Post-Up Study: Postpartum Depression Screening in Well-Child Care and Maternal Outcomes

Angarath I. van der Zee-van den Berg, MD,[a] Magda M. Boere-Boonekamp, MD, PhD,[a] Catharina G.M. Groothuis-Oudshoorn, PhD,[a] Maarten J. IJzerman, PhD,[a] Riet M.E. Haasnoot-Smallegange, MD,[b] Sijmen A. Reijneveld, MD, PhD[c]

abstract

OBJECTIVES: Postpartum depression often remains unaddressed. Screening in well-child care (WCC) may improve early detection, promote maternal recovery, and reduce effects on child development. We assessed the effectiveness of screening for postpartum depression in WCC compared with care as usual (CAU) on outcomes at mother and child levels.

METHODS: In a prospective, quasiexperimental, comparative design, mothers visiting Dutch WCC centers were exposed either to screening at 1, 3, and 6 months postpartum (n = 1843) or to CAU (n = 1246). Assessments were at 3 weeks (baseline), 9 months (the Mini International Neuropsychiatric Interview), and 12 months (the Spielberger State-Trait Anxiety Inventory, the Short-Form 12-Item Health Survey, the Maternal Self-Efficacy in the Nurturing Role questionnaire, and the Ages and Stages Questionnaire–Social Emotional) postpartum.

RESULTS: Significantly fewer mothers in the intervention group were depressed at 9 months postpartum compared with the CAU group (0.6% vs 2.5% for major depression). The adjusted odds ratio was 0.28 (95% confidence interval, 0.12 to 0.63; Cohen's d, 0.70). For minor and major depression, figures were 3.0% vs 8.4%, and the adjusted odds ratio was 0.40 (95% confidence interval, 0.27 to 0.58; Cohen's d, 0.51). For parenting, anxiety symptoms, and mental health functioning, the intervention resulted in effect sizes ranging from 0.23 to 0.27. The effect on the child's socioemotional development was negligible.

CONCLUSIONS: Implementation of screening for postpartum depression in WCC should be seriously considered given its positive effects on maternal mental health. The benefits of optimizing the trajectory after screening on maternal and child outcomes need further attention.

[a]*Department of Health Technology and Services Research, Institute for Innovation and Governance Studies, University of Twente, Enschede, Netherlands;* [b]*Department of Preventive Child Health Care, Municipal Health Services GGD Twente, Enschede, Netherlands; and* [c]*Department of Health Sciences, University Medical Center Groningen, University of Groningen, Groningen, Netherlands*

Dr van der Zee-van den Berg was responsible for day-to-day management of the trial, development of the trial and questionnaires, data collection, data analysis, and the first draft of the manuscript; Drs Boere-Boonekamp, Haasnoot-Smallegange, IJzerman, and Reijneveld supervised the study, critically interpreted the data, and revised the concept versions of this review; Dr Groothuis-Oudshoorn supervised the data analysis, performed imputation of the missing data, and reviewed and revised the manuscript; and all authors approved the final manuscript as submitted, take responsibility for the integrity of the data, and agree to be accountable for all aspects of the work.

This trial has been registered with the ISRCTN Register (http://isrctn.org) (identifier ISRCTN42298046).

WHAT'S KNOWN ON THIS SUBJECT: Postpartum depression is common after childbirth but is frequently unaddressed. Screening may improve early detection and maternal recovery and reduce the impact of postpartum depression on child development. Evidence on the effectiveness of screening in well-child care is limited.

WHAT THIS STUDY ADDS: We found that screening for postpartum depression in well-child care reduced maternal depressive symptoms and improved overall maternal mental health and parenting. This warrants a wider implementation of screening for postpartum depression. Effects on child outcomes were negligible.

To cite: van der Zee-van den Berg AI, Boere-Boonekamp MM, Groothuis-Oudshoorn C.G.M., et al. Post-Up Study: Postpartum Depression Screening in Well-Child Care and Maternal Outcomes. *Pediatrics.* 2017;140(4):e20170110

Postpartum depression is a common complication after childbirth, with a 7.1% period prevalence of major depression until 3 months postpartum.[1] Most of those at risk are mothers with a history of depression, negative life events, and a lack of social support.[2] Postpartum depression not only affects the well-being of the mother but may also have long-term consequences for her newborn child. Postpartum depression is associated with disturbed emotional regulation of infants, internalizing and externalizing behavioral difficulties of toddlers and schoolchildren, less developed social competences, and depression and attention-deficit/hyperactivity disorder in adolescence.[3] Parental sensitivity in parenting seems to be an important mediator.[3]

