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Depression Among Expectant and New Mothers: A Multi-Study Investigation of Rates, Correlates, and Training for Healthcare Providers

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**DEPRESSION AMONG EXPECTANT AND NEW MOTHERS:
A MULTI-STUDY INVESTIGATION OF RATES, CORRELATES, AND TRAINING
FOR HEALTHCARE PROVIDERS**

by

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ABSTRACT

DEPRESSION AMONG EXPECTANT AND NEW MOTHERS: A MULTI-STUDY INVESTIGATION OF RATES, CORRELATES, AND TRAINING FOR HEALTHCARE PROVIDERS

Molly M. Long
Old Dominion University, 2019
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Perinatal depression (PD) is a common concern among women. PD has been shown to have negative effects on the mother, child, and mother-child relationship. Screening for PD is inconsistent and low among healthcare providers. However, several governing organizations (e.g., The American College of Obstetricians and Gynecologists, The American Academy of Pediatrics) have provided guidelines for screening and treating PD, indicating the importance and utility of screening and treating PD by a variety of healthcare providers. Few studies, with low methodological rigor, have attempted to improve PD screening, treatment, and referral practices. Therefore, it is important to implement and assess additional interventions aimed at improving PD-related knowledge, attitudes, and skills.

The overarching purpose of this dissertation was to gain a better understanding of PD rates, correlates, and training for healthcare providers. Study one of this dissertation was a systematic review examining interventions aimed at improving screening and referral for PD for all disciplines of healthcare providers (e.g., students, pediatricians, nurses, obstetricians). Study two of this dissertation assessed PD screening and treatment practices of obstetrical health care providers in one clinic. Study three of this dissertation implemented and assessed an educational intervention for graduate nursing students pertaining to students' PD screening and treatment.

Study one determined that few heterogeneous interventions, with low methodological rigor, exist to improve screening and referral for PD. Most interventions were educational in nature and targeted a range of healthcare providers (e.g., obstetricians, pediatricians, medical students). Study two determined that screening for PD was highest at participants' 6-week follow up appointment, yet highest rates of clinically significant PD were noted at the intake appointment. Correlates of clinically elevated Edinburgh Postnatal Depression Scale scores at intake and 6-week follow-up appointments were history of depression, history of anxiety, and young age. Study three demonstrated positive gains in PD-related perceived behavioral control, attitudes, subjective norms, knowledge, intention to screen and treat PD, and perceived importance of screening and treating PD from pre- to post-educational intervention.

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CHAPTER I

INTRODUCTION

Background

Perinatal depression (PD) is common among pregnant women and new mothers. PD occurs in approximately 11.5% of perinatal women (Ko et al., 2017). However, this number is much higher (40-60%) among teenage and low-income mothers (Earls & Committee on Psychosocial Aspects of Child and Family Health, 2010). PD has been shown to have negative effects on the mother, child, and mother-child relationship, such as less affectionate touching toward the child (Ferber, Feldman, & Makhoul, 2008), negative, disengaged behavior towards the child (Lovejoy et al., 2000), and low birth weight in the child (Grote et al., 2010). In 2015, nearly 4 million births occurred in the United States (Martin et al., 2017), demonstrating a need for healthcare providers to properly screen and treat for PD.

Screening completion rates are inconsistent and low for PD among healthcare providers (Evans, Phillippi, & Gee, 2015), despite the need for identifying women at risk. An average of only 55% of healthcare professionals ever, sometimes, often, or always assess women for PD (Evans, Phillippi, & Gee, 2015). Many healthcare providers rely on clinical judgment rather than validated screening tools if they assess for PD at all (Connelly et al., 2007; Heneghan et al., 2007; Wiley et al., 2004). However, clinical judgment often does not provide accurate results (Heneghan et al., 2007). This may indicate a need for healthcare providers to use a validated screening tool to assess patients for PD.

Several governing organizations have provided guidelines for screening and treating PD. The American College of Obstetricians and Gynecologists (ACOG) recommends screening for depression and anxiety at least once during the perinatal period using a standardized, validated

tool (ACOG, 2015). Postpartum Support International (PSI) recommends PD screening using an evidence-based tool (PSI, n.d.). PSI also recommends screening for PD in the prenatal, postnatal, and pediatric settings. The American Academy of Pediatrics (AAP) recommends incorporating the Edinburgh Postnatal Depression Scale (EPDS) into the 1, 2, 4, and 6 month visits (Earls & Committee on Psychosocial Aspects of Child and Family Health, 2010). These guidelines by leading professional organizations indicate the importance of screening by a variety of healthcare professionals.

