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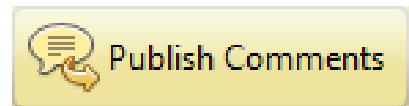
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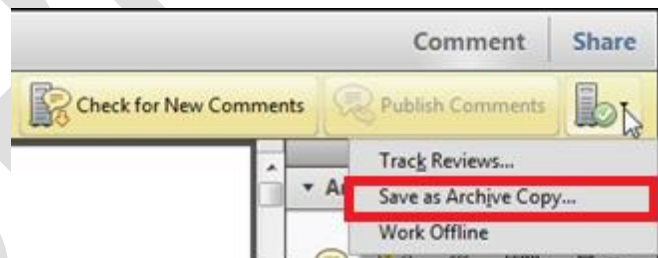
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Q6

Mental health and well-being in parents of excessively crying infants: Prospective evaluation of a support package

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Abstract

Background: During the first 4 months of age, approximately 20% of infants cry a lot without an apparent reason. Most research has targeted the crying, but the impact of the crying on parents, and subsequent outcomes, need to receive equal attention. This study reports the findings from a prospective evaluation of a package of materials designed to support the well-being and mental health of parents who judge their infant to be crying excessively. The resulting “Surviving Crying” package comprised a website, printed materials, and programme of Cognitive Behaviour Therapy-based support sessions delivered to parents by a qualified practitioner. It was designed to be suitable for United Kingdom (UK) National Health Service (NHS) use.

Methods: Parents were referred to the study by 12 NHS Health Visitor/Community Public Health Nurse teams in one UK East Midlands NHS Trust. Fifty-two of 57 parents of excessively crying babies received the support package and completed the Edinburgh Postnatal Depression Scale and Generalized Anxiety Disorder-7 anxiety questionnaire, as well as other measures, before receiving the support package and afterwards.

Results: Significant reductions in depression and anxiety were found, with numbers of parents meeting clinical criteria for depression or anxiety halving between baseline and outcome. These improvements were not explained by changes in infant crying. Reductions also occurred in the number of parents reporting the crying to be a large or severe problem (from 28 to 3 parents) or feeling very or extremely frustrated by the crying (from 31 to 1 parent). Other findings included increases in parents' confidence, knowledge of infant crying, and improvements in parents' sleep.

Conclusions: The findings suggest that the Surviving Crying package may be effective in supporting the well-being and mental health of parents of excessively crying babies. Further, large-scale controlled trials of the package in NHS settings are warranted.

KEYWORDS

infant crying, parental mental health, parental well-being, parenting

1 | INTRODUCTION

Approximately 20% of infants cry for long periods without an apparent reason during the first 4 months of age (Douglas & Hill, 2011; St James-Roberts & Halil, 1991). Traditionally, this crying

was called “infant colic” and attributed to gastro-intestinal disturbance (Illingworth, 1954; Wessel, Cobb, Jackson, & Detwiler, 1954). However, this and other explanations of the crying remain controversial (St James-Roberts, Alvarez, & Hovish, 2013; Sung et al., 2014).

Evidence is growing that this focus on the infant crying needs to be matched by equal attention to its impact on parents and subsequent outcomes. For instance, crying parents judge excessive can trigger premature termination of breastfeeding (Howard, Lanphear, Lanphear, Eberly, & Lawrence, 2006), overfeeding (Stifter, Anzman-Frasca, Birch, & Voegtline, 2011), parental distress and depression (Kurth, Kennedy, Spichiger, Hoesli, & Stutz, 2011; Murray & Cooper, 2001), poor parent-child relationships (Papousek, Wurmser, & Hofacker, 2001), and infant abuse in a small number of cases (Barr, Trent, & Cross, 2006). Parental concerns are responsible, too, for health service contacts and costs, which are substantial (Morris, James-Roberts, Sleep, & Gillham, 2001).

As well as crying's loud and aversive sound, a feature particular to the first 4 months—bouts that resist soothing manoeuvres—trigger frustration in many parents (Fujiwara, Barr, Brant, & Barr, 2011). However, the impact on parental emotions and actions depends partly on how parents cope with the crying and hence on parental resources, vulnerabilities, and circumstances. Factors such as depression, anxiety, and high arousal influence how parents interpret and respond to infant crying (Frodi & Lamb, 1980; Laurent & Ablow, 2012; Pearson, Cooper, Penton-Voak, Lightman, & Evans, 2010). Social isolation may increase its impact. Parental vulnerabilities can increase the likelihood of long-term child disturbances (Smarius et al., 2016).

Given this background, it is striking that the UK lacks evidence-based services for supporting parents in managing infant crying. Instead, parents turn to popular books, magazines, or websites, which give conflicting advice (Catherine, Ko, & Barr, 2008), or contact clinicians or hospital emergency departments, adding to the cost of infant crying for services (Barr, Rajabali, Aragon, Colbourne, & Brant, 2015; Freedman, Al-Harthy, & Thull-Freedman, 2009). UK legislation and health care services have prioritized the need to support adult mental health, including parental mental health in the postpartum period. For the most part, the resulting support programmes target parental cognitions, emotions, and behaviours but overlook environmental factors. Programmes that support coping with infant crying may be particularly effective in improving some parents' well-being and mental health and enhancing services.

