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UNIVERSAL DEPRESSION SCREENING IN PREGNANCY

A CAPSTONE PROJECT

SUBMITTED TO THE GRADUATE FACULTY

OF THE GRADUATE SCHOOL

BETHEL UNIVERSITY

BY

KAYLA SCHMIDT

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

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Universal Depression Screening During Pregnancy

Kayla Schmidt

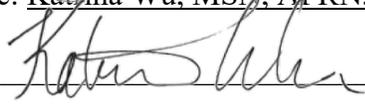
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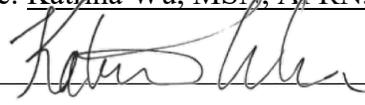
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Abstract

Introduction: Identifying the optimal timing and frequency of universal depression screening during pregnancy can optimize the current national recommendations. Identifying whether a protocol for universal depression screening is beneficial in obstetric clinics. This integrative review of published literature explored the optimal timing, frequency, and feasibility of universal antenatal depression screening.

Methods: A literature search using CINAHL, PubMed, and Google Scholar identified published and original articles associated with universal antenatal depression screening. Articles were included if they pertained to the topic, were published within the last 6 years, were peer reviewed, available in English, and contained quality evidence. The included studies were screened using a web-based application while organizing them into the PRISMA flow diagram. The results were disseminated into three categories using King's theory of goal attainment: personal, impersonal, and social.

Results: The search identified 543 articles, of which 17 were included in this review. The 17 studies identified the depression screening during every prenatal visit as the optimal frequency, and the least optimal frequency being once during pregnancy. The studies also identified screenings taking place during the intake and first trimester prenatal visit as optimal timing. Lastly, a universal depression screening protocol during pregnancy screened a higher number of patients, which in turn increased the number of women seeking mental health services while pregnant.

Discussion: Despite the limited amount of research on the topic, the results showed the need for universal antenatal depression screening protocols in every obstetric clinic. Screening during pregnancy should take place more than once and should include intake and the first trimester visit. The results are clinically significant for obstetric practice providers since they offer a more refined recommendation for depression screening during pregnancy. Gaps in the research, which include barriers to universal screening and consistent thresholds for positive Edinburgh Postpartum Depression Screen results need to be addressed.

Keywords: Universal depression screening protocol, depression screening, pregnancy, antenatal, prenatal care, Edinburgh Postpartum Depression Screen

Universal Depression Screening in Pregnancy

Perinatal depression is one of the most common obstetric complications, impacting up to 25% of all pregnancies (Adane et al., 2021). Perinatal depression has been linked to a higher chance of stillbirth, fetal mortality, infant mortality, low birth weight babies, and preterm delivery (Adane et al., 2021). The U.S. Preventive Services Task Force (USPSTF) recommends that all pregnant women should be universally screened for depression (Siu & the U.S. Preventive Services Task Force, 2016). Universal antenatal depression screening means that all women, despite their risk factors, should be given a brief screening to identify depressive symptoms during their pregnancies.

Most of the evidence for this recommendation was based on previous research showing a large decrease in postpartum depression risk after universal screening protocols were employed in the postpartum period (O'Connor et al., 2016). O'Connor et al. (2016) stated that universal postpartum depression screening reduced the risk for postpartum depression by 28%–59%. Wisner et al. (2013) also identified that postpartum depression may start before pregnancy or during the antenatal period.

The American College of Obstetrics and Gynecology (ACOG, 2018) adopted the USPSTF's recommendation that universal perinatal depression screening should occur at least once during pregnancy using a validated screening tool. The American College of Nurse-Midwives (ACNM, 2020) also adopted these recommendations but stated that universal perinatal depression screening using a validated screening tool should occur at least twice during pregnancy.

Universal perinatal depression screening is a newer concept that may not be fully initiated in every obstetric prenatal clinic. Since there are not enough details in the USPSTF,

ACOG, and ACNM recommendations, prenatal providers are left to their own discretion when it comes to initiating screening and its frequency. The purpose of this integrative review was to address these inconsistencies and to help ensure that pregnant women are universally screened for depression by answering the following questions: What is the optimal timing and frequency of universal perinatal depression screening during pregnancy? and, Is universal screening feasible for obstetric clinics?

Framework

Imogene King's theory of goal attainment provided the framework for this integrative review. This theory was developed in the 1960s to describe dynamic interpersonal relationships in which patients attain certain life goals through personal growth and development (Petiprin, 2020). King focused on the patient's health as being the main goal with three interacting systems: personal, interpersonal, and social.

The theory posits that nurses' goals should be to help patients maintain their health, which allows normal functioning in the patient's roles (Petiprin, 2020). King identified the interactions with patients as a step in attaining this goal. During pregnancy, an obstetric provider interacts with patients during many prenatal appointments. The goal set for pregnant women is to have a healthy pregnancy and an easy transition to their roles as mothers. The changes in pregnancy may cause a new onset or flare up of depression, which could impact a pregnant women's goals. Administering universal depression screenings at the correct time and frequency could positively impact the three systems King identified.

The frequency of how often screening should be completed in pregnancy addresses the needs patients may experience related to their personal systems during pregnancy. King's nursing theory of goal attainment describes the personal system as the body image, development,

self-image, and one's perception (Petiprin, 2020). The personal system may fluctuate many times while experiencing the physical and emotional changes from pregnancy. The interpersonal system is characterized as the part that consists of interactions, communication, transaction, role, or stress (Petiprin, 2020). When depression screening takes place may help pregnant women cope with any of these areas in the interpersonal system.

Lastly, the social system of King's nursing theory of goal attainment covers the relationship that the patient establishes with the provider in the obstetric clinic. Interactions in the clinic setting can help patients with decision-making, roles of power, status, and organizing goals (Petiprin, 2020). Establishing universal screening in obstetric settings can address the social needs of pregnant patients and allow them to identify depressive symptoms while also offering enough time to seek the necessary treatments.

