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Implementing an Inpatient Postpartum Depression Screening, Education and Referral Program: A Quality Improvement Initiative

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AUTHOR CONTRIBUTIONS

EEA and SJK conceived the study and contributed to its design. RB contributed to data

collection, analysis and interpretation of the data. LH contributed to collection of the data.

OB, EEA and SJK contributed to interpretation of the results. All authors contributed to

writing and revising the manuscript.

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Condensation: Four QI interventions improved depression screening rates, screen positive rates and rates of social work consultation in 19,564 women over a 3 year period.

AJOG MFM at a Glance:
A. Why was this study conducted? To evaluate an inpatient Postpartum Depression Screening, Education and Referral Program at a major U.S. birthing hospital.
B. What are the key findings? Four quality improvement interventions improved:

(1) Nurse screening comfort and PMAD knowledge;

(2) PHQ-9 screening rates from 10% to 99% and screen positive rates from 0.04% to 2.9%; and

(3) Increased rates of social work consultation, from 1.7% to 8.4%.
C. What does this study add to what is already known? Mental health programs that include routine depression screening, education, consultation and referral to treatment should be a part of comprehensive care for all pregnant women to achieve better birth and postpartum outcomes. Such practices may enable early detection, referral, and timely treatment to potentially reduce risk for adverse birth outcomes.

ABSTRACT

Objective: Perinatal mood and anxiety disorders (PMADs) are common and can interfere with pregnancy, delivery and the postpartum period. Best practice includes symptom screening, patient education and appropriate referrals, however, many hospitals struggle to identify and support PMAD patients. Therefore, the Cedars-Sinai Postpartum Depression Screening, Education and Referral Program was initiated.

Methods: Using the Standards for QUality Improvement Reporting Excellence (SQUIRE 2.0) guidelines, we report outcomes (N=19,564 deliveries) from four interventions; (1) nurse champion training; (2) Use of the 9-item PHQ-9 in postpartum unit; (3) a series of brief in-

service trainings; and (4) a 10 minute video training. We collected data including nurse feedback, screening rates, screen positive rates and social work consultation rates.

Results: The four interventions improved (1) nurse champion screening comfort and PMAD knowledge; (2) PHQ-9 screening rates from 10% to 99% and screen positive rates from 0.04% to 2.9%; and (3) increased rates of social work consultation from 1.7% to 8.4%.

Conclusions: Quality improvement results from the first three years of the program suggest that four interventions improved screening rate, screen positive rate and social work consultation rate. Future work will focus on method of screening, patients at highest risk of PMADs and ongoing nurse training.

INTRODUCTION

Perinatal mood and anxiety disorders (PMAD) are a broad group of disorders including minor to major depression and several forms of anxiety. The symptoms occur during pregnancy and the first year post-delivery. Approximately 10-15% of women experience PMADs [1], a higher rate of women experience subclinical symptoms and this rate triples in women of color [2-5]. Postpartum depression (PPD) is diagnosed when women exhibit symptoms of major depression, such as feelings of worthlessness, agitation, and/or reduced interest in activities [6]. Postpartum anxiety (PPA) is characterized by excessive worry, irritability, difficulty sleeping, and intrusive negative thoughts [7]. In the setting of maternal and neonatal complications, rates of PPD are as high as 40% and can be life threatening [8,9]. The symptoms can result in devastating effects in both the mother and child if they go undetected and untreated. Immediate adverse effects of PMADs include preterm birth, poor infant outcomes and lack of maternal efficacy[7,10] and long-term effects can severely affect children beyond the neonatal period [11-15].

Unfortunately, PMADs are heavily stigmatized and often overlooked disorders that are treatable once identified. Multiple guidelines recommend screening for PMADs at least once in pregnancy and once afterwards and can help identify women at risk for PPD and steer them towards treatments such as cognitive behavioral therapy and antidepressants [16,17]. Yet 50% of all persons with PMADs are never identified, likely because perinatal depression screening is oftentimes not conducted [18]. In 2018, California Senate Bills AB2193 and AB3032 made it imperative that California birthing hospitals properly screen, educate and refer women at PMAD risk to mental health care [19,20].

Problem Description: Despite these state laws, many California hospital systems fail to meet the standards due to screening barriers. Healthcare providers report time pressure, lack of knowledge on assessment tools, poorly defined referral pathways and lack of mental

healthcare services as constraints [6]. Patient-specific barriers such as stigma, lack of

motivation and inadequate insurance are also important [6,21]. Birthing hospitals often screen

in the immediate postpartum period (1-2 days following delivery) to ensure that screening

occurs at least once in the perinatal period, because individual private praciticners do not

consistently screen, educate and refer their patients to care. Additionally, research suggests

that immediate screening scores can predict the development of an episode of depression or

anxiety 2-8 weeks post-delivery.[22,23] Hospitals must therefore do their best to conduct

PMAD screening, patient education and referral and collect data to ensure that screening

programs are effective in connecting women to care.

Available Knowledge: Successful attempts in improving screening and referral rates

across the United States have been demonstrated [10,24]. At Northwestern University,

screening results and treatment referrals increased dramatically after an institutional policy

enforced depression screening and education. Prenatal screening rate improved by 65%,

postpartum screening rate improved by 20% and treatment recommendations improved by

33% [10]. Similarly, a Texas-based hospital introduced standardized screening guidelines and

a one-hour training video for all healthcare professionals and saw screening rates improved

from 33.5% to 82.7% [24]. These quality improvement (QI) projects demonstrate that with

proper training, screening tools and guidelines, screening and referral rates increase

considerably and fewer women fall through the cracks.

