AQS (Version 3.0)[15] to obtain a security score for each child by correlating the child's Q-set description with the criterion sort established by experts for a prototypically secure infant, Kalinauskiene and colleagues[29] found that at posttest, the mean attachment score for children in the intervention group was equal to that of children in the control group (mean 0.33, SD 0.22, and mean 0.33, SD 0.19, respectively), with a non-significant intervention effect (t[51] = −0.02, P = .99).

Video-feedback Intervention to promote Positive Parenting with a Representational focus (*VIPP, VIPP-R*) was used in a study (n = 81) by Klein-Velderman and colleagues[30,31] with mothers provisionally classified as insecure, dismissing, or preoccupied on the Adult Attachment Interview, and with their first-born baby, mean age 6.83 months (SD 1.03 months, range not reported). The intervention was based on 4, 90- or 180-minute home visits (frequency not reported), delivered in the home by a female, degree-educated home visitor. It included 3 video feedback sessions, brochures, and (in the *VIPP-R* version of the intervention) discussions about the attachment experiences of the mother. The control comparator used filming in the home during mother-infant interaction.

Using the Strange Situation Procedure[11] and a continuous attachment security score,[32] Klein-Velderman and colleagues[30] found no significant intervention effect (t[79] = 0.43, P = .33 [1-tailed], d = 0.10). Using the Ainsworth Strange Situation Procedure[11] at 13 months and Waters and Deane's Attachment Q-Sort+[15] at 14 months, no longer-term intervention effects on children's AQS security scores were found (t[75] = 0.22, P = .41 [1-tailed], d = 0.05), irrespective of whether the VIPP or the VIPP-R was used (F[2, 74] = 1.31, P = .28). The mean score for VIPP children was 0.44, SD 0.29, while that for VIPP-R children was 0.32, SD = 0.30, and that for control children 0.37, SD = 0.24.

Infant Parent Psychotherapy was used in a study (n = 59) by Lieberman and colleagues[33] with recent Latino immigrant mothers of low SES. The mean age and SD of the children was not reported, but the range was 11 to 14 months old at commencement of intervention. This involved 1 year of weekly, 1.5-hour sessions of parent-infant psychoanalytically informed psychotherapy, delivered in the home by master's degree level, clinically experienced female therapists. It aimed to be responsive to the emotional experiences of mother and child, both as reported by the mother and as observed through mother-child interaction. The control comparator was monthly telephone contact.

Using the 90-item Attachment Q-Sort,[15] no statistically significant differences were found in outcome comparisons of intervention and control groups using ANOVAs with a priori contrasts between the 2 anxiously attached groups. The secure controls demonstrated a trend toward higher Q-sort scores than the intervention group (secure control mean 0.414, SD 0.245; anxious control mean 0.299, SD 0.335; anxious intervention mean 0.252, SD 0.413).

Counselling, cognitive behavior therapy, and *brief psychodynamic psychotherapy* were used in a study (n = 193) by Murray and colleagues[34] with mothers with a

major postpartum depressive episode and babies ranging from 8 to 18 weeks in age at the start of the intervention. *Counselling* comprised 10, weekly, nondirective home-based sessions delivered by a specialist and a nonspecialist in counselling and aimed to support new mothers in their role, with a particular focus on the mother-baby relationship. *Cognitive behavioral therapy* was based on advice about negative patterns of thought, modelling, and reinforcement, directed primarily at problems of infant management identified by the mother and in observed mother-infant interaction. *Brief psychodynamic psychotherapy* explored maternal representations of the baby and of the mother-baby relationship, by reflecting on the mother's own early history, with the aim of helping mothers cope and promote positive representations of their babies. The control for all 3 interventions was routine care provided by the primary health care team.

Using the Strange Situation Procedure,[11] infant attachment was measured in the study by Murray and colleagues[34] when children were 18 months old, with no significant differences being found between the treatment groups and the control group. The treatment effects also remained non-significant after controlling for social adversity.