Early detection, support, and treatment can promote fast recovery of the mother[4,5] and may reduce the effects of postpartum depression on the child's development, but postpartum depression symptoms frequently remain unadressed.[6] Implementing a structured assessment in primary care with a screening instrument such as the Edinburgh Postnatal Depression Scale (EPDS)[7] can improve early detection. In the Netherlands, routine postpartum maternity care ends 1 week after delivery. There is only 1 standard follow-up contact with the midwife or gynecologist 6 weeks postpartum. Well-child care (WCC) professionals have frequent contact with mothers during the entire postpartum year, which makes WCC a particularly suitable screening setting. WCC professionals can build a trusting relationship, offer repeated screening, and motivate mothers to seek further treatment if necessary.

Despite the potential benefits of the WCC setting and promising results of screening for postpartum depression in general,[4,5] evidence on the value of screening for postpartum depression in the setting of WCC is limited. A recent systematic review found 6 studies in which researchers examined the effectiveness of screening compared with care as usual (CAU).[8] Although limited, the evidence was indicative of a positive effect of screening for postpartum depression on detection, referral and treatment rates, and a reduction effect of screening on depression symptoms at follow-up. No effects were found for other outcomes at the parent level. Relevant outcomes at the child level were not examined, and only researchers in studies of weak quality examined the effects of repeated screening. Therefore, our aim in the Post-Up study was to determine if repeated screening for postpartum depression in WCC followed by routine care for screen-positive mothers results in improved outcomes at both the maternal level (state of depression, parenting, health-related quality of life, and anxiety symptoms) and child level (decreased rates of socioemotional problems) at the end of the first year postpartum compared with CAU.

METHODS

Design and Participants

This study had a prospective, quasiexperimental, comparative design. Participants were mothers visiting Dutch WCC centers, included after childbirth between December 1, 2012, and April 1, 2014. Participants were exposed either to a procedure of screening at 1, 3, and 6 months postpartum (intervention condition) or to CAU (control condition). Participants' allocation to intervention or CAU was based on their living areas as registered in the municipal population register (MPR). Each living area was connected to a specific WCC organization. In total, 23 WCC centers of 1 organization formed the intervention region, and 19 centers of 2 organizations formed the CAU region. Intervention and CAU regions were selected on the basis of comparability of urbanity and the absence of specific interventions related to parental mental well-being. Exclusion criteria are indicated in the flowchart (Fig 1).

Ethical Permission

The Medical Ethics Committee Twente assessed the study protocol and concluded that the measures pertaining to confidentiality and informed consent were appropriate, and the study was beyond the remit of the Medical Sciences Research with Human Subjects Act.

Setting

WCC centers offer free WCC to parents of all newborn children in the Netherlands, including monitoring child growth, health and development, and vaccinations. Coverage is >95% of the children registered in the municipal population register. The first contact is a home visit 2 weeks after birth. Subsequently, there are ~7 standard visits to the WCC center within the first year, usually conducted alternately by a WCC physician and nurse.[9] WCC is offered nationwide in a standardized way, with professionals working according to multiple guidelines of the Dutch Center on Preventive Child Healthcare. Two institutes perform the training of all WCC physicians nationwide. The quality of WCC is supervised by the Dutch Health Care Inspectorate.

Intervention

The intervention comprised early detection of postpartum depression by repeated screening followed by advice on treatment options and referral when needed. The EPDS[7] was used for screening. This widely used, 10-item, self-report measure was developed specifically for use in community samples of postpartum mothers. According to the pooled data in the review of Hewitt et al,[4] the