Rationale: In 2014, Cedars-Sinai began hospital-wide depression screening upon

admission across all departments using the first 2 items of the Patient Health Questionnaire

(PHQ) [25]. If someone endorsed one of these two items then the final seven PHQ-9

questions populated. Pregnant women were screened in the Labor & Delivery (L&D) triage

unit, when women were often in no condition to be screened. There was no formal nurse

training to ensure comfort when screening, nor was there any standardized method for

educating and referring patients who screened high. This resulted in only 10% of women being screened in L&D and only 0.04% screening positive for depression risk (PHQ-9≥13). To improve the hospital's screening rates and positive screen rates for PPD risk (e.g. in line with epidemiological rates), our team implemented a new postpartum screening, education and referral program (Appendix 1) [18]. Based on the Plan-Do-Study-Act (PDSA) framework for QI (Agency for Healthcare Research and Quality [AHRQ], 2015) (Fig. 1), we defined the goals for the project and then met with clinic staff and stakeholders to determine a timeline for implementing the PHQ-9 into the Postpartum Unit Encounter as well as initiating nurse training. After preparing nursing staff for implementing the interventions, the intervention period ran from January 2017 through December 2018; however, as a process change, the clinic administrators approved the PHQ-9 to be implemented as a permanent change to clinic practice.

Specific Aims: The primary aims of this project were to determine if four QI interventions (Figure 1) improved the PPD screening rate, PPD screen positive rate and related social work referrals and resulting consultation rate at Cedars-Sinai's postpartum and maternal fetal care units.

METHODS

Population:

Screening data from birthing individuals at Cedars-Sinai were included in this study whether they were admitted to the Postpartum Unit (PPU) or the Maternal Fetal Care Unit (MFCU) after delivery. Our dataset does not include screening data from the prenatal/pre-delivery time point or from those who experienced miscarriage if they were never admitted to the MFCU or PPU. The Hospital IRB reviewed this project and approved use of de-identified patient data.

Materials:

The Patient Health Questionnaire- 9 (PHQ-9) has the potential to be a dual-purpose instrument that can establish a tentative diagnosis of a depressive episode as well as depressive symptom severity [25]. Each question in the scale has four response choices: "not at all", "several days", "more than half the days," and "nearly every day." The continuous measure is a summary score ranging from 0 to 27 and is calculated by adding up the responses to the nine questions, which assesses the presence and severity of a depressive episode [26]. Regarding severity, the PHQ-9 comprises five categories, where a cut-off point of 0–4 indicates no depressive symptoms, 5–9 mild depressive symptoms, 10–14 moderate depressive symptoms, 15–19 moderately-severe depressive symptoms, and 20–27 severe depressive symptoms [26]. The cutoff points for immediate PPD risk (1-3 days post-delivery) proposed by the Psychiatry team in the original working group was a PHQ-9≥13 for postpartum depression risk. The decision to use a cutoff of 13 for intervention (i.e. social work consultation), as opposed to a 10 (commonly used), for immediate PPD risk was because the PHQ-9 does not take into account commonly experienced somatic symptoms of late pregnancy and delivery. The concern was that these symptoms could increase our false positive rate by masquerading as depression symptoms, therefore the Psychiatry team suggested a higher cutoff.

Intervention 1: Nurse Champion Training

Nursing staff provided feedback that lack of comfort with screening tools may act as a barrier to routine screening. Maternal Mental Health Now (MMHN) partnered with Cedars-Sinai in January 2017 in designing and facilitating an eight-hour training for nurses that addressed PMAD prevalence, risk factors, symptoms, and negative outcomes (https://www.maternalmentalhealthnow.org/providers/#online-training). Twenty nurse champions attended in-person training and learned how to effectively administer the PHQ-9 by observing a model interaction. Following training, nurse champions were tasked to

educate the rest of the nursing staff. Nurse champions were surveyed (Appendix 2) before and after the training regarding the key measures of screening comfort level, discussing PMADs, providing referrals and distributing materials in relation to screening patients for maternal depression.

Intervention 2: Standardized Depression Screening

In April 2017, the PPU and MFCU nurses began routine depression screening within two days after a woman delivered with a new PHQ-9 screening workflow (Appendix 1) [18]. Data regarding the quality of nurse mental health training, perceived barriers and process outcomes were also collected using structured surveys. The second intervention was the development and implementation of this new PHQ-9 screening workflow that was administered to patients in the PPU and MFCU, as opposed to their initial presentation to L&D triage. The Edinburgh Postnatal Depression Scale (EPDS) [27] was considered for depression screening as it is commonly used in the field and includes assessment of anxiety as well as depression, but ultimately the decision was made to use one tool consistently across the hospital system. Therefore this program has focused only on perinatal depression, by using the The PHQ-9 (Appendix 3), a nine-item depression scale used for screening, diagnosing, monitoring and measuring the severity of depression. The PHQ-9 is a viable option for perinatal depression screening with operating characteristics similar to the legacy EPDS [28]. As described above, the PHQ-9 items are each assigned a score from 0-3, with a maximum score of 27 and are based directly on the diagnostic criteria for major depressive disorder in the Diagnostic and Statistical Manual of Mental Disorders (5th edition, DSM-V). Patients who scored between 5 and 12 were considered to have mild-to-moderate depression risk, while those who scored 13 or higher were considered to have a high depression risk, and therefore more likely to meet DSM-V criteria for a major depressive episode.