In an effort to understand PD screening and treatment practices, study one of this dissertation (Long et al., 2018) was a systematic review examining interventions aimed at improving screening and referral for PD for all disciplines of healthcare providers (e.g., students, pediatricians, nurses, obstetricians). Results from this study suggest that the most common type of intervention is educational in nature and aimed at improving the percentage of women screened, percentage of women referred for services, percentage of women screened positive for PD, and provider knowledge, attitudes, and/or skills concerning PD (Long et al., 2018). Study quality varied, but overall they lacked methodological rigor.

Study two of this dissertation aimed to assess PD screening and treatment practices of obstetrical health care providers in one clinic. More specifically, the frequency of screening for PD, rates of elevated Edinburgh Postnatal Depression Scale (EPDS) scores, treatment recommendations, and correlates of elevated EPDS scores were assessed. Results suggested that the highest screening completion rates occurred at the 6-week follow up appointment while the highest rates of clinically significant EPDS scores occurred at the intake/initial appointment. History of depression, history of anxiety, and young age were correlated with elevated EPDS scores at intake and 6-week follow up. These two studies indicate the need for a

methodologically sound educational intervention for healthcare providers to improve providers' PD knowledge of screening and treatment practices.

Study three of this dissertation aimed to implement and assess an educational intervention for graduate nursing students pertaining to students' PD screening and treatment. The study implemented an established online educational intervention for graduate nursing students enrolled at Old Dominion University. Participants were examined by survey pre- and post-intervention to assess the effectiveness of the program. The Theory of Planned Behavior (TPB) (Ajzen, 1985) was used to guide intervention material and assessment questions. The study assessed whether the TPB constructs predicted PD screening and treatment intention among graduate nursing students.

Nursing students were targeted as the participant population for several reasons. First, literature suggests that educational interventions for healthcare profession students have been well received (Tucker et al., 2004), rated as useful (Tucker et al., 2004), and effective in improving student comfort with addressing postpartum depression (Schillerstrom et al., 2013). Second, nursing is the largest of the healthcare professions, with almost 3 million nurses practicing in the United States, indicating their potential impact on patient care (Bureau of Labor Statistics, 2019). Third, the nursing profession has shifted to providing evidence-based care to patients (Stevens, 2013); as such, this proposal aims to improve PD-related evidence-based care. The current study aimed to aid nurses in incorporating evidence-based practice into their care of perinatal women.

The Problem

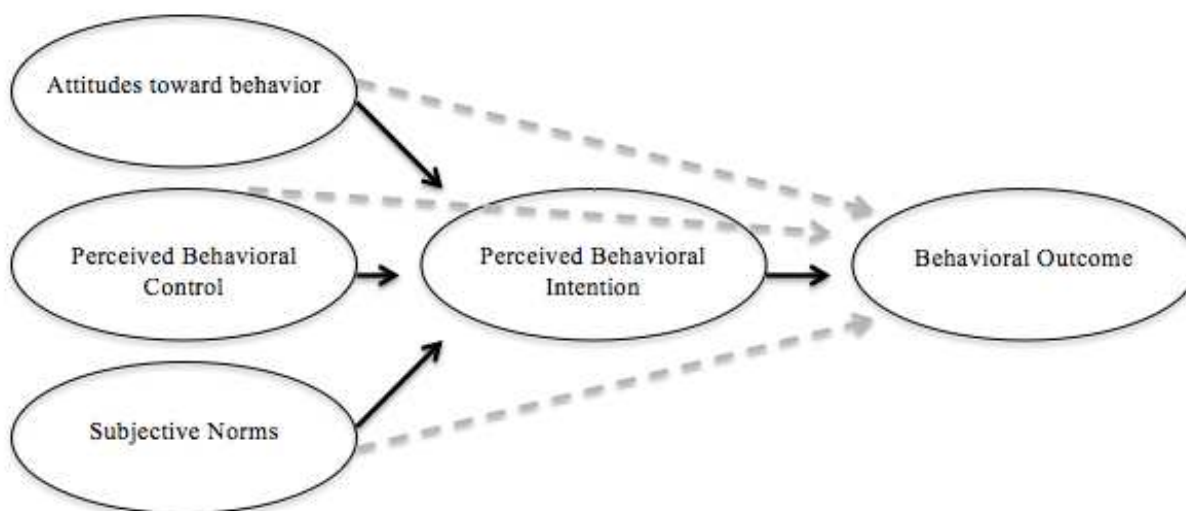
Although the high prevalence and negative impacts of PD are known, screening for PD is relatively low and inconsistent among healthcare professionals. Few studies, with low