Right from the Start was used in the study (n = 76) by Niccols[35] with mothers of predominantly low SES with slightly lower than average maternal sensitivity scores on the Maternal Behaviour Q-Sort.[36] Infants had a mean age of 8.4 months (SD 5.4 months, range 1-24 months), with slightly lower than average security of attachment, measured using the Maternal Behaviour Q-Sort. The intervention involved 8, weekly, 2-hour group sessions, delivered in convenient locations by specialists in infant development, and was based on a problem-solving approach, using video clips discussed in small groups followed by large group discussion and home practice, with the aim of enhancing parental sensitivity and baby security of attachment. The control comparator was home visiting (treatment as usual).

Infant attachment security was measured using the Waters AQS,[25] with *t*-tests in intention to treat analyses showing no significant difference at pretest versus posttest or pretest and 6-month follow-up between those assigned to the intervention and those receiving treatment as usual.

Toddlers (>12 Months and ≤60 Months)

Interventions showing a statistically significant improvement in secure attachment. *Toddler parent psychotherapy* was used in a study (n = 130) by Cicchetti and colleagues[37] and in a study (n = 130) by Toth and colleagues.[38] The results reported here are from the later study,[38] which used the data from the earlier study together with data from an additional 55 parent-child dyads. Children had a mean age of 20.34 months (SD 2.5 months), and mothers had had a major depressive episode since their child's birth, which met the criteria of the *Diagnostic and Statistical Manual of Mental Disorders*, 3rd edition (*DSM-III*).[39] The intervention comprised a mean of 45.24 sessions (SD 11.16, range 30-75) over an average of 58.19 weeks (SD 10, range 42-79), and aimed to promote toddler attachment security through manualized, psychoanalytic, conjoint parent toddler therapy sessions, with weekly individual supervision and weekly group presentations with discussion of videotaped therapy sessions. Two control groups were used: a depressed mother control group and a nondepressed mother control group. The control comparator was no treatment or treatment as usual, that is, mothers accessed a range of therapies, if needed. Toddlers' attachment security was measured at baseline and at age 3 years, using the Strange Situation Procedure.[11]

At postintervention, the percentage of securely versus insecurely attached toddlers in the depressed mother intervention group was significantly higher than that in the depressed control group (χ^2[1, n = 100] = 26.63, P < .001), as well as being significantly higher than in the nondepressed control group (χ^2[1, n = 109] = 4.22, P < .04). The effect size (Cohen's h) for the difference in security of toddler attachment between the depressed mother intervention and depressed mother control groups was 1.084. The rate of change from insecure to secure attachment pre- and postintervention was also significantly higher for the depressed intervention group (54.3%) compared with the depressed control group (7.4%), χ^2(1, n = 100) = 26.58, P < .001, as well as compared with the nondepressed control group (14.3%), χ^2(1, n = 117) = 1.39, with an effect size (Cohen's h) of 1.11, from insecure to secure attachment in the depressed intervention group compared with the depressed control group.

The *Multidimensional Treatment Foster Care Program for Pre-Schoolers program* was used in a study (n = 117) reported by Fisher and Kim[40] with foster carers and birth parents of predominantly European American ethnicity (age and SES not reported), of children with mean age 4.54 years (SD 0.86 years, range 3-5 years). This involved 12 hours of intensive foster carer training, together with 24-hour on-call telephone support and group meetings. There were also weekly therapeutic children's play sessions delivered by clinicians over 9 to 12 months, meetings with a behavior specialist, and sessions with a family therapist for the foster child's birth parent(s), all delivered in the home and/or preschool day care. The control comparator was foster care as usual

(including foster care training prior to approval). The attachment measure used was the Parent Attachment Diary.[41,42] They use a complicated statistical analysis (linear spline model) that appears to show that, when accounting for baseline levels, the intervention group showed improvements in secure attachment across time from baseline to 12 months.

