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Research paper

Outcomes for collaborative care versus routine care in the management of postpartum depression

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ABSTRACT

Background Even with routine screening, women diagnosed with postpartum depression (PPD) often experience delays in treatment with consequences affecting mother, infant, families and communities. A collaborative care management (CCM) approach may provide more timely, effective and higher quality of care for women suffering from postpartum depression.

Aims This study compared the outcomes of women diagnosed with depression within a year of giving birth, comparing management using a collaborative care model with routine primary care.

Methods In a retrospective quantitative cohort pilot study ($n = 78$), the outcomes of days to first follow-up, one-year healthcare utilisation, remission rates and other quality metrics were investigated.

Results Those who were managed with CCM had fewer days to first follow-up (6.1 versus 31.4; $P < 0.01$), were more likely to meet the quality metrics of three or more related contacts in the three months after diagnosis ($P < 0.01$), and had documented Patient Health Questionnaire (PHQ-9) or Edinburgh Postnatal Depression Scale (EPDS) measurements at 3 ($P < 0.01$), 6 ($P < 0.01$) and 12 ($P < 0.01$) months. With an intention to treat model, 6-month remission rates were improved with CCM (46.7 vs. 6.3%, $P < 0.01$). Those managed collaboratively versus routinely used healthcare in the year following diagnosis at similar rates.

Conclusions A CCM model offers timelier and higher quality care to women suffering from PPD, without contributing to higher healthcare utilisation.

Keywords: collaborative care management, depression, postpartum, postpartum depression, primary care, quality improvement, routine care

How this fits in with quality in primary care?

What do we know?
Postpartum depression (PPD) is common and can have a significant impact on the entire family unit. Current practices of care do not achieve goals for quality metrics or patient outcomes. Collaborative care management (CCM) allows for improved outcomes for all depressed patients.

What does this paper add?
CCM for PPD can improve quality metrics. No increase in healthcare utilisation is noted, compared with patients treated with routine primary care.

Introduction

The incidence of postpartum depression (PPD) is estimated from studies performed mostly in Western and industrialised populations, and ranges from 3 to > 25%, with postpartum psychosis affecting fewer than 1% of new mothers.[1] Determining the worldwide impact of PPD has been more challenging, with one meta-analysis concluding prevalence in various countries ranging from 0.5% to as high as 57%.[2] The numerous sequelae of PPD include depressed mothers experiencing higher rates of marital discord, physical health problems and vocational difficulties.[3] Further, maternal depression is associated with an increased risk for impaired maternal–infant interactions and higher incidence of infants and children with delayed psychological, cognitive and motor development.[4]

PPD, like depression outside the perinatal period, may become chronic, especially if there is a delay in adequate treatment.[5] All too often, women with PPD have inconsistent, delayed and inadequate follow-up, even after being identified by a healthcare provider. Also, they may face a number of unique barriers when seeking treatment for PPD. For example, new mothers may find it difficult to have time, much less childcare, to attend medical appointments, have concerns about medication effects on self and/or nursing infants and may hold the belief that their mood symptoms are just a short-term problem that will eventually improve.[6] The optimal approach to managing women with PPD continues to be a topic of important clinical investigation.

Outside the perinatal period, collaborative care management (CCM) has been associated with improved short- and long-term outcomes in adults with depression.[7–9] CCM is an intervention that utilises a team consisting of a primary care provider (typically physician, nurse practitioner or physician assistant), mental health specialist (psychiatrist and/or therapist) and care manager (often a nurse or medical assistant) who work together to treat individual patients within a primary care setting. One such model implemented in 2008 by the Institute for Clinical Systems Improvement (ICSI) is Depression Improvement Across Minnesota – Offering a New Direction (the *DIAMOND* programme).[10] The initial sites that implemented this model included two Mayo primary care clinics in Rochester, Minnesota, USA (Clinic A and Clinic B, for the purposes of this paper).