methodological rigor, have attempted to improve PD screening, treatment, and referral practices. Utilizing a theoretical model, the current study implemented and assessed an online educational intervention for graduate nursing students to improve PD knowledge of screening and treatment practices.

Theory of Planned Behavior

The TPB (Ajzen, 1985) consists of three main constructs that are thought to directly predict perceived behavioral intention and indirectly predict behavioral outcomes. Figure I.1 shows the main components of the theory and their relation to other elements of the theory. Main components of the theory include: attitudes toward behavior, perceived behavioral control, subjective norms, perceived behavioral intention, and behavioral outcome. Attitude toward behavior relates to one's thoughts, positive or negative, toward a certain behavior. In the current study, attitudes toward behavior relates to the healthcare professionals' attitudes towards PD screening and treatment. Perceived behavioral control relates to one's self-efficacy to execute an action. In this case, perceived behavioral control is the healthcare professionals' perceived ability to screen and treat PD effectively. Subjective norms consist of normative beliefs about a particular topic. In the current study, subjective norms relate to professionals' normative beliefs about PD screening and treatment, such as their expectations from governing organizations and peers. Perceived behavioral intention is the level of intention one has to perform a particular behavior. In the current study, perceived behavioral intention is the participants' intention to screen and treat PD. Behavioral outcomes are the actual behaviors observed in providers. Behavioral outcomes were not assessed in the current study.

Figure I.1. Theory of Planned Behavior



Note: Author's schematic depiction of the Theory of Planned Behavior; Solid black lines represent direct pathways while gray dotted lines represent indirect pathways

Recent additions to the TPB include: background factors, behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 2017). Background factors include items such as, personality, mood, values, stereotypes, experiences, education, age, gender, income, religion, and media. Behavioral belief is the subjective probability that a behavior will produce a certain outcome (e.g., I believe screening patients will help identify those at risk for depression; Ajzen, 2006). Normative beliefs are perceived behavioral expectations of important groups or individuals (e.g., My colleague think it is important to screen for PD and anxiety). Control beliefs consist of the perceived presence of factors that facilitate or inhibit a behavior (e.g., I have the time to screen patients for PD and anxiety). Is it posited that background factors indirectly predict behavioral beliefs, normative beliefs, and control beliefs (Ajzen, 2017). Also, it is hypothesized that behavioral beliefs, normative beliefs, and control beliefs directly predict attitudes toward behavior, subjective norms, and perceived behavioral control, respectively (Ajzen, 2017). The

current study assessed the following constructs of the TPB: perceived behavioral control, attitudes, subjective norms, and perceived behavioral intention.

The TPB can be used in the design and implementation of an intervention and in the assessment measures. Ajzen (2006) suggests several guidelines for incorporating TPB constructs into an intervention. First, one must consider if there is much room for change in a target construct. If significant changes in the construct are needed or possible, an intervention designed to raise the noted construct is warranted. It is also suggested that constructs that hold a greater relative weight be targeted in an intervention. In other words, if a certain construct is more likely to influence intention and behavior than others, then that construct should be targeted. Interventions can also target belief strength, scale value or both. Targeting belief strength focuses on the change in level of a held belief. For example, the intervention may inform participants that a certain event is less likely to occur than one may expect. Targeting scale value focuses on the value of a certain outcome. For example, the intervention may inform participants that a certain event is not as undesirable as one may expect. Another method available for designing interventions is to change accessible beliefs or introduce new beliefs. Through the use of changing accessible beliefs, the researchers attempt to change existing beliefs. However, introducing information designed to lead to the creation of new beliefs is often easier. The current study utilized the noted guidelines to understand the established training in terms of TPB constructs.