The initial timing of the screening in L&D triage was identified as a barrier due to its urgent and time pressed circumstances. Nursing staff therefore administered the full PHQ-9 within two days after delivery. Given the potential consequences of untreated symptoms: mild risk resulted in the nurse providing the MMHN brochure (Appendix 4), educating the patient about the online referral resource and offering a social work consultation. If a patient scored 13 or higher (high risk), the nurse followed the same protocol and immediately consulted social work and notified the patient's OB. If a patient endorsed suicidal ideation, regardless of PHQ-9 score, the nurse notified the patient's OB, who decided whether to consult psychiatry. Patients were also offered social work referrals for: concern for abuse, neglect, or substance use disorder; bereavement due to pregnancy loss; and known history of depression. Analyses included the variable "social work consultation" only once all of these steps were completed: (a) an order was placed, (b) social worker met with patient, (c) social work consults deemed completed and (d) a social work note was placed in the chart. There was no previous Cedars-Sinai data about screening postpartum, so key measures abstracted from the EMR, including the number of PHQ-9 screenings completed and positive screens identified as well as the number of completed social work consultations, were assumed to be due to the intervention.

Intervention 3: 20-Minute In-service Training

Feedback solicited from the nurses revealed that they did not universally understand proper PHQ-9 administration. Therefore, a series of 20-minute in-service trainings were offered. Training focused on how to administer the PHQ-9 by modeling a sample interaction between a "patient" and a clinical psychologist. Additionally, nurse champions made themselves available in real-time (on the unit) so that recently trained nurses could be observed while screening patients and ask questions. Baseline screening rates were compared to new screening rates, screen positive rates and completed social work consultation rates

after two months of multiple in-service sessions. In addition, nurse comfort with screening and referring patients was measured after the training.

Intervention 4: Video Training

Despite the additional in-service trainings, ongoing data review showed that screening and screen positive rates remained at low levels. We hypothesize this may be partially related to night shift nurses and traveling nurses who may not have been on campus, in person, available for in-service trainings. To address this, brief video training was implemented for nursing staff. The 10-minute training video was created in partnership with MMHN and demonstrated the PHQ-9 screening process depicting a model encounter between a nurse and a "patient." The nurse began the encounter by preparing the room for screening (politely but firmly inviting family members to leave), normalizing the process and framing private screening as standard protocol. The nurse reassured the patient that her responses are confidential unless she indicated that she or someone else is in danger. The nurse then explained and administered the PHQ-9 rating scale. Finally, the nurse provided an educational brochure explaining the symptoms of PPD (Appendix 4) as well as resources available. She provided the patient with the option of a social work referral and reminded her to follow up with her obstetrician. At the end of the patient encounter, the viewers were reminded that a "yes" response to question #9 on the PHQ regarding suicidal thoughts requires social work follow up, alerting the physician, discussing protective factors with the patient, and following hospital safety protocols. The video was not formally evaluated before use. Indeed, the video's training effectiveness is to be evaluated as part of the larger QI project (data not presented here).

Statistical Analysis of interventions 1-4: De-identified data on PHQ-9 scores, including screening rates and positive screens identified, and social work consultations were extracted from the EMR from deliveries that occurred between 1/1/17-1/1/20. Nurse training

data was pulled from the REDcap database [29]. Statistical Process Control (SPC) was performed to identify outliers and compare variables following initiation of the PPD screening program. PHQ-9 screening rates were plotted by month and the SPC proportion chart (*p*-chart) was utilized to find *p*-bar, upper control limit (UCL), and lower control limit (LCL). PHQ-9 screening became standard of care on 4/1/2017, so screening rates prior to this (1/1/17-3/31/17) were not included in the *p*-chart. The *p* chart compared the total PHQ-9 screens completed to the total delivered patients in a given month. Total number of PHQ-9 screens requiring follow-up (scores ≥5) were converted into a percentage of total screens completed and plotted by month.

RESULTS

Characteristics of the sample: Cedars-Sinai is a nonprofit hospital located in Beverly Hills, California. Approximately 6500 women deliver their babies at Cedars-Sinai every year; N=19,564 were included in this sample. According to most recent data available, 70% of women identify as White, 15% as Hispanic (and overlap other races), 12% as Asian/Pacific Islander/Native Hawaiian, 8% as "other race," 7% as Black, 2% as "mixed race or multiracial," and the race of 1% of patients was unknown. The average patient age was 33.95 (± 4.87) years. Patients are mostly covered by private insurance, with only 4.6% of patients using publicly funded insurance. Over the course of two years and four interventions (Figure 1B) the majority of the nursing staff was trained about PMADs and how to properly administer the PHQ-9. Together, all four interventions successfully improved nurse comfort and ability in screening and resulted in improved rates of screening, screen positives, and social work consultations.

Intervention 1: Full day in person Nurse Champion training: Prior to training, 43% of surveyed nurses felt "very comfortable" screening patients for depression. After training, overall comfort increased to 73% (Figure 2). Nurse champions showed increased

comfort discussing perinatal mental health, facilitating mental health referrals, and providing information to patients. Nurse champions were also asked about their ability to assess when a patient would benefit from a mental health referral and how to facilitate that process. Before training, 24% of nurse champions felt that connecting patients to mental health care was not applicable to their job (Figure 2). After training, 90% of nurse champions felt they would be able to identify patients who would benefit from mental health referrals (Figure 3).

Intervention 2: Standardized Depression Screening: When initial hospital wide screening began in 2014, the baseline screening rate was 10% and screen positive rate was 0.04%. By August 2017, depression screening moved from L&D to PPU and initial screening rates improved to 67% and the screen positive rate improved to 4% (Figure 4).

Intervention 3: 20-Minute in-service trainings: The 20-minute in-service trainings were offered to additional nurses (N=50) and subsequent patient screening rates improved to 99%. Before training, 25% of nurses rated themselves as "very comfortable" screening patients, which increased to 75% after training (Figure 5A). Before training, 27% of nurses were "very comfortable" discussing perinatal mental health with patients, which increased to 56% after training (Figure 5B). Before training, 17% of nurses reported comfort in providing referrals to social work, which increased to 67% after training (Figure 5C). Before training, 25% of nurses reported being "very comfortable" distributing information to patients, which increased to 89% after training (Figure 5D). Nurses were also asked about their ability to assess when a patient would benefit from a mental health referral and how to facilitate that process. (Appendix 5).