CCM programmes focus on six key components of care: the standard use of a reliable depression screening tool (Patient Health Questionnaire, PHQ-9);[11] systematic patient follow-up and monitoring; the use of evidence-based guidelines for treatment modification; plans for relapse prevention once patients graduate from CCM; care manager roles which include maintaining patient contact, educating and coordinating care; and a psychiatrist consultant who oversees care managers and makes treatment suggestions to primary providers.[10]

In a study by Gjerdingen *et al*, where a pilot collaborative care intervention was implemented for treating PPD compared with routine care, there was no clear benefit for duration of treatment, health outcomes or work outcomes.[6] This study also noted that for mothers with a self-diagnosis of depression, those who reported receiving treatment ($n = 76$) had more acute care visits and specialty referrals than women who did not receive treatment ($n = 46$), regardless of treatment type. These findings highlighted a concern that treatment for PPD may lead to an overall increase in healthcare utilisation and costs without a clear treatment benefit.

When it comes to treatment for depression, a number of quality metrics exist including rates of utilisation of PHQ-9 for monitoring patients with depression, and measurement of remission rates after 6 and 12 months. Health Plan Employer Data and Information Set (HEDIS) metrics focus on the effectiveness of care related to antidepressant medication management. HEDIS metrics define optimal patient contact as at least three follow-up contacts with a primary care or mental health provider with a mental health diagnosis coded during the first 12 weeks of treatment, documentation of 12 weeks of filled prescriptions for antidepressant medication and documentation of 6 months of continued use of antidepressant medication.[12]

This study sought to investigate the clinical response, healthcare utilisation and adherence to quality metrics among individuals with PPD followed through CCM versus those managed with routine care. It was hypothesised that those who were managed through CCM would receive a higher quality of care, would utilise healthcare resources at a different rate and have improved clinical response to treatment with higher rates of remission compared to those managed routinely.

This study was approved by the Institutional Review Board of Mayo Clinic, Rochester.

Methods

Mayo Clinic is a multispecialty referral centre that provides obstetric and postpartum care to residents of Olmsted County and surrounding communities. The patients were included in the study only if their primary care was obtained from one of Mayo Clinic's five primary care facilities. The clinic electronic patient database was reviewed retrospectively from 1 March

2008 to 1 May 2011 to identify potential participants who had an ICD-9 coded diagnosis of depression and/or anxiety within one year of giving birth between 1 March 2008 and 1 May 2010. The most common departments that care for postpartum women are family medicine, obstetrics and gynaecology, midwifery and internal medicine. The patient population was predominately Caucasian, with many patients being employed at Mayo Clinic.

A total of 432 charts were initially considered eligible for inclusion. Exclusion criteria included those who had miscarriage or foetal demise, those with antepartum onset/exacerbation of mood symptoms, those who did not have a PHQ-9 or EPDS[13] at time of diagnosis or those who did not meet screening cut-off limits. Participants had to have a PHQ-9 of 10 or greater or an EPDS of 12 or greater at the time of diagnosis. Upon initial diagnosis, patients were identified as being managed by routine care ($n = 63$) or by CCM ($n = 15$). To be eligible for CCM, a score on the PHQ-9 of 10 or greater was required at the time of diagnosis by a clinician. Because of the implementation schedule of CCM and the time frame of this study, participants in this programme were mostly from Clinic A (which implemented CCM on 1 March 2008) and Clinic B (which implemented CCM on 1 September 2008). Other Mayo Clinic primary care sites subsequently implemented CCM in 2010 with the exception of obstetrics and gynaecology or midwife clinics where CCM has not been implemented. Prior reviews of our CCM implementation have been published previously.[14,15]