Interventions not showing a statistically significant improvement in secure attachment. The *Promoting First Relationships program* was used in the study (n = 210) by Spieker and colleagues[43] with parents of children with a mean age of 17.96 months (SD 4.97 months, range 10-24 months), where toddlers were receiving Child Welfare support as a result of a court-ordered placement resulting in a change in primary caregiver within the previous 7 weeks. The intervention included 10, weekly, 60- to 75-minute sessions, including 5 sessions of video feedback, delivered by providers with a master's degree, to enhance nurturing relationships and thereby promote social and emotional development. This was done through videoing and discussion of interactions and feelings underlying behaviors and positive feedback, versus early education support.

Using the Toddler Attachment Sort-45,[44] there was no significant difference between intervention and control children on attachment security at postintervention or 6-month follow-up (postintervention mean adjusted for ANCOVA model covariates 0.58, SD 0.30; control adjusted mean 0.54, SD 0.29 [$F = 0.68$, $P = .410$, $d = 0.16$]; 6-month follow-up intervention adjusted mean 0.53, SD 0.37, control adjusted mean 0.55, SD 0.28 [$F = 0.12$, $P = .736$, $d = -0.13$]).

Children (≥60 Months)

Interventions showing a statistically significant improvement in secure attachment. The *Fostering Changes Program* was used in the study (n = 77) by Briskman and colleagues,[45] predominantly with white British foster parents (SES not reported), mean age 50 years (SD 8 years, range 29-63 years) and children with a mean age of 7.9 years (SD 3.1 years, range 2-12 years). The intervention involved 12, weekly, 180-minute structured parenting skills group sessions, delivered by 2 experienced facilitators with the aim of helping foster carers understand how and why specific behavioral patterns occurred, in order to enhance carer-child relationships. This was compared with home visits where participants were interviewed and asked to complete questionnaires.

Using a Quality of Attachment Relationships Questionnaire constructed out of items related to broader attachment concepts, there was a statistically significant improvement in total scores for the intervention group compared with the control group, with a significant difference between the change in group mean scores ($F = 4.401$; $P = .04$) and an effect size of 0.4.

Interventions not showing a statistically significant improvement in secure attachment. The *Incredible Years program* was used in the study (n = 174) by O'Connor and colleagues[46] with ethnically diverse, socioeconomically disadvantaged parents (age not reported) of children with a mean age of 66.4 months (SD 5.9 months, range not reported), at high risk of behavioral and emotional issues. This included 18 group sessions over 12 weeks, delivered by a psychology graduate with a master's degree in child development, and co-leaders with mental health professional training. The intervention aimed to improve parent-child interaction using videos, group discussion, observation, and role play, in addition to a GP, school-based drop-in service, and specialist mental health service, alongside a *SPOKES* 6-week literacy program delivered in the home.[47] The control was a GP, school-based drop-in service and specialist mental health service only.

Using the Manchester Attachment Story Task,[48] the intervention did not significantly increase the likelihood of a secure posttreatment classification (OR 1.21, 95% CI 0.49, 2.97).

Interventions for Infants, Toddlers, and Children With Disorganized Attachment or RAD

Preterm Babies/Antenatal

Interventions showing a statistically significant improvement in secure attachment. In a study (n = 449) by Cooper and colleagues,[49] a manualized *Health Visitor Preventive Intervention program*, adapted for use through incorporation of key World Health Organization principles, was used with women in the last trimester of pregnancy, mean age 25.5 (SD 5.23), in a South-African, peri-urban settlement, together with fortnightly visits by a community health worker from the local infant clinic for physical and medical assessment and encouragement to visit the baby clinic. This was compared with a control involving community health worker visits only. The manualized program involved a total of 16, 1-hour home visits: twice antenatally, weekly for 8 weeks postpartum, fortnightly for the next 2 months, and then monthly for a further 2 months. It aimed to encourage mothers' sensitive interaction with infants, and was delivered by local women trained in the intervention, with weekly group supervision from a clinical psychologist.

Using the Strange Situation Procedure[11] at infant age 18 months, a greater proportion of infants of mothers in the intervention group were found to be securely

attached than in the control group (74% vs 63%; Wald = 4.74, OR = 1.70, P = .029). The main difference between the groups was a higher rate of avoidant infants in the control group; the rate of disorganized infants in the control group was higher, but not statistically significant.