The "Surviving Crying" study was designed to take a first step in meeting this need by developing a package of materials that support the coping and well-being of UK parents who judge their infant to be crying excessively. The development process involved collaboration between academic, voluntary sector, and National Health Service staff. Because Health Visitors or Community Public Health Nurses (HV/CPHNs) provide universal support for UK parents and infants and are likely to be key professionals in delivering the package, they were closely involved. The resulting package, comprising a website, printed materials, and Cognitive Behaviour Therapy (CBT)-based support sessions delivered to parents by a qualified practitioner, has been described (Garratt et al., 2017; Long et al., 2017). The study reported here aimed to provide an initial longitudinal evaluation of whether the package might improve the well-being and mental health of parents of excessively crying infants. We hypothesized that the package would be associated with reductions in parental anxiety and depression, the number reporting crying to be a problem, and in frustration because of the crying. In addition, it would be associated with improvements in parents' confidence, knowledge of infant crying, and sleep.

Key Messages

- During the first 4 months of age, approximately 20% of infants cry repeatedly for long periods without an apparent reason.
- Most research has targeted the crying and its causes, but there is a need for equal attention to the impact of the crying on parents and subsequent outcomes. This encompasses parental resources, vulnerabilities, and circumstances.
- This study provides an initial, prospective evaluation of the Surviving Crying support package for parents who judge that their infant is crying excessively. The package, which includes a website, printed materials, and Cognitive Behaviour Therapy-based programme, is designed to be suitable for National Health Service use.
- The package was associated with substantial reductions in parents' frustration because of their infant's crying and numbers meeting clinical criteria for anxiety or depression halved. Parents' knowledge of infant crying increased, perceived crying amounts and the extent to which parents considered them a problem reduced, and parents' confidence and sleep improved. The improvements in parental mental health were not explained by reductions in infant crying.
- Towards the goal of evidence-based health services, this evaluation indicates that large-scale controlled trials of the Surviving Crying package to substantiate and clarify the improvements in parental well-being and mental health found here are warranted.

To avoid terminological confusion, the phrase "excessive infant crying" is used to refer to a parent's judgment that an infant is crying too much, often accompanied by concern that the crying is a sign that the infant is unwell. The phrase "prolonged infant crying" refers to a measure of crying duration, such as the Wessel et al. (1954) "Rule of Threes" (e.g., Wolke, Bilgin, & Samara, 2017).

2 | METHODS

2.1 | Governance

Study public registration no. ISRCTN84975637; ethical approval provided by De Montfort University (13450) and the National Research Ethics Committee East Midlands (Nottingham): ID 152836; NRES: 14/EM/1202. A safeguarding protocol was used to ensure participants' safety and exclude illness.

2.2 | Recruitment

Recruitment involved collaboration with 12 HV/CPHN teams in city, suburban, and rural areas of one East Midlands UK National Health Service Trust. HV/CPHNs provided eligible participants with written

1 details about the study. Where parents gave provisional consent,
2 researchers explained the study, assessed eligibility, and invited them
3 to participate by signing a consent form. Participants were (a) parents
4 of a healthy infant age 6 months or less who they judged was crying
5 excessively; (b) English speaking or supported by an English speaker;
6 (c) living within the study area. Parents not meeting these criteria were
7 excluded.

8 Participants were recruited to one of two groups:

- 9 • Group 1 “Referred Crying” (RC) group were parents who sought
10 HV/CPHN help because of their infant's current excessive crying,
11 or self-referred after seeing the call for eligible parents on local
12 websites or notices.
- 13 • Group 2 “New Birth Visit” (NBV) group included parents intro-
14 duced the study by their HV/CPHN at the statutory “universal”
15 home visit 10–14 days after childbirth. These parents were told
16 about the availability of the Surviving Crying materials and
17 followed up by researchers until 6–8 weeks after their baby's birth.
18 If parents reported excessive infant crying at any point, the support
19 package was offered. If not, they were thanked and not followed up
20 further. We anticipated that this group would provide figures for
21 the incidence of excessive infant crying and allow earlier detection.