Methods

Whittemore and Knafl's (2005) methodology and framework guided this integrative review. This integrative review followed the recommended steps using this methodology and framework in which a problem was identified, a literature review search was conducted, and the data were evaluated and analyzed. The preferred reporting items for systematic review and meta-analysis (PRISMA) guidelines were used to verify the search strategy. The literature search was conducted after a consultation with a Bethel University librarian on recommendations for databases and to determine the keywords, which were the following: universal perinatal depression screening, depression screening, pregnancy, antenatal depression screening, prenatal care, PHQ-9 (Patient Health Questionnaire-9), and the Edinburgh Postpartum Depression Screen (EPDS). The literature searches took place in the CINAHL, PubMed, and Google Scholar databases and an ancestry search, using the following search terms: *perinatal depression*,

depression screening, universal depression screening, prenatal care, pregnancy, Edinburgh Postpartum Depression Screen, and PHQ-9.

Articles from the searches were uploaded into the web-based software Covidence for the screening process. A total of 550 articles were imported. 202 duplicates were removed. Each article's title and abstract were reviewed for relevancy, which yielded 61 articles. The full-text articles were then examined for eligibility, and 44 articles were excluded from review. The articles were evaluated for study design, outcome measurements, population, quality, and level of evidence. Inclusion criteria for this integrative review consisted of original qualitative or quantitative research, peer-reviewed articles, published research, English language, published within the last 6 years, and relevant studies that addressed the chosen topic. Exclusion criteria included studies on different populations than the present study, different interventions than the present study, or measured outcomes different from those in the present study.

Using these criteria, 17 articles were identified and included in the integrative review. Figure 1 displays a PRISMA flow diagram which was chosen to report the search screening process. Table 1 summarizes the studies included in this review, offering a brief synopsis of each study's design, recommendations, strengths, limitations, and level of evidence. Levels of evidence were measured using the John Hopkins Evidenced-Based Practice Model (JHEBDM) using appendix D. This appendix summarizes how to determine the level of evidence and quality grade. The levels of evidence are the following: Level I; experimental, Level II; quasi-experimental, Level III; nonexperimental, Level IV; expert opinions in clinical practice, and Level V; nonresearch and experiential evidence. The quality grades consist of A; high quality, B; good quality, and C; bad quality or major flaws.

After the final studies for review were established, the results were then disseminated into three categories using King's theory: timing and interpersonal system; frequency and personal system; and feasibility of a universal depression screening in an obstetric clinic and the social system.

Results

Summary of Articles

The 17 studies identified that fit the criteria for the present review were conducted in various geographic locations, including China, Australia, and the United States. The samples consisted of pregnant and postpartum women, and the sample sizes ranged from 77 to 102,906. The samples also reflected a diverse population with multiple ethnicities (Black, White, Hispanic, Asian, and other), cultures, and socioeconomic backgrounds. Methodology in the studies varied, with 10 retrospective cohort studies, three quality improvement studies, one mixed methods study, one survey, one longitudinal study, and one cross-sectional study. Using the tool from JHEBDM the articles included were found to be of the following evidence levels and quality grade: one study at Level II, 12 studies at Level III, one study at Level IV, and three studies at Level V. No studies reflected Level I. All the studies contained high-quality evidence since each included adequate sample sizes, consistent and generalizable results, definite conclusions, and a thorough evidence review.

The evidence was organized using the framework from King's theory and placed into three categories: frequency and personal system, timing and interpersonal system, and feasibility of a universal depression screening in an obstetric clinic and social system. Table 2 is a summary of the results.

Frequency and Personal System

Screening Once.

Of the 17 studies, two (Ellington, 2021; Venkatesh et al., 2016) measured the results from screening depression once during pregnancy. Venkatesh et al. (2016) screened pregnant women during a third trimester appointment and during a 6-week postpartum visit. Of the 8,985 women screened, 6.5% screened positive using the EPDS. The positive screens included 69% antepartum and 31% postpartum women ($p < .01$). The positively screened antepartum patients were more likely to seek mental health services when compared with positively screened postpartum patients (83% versus 71%, $p < .01$). Following these women after delivery, the antepartum women who were linked to mental health services were less likely to have a positive screen 6 weeks postpartum compared with those who were not linked to mental health services (20% versus 82%, $p < .0001$). Ellington (2021) reported that 24 of 77 patients (31.17%) were positively screened during intake visits, which averaged between 8–12 weeks gestation.

Screening Twice.

Four studies (Avalos et al., 2016; Long et al., 2020; Mestad et al., 2016; Miller et al., 2019) reflected screening twice for depression during pregnancy. Avalos et al. (2016), Long et al. (2020), and Miller et al. (2019) stated that they chose to screen twice since it was easier to add these screens during the intake and glucola screening visits.

Avalos et al. (2016) initiated a health care-system-wide protocol for universal screening with the goal of screening pregnant women at least two times during pregnancy and one time postpartum using the PHQ-9. After full implementation of the protocol, 97% of pregnant women were screened at least once, and 89.1% of these women were screened twice or more ($p < 0.001$). A new diagnosis of depression and its severity increased from preimplementation to

postimplementation (depression, 8.2% versus 11.7%, $p < 0.001$; severity, 0.2% versus 3.1%, $p < 0.001$).

Mestad et al. (2016) reviewed the statistics associated with screening for depression during pregnancy in an obstetric clinic. The results showed that pregnant women were screened at least once 84% of the time and at least twice 50% of the time. The women who received only one screening either entered prenatal care late or after their first trimester. Of the women who were screened for depression, 27% screened positive once and 13% screened positive twice (Mestad et al., 2016).

Miller et al. (2019) found that 8.6% of study participants screened positive in the first trimester, 6.6% screened positive in the third trimester, and 1.2% screened positive at the 6-week postpartum visit. Long et al. (2020) found higher screening rates in intake and postpartum appointments (60.14% and 85.45%) when compared with the glucola screening appointment (35.01%). Clinically significant EPDS scores were 18.21% at intake, 17.43% at the glucola screening appointment, and 13% at the 6-week postpartum visit. Long et al. concluded that the screening rates and clinically significant EPDS scores showed that depressive symptoms can increase or decrease throughout pregnancy and after.

Screening Three or More Times.

Studies in which depression screens occurred three or more times (Guo et al., 2021; Wilcox et al., 2019; Yu et al., 2020) offered perspectives on trajectories of depression for pregnant and postpartum women. Wilcox et al. (2019) evaluated several groups of pregnant beginning at either the first or third trimesters. This study was not associated with an obstetric clinic; its purpose was to interpret the data received from pregnant and postpartum women. Multiple EPDS screens administered during pregnancy and postpartum showed that the highest

depressive incidents (EPDS score >14) occurred during pregnancy: 33% first trimester, 24% second trimester, 22% third trimester, 13% 4 weeks postpartum, and 8.4% 3 months postpartum. Wilcox et al. also found that women with high EPDS scores did not necessarily persist there.