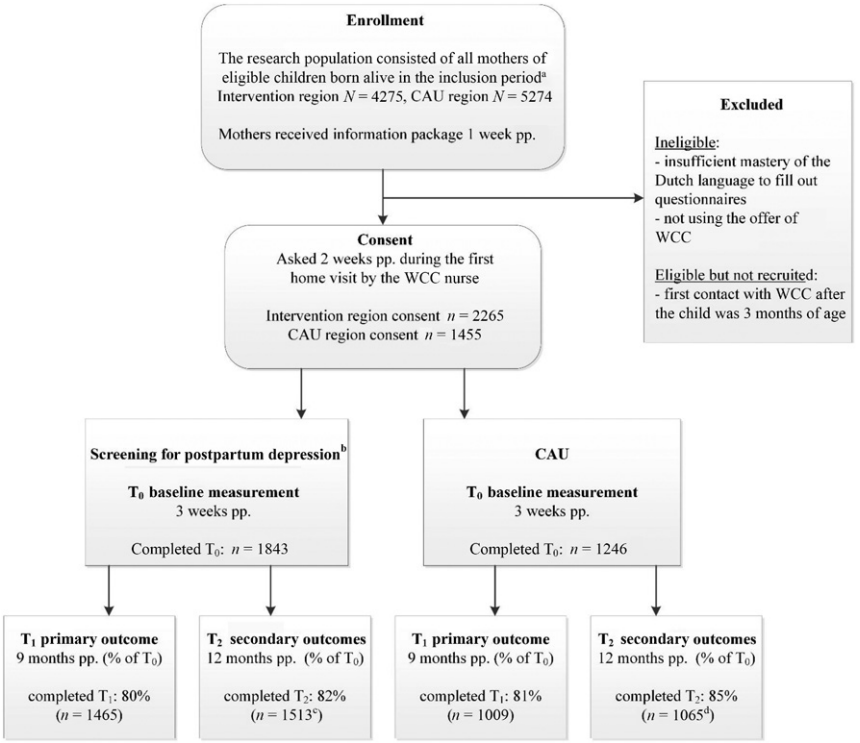

FIGURE 1

Flowchart of participants in the Post-Up study. [a] The inclusion period of the intervention region was January 1, 2013, to March 31, 2014. The inclusion period of the CAU region was December 1, 2012, to March 31, 2014. [b] EPDS at 1, 3, and 6 months postpartum, including subsequent advice and referral. [c] Of these 1513 mothers, 1287 completed T_0 and T_1 and 226 completed only T_0. [d] Of these 1065 mothers, 919 completed T_0 and T_1 and 146 completed only T_0. PP, postpartum; PPD, postpartum depression.

EPDS will correctly identify 79% of women with postpartum depression (sensitivity: 0.79; 95% confidence interval [CI], 0.74 to 0.83) and 89% of the women without postpartum depression (specificity: 0.89; 95% CI, 0.85 to 0.92). The Cronbach's α of the Dutch version is 0.82,[10] which implies that the 10 items of the EPDS interrelate well and measure the same concept.

On initiation of the screening, a guideline was developed containing instructions on use of the EPDS, interpretation, and referral options. The guideline was discussed in structured, intercollegiate learning sessions by the professionals.

During the home visit 2 weeks postpartum, the WCC nurse explained the purpose of screening for postpartum depression and asked the mother to complete an EPDS form before the WCC visits at 1, 3, and 6 months. During these visits, the WCC physician scored the EPDS and discussed the outcome with the mother. A score ≥13 was interpreted as indicating a high risk of having major depression. If the physician's clinical impression was consistent with the score, guideline instructions were to refer the mother to her family practitioner or mental health care professional. EPDS scores from 9 to 12 were an indication for minor depression. According to the guideline, mothers with scores from 9 to 12 were offered a home visit by the WCC nurse to clarify if the mothers could cope with these symptoms on their own, with support from WCC, or needed further referral. In case of suicidal ideation, 24-hour crisis services were available provided by the mental health care organizations in the region. Follow-up was part of standard care.

CAU

In the CAU group, mothers and their newborns visited WCC at the same, regular basis but received no EPDS screening that guided further advice and referral. The professional conducted a routine interview with the mother; although the professional could ask about maternal depressive symptoms, this was not a standard part of the consultation. When depression was suspected, a home visit or referral for further help could be offered.

Procedures

Participation implied the following 3 assessments: at 3 weeks (T_0, baseline), 9 months (T_1), and 12 months (T_2) postpartum for intervention and control mothers plus the threefold EPDS filling-in for intervention mothers only. Participating mothers gave written informed consent during the WCC home visit. Invitations to fill in the online questionnaires at T_0 and T_2 were sent by e-mail, and mothers were reminded by e-mail or telephone. Hard-copy versions were available on request. T_1 consisted of a telephone interview administered by 3 master's-level psychology students, who were trained and supervised by a health care psychologist. Mothers who were not reached by telephone received a request to answer the questions online. Participating professionals were informed of the procedures of the Post-Up study in a face-to-face presentation and received a manual explaining the procedures.

Blinding

The allocation of participants to the screening or CAU group could not be blinded because it was linked to separate organizations providing WCC. Assessors of T_1 outcomes were blinded.