Fishbein and Ajzen (2011) suggest several principles for the design of questionnaires based on the TPB constructs. First, the behavior of interest must be clearly defined, including target actions, context, and time elements. The population of interest must also be clearly defined. The use of a seven-point scale is preferred and items should be self-directed. Items

should address the strength of a behavioral belief and the evaluation outcome. When assessing normative beliefs, both injunctive and descriptive normative beliefs should be assessed.

Injunctive normative beliefs consist of one's motivation to comply with a referent individual or group. Descriptive normative beliefs consist of one's perception that a behavior is normal for peers. These principles were used in the creation of the assessment battery for the current study.

In the current study, the TPB constructs were directly targeted in the educational material and examined in the assessment questionnaires. Based on best practice recommendation by Ajzen (2006), in the educational material, perceived behavioral control was targeted in the following sections: interviewing skills, screening tools, and treatment options. Based on recommendation by Fishbein and Ajzen (2010), in the assessment questionnaires, perceived behavioral control was assessed through questions regarding confidence in ability to diagnose, screen, refer, and treat women with PD. In the educational material, attitudes were addressed in the referral checklist and referral resources sections. In the assessment questionnaire, attitudes were assessed through questions regarding the importance of recognizing PD and one's responsibility to screen and treat for PD. In the educational material, subjective norms were targeted in the guidelines for anxiety and depression screening and treatment during pregnancy section. In the assessment questionnaire, subjective norms questions assessed the level of importance to colleagues to screen and treat PD and the recommendations from governing organizations to screen and treat for PD. More details on the use of TPB constructs in the educational material and assessment questionnaires are discussed in the methods section of this study.

While the TPB has not been used to examine an educational intervention for PD to date, similar studies have demonstrated the usefulness of the TPB for other health care topics. A

systematic review by Durks and colleagues (2017) demonstrated the positive impact of the TPB for intervention mapping for a variety of health care topics. Five studies in the systematic review utilized the TPB to explain and predict intended changes in health care practices. One study used the TPB as a basis for an intervention for nurses in pediatric units to improve adherence to clinical guidelines for the use of needle filters (Cassista et al., 2014). Morgenstern and colleagues (2002) implemented a health program for emergency department staff to improve adherence to clinical guidelines for acute care and stroke. Rutten and colleagues (2014) implemented a health program for physical therapists to improve adherence to clinical guidelines, management of patient information, and low back pain. Sassen and colleagues (2011) developed a program for nurses and physiotherapists to improve the assessment of barriers to physical activity and patient follow up. Schmid and colleagues (2010) implemented a health program for providers involved in the prevention of stroke to improve the assessment and treatment of risk factors for stroke, educational support, and referral of patients. Collectively, this body of literature suggests that the TPB constructs may be useful in understanding change in healthcare providers' behavior, which parallels the aims of the current study.

Perhaps most relevant to this study, TPB constructs have also been examined in a program designed to assess screening for post-stroke depression (Hart & Morris, 2008). Participants included the following healthcare providers: psychologists, health care assistants, nurses, physiotherapists, occupational therapists, speech and language therapists, and physicians. Following interviews with 3 healthcare providers, themes were mapped onto the TPB constructs. Open and closed ended questions were developed and surveys were sent to additional healthcare providers. Results suggested that increased indirect perceived behavioral control and subjective norms positively predicted intention to screen for depression. Indirect perceived behavioral

control refers to the perception of the presence or absence of barriers and facilitator of screening for depression. While this study did not implement a healthcare program, it demonstrates the usefulness of the application of the TPB in understanding providers' intention to screen patients for depression.

Other studies have demonstrated the utility of TPB in explaining variation in nurses' intentions to provide care, such as smoking cessation advice (Puffer & Rashidian, 2004) and pain assessments (Nash, Edwards, & Nevauer, 1992). Increased attitudes and perceived behavioral control positively predicted nurses' intention to provide smoking cessation advise to patients (Puffer & Rashidian, 2004). Increased perceived behavioral control positively predicted nurses' intention to provide pain assessments to patients (Nash et al., 1992). Taken together, these studies suggest that the TPB may be useful in understanding healthcare providers' intention to screen or treat for PD. These studies were used as a guide for properly assessing the TPB constructs in graduate nursing students.