The *University of California Los Angeles Family Development Project intervention* was used (n = 70) by Heinicke and colleagues[50-52] with socially high-risk and economically disadvantaged mothers of infants from late pregnancy through to 1 year of age, and their male caregivers. The intervention was based on 12 months of weekly, 60-minute home visits and weekly mother-infant groups (from infant age 3 months to 1 year) delivered by mental health professionals with the aim of enhancing the ability of families to provide support for each other and to become aware of, and meet, their babies' needs. This was compared with usual care from a pediatric continuity clinic. Measures used were the Ainsworth Strange Situation Procedure,[11] the AQS,[53] home observation, the Bayley Scale test situation, and the Bayley test mother-child separation and free play situation,[54] but application of factor analysis did not produce factor structures across time, and so the trends for each measure were recorded.

The secure response to separation scores (1-7, with 1 being nonanxious, nondefensive) using the AQS were mean 5.1, SD 1.85, for the intervention group and mean 6.06, SD 1.22, for the control group, effect size −0.61 (P = .02) at 6 months; mean 6.32, SD 0.70, for the intervention group and mean 4.61, SD 1.73, for the control group, effect size 1.3 (P = .0001) at 12 months; and mean 6.1, SD 0.94, for the intervention group and mean 4.21, SD 1.81, for the control group, effect size 1.31 (P = .0001) at 24 months. The intervention group was worse than the control group at 6-month follow-up, but better at 12- and 24-month follow-up.

Interventions not showing a statistically significant improvement in attachment. None.

Babies (≤12 Months)

Interventions showing a statistically significant improvement in secure attachment. The *Attachment and Biobehavioral Catch-up* intervention was used in studies by Bernard and colleagues.[55,56] The study (n = 120) by Bernard and colleagues[55] was with birth parents of babies with a mean age of 10.1 months (SD 6.0 months, range 1.7-21.4 months) where birth parents had been referred by agencies working with Child Protection Services, while the study (n = 120) by Dozier and colleagues[56] was with foster parents of children who were in foster care and who were aged between 3.6 and 39.4 months

at 1 month postintervention follow-up. The intervention involved 10, parent-child, weekly sessions delivered in the home by professional social workers or psychologists, with the aim of assisting parents or foster parents to understand babies' signals and to provide a nurturing, responsive, and consistent environment through semistructured individual coaching with video feedback.

The control comparison (Developmental Education for Families) was delivered at the same frequency and duration and targeted the cognitive and language development of the infants. Using the Strange Situation Procedure,[11] Bernard and colleagues[55] found that, compared with children in the control group, children who had received the intervention demonstrated significantly lower rates of disorganized attachment (32% intervention, 57% control) ($\chi^2[1, 120]$ = 7.60, P < .01, Cohen's d = 0.52), and higher rates of secure attachment (52% and 33%) ($\chi^2[1, 120]$ = 4.13, P < .05, Cohen's d = 0.38) at approximately 1-month postintervention follow-up. Using attachment diaries, Dozier and colleagues[56] found that children whose foster parents had received the intervention showed less avoidant attachment behavior (mean 0.12, SD 0.24) and more secure attachment behavior (mean 1.30, SD 0.30) than those who had received the control (mean 0.35, SD 0.41, and mean 1.18, SD 0.54, respectively), with a main effect of the intervention group emerging when avoidance was the dependent variable ($F[1, 44]$ =5.02, P < .05). However, scores on postintervention secure attachment behaviors were not statistically significant (P > .10).

The *Circle of Security Home Visiting-4 Intervention* was used in the study (n = 220) by Cassidy and colleagues[57] with economically disadvantaged mothers with highly irritable new born infants, as assessed by 2 separate Neonatal Behavioral Assessment Scale examinations with the first 30 days postpartum.[58] The intervention involved 4, 1-hour home visits with video feedback over 2.5 months, versus a control of 3, 1-hour psychoeducational sessions, following the same time-line. The intervention was delivered by master's and doctoral level clinicians with the aim of preventing child mental health disorders and insecure attachment by assisting carers to recognize their unconscious responses to their children and to teach them to regulate their emotional, cognitive, and behavioral responses.