Primary Outcomes

The primary outcome of this study was the presence of depression (major or minor) at 9 months postpartum measured with the depression subscale of the Dutch Mini International Neuropsychiatric Interview[11] (MINI) version 5.0.0. The MINI is a structured diagnostic interview that was developed to assess psychiatric diagnoses according to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* and *International Classification of Diseases, 10th Revision* criteria. The reliability of the MINI proved to be excellent and the validity sufficient.[11–13] Depression definitions correspond to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria, with major depression implying the presence of at least 5 depressive symptoms and minor depression the presence of at least 2 (but fewer than 5) symptoms during a 2-weeks period.

Secondary Outcomes at Mother and Child Levels

Secondary outcomes at the mother level concerned health-related quality of life, maternal anxiety, quality of parenting, and child socioemotional development all at 12 months postpartum. The Short-Form 12-Item Health Survey (SF-12)[14] was used to measure health-related quality of life. It is a validated instrument with physical and mental summary scales, which are calculated based on scoring algorithms.[15] The SF-12 has good psychometric properties.[14,16]

Anxiety levels were measured with the 6-item short form of the state scale of the Spielberger State-Trait Anxiety Inventory.[17] The Dutch translation showed good reliability and validity.[18] The quality of parenting was measured with the Dutch version of the Maternal Self-Efficacy in the Nurturing Role questionnaire,[19] which consists of 16 statements regarding a mother's perceptions of her competence in caring for her infant. The Cronbach's α of the Dutch version ranged from 0.78 to 0.89.[20,21]

The socioemotional development of the children was measured with the 12-months version of the Ages and Stages Questionnaire–Social Emotional (ASQ-SE).[22,23] Psychometric properties ranged from satisfactory to good.[22,24,25]

Sample Size

Sample size was determined on the basis of the expected difference in identified cases when performing a threefold screening, assuming a prevalence rate of postpartum depression of 6% and detection rates of 70% through screening with the EPDS and 40% through CAU. Demonstrating a difference in identified cases between the groups of 1.8% (4.2% vs 2.4%) at $P < .05$ with a power of 80% required 1545 women in each group.

Background Characteristics

Background characteristics measured at T_0 concerned demographic characteristics of the mother and her current partner (age, native country, living in an urban area, education level, employment, and single status), pregnancy characteristics (complications, preterm birth, and firstborn), history of depression, and breastfeeding of the child.

Statistical Analyses

First, we assessed the flow of participants through the study. Second, we described the background characteristics of the 2 groups; we assessed differences by using χ^2 tests. Third, we assessed differences between intervention and control conditions regarding the primary and secondary outcomes on the basis of intention-to-treat analyses by using χ^2 tests and independent sample t tests. We further analyzed the differences between the conditions with regression models and included as covariates those factors known to be associated with postpartum depression, with a significantly different frequency in intervention and CAU (ie, urbanity of living area, employment of the mother, lifetime history of depression, and initiation of breastfeeding after birth). To account for potential clustering of the effects per WCC, we used multilevel linear and logistic regression models. Moreover, we performed multiple imputation of missing values with the method based on chained equations.[26] To calculate effect sizes for dichotomous (yes or no) outcomes, the corresponding odds ratio (OR) was transformed to Cohen's d (according to Hasselblad and Hedges[27]). In case of continuous outcomes, the regression coefficient per SD was used as the effect size. We performed data analyses using SPSS 24 (IBM SPSS Statistics, IBM Corporation, Armonk, NY) and used R for multiple imputation and multilevel regression models.

RESULTS

A flowchart of the Post-Up study is provided in Fig 1. Response rates for T_0 were 81% (n = 1843) in the intervention group and 86% (n = 1246) in the CAU group. In the intervention group, 80% (n = 1465) completed T_1 and 82% (n = 1513) completed T_2, compared with 81% (n = 1009) and 85% (n = 1065) in the CAU group, respectively.

Background Characteristics

Sociodemographic characteristics such as age and education did not differ significantly between the

intervention and CAU groups (Table 1). However, significantly more mothers in the CAU group were living in an urban area, were employed (>12 hours per week), had a lifetime history of depression, had delivered their firstborn children, and had started breastfeeding after birth.

Effects on Primary and Secondary Outcomes

In the intervention group, significantly fewer mothers were depressed at 9 months postpartum (major depression: 0.6%, *n* = 11; minor and major depression: 3.0%, *n* = 56) than in the CAU group (major depression: 2.5%, *n* = 31; minor and major depression: 8.4%, *n* = 105), with an adjusted OR of 0.28 for major depression (95% CI, 0.12 to 0.63) (Table 2) being a medium effect on depressive symptoms (Cohen's d, 0.70). Regarding minor and major depression, the adjusted OR was 0.40 (95% CI, 0.27 to 0.58).