Purpose

There are several purposes of this dissertation, namely to gain a better understanding of PD screening and treatment practices, and to implement an educational intervention aimed at improving PD knowledge of screening and treatment in graduate nursing students. The first purpose was to summarize and describe the literature concerning implementation of an intervention for healthcare professionals to increase PD screening rates and, in instances of positive screens, behavioral health referrals and treatment. The second purpose was to assess PD screening and treatment practices and correlates of elevated PD scores at a local obstetric provider. The third purpose was to implement and assess an educational intervention for graduate nursing students to improve knowledge of PD screening and treatment.

Experimental Aims and Hypotheses

Aim 1. To evaluate the impact of an educational intervention on graduate nursing students pertaining to students' PD knowledge and attitudes

Hypothesis 1a. Graduate nursing students' knowledge of PD screening and treatment will improve from pre- to post-educational intervention.

Hypothesis 1b. Graduate nursing students' attitudes of PD screening and treatment will improve from pre- to post-educational intervention.

Aim 2. To assess intended PD screening and treatment practices before and after the educational intervention.

Hypothesis 2a. Intended PD screening and treatment practices will improve from pre- to post-educational intervention.

Hypothesis 2b. Perceived importance of PD screening and treating will improve from pre- to post-educational intervention.

Aim 3. To investigate whether pre-post changes in Theory of Planned Behavior constructs predict PD screening and treatment intention

Hypothesis 3a. Positive change scores in attitudes, perceived behavioral control, and subjective norms will significantly and positively predict intention to screen and treat PD.

Hypothesis 3b. Positive change scores in attitudes, perceived behavioral control, and subjective norms will significantly and positively predict perceived importance of screening and treating PD.

Operational Definitions

Graduate Nursing Student: In the current study, graduate nursing students refers to students enrolled at Old Dominion University in a graduate nursing program in the spring semester of 2018-2019.

Healthcare Professional: In the current studies, healthcare professional refers to anyone who may come in contact with a pregnant or postpartum mother in a healthcare setting. This includes, but is not limited to, midwives, obstetricians, physicians, nurses, nurse practitioners, and nursing students.

Perinatal Depression: Perinatal depression (PD) refers to any form of depression (e.g., major depressive disorder, dysthymia, minor depression), which occurs during pregnancy or up to 1 year postpartum (Gaynes et al., 2005).

Perinatal Depression Screening: PD screening refers to the use of a tool (e.g., questionnaire, survey) to assess perinatal women for depressive symptoms. Positive screens warrant further evaluation, discussion, and/or treatment (ACOG, 2015).

Perinatal Mood and Anxiety Disorders: Perinatal Mood and Anxiety Disorders (PMAD) is an overarching term for any mood or anxiety disorder diagnosed (Thiam & Weis, 2017) while pregnant and up to 1 year postpartum (Gaynes et al., 2005). PMAD is a broad category that includes, but is not limited to, postpartum depression (PPD), perinatal anxiety, and perinatal depression.

Assumptions

For Chapter II

1. Authors accurately reported the results of their research.
2. Authors thoroughly described the intervention process and methods.

3. The researcher found all relevant studies to review for the systematic review in the noted databases.

For Chapter III

1. Healthcare professionals were thorough and honest when reporting patients' care on medical records.
2. Obstetric patients were honest when reporting PD symptoms on screening tools.

For Chapter IV

1. Participants were attentive when engaging in the online training intervention.
2. Participants understood the content of the online training intervention.
3. Participants were honest and accurate when reporting information on all questionnaires.

Limitations

For Chapter II

1. Variation of authors' definitions of PMAD.
2. Heterogeneity of outcome variables between studies.
3. Assessment of only 4 databases to discover articles for the systematic review.

For Chapter III

1. Inclusion of only 1 obstetric office for review.
2. Variation of healthcare professionals' cut scores for the Edinburgh Postnatal Depression Scale (EPDS) screening tool.
3. Lack of confirmation of diagnosis of major depressive disorder with peripartum onset with positive screens.

For Chapter IV

1. Lack of generalizability due to the study only consisting of participants in a graduate nursing program at Old Dominion University.
2. Participant self-report on all study questionnaires.
3. Partial evaluation of the Theory of Planned Behavior constructs.

Delimitations

For Chapter II

1. Articles included in PubMed/Medline, PsychInfo/PsychArticles, and Cumulative Index to Nursing, Allied Health Literature (CINAHL), and Health Source: Nursing/Academic Edition databases.