Those receiving care under the CCM were included in a computer depression registry that was regularly maintained and updated by members of the care team. Patient's depression symptoms were routinely evaluated with the aid of the PHQ-9 depression screening tool. Patients receiving care through CCM had their care reviewed on a weekly basis by a psychiatrist. Depending on symptom severity, patients were regularly contacted via phone by a care manager working in the primary care clinic. The severity of symptoms, as determined by PHQ-9 scores and discussion with the care manager, determined the frequency of phone contact, which occurred on a daily, weekly or monthly basis. Additional primary care or mental health specialty visits varied depending on individual patient needs. Once depression was in remission, patients were contacted to measure depression symptoms through the completion of the PHQ-9 depression screening tool at 6- and 12-month remission intervals.[15]

In this study, routine care was defined as any care for the treatment of PPD that did not use CCM. Routine care varied among clinics and providers. During the study time frame, there was generally routine screening for PPD throughout the institution at the 6-week postpartum visit. In the obstetrics and midwifery clinics, the women that were identified with depression during their routine postpartum visit were frequently referred to a psychiatrist for follow-up, rather than referred to their primary care provider. Additionally, the family medicine and paediatric providers at Clinics A and B began piloting another new practice protocol in June 2009 that implemented routine screening for PPD at 2-, 4- and 6-month well-child visits, in addition to screening at the routine postpartum visit.[16] Many of those women were enrolled in CCM but some were followed outside of CCM as well.

In routine care, the follow-up after a positive screen or diagnosis of depression included follow-up with a primary care provider, referral to a psychiatrist, referral to a counsellor or therapist or a combination of the above. Medication management and frequency of follow-up were at the discretion of the primary care provider, the psychiatrist or both. The frequency of monitoring of mood symptoms with the use of any objective tool was at the discretion of the provider and variable among providers and clinics.

Treatment outcome of interest was clinical remission, defined as a PHQ-9 score of < 5. Healthcare utilisation outcomes of interest were total number of healthcare visits in the year after diagnosis, number of mental health visits in the year after diagnosis and number of non-mental health visits in the year after diagnosis. Quality outcomes of interest were days from diagnosis to first follow up, continuation of antidepressant medication at 3, 6 and 12 months, any change to antidepressant medication at 3, 6 and 12 months, whether there were three or more related contacts in first 3 months after PPD diagnosis and documentation of completion of PHQ-9 or EPDS at 3, 6 and 12 months. Other variables obtained were maternal age, race or ethnicity, marital status, initial PHQ-9 or EPDS score, smoking status during pregnancy, maternal history of mental disorder, delivery of preterm infant, primiparity, delivery type (caesarean vs. vaginal), breastfeeding at time of diagnosis, antidepressant medication initiation, anxiety component at time of diagnosis, days from diagnosis to follow-up and PPD screening at routine postpartum visit.

The statistical software package SAS (version 9.3 software) was used for all data analysis. Outcomes of interest were compared between those managed with collaborative care and those managed routinely. Categorical variables were analysed using chi-squared and Fisher's exact test. Continuous variables were analysed using the Wilcoxon–Mann–Whitney test. Analysis for determining treatment remission rate was performed with documentation of a PHQ-9 at 6 months ($\pm$ 4 weeks). Analysis for determining mean days from diagnosis to first follow-up included only those participants who did follow-up at least once. In the routine care group, two participants never followed

up (i.e. lost to follow-up). Analysis for antidepressant continuation and augmentation/change in medication was performed only on those participants that had documentation of use of medications in the medical record. Analysis for baseline characteristics was performed on those with documentation of characteristic of interest.

All potential subjects were required to have a signed consent on record giving permission for access to their medical records for research purposes. This consent is routinely granted or denied at the time one becomes a patient at Mayo Clinic. This study was approved by the Institutional Review Board of Mayo Clinic, Rochester.

Results

Of the 78 charts analysed, 15 (19.2%) were followed in CCM and 63 (80.8%) followed in routine care. Baseline demographic and clinical characteristics (Table 1) were similar between the two groups.

Participants in the CCM model and those followed with routine care had significantly different remission rates at 6 months on an intention to treat methodology (46.7 vs. 6.3%, $P < 0.01$). Analysing only those remeasured patients, there was no statistical difference, but the sample size, especially for the routine care was small ($n = 6$) (Table 2). Those in the CCM and those in routine care had similar mean total number of healthcare visits, mean number of mental-health-related visits and mean number of non-mental-health-related visits in the year after diagnosis (Table 2).