22 We aimed to recruit 30 parents to each group. As this was an
23 exploratory study, there was no control group.

24 2.3 | Assessments

25 Following recruitment, baseline assessments were conducted in
26 participants' homes. Parental measures included four validated rating
27 scales: EQ-5D Quality of Life Questionnaire (EuroQol Group, 1990);
28 Edinburgh Postnatal Depression Scale (Cox, Holden, & Sagovsky,
29 1987); Generalized Anxiety Disorder-7 General Anxiety Scale (Spitzer,
30 Kroenke, Williams, & Löwe, 2006); Maternal Confidence Question-
31 naire (MCQ, Badr, 2005). Due to the lack of validated paternal confi-
32 dence questionnaires, fathers also completed the MCQ with minor
33 adjustments to wording. In addition, parents rated their infant's crying
34 problem severity and the degree to which they were frustrated by the
35 crying and provided information on their own sleep and social sup-
36 ports, using items from previous studies (Cook et al., 2012; Fujiwara
37 et al., 2011; Hiscock et al., 2014; St James-Roberts & Halil, 1991).
38 To indicate the basis for parents concerns, their babies' perceived cry-
39 ing, health, and feeding problems were measured using items from
40 previous studies (Cook et al., 2012; Hiscock et al., 2014; St James-
41 Roberts & Halil, 1991).

42 Following baseline assessments, parents in both groups reporting
43 excessive infant crying were offered the support package. Parents
44 could choose which support package elements (website, printed book-
45 let, CBT programme) they received and how often they accessed them.

46 Outcome assessments were designed to occur approximately
47 4–6 weeks later, allowing access to the package. Baseline measures
48 were repeated and parents were asked five questions about crying
49 knowledge addressed in the package, adapted from Barr et al. (2009).
50 All recruited parents received a £20 shopping voucher at outcome
51 to acknowledge their contribution.

52 2.4 | Data analysis

53 Questionnaire summary scores were treated as continuous variables.
54 Confidence intervals for the summary scores were calculated from lin-
55 ear regression models, adjusting for the baseline score. Confidence
56 intervals calculated were for the outcome score and the change from
57 baseline, both overall and by group. Because few differences were
58 found between the two groups, their data are combined except where
59 indicated.

60 3 | RESULTS

61 Figure 1 provides a flow diagram for parents' progress through the
62 study. Table 1 summarizes participants' demographic characteristics.
63 Thirty RC group participants received the support materials. Of 124
64 NBV parents who consented to participate, 27 reported their baby to
65 be crying excessively and received the support package (Figure 1),
66 corresponding to an incidence of 21.7%. This group fell just short of
67 the target 30 cases. Overall, 55 parents requested access to the website,
68 27 the printed booklet, and 32 the CBT sessions. Five participants could
69 not be contacted at outcome. The average interval from baseline to
70 outcome was 5 weeks 5 days (range: 1 week 6 days–13 weeks 6 days).
71 The interval was longer where parents received the CBT sessions.

72 The majority of participants (94%) were mothers and married or
73 cohabiting (92%). They were predominately White, but small numbers
74 of Asian, Black, Mixed, and Other-ethnicity parents took part. Around
75 40% had university degrees. Many (69%) were on maternity or pater-
76 nity leave when their baby cried excessively. Because of some missing
77 data, participant numbers are given for each analysis.

78 3.1 | Parental well-being and mental health

79 Table 2 presents the outcome scores and changes from baseline in
80 measures of parents' well-being and mental health. Total EQ-5D
81 scores can vary from 0 to 1, and a score near 1 indicates an excellent
82 quality of life. Low scores were not expected, because this scale is
83 used across physical and mental health areas including severe disabil-
84 ities. The mean parental EQ-5D baseline score of 0.87 (*SD* 0.2) indi-
85 cated a good quality of life. The mean outcome score of 0.90 (*SD*
86 0.16; 95% CI: 0.88, 0.92) showed a modest improvement.

87 The Edinburgh Postnatal Depression Scale (EPDS) provides
88 screening for postnatal depression. A score of ≥ 13 is often used for
89 clinical purposes, but a score of ≥ 10 is recommended for screening
90 (Wisner, Parry, & Piontek, 2002). As Table 2 shows, the average paren-
91 tal EPDS score at baseline exceeded this cut-off (mean score 10.08;
92 *SD* 4.9). Using a head count and a cut-off of 10, 30 (53%) of the 57
93 parents with excessively crying infants were classified as depressed
94 at baseline. A cut-off of ≥ 13 identified 17 (30%) parents as depressed
95 at baseline. EPDS scores at outcome were substantially reduced (mean
96 7.10; *SD* 4.5), a reduction of 2.98 points (95% CI: -4.05, -1.92). The
97 number of parents with an EPDS criterion score for depression ≥ 10
98 halved (from 30 to 15 parents) between baseline and outcome (from
99 17 to eight parents using a cut-off ≥ 13).

100 The Generalized Anxiety Disorder-7 measures generalized
101 anxiety. Total scores range from zero to 21 with cut points of five,
102 10, 15, and 20. The mean score at baseline was 10.08 (*SD* 4.9) and
103 at outcome was 7.10 (*SD* 4.5), a reduction of 2.98 points (95% CI:
104 -4.05, -1.92). The number of parents with a score ≥ 10 halved
105 (from 30 to 15) between baseline and outcome. The number of
106 parents with a score ≥ 15 halved (from 17 to eight) between
107 baseline and outcome.