For Chapter III

1. Participants were patients at Tidewater Physicians for Women between 2015 and 2017.
2. Participants delivered a baby between December 1, 2015 and May 31, 2017 in Eastern Virginia.

For Chapter IV

1. Participants were graduate nursing students at Old Dominion University.

CHAPTER II

LITERATURE SUMMARY

ARTICLE ONE

A SYSTEMATIC REVIEW OF INTERVENTIONS FOR HEALTHCARE

PROFESSIONALS TO IMPROVE SCREENING AND REFERRAL FOR PERINATAL MOOD AND ANXIETY DISORDERS (Long et al., 2018)

Abstract

Purpose: Postpartum depression affects approximately 11% of women. However, screening for Perinatal Mood and Anxiety Disorders (PMAD) is rare and inconsistent among healthcare professionals. When healthcare professionals screen, they often rely on clinical judgment, rather than validated screening tools. The objective of the current study is to review the types and effectiveness of interventions for healthcare professionals that have been used to increase the number of women screened and referred for PMAD. Methods: Preferred Reporting Items for Systematic Reviews and Meta-Analyses was utilized to guide search and reporting strategies. PubMed/Medline, PsychInfo/PsychArticles, and Cumulative Index to Nursing, Allied Health Literature (CINAHL), and Health Source: Nursing/Academic Edition databases were used to find studies that implemented an intervention for healthcare professionals to increase screening and referral for PMAD. Twenty-five studies were included in the review. Based on prior quality assessment tools, the quality of each article was assessed using an assessment tool created by the authors. Results: The four main outcome variables were: percentage of women screened, percentage of women referred for services, percentage of women screened positive for PMAD, and provider knowledge, attitudes, and/or skills concerning PMAD. The most common intervention type was educational, with others including changes in electronic medical records

and standardized patients for training. Study quality and target audience varied among the studies. Interventions demonstrated moderate positive impacts on screening completion rates, referral rates for PMAD, and patient-provider communication. Studies suggested positive receptivity to screening protocols by mothers and providers. Conclusion: Given the prevalence and negative impacts of PMAD on mothers and children, further interventions to improve screening and referral are needed.

Introduction

Perinatal Mood and Anxiety Disorders (PMAD) is an overarching term for any mood or anxiety disorder diagnosed (Thiam & Weis, 2017) while pregnant or up to 1 year postpartum (Gaynes et al., 2005). PMAD is a broad category that includes, but is not limited to, postpartum depression (PPD), perinatal depression, and postpartum anxiety. PMAD encompasses diagnosed psychopathology (e.g. Major Depressive Disorder) and other dimensions of psychological distress. Symptoms include crying more often than usual, feelings of anger, withdrawing from loved ones, feeling numb or disconnected from the baby, feeling guilt about not being a good mom, loss of energy, irritability, and hopelessness (Centers for Disease Control and Prevention 2017). While the terminology PPD has historically been used to discuss maternal mental health concerns, the current review uses the term PMAD to reflect contemporary literature. However, PPD is still used if there is an obvious distinction between PPD and PMAD in the context of a study. Within a diagnostic framework, PPD is diagnosed as a Major Depressive Disorder with peripartum onset, which is the most recent episode occurring during pregnancy or in the four weeks following delivery (American Psychiatric Association 2013). PPD affects approximately 11% of women (CDC 2017). Moreover, some reports have estimated the prevalence of PPD to

be as high as 40-60% among low income and teenage mothers (Earls, Committee on Psychosocial Aspects of Child and Family Health, 2010).

What do we know about PMAD?

PMAD has been shown to have negative effects on the mother, child, and the mother-child relationship. For instance, Lovejoy and colleagues (2000) reported that mothers with PPD exhibited more negative and disengaged behavior towards their children compared to their non-depressed counterparts. Also, mothers with PPD touch their infants less and in a less affectionate manner than non-depressed mothers (Ferber et al., 2008). Infants of depressed mothers are less likely to be securely attached (Martins & Gaffan, 2000). Depressed mothers are less likely to put their infant to sleep in the back position, have a lower likelihood of ever breastfeeding, and more likely to put the child to bed with a bottle (Paulson et al., 2006). A meta-analysis by Goodman and colleagues (2011) indicated that maternal depression was related to children's higher levels of internalizing, externalizing, and general psychopathology in small magnitude. Likewise, maternal depression was related to negative affect and behavior and lower levels of positive affect and behavior in children (Goodman et al., 2011).