Mothers in the intervention group had significantly better scores on most secondary outcomes at the maternal level (parenting, anxiety symptoms, and mental health functioning), resulting in small effect sizes ranging from 0.23 to 0.27. We found no differences for the SF-12 physical composite summary. At the child level, the effect on the ASQ-SE was negligible (effect size of 0.10). We observed no adverse events in the intervention group nor in the CAU group.

Process Outcomes

EPDS forms were returned by the WCC centers for 91.4% of the intervention mothers. The cumulative incidence of an EPDS score ≥9 at 1, 3, or 6 months was 12.0%, including 4.0% of the women with a score ≥13. Of the intervention

TABLE 1 Background Characteristics (Mean or Percent) of Participants in the Intervention and CAU Groups

Background Characteristic	Intervention	CAU	*P* [a]
	Participating Mothers (*n* = 1843)	Participating Mothers (*n* = 1246)	
Mother's age (mean)	30.6	30.8	.27
Partner's age (mean)	33.5	33.4	.58
Mother is Dutch born	95.3%	95.2%	.85
Partner is Dutch born	95.2%	94.8%	.58
Single mother	0.9%	1.2%	.45
Living in an urban area[b]	12.4%	40.4%	<.001
Mother's education (medium to high)	88.3%	90.0%	.28
Partner's education (medium to high)	81.4%	84.0%	.16
Mother is employed (>12 h/wk)	81.1%	84.6%	.04
Partner is employed (>12 h/wk)	93.9%	93.6%	.71
Depression			
Lifetime	17.7%	23.0%	<.001
During pregnancy	1.6%	1.6%	.95
Previous postpartum[c]	4.1%	5.6%	.06
Firstborn child	45.1%	48.6%	.05
Preterm birth[d]	3.7%	3.0%	.28
Complications during pregnancy	24.0%	25.0%	.54
Breastfeeding started after birth	74.1%	82.5%	<.001

[a] Differences tested between participating mothers in intervention and CAU groups.
[b] ≥1000 addresses per km^2.
[c] Percentage of whole sample.
[d] Birth before 37 weeks' gestation.

TABLE 2 Effects of Screening for Postpartum Depression in WCC on Primary and Secondary Outcomes, Crude and Adjusted for Potential Confounders: Multilevel Logistic Models Leading to ORs and Multilevel Linear Regression Models Leading to Regression Coefficients on the Basis of Imputed Data Sets

Outcomes	Intervention (*n* = 1843)	CAU (*n* = 1246)	Crude Difference	*P*	Adjusted Difference[a]	*P*	Effect Size
Primary[b] (% [*n*]; OR [95% CI]; Cohen's d)							
MINI major depression	0.6% (11)	2.5% (31)	0.23 (0.10 to 0.49)	<.001	0.30 (0.13 to 0.66)	.001	0.66
MINI minor and major depression	3.0% (56)	8.4% (105)	0.33 (0.21 to 0.53)	<.001	0.38 (0.24 to 0.61)	<.001	0.53
Secondary[c] (mean; B [95% CI]; B/SD)							
Mother level, score							
SENR total[d]	100.8	98.0	2.68 (1.77 to 3.59)	<.001	2.19 (1.48 to 2.89)	<.001	0.23
SF-12 PCS[d]	52.4	52.8	−0.43 (−1.12 to 0.32)	.12	−0.53 (−1.29 to 0.23)	.07	0.06
SF-12 MCS[d]	51.7	49.2	2.56 (1.59 to 3.53)	<.001	2.17 (1.33 to 3.02)	<.001	0.26
STAI-6 total[e]	33.9	37.3	−3.47 (−4.99 to −1.98)	<.001	−3.09 (−4.43 to −1.75)	<.001	0.27
Child level, score							
ASQ-SE[e]	13.0	14.4	−1.36 (−2.45 to −0.26)	.003	−1.06 (−2.14 to 0.01)	.02	0.10

B, regression coefficient; MCS, mental composite summary; PCS, physical composite summary; SENR, Maternal Self-Efficacy in the Nurturing Role questionnaire; STAI-6, State-Trait Anxiety Inventory, 6-item Short Form (state scale).
[a] Based on logistic regression model with the following variables: urbanity of living area, mother employed, lifetime history of depression, and started breastfeeding after birth.
[b] Measured at 9 months postpartum.
[c] Measured at 12 months postpartum.
[d] Higher score indicates more positive outcome.
[e] Lower score indicates more positive outcome.

mothers who could recall at T_2 having experienced a depressive period since giving birth, 60% reported to have consulted their family practitioners in relation to their depression, and 38% reported having received further treatment. Rates for CAU mothers were 60% and 37%, respectively.