Intervention 4: Video Training: After the first three interventions, the percentage of patients being screened increased from baseline screening of 10% to 98%; however, screen positive rates were much lower than the expected epidemiological rates. Therefore, a training video was created for the staff. The 10-minute training video was viewed by 113 nurses over

a five-month period. Not all the nurses who viewed the training responded to every survey question. Seventy-seven nurses responded to a question about how informative and helpful the video was and rated it as helpful and informative with a mean rating of 8.9 out of 10. The nurses who responded to the survey (N=106) were asked questions about their comfort screening and discussing PMADs and referring patients to mental health resources after viewing the video; they were not surveyed prior to viewing the video. After the video training nurses were asked about their ability to know when and how to connect a patient to mental health care (Appendix 6) and the majority indicated that they "strongly agree." When asked if they knew when a patient should be referred, 92% noted "yes." After the first week of video training, the PHQ-9 screening rate increased from 96% to 99%. Of those screened, 14% screened positive and 35% were referred to social work. After completion of five months of video training, the screening rate remained at 99%. Of those screened 19% screened positive and as many as 39% of them consulted with social work (Figure 4).

Statistical Process Control Chart Results: The statistical process control (SPC) chart allows us to visualize the screening rate, total number of PHQ-9 surveys that resulted in a score greater than or equal to 5, and the percentage of patients receiving a social work consult (Figure 4). The lines visualized on the chart include the p-bar, the upper control limit (UCL) and the lower control limit (LCL) of PHQ-9 screening rates, only. The center line, or p-bar, represents the averages of the entire data set. The UCL and LCL were determined by adding one standard deviation above and below the p-bar and represent threshold values between which most screening rates are predicted. SPC can be beneficial because screening rates that are routinely above the center line and even above the UCLis encouraging. On the other hand, noting that the screening rate falls below the center line or below the LCL can alert the need to implement ways to improve protocols [30]. Based on these limits we could assess whether our interventions (represented by 4 solid vertical lines) were successful in

achieving our three main outcomes: increase in the screening rate, increase in the screen

positive rate (Appendix 7), and an increase in the social work consultation rate (Appendix 8).

As visualized in the SPC, screening rates had a sharp increase between March-June 2017,

from 0.01% to 59.54%. Between June-July 2017, there was a slight decline in screening rates

of approximately 9.45%, but this rapidly increased in August 2017. The screening rates from

August-December 2017 experienced steady inclines. From December 2017 and onwards,

screening rates were relatively stable at an approximate average of 98.44%. Consequently,

there appears to be an increase in the number of PHQ-9 positive scores (>/=5)(Appendix 7),

especially from April 2019 to January 2020. Social work consults also demonstrated an

increase from April 2017, but remained fairly steady thereafter, with small increases after

each intervention (Appendix 8). Most importantly, inpatient social work consultation rates

increased each year (during these 4 interventions) for women who screened positive on the

PHQ-9 (Figure 6). In 2017 of those with PHQ-9 $\geq$ 5 (lowest cutoff, see SPCC, Figure 4),

61/119 or 51.3% received social work consultation. Of those with PHQ-9 $\geq$ 8 (which results

in later outpatient follow up), 31/47 or 66% received social work consultation. Of those with

PHQ-9 $\geq$ 13 (highest cutoff which results in immediate inpatient social work consultation),

10/11 or 90.9% received social work consultation. In 2018, of those with PHQ-9 $\geq$ 5, 95/147

or 64.6% received social work consultation, of those with PHQ-9 $\geq$ 8, 29/40 or 72.5%

received social work consultation and of those with PHQ-9 $\geq$ 13, 7/7 or 100% received social

work consultation.

DISCUSSION

All four interventions were successful in achieving our three main outcomes; (1)

increasing our screening rate; (2) increasing our screen positive rate; and (3) increasing our

social work consultation rate. We were consistent with other institutions who increased

efforts to screen their patients for PMADs and achieved even higher screening rates of up to

99%. Even after the first 2 interventions, our screen positive rates remained lower than the expected epidemiological rates. For example, California Public Health Department data suggests that 13.6% of postpartum patients in Los Angeles experience depressive symptoms [31] therefore it was clear that our initial protocol change in 2017 still fell short of addressing the mental health concerns of Cedars-Sinai birthing patients. These first 2 interventions moved away from the standard use of "clinical judgement" and initiated routine screening with a reliable and validated measure of depression. Long and colleagues concluded that clinical judgment from the healthcare provider often improperly substitutes appropriate protocols. The authors encourage QI projects like ours, which focus on PMAD-related competency and pre- and post- intervention assessments to enhance the rigorous testing of interventions [32]. The four interventions we used had a substantial impact on people and systems at Cedars-Sinai. The OB nurses gained significant knowledge about PMADs and are more comfortable screening and discussing mental health with patients. The increased rate of screen positives and consultation with social work allows more at-risk patients to be connected with care. We noted a difference between observed and anticipated outcomes, specifically in the low rates of positive screens which suggests variability in how screenings are conducted. We hypothesize this may be related to the heterogeneity of nursing staff due to night shift nurses, traveling nurses, and high staff turnover rate. The SPC reflects the timing of our trainings, which occurred in phases, thus resulting in peaks in screening rates after various trainings followed by valleys.