Guo et al. (2021) screened pregnant women during the first, second, and third trimesters and offered several conclusions from their findings. The results showed that gestational age ($p = 0.014$) and gestational weeks ($p < 0.001$) were significant for antenatal depression diagnosis. Another conclusion from the results was women in the first trimester had a higher risk for depression compared to the women in the second, AOR = 0.611, 95% CI [0.483, 0.773] and third trimesters, AOR = 0.337, 95% CI [0.228, 0.498].

Yu et al. (2020) identified three trajectories of depressive symptoms during pregnancy and postpartum among women who were screened seven times. Ninety percent of the women screened had no depressive symptoms throughout their pregnancy and postpartum, 5.1% had higher EPDS scores during pregnancy, and 4.9% had higher EPDS scores postpartum. Just over 52% of the women had their first onset of depressive symptoms during pregnancy, with 26.8% of these women having their highest EPDS score between 12–24 weeks gestation. The highest EPDS scores were during visits between 12–24 weeks gestation and 1 week postpartum (Yu et al., 2020).

Timing and the Interpersonal System

EPDS Scores During the First Trimester.

A number of researchers conducted studies in which trimester EPDS and PHQ-9 scores were compared to postpartum scores (Ellington, 2021; Guo et al., 2021; Lomonaco-Haycraft et al., 2018; Long et al., 2020; Tourtelet et al., 2020; Wilcox et al., 2019; Yu et al., 2020). An overwhelming amount of evidence showed that pregnant women screened higher for depression

during the first trimester (Ellington, 2021; Guo et al., 2021; Lomonaco-Haycraft et al., 2018; Long et al., 2020; Tourtelet et al., 2020; Wilcox et al., 2019; Yu et al., 2020). Guo et al. (2021) reported that 18.1% of pregnant women were positively screened during the first trimester, which was the highest reported positive trimester screening comparing with the second and third trimesters. Lomonaco-Haycraft et al. (2018) reported that 21.52% of women in the first trimester were positively screened, which was higher than the third trimester and postpartum screens. Long et al. (2020) reported that clinically elevated EPDS scores were 18.21% at the first trimester, making this the highest percentage of significant scores when compared with the third trimester and postpartum scores. Tourtelet et al. (2020) was a mixed methods study in which pregnant women were screened during their first prenatal appointment and followed if they received treatment after a positive screen. Fifty-eight of the 393 women screened positive (Tourtelet et al., 2020).

Ellington (2021) found that 31.17% of pregnant women screened positive at their intake visit, which averaged between 8–10 weeks gestation. Wilcox et al. (2019) stated that in Cohort 1 in their study, which included women in their first trimester, 10% had positive screens at baseline, which increased at the end of the first and second trimesters, rising to 13% in each trimester. Yu et al. (2020) found that 5.1% of pregnant women screened positive during the first and second trimesters, which was slightly higher than the postpartum group at 4.9%. During the first trimester, the EPDS scores ranged from 6 to 16 points (Yu et al. 2020).

EPDS Scores During Second and Third Trimesters.

Results from Guo et al. (2021), Lomonaco-Haycraft et al. (2018), Long et al. (2020), Venkatesh et al. (2016), Wilcox et al. (2019), and Yu et al. (2020) showed lower second and third trimester scores compared with first trimester scores. In Guo et al., the risk of depression

was lower in the second trimester, AOR = 0.611, 95% CI [0.483, 0.773] and third trimester, AOR = 0.337, 95% CI [0.228, 0.498] when comparing positive screening rates to the first trimester. Guo et al. also concluded that gestational age ($p = 0.014$) and gestational weeks ($p < 0.001$) were contributing factors to antenatal depression.

Lomonaco-Haycraft et al. (2018) screened only 37% of pregnant women at the 28-week visit, and 16.04% screened positive, which was 5% lower than in the first trimester. Long et al. (2021) reported clinically elevated EPDS scores (17.43%) at the glucola screening appointment. Venkatesh et al. (2016) determined that 69% of the women screening positive were antepartum screenings. Wilcox et al. (2019) reported that the positive screen percentage rose to 16% in Cohort 1 in their study, which consisted of women during their first trimester, compared with the baseline of 10% and second trimester screen of 13%. Cohort 2, which consisted of women during the beginning of the third trimester, had a baseline score of 12.7% screening positive, which decreased to 10.7% by the end of the third trimester. Yu et al. (2020) concluded that the highest EPDS scores during pregnancy happened during the second trimester, between Weeks 12 and 24. Scores during the third trimester remained stable, with a possible higher trend for the pregnant women who would eventually screen positive during their postpartum screenings (Yu et al., 2020).

Feasibility and the Social System

Screening Rates: No Established Protocol for Universal Screening.

Several studies (Fedock et al., 2018; San Martin Porter et al., 2019; Sidebottom et al., 2020) included demonstrated screening rates of obstetric clinics without a universal screening protocol established. Sidebottom et al. (2020) researched a large health care system and reviewed the screening rates throughout. Pregnant women were screened 65.1% of the time, with 34.9%

not screened at all. Of the pregnant women who were screened, 52% were screened once and 13.3% were screened two or more times. Screenings ranged widely among 35 obstetric clinics, with the low being 34.7% and the high being 100% of patients screened for depression while pregnant. Sidebottom et al. recognized that women with a documented history of anxiety and depression and those who had a larger number of prenatal visits were more likely to be screened, AOR 2.18. Women who spoke a language other than English were less likely to be screened, AOR 0.74.

Fedock et al. (2018) researched the difference in screening rates among pregnant and postpartum women. After reviewing the data, the researchers concluded that obstetric providers were less likely to universally screen pregnant women (53.04% versus 82.40%, $p < 0.001$) and less likely to offer guideline-congruent care (33.61% versus 58.51%, $p < 0.001$) to pregnant women compared to postpartum women. Fedock et al. observed several factors that influenced whether the obstetric provider screened pregnant women. The clinics that screened were more likely to have onsite mental health services, higher satisfaction rates working with mental health services, and previous experience with universally screening pregnant women. Fedock et al. concluded that personal motivation was the largest influence on whether obstetric providers screened for depression during pregnancy.