DISCUSSION

In this study, we found a medium effect of screening for postpartum depression in a WCC setting, compared with CAU, on depression in mothers at 9 months postpartum. We also found small effects for secondary outcomes at the mother level (including parenting, anxiety symptoms, and mental health functioning) but negligible effects on the socioemotional development of their children.

Our findings of the substantial effect of screening on maternal depression later in the postpartum year confirm findings in other studies on screening for postpartum depression in WCC[8] and other settings.[4,5] However, our use of the MINI structured diagnostic interview provided us with a more valid outcome than that of most previous studies, which used a screening instrument instead. Therefore, our study provides stronger evidence that screening for postpartum depression in a WCC setting is an effective way to reduce maternal depressive symptoms.

Researchers in other studies found 0 to modest effects of screening on the secondary outcome of maternal mental health functioning by using various measures.[8,28,29] The findings in our study are most in line with the cluster randomized trial of Morrell et al[29] but with larger effect sizes. In previous studies, no effects of screening were found on another secondary outcome, parenting at 1 year postpartum.[5,8,29] In contrast, we found a modest improvement of maternal self-efficacy in parenting, which underlines the potentially beneficial effect of screening for postpartum depression on parenting.

We found screening for postpartum depression to have a negligible effect on socioemotional development of the child with no former evidence to compare with. An explanation could be that a longer interval may be required to determine the effects from undetected maternal depression on the child's socioemotional development. Also, the relatively low sensitivity of the ASQ-SE[25] may have led to underestimation of the number of children with problematic socioemotional development.

Strengths and Limitations

Our study has several strengths. First, it was performed in a large, community-based sample and was adequately powered. Second, we had relatively high retention rates at T_1 and T_2, limiting the potential of selective dropout. Third, the primary outcome was measured with a strong gold standard, ie, the MINI interview.

A potential limitation is that our quasiexperimental design might have led to differences between groups, thereby affecting our findings. However, differences between groups were generally small, limiting any potential bias. Another limitation regards potential clinic-specific effects on the outcomes. However, we expect this bias, if any, to be small because WCC is conducted in a standardized way in the Netherlands. The same goes for the care provided by family practitioners because they work according to a national depression guideline.[30] A final limitation is the limited information on the trajectory of referral and received care in both groups.

Implications

The Post-Up study provides strong evidence for a moderate effect of screening with the EPDS on maternal depressive symptoms and, to a lesser extent, on the levels of maternal anxiety and general mental well-being. This implies that we should seriously consider further implementation of screening for postpartum depression in WCC, which fits well with the recent recommendation statement on screening for depression in adults by the US Preventive Services Task Force[31] and the 2017 recommendations for preventive pediatric health care released by the American Academy of Pediatrics.[32] WCC appears to be a suitable and effective screening setting, enabling repeated screening of the majority of postpartum mothers.

Benefits are likely to increase when optimizing the trajectory after screening[33] because <40% of the women who reported having had postpartum depression at T_2 actually received treatment in addition to visiting their family practitioners. The supporting and normalizing role of WCC may have prevented the need for further treatment, especially in mild cases. Intensifying professionals' training with motivational skills and more attention for follow-up could further improve the outcomes. Further research is needed to clarify this. We found a promising effect on parenting, although it is not reflected in the child's socioemotional functioning. Attention for the mother-child interaction in the trajectory after screening may improve child outcomes[34,35]; this evidently requires further study.

The size of the effects that we found suggests that screening for postpartum depression is likely to be cost-effective for society

because besides the additional time needed for the professionals, other investments required for screening for postpartum depression are low. When considering further implementation, more information on the received care of positive screen results, including the false-positive results, is needed to determine the impact on costs.

CONCLUSIONS

In this study, screening for postpartum depression in WCC resulted in the improvement of both maternal depressive symptoms and overall mental health and parenting. This promising finding warrants wider implementation of screening for postpartum depression.

ACKNOWLEDGMENTS

We express our gratitude to all the mothers who participated in this study. We also thank the health care organizations Vérian, GGD IJsselland, GGD Twente, and Naviva Maternity Care and their professionals for their cooperation.