Strengths and Limitations: Notable strengths of our project include: Nursing staff commitment to improving PMAD screenings among our patients; our team's solutions-focused approach to addressing difficulties; and a large dataset (N=19,564) including women from moderately diverse racial and ethnic backgrounds (15% Hispanic, 12% as Asian/Pacific Islander/Native Hawaiian, 8% as "other race," 7% as Black, 2% as "mixed race or

multiracial,"), suggesting generalizability of these interventions. One limitation is the timing of our PPD screening. Ideally women would be screened by their OBGYN physicians during the pregnancy and again 2-4 weeks after delivery. Recent research suggests that immediate PPD screening scores (i.e. 1-2 days post-delivery) can predict the development of an episode of depression or anxiety 2-8 weeks post-delivery.[22,23] Additionally, only 5% of our patients used publicly-funded insurance, and its well-known that socioeconomic status negatively correlates with mental health which could affect generalizability. Another possible limitation is that some patients may have declined screening questions, but still accepted a social work consult, which results in fewer PHQ-9 positive screens while increasing the number of social work consultations. Similarly, some women accept a social work consultation not for current depression but for other reasons such as intimate partner violence, substance use or bereavement. Women in the MFCU and those whose babies are in the NICU also automatically receive social work consultation. All of these indications, however, place women at higher risk for current depression therefore meeting our goal of connecting women at risk for PPD to care. Another limitation is the inability to know for certain that patients were asked the screening questions using the demonstrated techniques, as patient interactions with nurses are generally not observed. Some patients may hesitate to answer questions truthfully and some nurses, being busy and rushed, may miss potential positive screens. The frequent offering of in-service as well as the video trainings, were made in order to address this limitation. Finally, although anxiety is very common in the postpartum period, we were not able to administer the EPDS, which includes 3 items assessing anxiety symptoms. One of our future directions is to replace the PHQ-9 with the EPDS to the postpartum screening workflow, and to allow women to self-administer.

Ongoing and Future Work: We continue to make improvements to this program. For example, interventions implemented between 2018 and 2020 include a staffwide Cultural

Humility Training; An Outpatient follow up Program (re-screening anyone who scored above an 8 on the PHQ-9 at delivery); an Intensive Care Unit and Stillbirth Screening Initiative; and a more robust one hour virtual nurse training program implemented by the Hospital Quality Training Institute (https://www.hqinstitute.org/). The progress achieved by the first 4 interventions detailed in this report are being sustained and data from these next 4 interventions are currently being analyzed. We also wil begin inviting patients to complete the screening on hospital-provided iPads in 2022, which may provide more privacy after the nurse has introduced the concept of family wellness. We recognize that nurses are busy and may not always properly conduct the screening. We have considered that incorporating this training as part of the standard curriculum for nurses would help standardize PHQ-9 administration. We have also noted the need for consistent and frequent training, given the observed peaks and valleys in improvements. Next, we will focus on populations at the greatest risk of developing a PMAD: patients in the MFCU, ICU, NICU and women of color.

Conclusions: The Postpartum Depression Screening, Education and Referral program has improved depression screening and increased social work referral rates (resulting in increased social work consultation) at Cedars-Sinai. This program is sustainable, especially with ongoing use of the training video. Mental health programs that include routine depression screening, education, consultation and referral to treatment should be a part of comprehensive care for all pregnant women to achieve better birth and postpartum outcomes. Such practices may enable early detection, referral, and timely treatment to potentially reduce risk for adverse birth outcomes, especially LBW and preterm birth, and can certainly help to reduce risk of PPD, if treated.

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FIGURE LEGENDS

Figure 1: Plan, Do, Study, Act (PDSA) Chart and Four Quality Improvement Interventions (2017-2018)

Figure 2: Nurses champions reported their comfort screening, discussing and referring for perinatal mood and anxiety disorders

Figure 3: Nurse champions reported their ability to connect patients to care

Figure 4: Statistical Process Control Chart: PHQ-9 Screening rate, screen positive and social work consult by month

Figure 5: Nurses reported their comfort level screening patients and providing referrals