CCM patients were seen in follow up sooner than those in routine care (6.1 vs. 31.4 days, $P < 0.01$) (Table 2). Also, they were more likely to meet the quality metrics of having at least three follow-up contacts within 3 months of diagnosis (100 vs. 33.3%, $P < 0.01$) and have documentation of a PHQ-9 or EPDS score at 3, 6 and 12 months. Rates of antidepressant medication continuation and antidepressant medication

Table 1 Demographic and clinical characteristics of participants at baseline (% unless otherwise indicated)

	Collaborative care ($n = 15$)	Routine care ($n = 63$)	*p*
Demographic characteristics			
Age (years), M (SD)	29.8 (5.06)	28.7 (5.91)	0.58
Non-white	13.3	19.1	1.00
Married	80.0	54.0	0.08
Receiving medical assistance	20.0	34.9	0.36
Primiparity	26.7	34.9	0.76
Smoking during pregnancy	0.0	11.1	0.33
Clinical characteristics			
Initial PHQ-9 score, M (SD)	14.2 (3.45)	15.4 (3.72)	0.30
PPD screening at routing postpartum visit	80.0	82.3	1.00
History of mental disorder	80.0	63.5	0.36
Anxiety at diagnosis	53.3	30.2	0.09
Antidepressant medication initiation	86.7	79.4	0.72
Breastfeeding at routine postpartum visit	78.6[a]	58.6[b]	0.22
Breastfeeding at diagnosis	28.6[c]	55.8[d]	0.24
Preterm delivery	20.0	9.5	0.36
Caesarean delivery	33.3	28.6	0.76

[a] Sample size = 14; [b] sample size = 58; [c] sample size = 7; [d] sample size = 52. M, mean; SD, standard deviation.

Table 2 Quality metrics and healthcare utilisation in collaborative care management versus routine care in women with postpartum depression (% unless otherwise indicated)

	n[a]	Collaborative care	n[a]	Routine care	P
Days from diagnosis to first follow-up, M (SD)	15	6.1 (11.49)	63	31.4 (63.64)	< 0.01
Three or more related contacts in first 3 months after PPD diagnosis	15	100.0	63	33.3	< 0.01
PHQ-9 or EPDS documented					
3 months	15	73.3	63	11.1	< 0.01
6 months	15	80.0	63	9.5	< 0.01
12 months	15	53.3	63	14.3	< 0.01
Antidepressant medication continuation					
3 months	13	84.6	48	66.7	0.31
6 months	13	84.6	37	67.6	0.30
Antidepressant medication change					
3 months	11	18.2	37	35.1	0.46
6 month	11	18.2	30	30.0	0.69
Remission at 6 months (intention to treat model)	15	46.7	63	6.3	< 0.01
Remission at 6 months (remeasured patients)	12	58.3	6	66.7	1.00
One year total healthcare visits, M (SD)	15	13.0 (10.71)	63	11.2 (11.49)	0.57
One year mental health visits, M (SD)	15	2.7 (3.46)	63	1.5 (2.90)	0.17
One year non-mental health visits, M (SD)	15	9.9 (9.22)	63	9.5 (9.64)	0.96

[a] Sample size differed because of missing chart data.
M, mean; SD, standard deviation.

adjustments were similar between the groups (Table 2).

Discussion

In alignment with the study's hypothesis, women diagnosed with PPD and managed in CCM received a higher quality of care, as determined by adherence to most quality metrics evaluated in this study. In particular, they had timelier follow up after diagnosis, three or more related contacts in the first 3 months following diagnosis and had systematic follow-up and monitoring in the year after diagnosis. Using an intention to treat model, CCM patients had a significantly increased 6-month remission rates for their depression. By contrast to the study's hypothesis, both groups had similar rates of utilisation of healthcare within the year following diagnosis.