San Martin Porter et al. (2019) reported differences in screening rates among public and private hospitals in Queensland, Australia. The public hospitals initiated a universal screening protocol for all pregnant women, whereas the private hospitals had not initiated universal screening at the time of the study. Just over 71% of pregnant women were screened in public and private hospitals. Significantly fewer pregnant women in the private hospitals were screened compared to public hospitals (28.8% versus 91.0%, $p < 0.001$).

Screening Rates Before and After Protocol Implementation.

Many of the studies included in the current review compared screening rates before and after implementing a universal screening protocol for pregnant women (Avalos et al., 2016; Gisseman et al., 2021; Lomonaco-Haycraft et al., 2018; Miller et al., 2019, 2021; Puryear et al., 2019). Avalos et al. (2016) concluded that prior to implementation pregnant women were screened less than 1% of the time, and that after implementation 98% of women were screened at least once during pregnancy ($p < 0.001$). Gisseman et al. (2021) used a universal screening protocol and reported screening rates to be highest at intake (95%–97%) and lowest during the third trimester (48%–60%).

Lomonaco-Haycraft et al. (2018) found the screening rates improved from 0% prior to implementation to greater than 75% after. Miller et al. (2019) found significant improvement in screening rates after implementation for the first trimester (0.1% preimplementation versus 65.5% postimplementation, $p < .001$) and third trimester (0.0% preimplementation versus 42.7% postimplementation, $p < .001$). Miller et al. concluded that antenatal patients who received prenatal care after implementation were more likely to be screened (33% versus 81%, AOR 58.5). Puryear et al. (2019) found that 27% of pregnant women were screened at 11–13 weeks and 47% were screened at 35–37 weeks after implementation, demonstrating a 14%–91% compliance among four different clinics.

Benefits of Universal Screening.

Findings in several studies (Avalos et al., 2016; Ellington, 2021; Lomonaco-Haycraft et al., 2018; Long et al., 2020; Miller et al., 2019, 2021; Venkatesh et al., 2016) identified specific areas in which universal screening helped pregnant women. Avalos et al. (2016) reported more women receiving treatment after screening when comparing percentages before and after

implementation (5.9% versus 81.9%, $p < 0.05$). New depression diagnoses also increased after implementation (8% versus 12%, $p < 0.001$). In Ellington (2021) and Miller et al. (2021), more patients were able to seek mental health services since higher numbers of patients were referred. In Miller et al. (2019), the number of providers referring patients for mental health services increased, $p < 0.001$.

Lomonaco-Haycraft et al. (2018) identified greater enthusiasm for screening patients among providers and clinics, which helped more patients receive referrals for mental health services. Venkatesh et al. (2016) observed that antepartum patients were more likely to seek mental health services when compared with postpartum patients (83% versus 71%, $p = .002$).

Discussion

Summary Methods and Theory Integration

Depression has been identified as the most common obstetric complication. As such, the USPSTF (2016) recommends universal depression screening but does not specify screening, timing, frequency, or feasibility during the antenatal period (Adane et al., 2020). Addressing these key elements of antenatal depression screening could help reduce the impact of one of the most common obstetric complications (Adane et al., 2020). Findings from the 17 articles reviewed for the current study contributed evidence for recommending the optimal frequency, timing, and feasibility of universal depression screening in obstetric clinics.

Frequency and the Personal System

Depression screening scores can increase or decrease throughout pregnancy (Long et al., 2020). Yu et al. (2020) had similar findings after screening pregnant women throughout both pregnancy and postpartum, which showed that new onset of depression can occur at any point during pregnancy. Screening at every prenatal visit allows providers to quickly identify and

address new onset depression, making this frequency most optimal (Long et al., 2020; Wilcox et al. 2019; Yu et al., 2020). This frequency may increase the amount of time for each prenatal visit, which may not be feasible for every obstetric practice. The least optimal frequency for screening during pregnancy would be once (Long et al., 2020). When or if pregnant women will screen positive during pregnancy cannot be predicted. Only addressing depression once during pregnancy may cause depressed women to go undiagnosed, which was evidenced by the inconsistent screening rates seen in several articles (Ellington, 2021; Long et al., 2020; Venkatesh et al., 2016).

Timing and the Interpersonal System

This integrative review showed that the first trimester is the most optimal time to screen pregnant women for depression (Ellington, 2021; Guo et al., 2021; Lomonaco-Haycraft et al., 2018; Long et al., 2020; Tourtelet et al., 2020; Wilcox et al., 2019; Yu et al., 2020), with the second trimester also effective (Wilcox et al., 2019; Yu et al., 2020) and the third trimester the least effective (Lomonaco-Haycraft et al., 2018; Wilcox et al., 2019; Yu et al., 2020). Screening in any trimester provided more pregnant women access to mental health resources (Ellington, 2021; Lomonaco-Haycraft et al., 2018; Miller et al., 2021). Considering that antepartum women are more likely to seek mental health services, these results support implementing screening during the first trimester (Venkatesh et al., 2016).

Feasibility and the Social System

Findings from this integrative review also showed that a universal depression screening protocol during pregnancy is feasible for obstetric clinics (Avalos et al., 2016; Gisseman et al., 2021; Lomonaco-Haycraft et al., 2018; Miller et al., 2019, 2021; Puryear et al., 2019). Screening was more feasible when obstetric clinics included a standard protocol, easy access to mental

health services, health care workers who were trained prior to implementation, and screening integrated into their electronic medical records (Fedock et al., 2018; San Martin Porter et al., 2019; Sidebottom et al., 2020). San Martin Porter et al. (2019) demonstrated the differences between obstetric clinics having a universal screening protocol and those without. Other researchers demonstrated large differences between the number of pregnant and postpartum women screened before and after a universal depression protocol was implemented (Avalos et al., 2016; Gisseman et al., 2021; Lomonaco-Haycraft et al., 2018; Miller et al., 2019, 2021; Puryear et al., 2019), showing that more pregnant women were screened when a universal protocol was in place.

Research Gaps

Findings from this integrative review reflect several gaps in the research on universal screening that should be addressed. The first gap is whether screening positively impacts antenatal depression and its associated obstetric and neonatal outcomes. The recommendations for universal screening during pregnancy are rather new, and it is important to measure the universal screening's impact on outcomes.