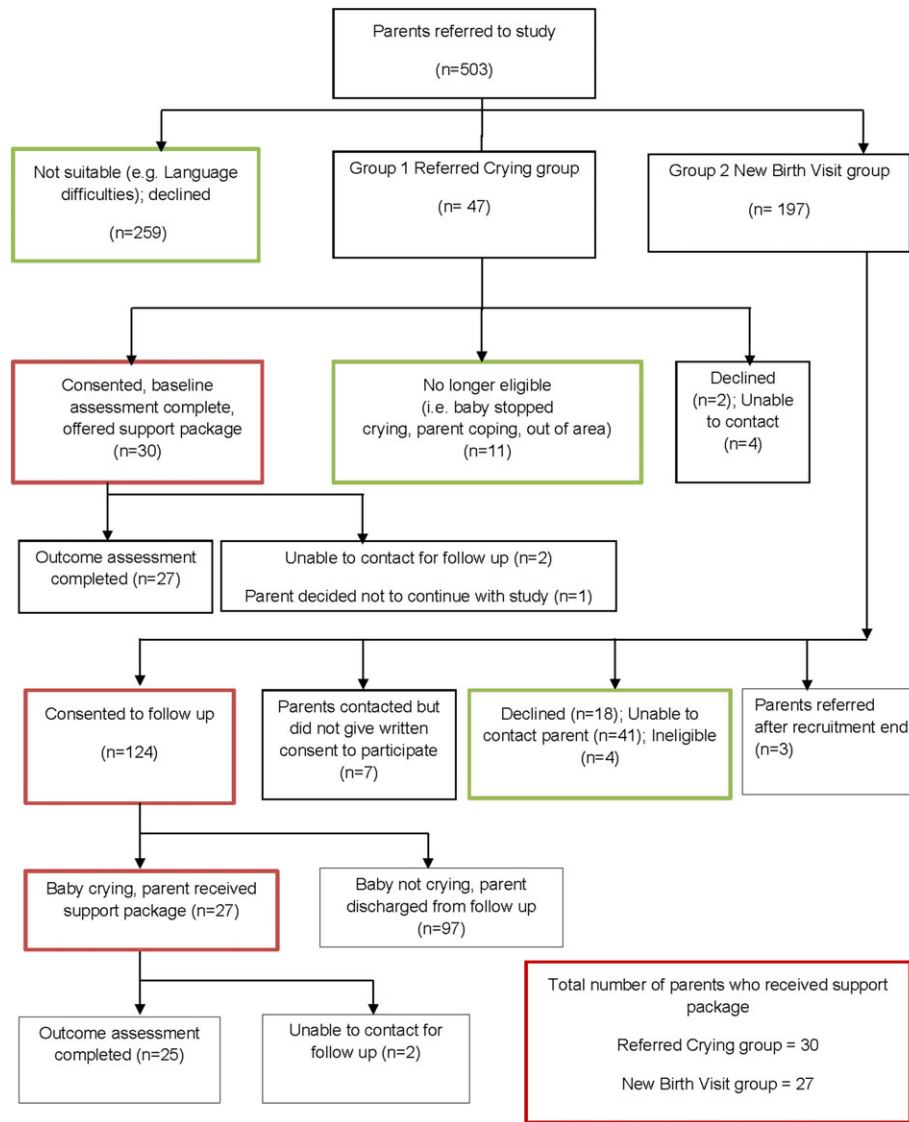


FIGURE 1 Surviving crying study recruitment diagram [Colour figure can be viewed at wileyonlinelibrary.com]

10, and 15 representing mild, moderate, and severe anxiety (Spitzer et al., 2006). At baseline, parents' mean (*SD*) score was 6.47 (*SD* 4.9) with 16 parents (28%) mildly anxious, 11 (19.5%) moderately anxious, and four (7%) severely anxious. By outcome, the adjusted mean had reduced to 3.9 (*SD* 3.8), a significant reduction of -2.55 points (95% CI: $-3.48, -1.61$). The number mildly anxious had decreased from 16 to 12, moderately anxious from 11 to two, and severely anxious from four to two.

The MCQ is a unidimensional measure with scores ranging from one to five, a higher score indicating higher confidence. The combined parents' MCQ scores showed a modest increase between baseline and outcome, with an adjusted mean increase of 0.13 (95% CI: 0.089, 0.17) from 2.02 (*SD* 0.21) to 2.15 (*SD* 0.19).

3.2 | Parental sleep and social supports

T3 Table 3 summarizes parents' reports of their own sleep. Both groups reported increased sleep from baseline to outcome, amounting to an average increase of 1 hr and 6 min per 24 hr. The number reporting fairly bad or bad sleep quality halved at outcome.

Table 3 also shows parents' reports on the support received from partners, and family and friends. At baseline, most parents (about 70%) judged these to be enough; about 10% reported insufficient support. At outcome, 73–76% of parents reported receiving enough support.