Figure 6: Percent of patients above 3 cutoffs on inpatient PHQ-9 Screening who received a social work consultation in 2017 and 2018.
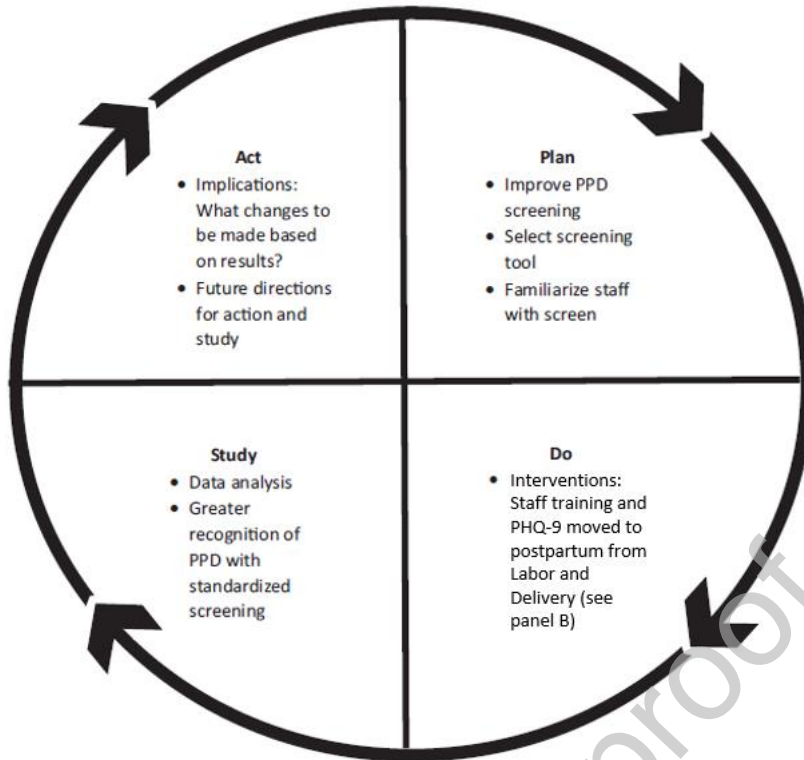
Figure 1A: Plan, Do, Study, Act: Representation of Plan-Do-Study-Act chart related to quality improvement of implementing standardized postpartum depression screens. Adapted from "Plan-Do-Study-Act (PDSA) Cycle" from the Agency for Healthcare Research and Quality, 2013, Retrieved from https://innovations.ahrq.gov/qualitytools/plan-do-study-act-pdsa-cycle.
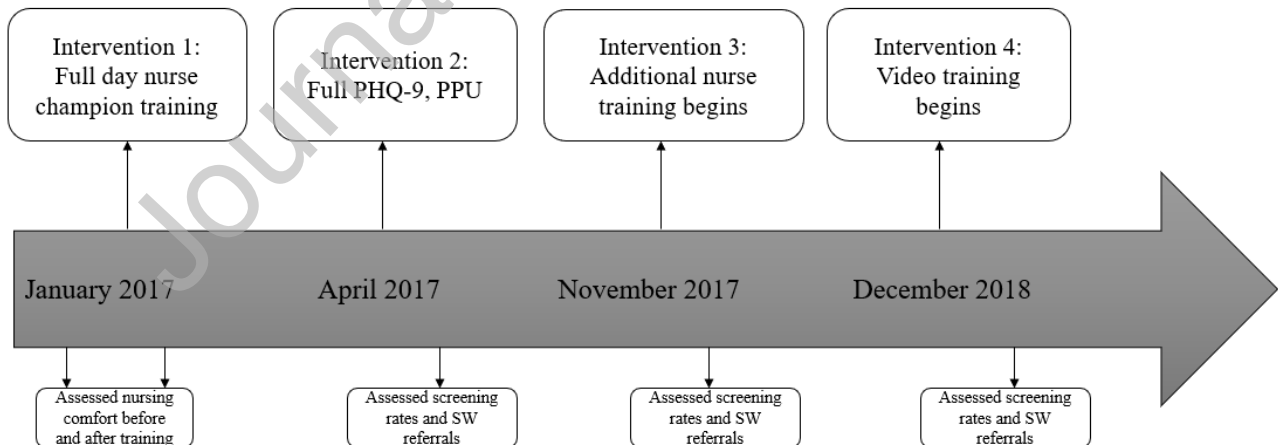

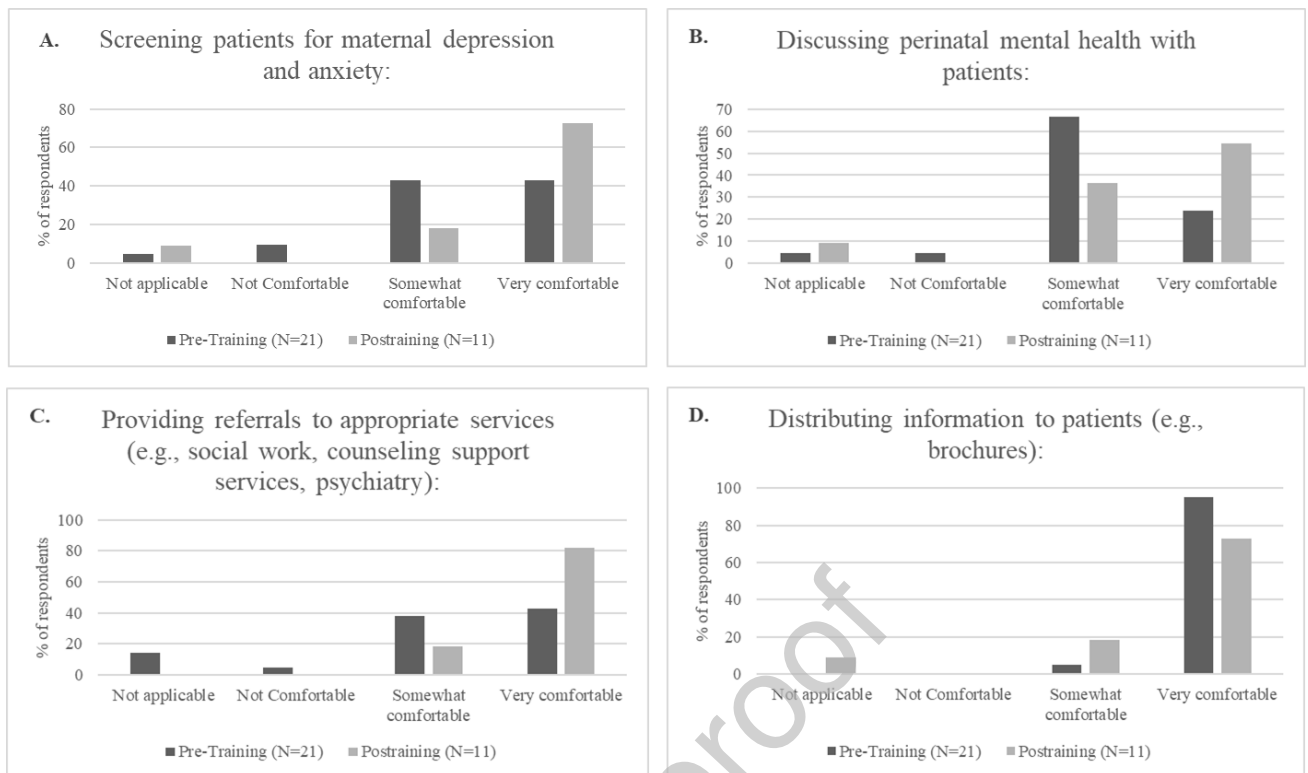**Figure 1B: Four Quality Improvement Interventions (2017-2018)**