Secondly, barriers to screening should be researched. The results from this integrative review showed that barriers still exist after implementing a protocol, causing less than 100% of pregnant and postpartum women being screened. Examples of barriers identified in the literature that should be included in future research are provider bias and patient characteristics. Universal screening offers a solution to minimize provider bias and allow more pregnant women to be screened for depression. Influences from patient characteristics and their correlated screening rates should be studied. Characteristics that should be studied include race, ethnicity, cultural background, language, sexual orientation, and socioeconomic status.

Lastly, despite having EPDS being validated for pregnancy screenings (Rubertsson et al., 2011), variations in the thresholds for screening still existed among the articles included in the present integrative review. Research is needed to investigate the optimal standardization of scores, especially in the antenatal period. Further research is needed to determine the optimal threshold during pregnancy for referrals to mental health services.

Review Limitations

A variety of limitations were present in this study. The evidence level in this review was low since the 17 included articles did not reflect experimental, quasi-experimental, or randomized control trials. Additionally, the review was limited by variations in threshold scores when positive depression screenings were present. Standardization of EPDS scores should be addressed in a universal depression protocol during pregnancy to help providers know when to refer and treat and to promote quality research. Lastly, this review was limited by the amount of extant research and evidence on universal depression screening during pregnancy.

Impact for Advanced Practice Providers

This integrative review is important for advanced practice providers who work in obstetric clinics. Addressing patients' personal, interpersonal, and social systems by universally screening every pregnant woman can help address the most common obstetric complication. If providers are screening for depression early in pregnancy, patients are more able to access mental health services, which hopefully will reduce the associated risks with depression during pregnancy. Ensuring that providers screen during optimal times and screen the optimal number of times during pregnancy is another important consideration. As previously discussed, optimal screening procedures will help to address fluctuations in depressive symptoms pregnant women can experience during pregnancy. Lastly, by screening appropriately, advanced practice

providers can help patients receive the mental health services they need. Universally screening all women will help to identify a higher number of depressed pregnant women and allow more of them to access mental health treatment.

Conclusion

To address the identified gap in research, this integrative review was guided by the methodology and framework in Whittemore and Knafl (2005), which helped disseminate the research into three categories using King's theory of goal attainment. Patients' three systems—personal, interpersonal, and social—are impacted when providers optimally screen for depression during pregnancy. Screening frequency can positively impact patients' personal systems. The interpersonal system can be addressed by screening patients for depression at the correct time. Lastly, the social system can be influenced by the obstetric clinic prioritizing depression screens for all patients during their pregnancies. The results from this integrative review addressed these questions: What is the optimal timing and frequency of universal perinatal depression screening during pregnancy? and, Is universal screening feasible for obstetric clinics?

Pregnant women are a vulnerable population, making them at high risk for depression (Adane et al. 2021). It is imperative that obstetric clinics establish a universal antenatal depression screening protocol. Screening should take place more than one time during pregnancy to ensure that first trimester or intake visits are included in screening protocols. The present study's evidence helped to fill the gaps in vague recommendations from ACOG and ACNM by addressing the details of screening for depression during pregnancy.

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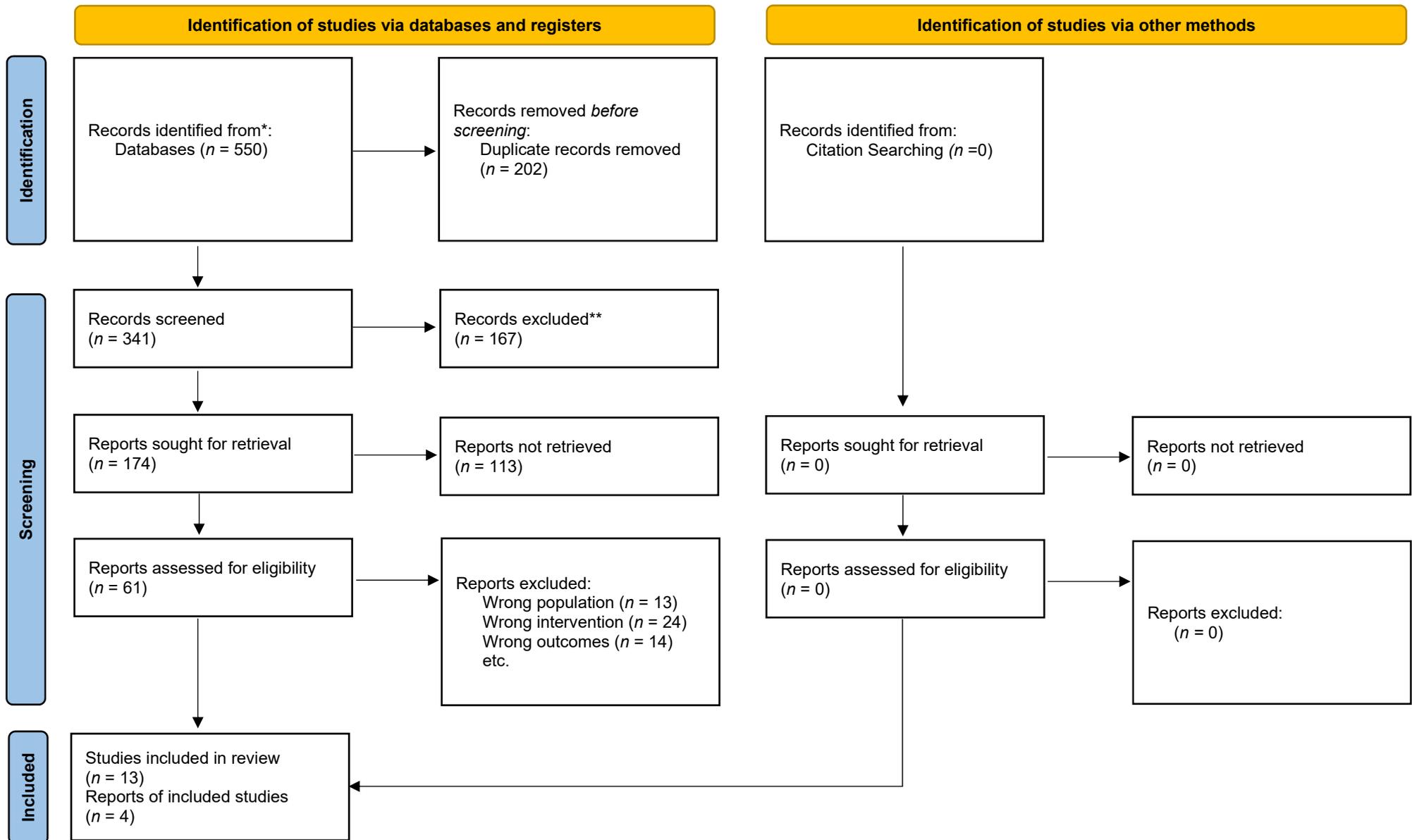
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Figure 1