ABBREVIATIONS

ASQ-SE: Ages and Stages Questionnaire–Social Emotional
CAU: care as usual
CI: confidence interval
EPDS: Edinburgh Postnatal Depression Scale
MINI: Mini International Neuropsychiatric Interview
OR: odds ratio
SF-12: Short-Form 12-Item Health Survey
WCC: well-child care

DOI: https://doi.org/10.1542/peds.2017-0110

Accepted for publication Jul 25, 2017

Address correspondence to Angarath I. van der Zee-van den Berg, MD, Department of Health Technology and Services Research, Institute for Innovation and Governance Studies, University of Twente, Ravelijn Building Room RA 5260, PO Box 217, 7500 AE Enschede, Netherlands. E-mail: a.i.vandenberg@utwente.nl

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: Funded by the Netherlands Organization for Health Research and Development (grant 80-82470-98-012).

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

REFERENCES

1. Gavin NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal depression: a systematic review of prevalence and incidence. *Obstet Gynecol*. 2005;106(5, pt 1):1071–1083
2. Howard LM, Molyneaux E, Dennis CL, Rochat T, Stein A, Milgrom J. Non-psychotic mental disorders in the perinatal period. *Lancet*. 2014;384(9956):1775–1788
3. Stein A, Pearson RM, Goodman SH, et al. Effects of perinatal mental disorders on the fetus and child. *Lancet*. 2014;384(9956):1800–1819
4. Hewitt C, Gilbody S, Brealey S, et al. Methods to identify postnatal depression in primary care: an integrated evidence synthesis and value of information analysis. *Health Technol Assess*. 2009;13(36):1–145, 147–230
5. Myers ER, Aubuchon-Endsley N, Bastian LA, et al. *Efficacy and Safety of Screening for Postpartum Depression*. Rockville, MD: Agency for Healthcare Research and Quality (US); 2013
6. Heneghan AM, Silver EJ, Bauman LJ, Stein RE. Do pediatricians recognize mothers with depressive symptoms? *Pediatrics*. 2000;106(6):1367–1373
7. Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *Br J Psychiatry*. 1987;150(6):782–786
8. van der Zee-van den Berg AI, Boere-Boonekamp MM, IJzerman MJ, Haasnoot-Smallegange RM, Reijneveld SA. Screening for postpartum depression in well-baby care settings: a systematic review. *Matern Child Health J*. 2017;21(1):9–20
9. Hielkema M, De Winter AF, Feddema E, Stewart RE, Reijneveld SA. Impact of a family-centered approach on attunement of care and parents' disclosure of concerns: a quasi-experimental study. *J Dev Behav Pediatr*. 2014;35(4):292–300
10. Pop VJ, Komproe IH, van Son MJ. Characteristics of the Edinburgh post natal depression scale in The Netherlands. *J Affect Disord*. 1992;26(2):105–110
11. Sheehan DV, Lecrubier Y, Sheehan KH, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*. 1998;59(suppl 20):22–33, quiz 34–57
12. Sheehan DV, Lecrubier Y, Harnett Sheehan K, et al. The validity of the Mini International Neuropsychiatric Interview (MINI) according to the SCID-P and its reliability. *Eur Psychiatry*. 1997;12(5):232–241
13. Lecrubier Y, Sheehan DV, Weiller E, et al. The Mini International Neuropsychiatric Interview (MINI).

A short diagnostic structured interview: reliability and validity according to the CIDI. *Eur Psychiatry*. 1997;12(5):224–231