For analysis, insecure groups were combined because of small numbers. Using the Strange Situation Procedure,[11] an intervention effect was found only with highly irritable children.

In the study (n = 100) conducted by Moran and colleagues,[59] a *brief intervention program designed to support the sensitivity of adolescent mothers to their infants' attachment signals* was delivered to teenage mothers

(mean age 18.42 years, SD 1.01, range 15.97-19.98) and their infants, aged 7 months at the start of the intervention. It involved 8, 1-hour home visits over 5 months provided by 2 mature mothers with knowledge of infant development and attachment research. The control comparator was 1 visit (visitor not specified) when the infant was 9 months old. The intervention aimed to improve the teenage mothers' sensitivity to their infants through videoing, observing, and discussing mutually beneficial play interactions.

Using the Strange Situation Procedure[11] at age 12 months, 54% of infants in the intervention group were disorganized, versus 58% in the control group. In the intervention group, 57% were secure, 18% were avoidant, and 25% were resistant, while in the control group, 38% were secure, 42% were avoidant, and 20% were resistant ($\chi^2[2] = 6.70$, $P < .05$, medium effect size, $w = 0.25$), but a secure/nonsecure comparison overall was not statistically significant ($\chi^2[1] = 3.64$, $P < .06$, ns).

In the van den Boom[60,61] studies (n = 100), an *intervention to enhance sensitive responsiveness in mothers with irritable infants* was provided to low SES Caucasian mothers aged between 19 and 33 years, receiving outpatient treatment for major depressive episodes or dysthymia, and their first-born infants aged 6 months at the start of the intervention. The intervention involved 2-hour home visits every 3 weeks over 3 months, versus care as usual. In the 1994 study, using the Strange Situation Procedure[11] at 12 months, van den Boom[60] found an association between attachment classification and intervention group ($\chi^2[1] = 16.96$, $P < .001$), with 62% of infants being secure in the intervention group versus 28% in the control group, and 38% being insecure in the intervention group versus 78% in the control group. In the 1995 study, using the Attachment Q-Sort[15] at 18 months, van den Boom found a statistically significant association between attachment classification and treatment group ($\chi^2[1] = 18.35$, $P < .001$), with 72% of infants in the intervention group being categorized as secure versus 26% in the control group. All the insecure categories were collapsed due to limitations in sample size.

Interventions not showing a statistically significant improvement in secure attachment. None.

Toddlers (>12 Months and ≤60 Months)

Interventions showing a statistically significant improvement in secure attachment. In a study (n = 89) by Moss and colleagues,[62] an *intervention aiming to enhance maternal sensitivity to the child's emotional and behavior signals* was provided to French-speaking Quebecoise mothers (mean age 27.82 years, SD 7.61, range 18-49 years) and children (mean age 3.35 years, SD 1.38 years, range 1-5.9 years) in families being monitored by a community or child welfare agency for child maltreatment, that is, physical, sexual, or emotional abuse or neglect. It involved 8, 90-minute home visits provided by child welfare clinical workers aiming to enhance maternal sensitivity and to contain parent-child role reversal behavior by using discussion and videoed play sessions with feedback, in addition to standard agency services of a monthly visit by a child welfare caseworker. The control comparator was care as usual from standard agency services alone.