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: <http://www.prisma-statement.org>

Table 1*Literature Matrix Review.*

Author, year	Level of evidence/quality	Design, participants	Study aim	Screening tool; frequency and timing during pregnancy	Results	Recommendations	Strengths/limitations
Long et al., 2020	Level III A	Retrospective Observational Study, 557 pregnant women	-To assess the frequency of screening for perinatal depression, rates of the Edinburgh Perinatal Depression Screen (EPDS), and treatment recommendations. -To identify the strongest predictor of elevated EPDS score	EPDS -Charts were reviewed at intake, glucola testing visit, and 6-week postpartum visit.	-Screening rates: Intake 60.14%, Glucola test 35.01%, and Postpartum 85.46%. -The highest rate of elevated EPDS scores was at intake.	-Screening for depression should take place at every prenatal visit to ensure patients who need treatment are not missed.	Limitations: -Assessing screening and treatment at only one obstetric clinic -OB providers used a range of cut off parameters for EPDS scores. Strengths: -Same EMR to access records, ease of referral process, and ease of screening.
Venkatesh et al., 2016	Level III A	Retrospective Cohort Study, 8985 pregnant women	-To assess the feasibility of a large-scale implementation of universal perinatal depression screening during pregnancy and postpartum using EPDS	EDPS -Screening during pregnancy takes place at 1 visit between 24–28-week gestation and 6-week follow up	-Screening rates: Antenatal 98% and Postpartum 86% -Highest number of elevated EPDS scores were during pregnancy, Antenatal 69% and Postpartum 31% -A higher number of women sought mental health evaluation during pregnancy when compared to postpartum	-Universal screening is feasible for antepartum and postpartum patients using the EPDS. -If screened positive, it is also feasible for patients to receive a referral for	Limitations: -Clinical characteristics of the women who screened positive were not included. -There may be barriers present for EPDS screening and non-English speaking patients. Strengths: -Large sample size

					treatment rates. Antenatal 83% and Postpartum 71%	mental health services to have an official diagnosis and treatment plan. -Universal depression screening can be integrated into routine prenatal care	
Miller et al., 2019	Level III A	-Retrospective Cohort Study, 5127 pregnant women; late prenatal care and preterm deliveries were excluded.	-Whether an initiation of universal perinatal depression screening program sustained its frequency	-Unable to determine screening tool -Screening was completed within the 1 st trimester, 3 rd trimester, and 6-week postpartum.	-Screening rates before policy were implemented and after policy: First prenatal visit 0.1% vs 65.5%, third trimester 0.0% vs 42.7%, postpartum 69.5% vs 90.0%. -Rates for screening during pregnancy increased overtime, Postpartum steadily stayed consistent	-Implementing a universal perinatal depression policy increased screening and treatment of pregnant women	Limitations: -unable to determine screening tool -observational study which may be impacted by the secular changes overtime Strengths: -Large sample size -Detailed chart review process
Avalos et al., 2016	Level III A	-Population-based Retrospective Cohort Study, 97,678 pregnant women	-To evaluate if universal prenatal and early postnatal depression screening leads to increased diagnosis, intervention, and improved depressive symptoms outcomes	PHQ-9 -Screening during early pregnancy, 0-20-weeks gestation, late pregnancy 20-weeks gestation until delivery, and 6-week postpartum visit. Goal of 3 times total	-Screening rates: 1% pre-implementation of universal screening and 97.5% after screening -All three perinatal time periods screened only 49% after implementation compared to 0% pre-implementation -Those receiving a new depression diagnosis after screening, 11.5% compared prior to policy change 0.4%	-Universal perinatal depression screening protocols are feasible and increase screening rates. -Universal perinatal depression screening should be initiated within obstetric clinics	Limitations: -Symptom comparison between before and after implementation could not happen since there was a lack of follow up screening prior to implementation -Referral and treatment rates were not included within this study which would have been needed to measure the success from screening and outcomes. Strengths: -large sample size

							-Research over a long period took place.
Sidebottom et al., 2020	Level III A	-Retrospective Cohort Study, 7,548 pregnant women who had at least 3 prenatal visits.	-Assess the prevalence of depression screening in the prenatal and postnatal periods within a large health system. Identify disparities in practices and variables of screening.	PHQ-2 triggers the full PHQ-9 -Measures screening during pregnancy and postpartum, does not specify gestational age when screening occurred	-Screening rates, Antenatal 63.3% and Postpartum 64.1% -Of note, this study compared measurable screening rates to self-reported screening rates from providers. 63.3%, 64.1% vs 98%. 95% of providers overestimated their personal screening rates. -Racial and socioeconomic disparities exist when measuring the difference in screening rates compared to patient characteristics.	- Providers who screened their patients had screening built into EHR, previously implemented a universal perinatal depression screening protocol, and included a nurse to establish standardized practices for screening.	Limitations: -Results were limited to the information included in the EHR. -This study may not have the ability to generalize to all pregnant women since this geographical area consists of certain demographics and socioeconomic levels. Strengths: -An entire health system was included in the study which identified areas of needed change for universal perinatal depression screening.
San Martin Porter et al., 2019	Level III A	-cross-sectional retrospective study, 30,468 pregnant women	-To investigate screening rates of public hospitals with universal screening protocols and private hospitals without	EPDS -Screened one time during pregnancy	-Screening rates at public standardized obstetric facilities 91.0% and private obstetric facilities 28.8%	-Universal perinatal depression screening protocols increase the number of women who are screened.	Limitations: -Analyzing health data may not identify every piece of needed information. -EPDS was the only screening tool evaluated. There may have been other screening tools used within the private hospitals. Strengths: -EPDS is a validated screening tool to measure -No recall bias existed within the study -Timeframe of measuring the data was 4 years after the protocols were changed allowing enough time to adopt the recommended changes.