14. Ware J Jr, Kosinski M, Keller SDA. A 12-item short-form health survey: construction of scales and preliminary tests of reliability and validity. *Med Care*. 1996;34(3):220–233
15. Ware JE, Kosinski M, Keller SD. *How to Score the SF-12 Physical and Mental Health Summary Scales*. Boston, MA: The Health Institute, New England Medical Center; 1995
16. Gandek B, Ware JE, Aaronson NK, et al. Cross-validation of item selection and scoring for the SF-12 health survey in nine countries: results from the IQOLA project. International quality of life assessment. *J Clin Epidemiol*. 1998;51(11):1171–1178
17. Marteau TM, Bekker H. The development of a six-item short-form of the state scale of the Spielberger State-Trait Anxiety Inventory (STAI). *Br J Clin Psychol*. 1992;31(pt 3):301–306
18. van der Bij AK, de Weerd S, Cikot RJ, Steegers EA, Braspenning JC. Validation of the Dutch short form of the state scale of the Spielberger State-Trait Anxiety Inventory: considerations for usage in screening outcomes. *Community Genet*. 2003;6(2):84–87
19. Pedersen FA, Bryan YE, Huffman L, Del Carmen R . Constructions of self and offspring in the pregnancy and early infancy periods. In: *Paper presented at the Society for Research in Child Development* ; 1989 ; Kansas City, MO
20. Verhage ML, Oosterman M, Schuengel C. Parenting self-efficacy predicts perceptions of infant negative temperament characteristics, not vice versa. *J Fam Psychol*. 2013;27(5):844–849
21. Kunseler FC, Willemen AM, Oosterman M, Schuengel C. Changes in parenting self-efficacy and mood symptoms in the transition to parenthood: a bidirectional association. *Parenting*. 2014;14(3–4):215–234
22. Squires J, Bricker D, Twombly L. *Ages and Stages Questionnaires: Social–Emotional*. Baltimore, MD: Brookes Publishing; 2002
23. Squires J, Bricker D, Heo K, Twombly E. Identification of social-emotional problems in young children using a parent-completed screening measure. *Early Child Res Q*. 2001;16(4):405–419
24. Kucuker S, Kapci EG, Uslu RI. Evaluation of the Turkish version of the "ages and stages questionnaires: social-emotional" in identifying children with social-emotional problems. *Infants Young Child*. 2011;24(2):207–220
25. de Wolff MS, Theunissen MH, Vogels AG, Reijneveld SA. Three questionnaires to detect psychosocial problems in toddlers: a comparison of the BITSEA, ASQ:SE, and KIPPPI. *Acad Pediatr*. 2013;13(6):587–592
26. van Buuren S, Groothuis-Oudshoorn K. Mice: multivariate imputation by chained equations in R. *J Stat Software*. 2011;45(3):1–67
27. Hasselblad V, Hedges LV. Meta-analysis of screening and diagnostic tests. *Psychol Bull*. 1995;117(1):167–178
28. Leung SS, Leung C, Lam TH, et al. Outcome of a postnatal depression screening programme using the Edinburgh postnatal depression scale: a randomized controlled trial. *J Public Health (Oxf)*. 2011;33(2):292–301
29. Morrell CJ, Slade P, Warner R, et al. Clinical effectiveness of health visitor training in psychologically informed approaches for depression in postnatal women: pragmatic cluster randomised trial in primary care. *BMJ*. 2009;338:a3045
30. Van Weel-Baumgarten EM, Van Gelderen MG, Grundmeijer HGLM, et al. NHG-guideline depression [NHG-standaard depressie] (second revision). *Huisarts Wet*. 2012;55(6):252–259
31. Siu AL, Bibbins-Domingo K, Grossman DC, et al; US Preventive Services Task Force (USPSTF). Screening for depression in adults: US Preventive Services Task Force recommendation statement. *JAMA*. 2016;315(4):380–387
32. Committee on Practice and Ambulatory Medicine; Bright Futures Periodicity Schedule Workgroup. 2017 recommendations for preventive pediatric health care. *Pediatrics*. 2017;139(4):e20170254
33. Yawn BP, Olson AL, Bertram S, Pace W, Wollan P, Dietrich AJ. Postpartum depression: screening, diagnosis, and management programs 2000 through 2010. *Depress Res Treat*. 2012;2012:363964
34. Nylen KJ, Moran TE, Franklin CL, O'hara MW. Maternal depression: a review of relevant treatment approaches for mothers and infants. *Infant Ment Health J*. 2006;27(4):327–343
35. Poobalan AS, Aucott LS, Ross L, Smith WCS, Helms PJ, Williams JHG. Effects of treating postnatal depression on mother-infant interaction and child development: systematic review. *Br J Psychiatry*. 2007;191(5):378–386

Post-Up Study: Postpartum Depression Screening in Well-Child Care and Maternal Outcomes

Angarath I. van der Zee-van den Berg, Magda M. Boere-Boonekamp, Catharina G.M. Groothuis-Oudshoorn, Maarten J. IJzerman, Riet M.E. Haasnoot-Smallegange and Sijmen A. Reijneveld

Pediatrics 2017;140;
DOI: 10.1542/peds.2017-0110 originally published online September 7, 2017;

PEDIATRICS®
OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Post-Up Study: Postpartum Depression Screening in Well-Child Care and Maternal Outcomes

Angarath I. van der Zee-van den Berg, Magda M. Boere-Boonekamp, Catharina G.M. Groothuis-Oudshoorn, Maarten J. IJzerman, Riet M.E. Haasnoot-Smallegange and Sijmen A. Reijneveld

Pediatrics 2017;140;
DOI: 10.1542/peds.2017-0110 originally published online September 7, 2017;