3.3 | Parents' knowledge about infant crying

Some parents knew some evidence about infant crying before taking part in the study, and some learned information from their HVs (Table 4). However, 32–64% (depending on the information) acquired **T4** knowledge from the support package. Up to 14% of parents indicated the information remained new to them, suggesting that they did not access or remember it.

3.4 | Parents' ratings of how much their baby's crying was a problem, and was frustrating, for them

At baseline, most (78%) parents judged their baby's crying to be a moderate or large problem, 16% a severe problem (Figure 2). Most **F2** **T4**

TABLE 1 Sociodemographic characteristics of participating parents

Sociodemographic characteristics	Referred Crying group	New Birth Visit group		All parents with an excessively crying baby	All parents
		Crying baby	No crying baby		
Parental sex: <i>n</i> (%)					
Female	24 (80)	27 (100)	94 (97)	51 (89)	145 (94)
Male	6 (20)	0 (0)	3 (3)	6 (11)	9 (6)
Parental age					
Mean age (years)	31.5	29.6	30.7	30.6	30.7
SD	5.7	4.7	5.2	5.3	5.2
(min-max)	(20-43)	(21-38)	(16-42)	(20-43)	(16-43)
Parental ethnicity: <i>n</i> (%)					
White	24 (80)	23 (85)	86 (89)	47 (82)	133 (86)
Mixed	0 (0)	1 (4)	2 (2)	1 (2)	3 (2)
Asian	5 (17)	2 (7)	5 (5)	7 (12)	12 (8)
Black	0 (0)	1 (4)	3 (3)	1 (2)	4 (3)
Other	1 (3)	0 (0)	1 (1)	1 (2)	2 (1)
Highest education level: <i>n</i> (%)					
Postgraduate degree	5 (17)	6 (22)	22 (23)	11 (19)	33 (21)
Undergraduate degree	6 (20)	7 (26)	21 (22)	13 (23)	34 (22)
Higher post A-level vocational qualification	4 (13)	3 (11)	8 (8)	7 (12)	15 (10)
A level/NVQ Level 3	8 (27)	6 (22)	19 (20)	14 (25)	33 (21)
GCSE/NVQ Level 2	3 (10)	2 (7)	10 (10)	5 (9)	15 (10)
Secondary school education	0 (0)	0 (0)	3 (3)	0 (0)	3 (2)
Primary school education	2 (7)	1 (4)	1 (1)	3 (5)	4 (3)
Other	2 (7)	2 (7)	13 (13)	4 (7)	17 (11)
Employment status: <i>n</i> (%)					
Full time	6 (20)	0 (0)	2 (2)	6 (11)	8 (5)
Part time	2 (7)	0 (0)	0 (0)	2 (3)	2 (1)
Maternity/paternity leave	15 (50)	18 (67)	74 (76)	33 (58)	107 (69)
Self-employed	0 (0)	2 (7)	3 (3)	2 (3)	5 (3)
Unemployed looking for work	2 (7)	2 (7)	1 (1)	4 (7)	5 (3)
Not in paid employment	4 (13)	5 (19)	14 (14)	9 (16)	23 (15)
Student	0 (0)	0 (0)	3 (3)	0 (0)	3 (2)
Full-time carer	1 (3)	0 (0)	0 (0)	1 (2)	1 (1)
Marital/Living Status: <i>n</i> (%)					
Married/cohabiting	28 (93)	22 (81)	92 (95)	50 (88)	142 (92)
Living alone but supported by partner	2 (7)	2 (7)	1 (1)	4 (7)	5 (3)
Living with parents/friends	0 (0)	0 (0)	2 (2)	0 (0)	2 (1)
Single parent living alone	0 (0)	3 (11)	2 (2)	3 (5)	5(3)

(71%) parents were moderately or very frustrated by the crying, and 16% extremely frustrated (Figure 3). By outcome, the number reporting crying to be a severe or large problem reduced from 28 (50%) to three parents (6%); the number feeling extremely or very frustrated by the crying reduced from 31 (55%) at baseline to one (2.0%) at outcome.

3.5 | Parental reports of infant crying, feeding, and health

These measures were obtained to indicate the bases for parents' concerns rather than to provide objective measures of infants. Because

five couples participated, baseline assessments were available for 52 infants. Fewer than half (44%) were first-borns, 44% second-born, 12% later-born. The average age for NBV infants (6.6 weeks) was significantly less than for RC infants (12.8 weeks), indicating that the NBV recruitment method identified excessive crying cases at a younger age (mean difference: 6.13, 95% CI: 3.50, 8.77).