Figure 2: Nurses champions reported their comfort screening, discussing and referring for perinatal mood and anxiety disorders
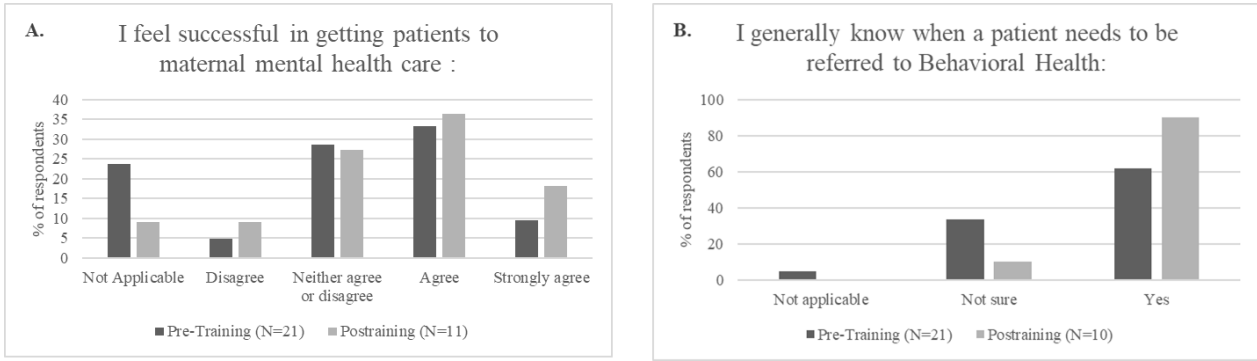
Figure 3: Nurse Champions reported their ability to connect patients to care
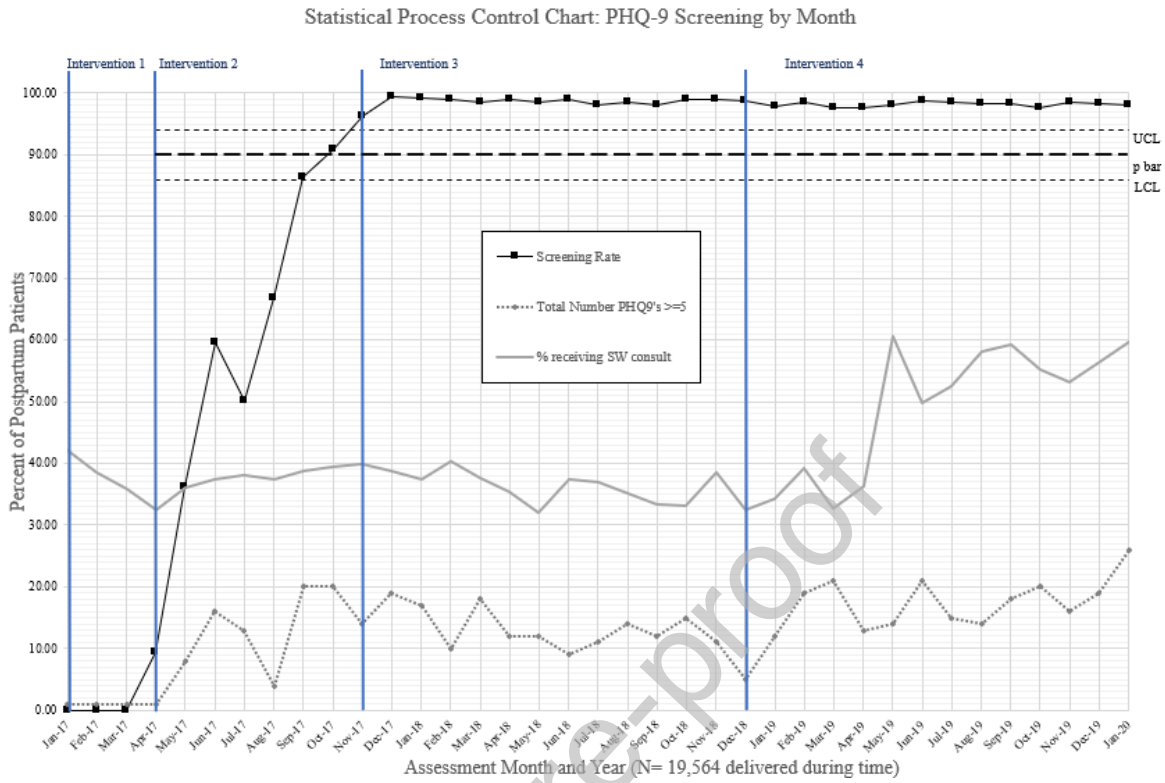
Figure 4: Statistical Process Control Chart: PHQ-9 Screening rate, screen positive and social work consult by month. UCL, p-bar and UCL available only for the PHQ-9 Screening Rate Data.
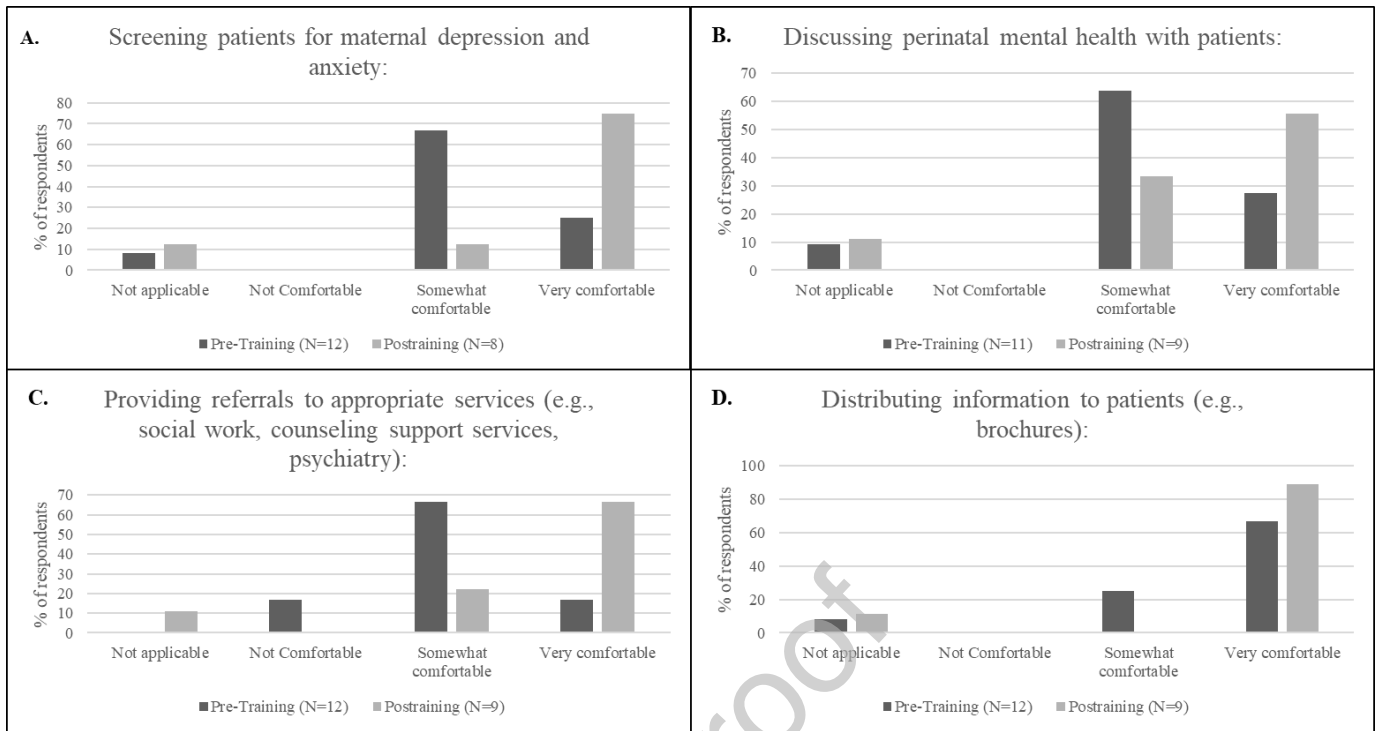
A. Screening patients for maternal depression and anxiety:

B. Discussing perinatal mental health with patients:

C. Providing referrals to appropriate services (e.g., social work, counseling support services, psychiatry):

D. Distributing information to patients (e.g., brochures):

Figure 5: Nurses reported their comfort level screening patients and providing referrals before and after In-service Training

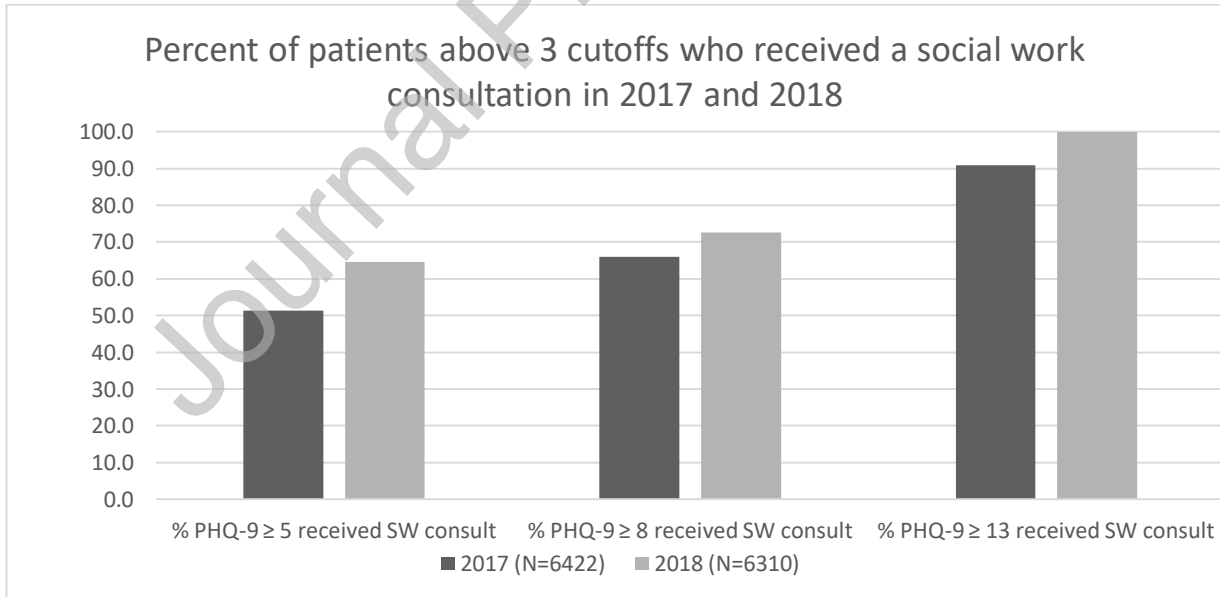Percent of patients above 3 cutoffs who received a social work consultation in 2017 and 2018

Figure 6: Percent of patients above 3 cutoffs on inpatient PHQ-9 Screening who received a social work consultation in 2017 and 2018.