Puryear et al., 2019	Level V A	-Quality Improvement 102,906 pregnant women	-To evaluate if a quality improvement plan for universal perinatal depression screening was effective	EPDS -Screened at the first trimester, third trimester, and postpartum visit	-Screening results: first trimester 27%, third trimester 47%, and postpartum 26% -Screening results from the 4 sites ranged from 14%-91%	-Planning, training, and implementation of a universal depression screening program can be initiated to achieve high screening and referral rates.	Limitations: -This study may not have the replicability since the providers all shared one EMR -Low number of women with Medicaid included in this study. Strengths: -Every provider shares the same EMR which allows easy access to mental health and referrals -Integrated Behavioral health
Fedock et al., 2018	Level IV A	-Summary of a survey from randomized OBGYN's utilizing the total design method, 483 OBGYN responses	-To test the conceptual model of provider decision-making. Also identify if a difference exists between pregnant and postpartum women being screened for depression.	n/a -Measure universal depression screening once during pregnancy and once postpartum.	-OBGYN's reported surveying pregnant women for depression often, always 53.04% of the time compared to postpartum women often, always 82.30% of the time. -OBGYN's who completed screening during pregnancy were most likely to have onsite mental health services, higher levels of satisfaction when coordinating referrals with mental health services, and twice as likely to have universal screening protocols within the health facility as a priority.	-Identifies disparities for pregnant women versus postpartum women being screened for depression.	Limitations: -Provider gender was not identified -The study relied on self-report instead of observing practices. -Universal perinatal depression screening recommendations may change or end in the future which may impact the direction of future research on this topic -Only OBGYN obstetric providers were included Strengths: -Direct response from providers to gain feedback on practices for depression screening. -Newer idea of comparing practices and protocols for antepartum and postpartum patients.
Tourtlot et al., 2020	Level III	-mixed-methods study,	-To evaluate positive depression	EPDS	-Screening percentage: 393 were screened with the EPDS at their first prenatal visit.	-Address barriers that may limit the	Limitations: -non-English speaking patients were excluded from the study

	A	pregnant 408 women	screening responses of obstetric providers with an integrated team approach -To evaluate patient perspectives.	-Screening at the first prenatal visit and 6-week postpartum visit	Mean gestation was 13.1 weeks. -Patient perception of screening and follow-up: 1 patient shared she did not think her mood needed a psychotherapy referral she would just follow up with the provider at her next prenatal appointment, 1 patient accepted a referral, but never attended the appointment, 1 said she did not expect to follow up at all, 1 said she was nervous about getting postpartum depression that is why she accepted medication, but wants to make sure her baby is safe during pregnancy	number of patients being screened. -Integrated team-based approach to prenatal care decreased the depressive symptoms pregnant and postpartum patients experienced.	-This study may not be generalized to other obstetric clinics that lack resources -EHR may have not captured every interaction between patient and provider -Lack of socioeconomic diversity among patient population Strengths: -Integrated team-based prenatal care was helpful when screening and referring patients for treatment. -Use of EHR. -Clinic resources were available when a patient screened positive.
Wilcox et al., 2019	Level II A	-The sample of women were found through the <i>babycenter</i> online platform owned by Johnson & Johnson. 858 were in the first trimester cohort. 321 were in the third trimester cohort.	-To describe perinatal depressive symptoms, onset, and trajectory	EPDS, PSS, STAI, GAD-7, PHQ-2, Perinatal-PTSD, and the PROMIS Emotional Support scale. Multiple psychosocial assessments were given. - Two cohorts were used throughout the study: a first trimester cohort and a third	-First trimester cohort results: Baseline 10% of women scored probably mild depressive disorder (MDD), end of first and second trimester rose to 13%, end of third trimester rose to 16%. -Third trimester cohort: Baseline at the beginning of the third trimester for probable MDD 12.7% and decreased to 10.7% at the end of third trimester. -Both cohorts had comparable rates at the postpartum visits: 9.6% for first trimester and 8% for third trimester.	-Most incidence of depressive symptoms occurred during pregnancy which was believed to mostly be in postpartum patients in the past.	Limitations: -No psychiatric evaluation was completed after the EPDS screening. The EPDS is not a diagnostic tool. Further evidence should utilize a psychiatric diagnostic tool to measure depression during pregnancy. Strengths: -Using internet-based assessments was more convenient for pregnant women and easy to assess or measure the data.

				<p>trimesters cohort. Both groups were followed through 12 weeks postpartum. This study assessed mood up to 15 timepoints during pregnancy to measure the changes in mood during pregnancy and postpartum.</p>	<p>-Incidence cases of a score >14 EPDS with a lower score prior: 80% of these incidence cases occurred during pregnancy. 33% in the first trimester, 24% in second trimester, and 22% in third trimester.</p>		
<p>Yu et al., 2020.</p>	<p>Level III A</p>	<p>-longitudinal study, 1126 pregnant women around 13-weeks gestation</p>	<p>-To measure the trajectory and onset of depressive symptoms during early pregnancy and up to 6 weeks postpartum. -To assess the patient's relationship, demographic information, and psychological factors.</p>	<p>GAD-7 for anxiety and EPDS for depression -Screening took place at 7 different times during pregnancy and postpartum.</p>	<p>-508 women completed all 7 assessments. 61.5% of them experienced depressive symptoms at least 1 time during pregnancy and postpartum. -52.4% first experienced depressive symptoms during early pregnancy. -58.3% of the antenatal high trajectory and 54.8% of the postpartum high trajectory experienced their first depressive symptom in early pregnancy. -Antenatal high trajectory peaked during the second trimester.</p>	<p>-3 trajectories were identified. High antenatal, high postpartum, and low throughout. -Pregnant women should be screened and offered intervention in early pregnancy which may change a trajectory.</p>	<p>Limitations: -Response rate was low -No clinical diagnosis data -No data overtime Strengths: -Validated findings in other research like this study design.</p>