Excessive crying began at a mean age of 3.1 weeks (*SD* 2.8 weeks). At baseline, infants were reported to cry for 6.9 hr per 24 hr on average (*SD* 3.7 hr, Table 5). Of the 52 infants, 45 (86%) were judged by parents to fuss and cry for more than 3 hr most days of the week, thereby meeting the Wessel et al. (1954) Rule of Threes criteria for prolonged crying. Fourteen infants were still crying excessively at

TABLE 2 Outcome scores and changes from baseline in psychometric measures of well-being and mental health for parents with excessively crying infants

Measure	N ^a	Parents overall 51
EQ-5D total score	Baseline, mean (SD)	0.87 (0.20)
	Outcome, mean (SD)	0.90 (0.16)
	Adjusted mean at outcome (95% CI) ^b	0.90 (0.88, 0.92)
	Change from baseline, adjusted mean (95% CI) ^c	0.033 (0.011, 0.055)
Edinburgh Postnatal Depression Scale	Baseline, mean (SD)	10.08 (4.93)
	Outcome, mean (SD)	7.10 (4.50)
	Adjusted mean at outcome (95% CI) ^b	7.10 (6.03, 8.16)
	Change from baseline, adjusted mean (95% CI) ^c	-2.98 (-4.05, -1.92)
GAD-7 anxiety questionnaire	Baseline, mean (SD)	6.47 (4.87)
	Outcome, mean (SD)	3.92 (3.87)
	Adjusted mean at outcome (95% CI) ^b	3.92 (2.99, 4.86)
	Change from baseline, adjusted mean (95% CI) ^c	-2.55 (-3.48, -1.61)
Maternal/paternal confidence questionnaire	Baseline, mean (SD)	2.02 (0.21)
	Outcome, mean (SD)	2.15 (0.19)
	Adjusted mean at outcome (95% CI) ^b	2.15 (2.11, 2.19)
	Change from baseline, adjusted mean (95% CI) ^c	0.13 (0.089, 0.17)

Note. GAD = Generalized Anxiety Disorder.

^aStatistics were calculated using individuals with complete data for baseline, outcome, group, and change in crying.

^bLinear regression models for means at outcome, both overall and by group, for each questionnaire were adjusted for their baseline score, with group also added as a covariate.

^cLinear regression models for mean change from baseline, both overall and by group, for each questionnaire were adjusted for their baseline score, with group also added as a covariate.

TABLE 3 Parents' reports of their own sleep and social supports

		Baseline	Outcome
Average hours of sleep per night	N	57	52
	Mean (SD)	5.3 (1.3)	6.5 (1.3)
	Range	2-8	3-9
	Median	5	6
Average hours of sleep per 24 hr	N	57	52
	Mean (SD)	5.9 (1.3)	6.8 (1.3)
	Range	3-10	4-10
	Median	6	7
	Missing	0	1
Parental sleep quality rating	N	57	52
	Very good	2 (3.6%)	7 (13.5%)
	Fairly good	26 (46.4%)	35 (67.3%)
	Fairly bad	22 (39.3%)	8 (15.4%)
	Very bad	7 (12.5%)	2 (3.9%)
Support from partner	N	56	51
	Enough	39 (69.6%)	39 (76.5%)
	Not enough	14 (7.1%)	8 (15.7%)
	None	2 (3.6%)	1 (2.0%)
	Do not need	0 (0.0%)	3 (5.9%)
	Prefer not to answer	1 (1.8%)	0 (0.0%)
Support from family and friends	N	57	52
	Enough	40 (70.2%)	38 (73.1%)
	Not Enough	14 (24.6%)	9 (17.3%)
	None	2 (3.5%)	3 (5.8%)
	Do not need	0 (0.0%)	1 (1.9%)
	Prefer not to answer	1 (3.7%)	1 (1.9%)
How often need support but cannot get it	N	57	52
	Very often	3 (5.3%)	1 (1.9%)
	Often	6 (10.5%)	5 (9.6%)
	Sometimes	33 (57.9%)	23 (44.2%)
	Never	14 (24.6%)	19 (36.5%)
	Do not need	1 (1.7%)	4 (7.7%)
	Prefer not to answer	0	0

outcome, at an average age of 15 weeks 6 days, implying the need for a longer follow-up in future studies. For the 33 infants who had stopped excessive crying, the crying lasted an average of 8 weeks and 1 day (SD 4.3 weeks). The total time per 24 hr infants spent fussing and crying halved between baseline and outcome, from 6.9 to 2.6 hr (mean difference: -4.3 hr, 95% CI: -5.2, -3.3).

Linear regression was used to examine whether the reductions in infant crying from baseline to outcome could account for the changes in parental well-being and mental health (Table 6). None of these associations was statistically significant, implying that factors other than the crying were involved.

When excessive crying began, most infants (71%) were breastfed; 40% were fed formula (some received both). At baseline and outcome, respectively, 52% and 53% were breastfed (Table 5), suggesting that where breastfeeding was discontinued, this happened at a young age. Of 21 infants whose parents stopped breastfeeding by outcome, the average infant age at stopping was 3.6 weeks (SD 4.1 weeks).