Strengths of the current study were that the results highlight outcomes of a commonly used CCM model in a real-life primary care setting, within a major medical centre and detailed electronic medical record on all patients. Data collection bias was minimised by the use of a standardised abstraction protocol that was used by all data abstractors. Still, limitations exist related to the retrospective design of the study, which introduces the possibility of confounding and bias. Even though most baseline characteristics were similar between groups, selection bias is likely with those managed in CCM perhaps being more compliant

with healthcare treatment, in general. However, it could be argued that those in the CCM group were more ill at diagnosis because there was a trend towards those in collaborative care having greater baseline anxiety and were more likely to have a history of mental disorder. Also, providers may have referred more challenging patients to the CCM programme than to routine care. Patients with a history of mental disorder and treatment are likely to have more experience with the health system and thus navigate it better. Further, their providers may have better clues through their history, as to what treatment works best for that individual. Finally, the practice setting of this study may not be representative of all populations.

Results of this study are consistent with the results in the Gjerdingen *et al* study that found no difference in health outcomes in women with PPD who are followed through stepped collaborative care model versus routine care.[6] This is in contrast to early outcome data collected by the ICSI that show higher remission rates among those followed in DIAMOND care compared with usual primary care treatment[17] and with pilot initiatives at our institution.[18] Analysis for depression remission rate was likely underpowered in this study due to the fact that many participants in the routine care group did not have a PHQ-9 score at 3, 6 and 12 months. Further studies with larger patient populations could be developed utilising the CCM currently implemented in most of the primary care clinics at our institution.

A number of studies have shown an increased initial utilisation of healthcare resources for patients managed in CCM.[18–20] By contrast, this study demonstrates that over the course of a year, women with PPD who were managed with a collaborative care model did not utilise healthcare resources differently from those followed routinely. Women with PPD may be more receptive to a CCM model for the treatment of depression compared with those who suffer from depression outside the perinatal period. They may be more receptive because of the convenience of being contacted by phone for follow-up rather than having to physically come into the clinic. If they are more receptive and find CCM more convenient, then perhaps they do not have the need to seek additional care through other medical appointments. This study is unique in that it links quality outcomes to CCM for postpartum depression.

This study suggests that a collaborative approach to managing disease improves quality of care. It makes sense that there would be an increase in quality when there is systematic follow-up, monitoring and adherence to evidence-based guidelines. Further, it is certainly plausible that adding a co-ordinator of care, the case manager, would lead to more efficient and timelier follow-up for the patient.

Quality is becoming an increasingly important focus for healthcare organisations. The Institute of Medicine has developed 'six aims' for the improvement in healthcare, stating that healthcare should be made safe, effective, patient-centred, timely, efficient and equitable.[21] This study demonstrates that CCM for the treatment of PPD meets at least three of those aims by providing care that is patient-centred, timely and efficient. Patient-centred care with respect to PPD treatment could be improved by further exploring how patients perceive quality of care. A focus group including participants in this study would help determine this. On the point of equitable care, women who are members of a poorer socio-economic class likely suffer disproportionately from untreated maternal depression. Further, when considering the effect of untreated maternal depression on the infant and child, not adequately treating depression in poorer mothers adds to the health disparities that exist for their children. Policies that ensure reimbursement by government-funded health plans, in particular, would potentially help reduce health disparities among disadvantaged populations. Future research should continue to evaluate the factors of safety, effectiveness and equitability as it relates to a CCM approach.

Conclusions

PPD is a common condition that impacts care for the mother and infant. Routine care has not been able to demonstrate improved metrics for clinical outcomes and quality. This study demonstrated that CCM for PPD improved several quality metrics, including time to follow-up, continuity of follow-up and outcomes. Although there was no difference in healthcare utilisation between CCM and routine care, further study is indicated. A CCM model offers timelier and higher quality of care to women suffering from PPD, without contributing to higher healthcare use.

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CONFLICTS OF INTEREST

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