Using the Strange Situation Procedure[11] at 12 months, the intervention group showed a statistically significant improvement in security scores ($\chi^2[3, 67] = 9.38$, $P < .05$, effect size $r = .36$), with a greater proportion of insecure children becoming secure (42.9%, $z = 2.40$ intervention versus 15.6%, $z = -.240$ control), and a smaller proportion remaining insecure (31.4%, $z = -2.50$ intervention, versus 62.5%, $z = 2.50$ control). The intervention group also showed a statistically significant improvement in disorganized attachment ($\chi^2[3, 67] = 10.91$, $P < .05$, effect size $r = .37$), with a greater proportion of disorganized children becoming organized (37.1%, $z = 2.00$ intervention versus 15.6%, $z = -2.00$ control). One child in the intervention group became disorganized (2.9%, $z = -2.40$), compared with 7 in the control group (21.9%, $z = 2.40$).

Toddler-parent psychotherapy was used in the studies (n = 130) by Toth and colleagues[38] and Cicchetti and colleagues[37] with children with a mean age of 20.34 months (SD 2.5 months, range not reported), where mothers had a history of major postpartum depressive disorder, versus a depressed mother control group and an additional nondepressed mother control group (controls not reported). The intervention involved an average of 45.24 weekly, 1-hour sessions (SD 11.16 sessions, range 30-75 sessions) of toddler-parent psychoanalytically informed psychotherapy. This was delivered by a psychoanalytically informed therapist, versus the 2 controls.

Using the Strange Situation,[11] Toth and colleagues[38] found that at postintervention, secure child attachment in the depressed mother intervention group was significantly higher than in the depressed mother control group ($\chi^2[1, 100] = 26.63$, $P < .001$) and the nondepressed mother control group ($\chi^2[1, 109] = 4.22$, $P < .04$, Cohen's $h = 1.084$). Distributions of avoidant and resistant attachment did not differ between the groups at postintervention, but significant differences were found for disorganized attachment, with disorganized attachment in the depressed mother intervention group at postintervention being significantly lower than in the depressed

control group (χ^2[1, 100] = 11.25, $P < .001$). There was a large effect size (Cohen's h = 1.11) for change from insecure to secure attachment overall in the depressed mother intervention group compared to the depressed mother control group. Using the AQS[24] and the Attachment Q-scales,[63] Cicchetti and colleagues[37] found that at baseline, children in the depressed mother intervention group had significantly higher rates of insecure attachment than children in the nondepressed mother control group (χ^2[1] = 8.71, $P < .003$). At posttreatment follow-up, the difference was nonsignificant (χ^2[1] = 0.56, ns), and the depressed mother intervention group children had attained similar rates of secure and insecure attachment to the nondepressed control group children.

Interventions not showing a statistically significant improvement in secure attachment. None.

Children (≥60 Months)

Interventions showing a statistically significant improvement in secure attachment. None.

Interventions not showing a statistically significant improvement in secure attachment. In the study (n = 160) by Minnis and colleagues[64] and Minnis,[65] an intervention based on the Save the Children manual, *Communicating With Children: Helping Children in Distress*, was delivered to foster carers of children aged 5 to 16 years, 93% of whom had experienced previous abuse or neglect, and 60% of whom had some degree of psychopathology on the Strengths and Difficulties Questionnaire.[66] For the intervention, the mean age of foster mothers was 45 years, SD 8.8; the mean age of foster fathers 46 years, SD 10; and the mean age of children was 10.9 years, SD 3.1; for the control comparator, the mean ages and SD were 46 years, SD 7.8; 48 years, SD 7.3 years; and 11.6 years, SD 3.27, respectively. The intervention was provided by an experienced social worker/trainer in 6 hours of sessions over 2 consecutive days, plus a 1-day follow-up a week later, versus standard services alone. Ninety-three percent of children had suffered previous neglect or abuse, and over 60% had some degree of psychopathology on the Strengths and Difficulties Questionnaire. Using the Reactive Attachment Disorder Scale, the mean difference in scores was 0.53 (95% CI −1.6, 2.6; Wald test, $P = .6$).

Other interventions. Other interventions, mentioned by our PPI group and our PPI and Expert panels, which did not have sufficiently robust RCT evidence at the time we undertook our systematic review to enable us to include them, were *Theraplay*, *Dyadic Developmental Psychotherapy*, and *Watch, Wait, and Wonder*.