Parents reported that 40-50% of infants had feeding problems or repeatedly brought up feeds at baseline (Table 5). However, all but one infant (98%) had been weighed by a health professional and 58% had received a feeding check, without a definitive diagnosis. Parents judged around a quarter of infants to be unwell and half had been seen by their general practitioner in the last fortnight for reasons other than crying (Table 5). At outcome, these parent-reported measures of infant ill health reduced in frequency, but 25% of parents reported infant feeding problems and 40% that infants repeatedly brought up feeds. The proportion of parents reporting signs of illness other than crying in the last 2 weeks remained similar at outcome, but fewer infants had been seen by their general practitioner in the last fortnight.

T6

Q10

TABLE 4 Measures of parents' knowledge of infant crying at outcome (n = 50)

	This is new to me	Learned in study	Learned from HV	Already knew ^a
Infant crying reaches a peak in the first 2 or 3 months before getting less	7 (14.0%)	32 (64.0%)	6 (12.0%)	5 (10.0%)
Infants of this age cry more often in the late afternoon and evening	2 (4.0%)	24 (48.0%)	6 (12.0%)	18 (36.0%)
Even healthy infants sometimes cry unexpectedly or without a clear reason	1 (2.0%)	16 (32.0%)	5 (10.0%)	28 (56.0%)
Even good parents are sometimes unable to soothe their crying infant	0 (0.0%)	21 (42.0%)	3 (6.0%)	26 (52.0%)
It is ok to walk away from a crying infant when his or her crying becomes very frustrating, providing the baby is in a safe place	4 (8.0%)	21 (42.0%)	7 (14.0%)	18 (36.0%)

Note. HV = Health Visitor.

^aAlready knew, learned from somewhere else, or cannot remember where this was learned.

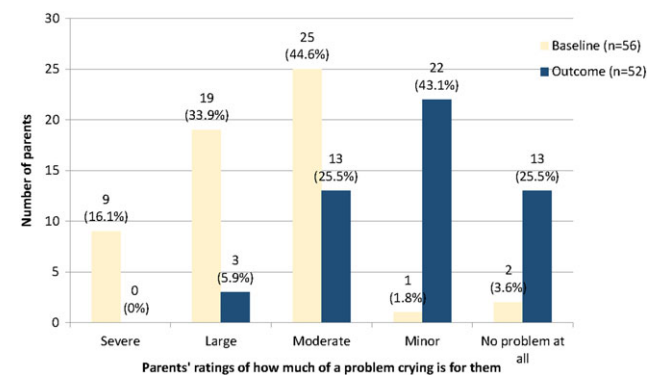


FIGURE 2 Parents' ratings of how much their baby's crying was a problem for them at baseline and outcome [Colour figure can be viewed at wileyonlinelibrary.com]

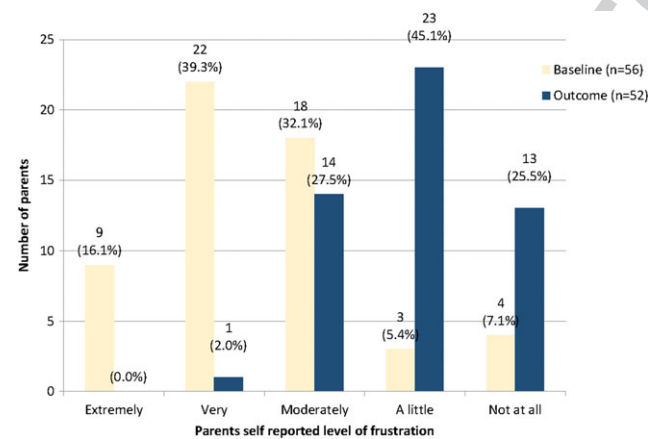


FIGURE 3 Parents' frustration because of infant crying at baseline and outcome [Colour figure can be viewed at wileyonlinelibrary.com]

4 | DISCUSSION

This study aimed to provide an initial, prospective evaluation of whether the Surviving Crying support package might improve the well-being and mental health of parents of excessively crying infants. Both validated rating scales and items from previous studies showed significant changes from baseline (before receiving the package) to outcome, approximately 6 weeks later. Numbers of parents who met clinical criteria for depression halved and numbers who met clinical criteria for anxiety reduced from 31 to 16 parents. The number reporting crying to be a large or severe problem reduced from 28