					<p>-Postpartum high trajectory peaked at 7 days postpartum.</p> <p>-Third trajectory was low throughout.</p>		
Gisseman et al., 2021	Level III A	-Retrospective cohort study, 4411 pregnant women	-To assess the rate and effectiveness of screening	<p>EPDS</p> <p>-First prenatal visit, 28-week visit, and 6-week postpartum visit.</p>	<p>-Screening rates: First prenatal visit 96%, 28-week visit 60%, and postpartum visit 84%.</p> <p>-88% of EPDS scores >12 was offered the appropriate treatment.</p>	-Standardization of screening recommendations are needed in an obstetric clinic to ensure screening rates are high.	<p>Limitations:</p> <p>-Follow up evaluations and diagnoses were not included within this research study which did not evidence of outcomes after screening</p> <p>-May not be able to generalize the study to multiple obstetric clinics since this study involves a specific population of women seeking care at a military hospital</p> <p>Strengths:</p> <p>-Standards of frequency and timing were included in this obstetric setting.</p> <p>-EPDS is a valid screening tool to measure.</p>
Miller et al., 2021	Level III A	-Cohort study, 7,028 pregnant women included: 3,227 prior to policy change and 3,801 after.	-To evaluate if perinatal collaborative care program increased screening and treatment for antenatal depression	<p>Unable to determine</p> <p>-1 screening during the prenatal period</p>	-Screening rates: Before program 33% and after program 81%	-Collaborative perinatal care is a feasible option within obstetric clinics. It helps increase the number of screened and treated pregnant women. It may also address a broad list of perinatal mental health concerns.	<p>Limitations:</p> <p>-Future research should use RCT methodology to evaluate the true impact of the collaborative care program</p> <p>-The state where this study took place mandated postpartum depression screening in 2008 which may impact awareness and screening rates.</p> <p>-Results did not include whether treatment was initiated or not.</p>

							<p>Strengths:</p> <ul style="list-style-type: none"> -Large and diverse population of women who included in the research -The study included a variety of obstetric providers which allows the evidence to be generalized to other obstetric clinics
Guo et al., 2021	Level III A	-Cross-sectional study, 5728 pregnant women	-To identify the prevalence and risk factors of antenatal depression at the first antenatal visit	<p>PHQ-9 and GAD-7</p> <p>-Screened at first antenatal visit- any trimester.</p>	<p>-Percentage of women in each trimester that participated: First trimester 73%, Second trimester 18%, and third trimester 9%.</p> <p>-Screening results: 16.3% of women had postpartum depression with the highest rates being in the first trimester 18.1%</p> <p>-There was a lower risk of antenatal depression in the second and third trimester when compared to the first trimester.</p>	<p>-1 in 6 pregnant women experience depressive symptoms.</p> <p>-Risk factors to consider for perinatal depression screening were: Early pregnancy, anxiety symptoms, somatic symptoms, and living in rural areas.</p>	<p>Limitations:</p> <ul style="list-style-type: none"> -cross-sectional study which did not allow relationship with variables to be studied -Psychosocial factors that may also impact depression during pregnancy were not fully included within the study -Further study should include a broader inclusion of psychosocial factors that may influence depressive symptoms during pregnancy and dynamically assess depression during different stages of pregnancy <p>Strengths:</p> <ul style="list-style-type: none"> -reliable results: Other studies have similar results
Lomonaco-Haycraft et al., 2018	Level V A	-Quality improvement, 750 pregnant women	-To evaluate the program's effectiveness	<p>EDPS</p> <p>-Women were screened during a first trimester visit, 28-week visit, and 6-week postpartum visit.</p>	<p>-Screening rates: Intake visits before program were 0% screened and after the program >75% screened</p> <p>-Intake 93% were screened 48/223 were positive: 21.52%</p> <p>-28-week visit 37% were screened 17/106 were positive: 16.04%</p>	<p>-Implementing a universal screening program for perinatal mental health disorders and Integrated behavioral health is feasible.</p>	<p>Limitations:</p> <ul style="list-style-type: none"> -Need to track more outcomes in the future to identify effectiveness -not identifying other factors that influence depression such as childhood trauma <p>Strengths:</p> <ul style="list-style-type: none"> -Collaboration with interdisciplinary groups to move the effort forwards.

					<p>-6-week postpartum 60% were screened 28/134 were positive: 20.89%</p> <p>-Screenings rates have increased with more time after the programs implementation</p>		<p>-Quantitative data is strong indication that women have a reduction in depressive symptoms after the implementation of the program</p>
Ellington, 2021	Level V B	-Quality improvement, 77 first trimester pregnant women	-To evaluate a QI project after initiating universal perinatal depression screening during pregnancy	EPDS -Intake obstetric visit	-Screening results: 24/77 women screened positive with an elevated EPDS score.	<p>-Educating and involving staff was essential to implementing the changes.</p> <p>-Screening increases patients' ability to have access to the mental health services they need.</p>	<p>Limitations: -Only evaluating one obstetric clinic</p> <p>Strengths: -EMR allowed an easier transition and helped prompt the screening for patients required</p>
Mestard et al., 2016	Level III A	-Retrospective cohort study, 245 pregnant women	-To identify what proportion of women screened positive once and twice during pregnancy.	EPDS -Screened at the first prenatal visit and the 26-week visit	<p>-Screening rates: Number of women screened once during pregnancy 84% and number of women screened twice during pregnancy 50%</p> <p>-27% of women screened positive for depression once during pregnancy</p> <p>-19% of women screened positive for depression twice during pregnancy</p> <p>-55 of the 56 women who screened positive received a referral to mental health services</p>	<p>-Universal perinatal depression screening during pregnancy allows more access to mental health resources as well as social services support.</p>	<p>Limitations: -Those who did not receive adequate screening were non-English speaking</p> <p>-EPDS does include an assessment of violence or neighborhood violence as a risk factor for depression</p> <p>-Social work training should continue to study perinatal depression to address these disparities</p> <p>-Patients who were only screened once usually enter prenatal care late</p> <p>Strengths: -Addressing a gap in the literature which includes integrative team approach to depression screening.</p>

Table 2

Summarized Results.

Frequency and the Personal System	<ul style="list-style-type: none">• Most optimal frequency at every visit during pregnancy.• Least optimal frequency is screening once during pregnancy.
Timing and the Interpersonal System	<ul style="list-style-type: none">• Most pregnant women screen highest during the first trimester or intake visit.• Pregnant women score the lowest for depression during the third trimester.• Women are more likely to have depression in the first trimester.
Feasibility and the Social System	<ul style="list-style-type: none">• A universal screening protocol screens a higher number of pregnant women for depression.• Universal screening increases the number of women who access mental health services.• Antepartum women are more likely to seek treatment compared to postpartum women.