Theraplay is used in a number of CAMHS in the United Kingdom and aims to build attachment through focusing on key aspects of the parent-child relationship via play, games, and a range of challenging and nurturing activities. We were unable to find evidence of its effectiveness that met the criteria for inclusion in our systematic review.

Dyadic Developmental Psychotherapy is an intervention that focuses on relationships and which aims to develop and maintain child-therapist, caregiver-child, and therapist-caregiver relationships, which are affectively attuned and collaborative. No studies met the criteria for inclusion in our systematic review. A feasibility study for a randomized controlled trial of Dyadic Developmental Psychotherapy versus treatment as usual has been undertaken.[67]

Watch, Wait, and Wonder is based on the idea of the infant negotiating the parent-infant relationship in the session, with much of the work being done between the therapist and the mother. The intervention involves the mother on the floor with her infant, observing and interacting at the infant's initiative so as to increase maternal sensitivity and responsiveness by means of the mother taking an observational viewpoint, while nevertheless being physically accessible to the infant. The mother then discusses what she has observed and experienced with the therapist. No studies met the criteria for our systematic review.

Discussion

Of the papers included in the systematic review, 21 had data that could be included in a meta-analysis.[6] Overall, this showed that interventions resulted in increased secure behaviors compared with the control groups, OR 1.83 (95% CI 1.26, 2.66), $P < .0002$). Studies seeking to reduce disorganized attachment in a meta-analysis showed that interventions resulted in overall reductions in disorganized attachment compared with the control groups, OR 0.46 (95% CI 0.33, 0.64), $P < .0001$). Even though these meta-analyses showed positive overall findings there is large variability between studies (as described above).

There is currently a limited evidence base with regard to the effectiveness of interventions aiming to promote secure attachment for some age groups, and it is also important to note that, even where studies have been shown to be statistically significant, sample sizes are often small, and most studies have been conducted in the United States. Furthermore, in the general population, approximately 60% of infants have secure attachment,[68] while approximately 35% display some form of insecure attachment pattern.[69] Disorganized attachment rates are

approximately 15% in the general population but can be up to 35% in high-risk groups such as teenage parent families.[1]

This leaves clinicians with a difficult choice when it comes to treating children with severe attachment problems. It would not be feasible to provide interventions to all children with insecure attachment given the large numbers, nor has it been shown to be necessary. Indeed, several authors have suggested that some aspects of insecure attachment are adaptive or developmental.[70,71] Research is needed to help us understand how best to target the interventions at those in most need, or where cost-effective outcomes can be achieved. As this article shows, researchers have used myriad methodologies to choose study participants or at-risk populations. Many children with insecure attachment do not go on to develop psychopathology, but disorganized attachment is more predictive of future psychopathology.[72] Many intervention studies, however, have targeted children with insecure attachment, with fewer targeting those with disorganized attachment. More research is needed with this more vulnerable group.

There are also various interventions that are currently used to treat children with attachment difficulties for which there is no robust evidence base as yet. Noninclusion of these interventions is not necessarily a comment on the interventions themselves, but rather on the fact that there was limited evidence (eg, they did not meet the inclusion criteria of our systematic review or there were no available RCTs).

Some interventions need to be replicated with large samples in fully powered RCTs. There are also significant gaps and fewer effective interventions for older children and high-risk groups. More high-quality research is therefore needed.

Conclusions

Early intervention with parents or foster parents, focusing on maternal sensitivity in particular, is clinically effective in promoting secure attachment in children. Clinicians need to give careful consideration not only to their choice of intervention but also to the match between their chosen intervention and the characteristics of the parents/carers and/or children with whom they wish to use it. Future high-quality intervention research is needed, especially on children under 5 with attachment disorders and those with disorganized attachment.

Author Contributions

BW contributed to conception and design; contributed to acquisition, analysis, and interpretation; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

EE contributed to acquisition and interpretation; drafted manuscript; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

Authors' Note

The views and opinions expressed therein are those of the authors and do not necessarily reflect those of the HTA, NIHR, NHS, or the Department of Health.

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