TABLE 5 Parents' reports of infant feeding, crying, and health

	Baseline (n = 52)	Outcome (n = 47)
Infant age (weeks)		
Mean (SD)	9.6 (5.6)	15.3 (5.6)
Median	7	13
Range	3–24	9–30
Infant feeding method		
Breast milk N (%)	27 (51.9%)	25 (53.2%)
Formula milk	28 (53.9%)	25 (53.2%)
Infant solid foods	2 (3.9%)	3 (6.4%)
Family foods	1 (1.9%)	0 (0%)
Infant's feeding checked by a professional? N (%)	30 (57.7%)	–
Infant's weight checked by a professional? N (%)	51 (98.1%)	–
Total hours of fuss/crying in a typical day		
Mean (SD)	6.9 (3.7)	2.6 (2.3)
Median	5.7	2.1
Range	1.3–17.0	0.3–13.0
Crying pattern: Hours (%) of fuss/crying in each period of a typical day		
Morning	1.6 (20.1%)	0.7 (25.5%)
Afternoon	2.0 (29.5%)	0.8 (33.5%)
Evening	2.3 (35.9%)	0.9 (43.8%)
Night	1.1 (15.3%)	0.2 (6.9%)
When crying excessively		
Infant seemed unwell	12 (23.1%)	6 (12.8%)
There were concerns about their weight gain	7 (13.5%)	8 (17.0%)
Infant had feeding problems	21 (40.4%)	12 (25.5%)
Infant repeatedly brought up feeds	26 (50.0%)	19 (40.4%)
Admitted to hospital specialist care unit in 1st week after being born	4 (7.7%)	–
Any other signs of illness in last fortnight?	18 (34.6%)	18 (38.3%)
Seen GP or other doctor in last fortnight for anything other than crying?	26 (50.0%)	17 (36.2%)

Note. GP = general practitioner.

(50.0%) at baseline to three parents (6%) at outcome; the number feeling very or extremely frustrated by the crying from 31 (55%) at baseline to one (2.0%) at outcome. If frustration is the trigger for

Colour online, B&W in print

Colour online, B&W in print

TABLE 6 Linear regression using measures of change in crying amount from baseline to outcome to predict changes in parental well-being and mental health

Outcome	Coefficient (95% CI)
Change in EQ-5D	-0.0000135 (-0.007 to 0.007)
Change in EPDS	-0.069 (-0.409 to 0.270)
Change in GAD-7	0.110 (-0.187 to 0.408)
Change in total confidence	0.068 (-0.279 to 0.415)
Change in mean confidence	0.00242 (-0.009 to 0.015)

Note. EPDS = Edinburgh Postnatal Depression Scale; GAD = Generalized Anxiety Disorder.

^aModel for change from baseline included the following variables: score at baseline, group, and change in crying.

infant abuse, as studies indicate (Fujiwara et al., 2011), this reduction is a particularly encouraging finding.

The findings support the notion that the impact of infant crying on parents (and vice versa) involves parental mental health and well-being. However, the direction of causation remains uncertain. Petzoldt et al. (2014) concluded that maternal anxiety during pregnancy predicted excessive infant crying, whereas Petzoldt's (2018) review found that maternal depression was more often a correlate or a consequence of excessive infant crying. This study's finding that substantial numbers of parents reduce their depression during the postnatal period is consistent with that view, but an equal number of parents also reduced in anxiety. The implication is that postnatal experience contributes to both depression and anxiety. Although the findings do not tell us whether the Surviving Crying package is responsible for those improvements, they allow that possibility.

Other findings include increases in amount and quality of parental sleep and in parental confidence. Although modest, these increases are encouraging so far as the aim is to improve parents' confidence and coping skills. Notably, most parents reported receiving adequate social support from partner, family, and friends and there was little change in these measures. The intervention was not associated with changes in numbers breastfeeding. Although approximately a third of parents discontinued breastfeeding, infant age averaged 3–4 weeks when this happened. This finding adds to evidence that excessive crying is associated with stopping breastfeeding (Howard et al., 2006) and indicates that breastfeeding support for parents of excessively crying infants needs to be delivered at an early age.

The study's limitations include failure to recruit sufficient numbers of fathers and, by design, the lack of a control group and randomization, preventing any conclusions about causation. Because infant crying development follows an inverted U-shaped curve, the increases found in parental well-being and mental health might be due to reductions in the crying. Using regression analyses, that proved not to be the case. A previous study, too, found that reductions in infant crying were not matched by parent-reported crying problems (Hill et al., 2005). A possible explanation is that parental concerns about excessive infant crying involve more than the amount their baby cries. For instance, the "unsoothability" of some cry bouts during early infancy is the primary source of parental frustration (Fujiwara et al., 2011). Other factors indicated here include concerns about infant feeding and health. The findings point to a cluster of infant and parental

factors, rather than duration of crying alone, as the basis for parental concern. The implication is that intervention studies need to broaden their outcome measures beyond cry duration.

In conclusion, these findings are promising. Towards the goal of evidence-based health services, this evaluation indicates that large-scale controlled trials of the Surviving Crying package to substantiate and clarify the improvements in parental mental health found here are warranted.

CONFLICT OF INTERESTS

None declared.

DEPARTMENT OF HEALTH AND SOCIAL CARE DISCLAIMER

This report presents independent research commissioned by the National Institute for Health Research (NIHR). The views and opinions expressed by authors in this publication are those of the authors and do not necessarily reflect those of the NHS, the NIHR, MRC, CCF, NETSCC, the HTA Programme, or the Department of Health and Social Care.

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