There are several known risk factors exacerbating susceptibility to PMAD. Risk factors for developing PMAD include a history of depression or anxiety (Gaillard et al., 2014), low marital satisfaction (Escriba-Aguir & Artazcoz, 2011), domestic violence (Ahmed et al., 2012), lack of social support (Eastwood et al., 2012), and isolation (Eastwood et al., 2012). In addition, positive depression screens have been associated with later increased rates of suicidal ideation (Bodnar-Deren et al., 2016), indicating a need to screen and refer perinatal women for further evaluation and treatment.

Screening and referral for treatment for those with PMAD

The American College of Obstetricians and Gynecologists (ACOG) recommends screening for depression and anxiety symptoms at least once during the perinatal period using a standardized, validated tool (ACOG 2015). The American Academy of Pediatrics (AAP) recommends incorporating the Edinburgh Postnatal Scale into the 1, 2, 4, and 6 month visits (Earls and Committee on Psychosocial Aspects of Child and Family Health 2010). The AAP also endorses using a cut score of 10 on the EPDS as an indicator of risk that depression is present (Earls and Committee on Psychosocial Aspects of Child and Family Health 2010). These guidelines by leading professional organizations indicate the importance of screening by a variety of healthcare professionals.

Screening rates for PMAD are inconsistent and low among healthcare professionals in the United States (Evans et al., 2015). A systematic review by Evans and colleagues (2015) demonstrated that among 7 studies, an average of only 55% of healthcare professionals ever, sometimes, often, or always assess for PPD. When healthcare professionals do assess women for PMAD, the most common method of assessment is clinical judgment. Pediatricians are most likely to use clinical assessment (80%), as opposed to a validated screening tool (Connelly et al., 2007; Heneghan et al., 2007; Wiley et al., 2004). However, Heneghan and colleagues (2000) have shown pediatricians demonstrate poor accuracy in recognizing elevated levels of depressive symptoms without a validated screening tool during the postpartum period (e.g., sensitivity = 29%, specificity = 81%). Moreover, sixty percent of OB/GYNs rely on clinical assessment (Chadha-Hooks et al., 2010; Leddy et al., 2011). This finding echoes a larger general trend in documented limitations in the accuracy of health professionals' clinical judgment when assessing mental health concerns (e.g., Lopez et al., 2017; Neal & Brodsky, 2016). Screening for PMAD is generally recognized as a way to improve depression outcomes (Georgiopoulos et al., 2001).

When obstetricians recognize a woman's PMAD, referral and treatment rates are fairly high during the prenatal period (80%) and postpartum period (93.7%) (Goodman and Tyer-Viola, 2010). However, when women screen positive for PMAD but the obstetrician is unaware of the positive screen, referral and treatment rates are low during the prenatal period (33%) and postpartum period (27.5%). The noted results indicate a need for systematic approach to screening for PMAD and use of results to increase treatment and referral rates for women suffering from PMAD. A review of the sensitivity and specificity of the Edinburgh Postnatal Depression Scale (EPDS), a commonly used perinatal depression screening tool, demonstrated that sensitivity of the scales ranges from 65%-100% while specificity ranges from 49% to 100% during the postpartum period (Eberhard-Gran et al., 2001). The EPDS has adequate reliability with a Cronbach's alpha of 0.87 (Cox et al., 1987). Due to providers' inconsistency in clinical judgment, as well as strong psychometric properties of the EPDS, screening tools should be used to adequately assess PMAD.

The Present Review

A lack of screening and referral for treatment of PMAD demonstrates a need to assess interventions for healthcare professionals to increase screening and, therefore, referral rates for behavioral health treatment for women with PMAD. Likewise, The Centers for Disease Control and Prevention considers PMAD a common and serious illness in the United States (CDC 2017). The current review aims to (1) summarize and describe the literature concerning implementation of an intervention for healthcare professionals (e.g., pediatricians, obstetricians, nurses) to increase PMAD screening rates and, in instances of positive screens, behavioral health referrals and (2) review the effectiveness of the noted interventions. To our knowledge, there have been no systematic reviews investigating such interventions for healthcare professionals.

Methods

Search Strategy

Articles included in the current review were identified through searches of the following databases: PubMed, Medline, PsychInfo, PsychArticles, CINAHL, and Health Source: Nursing/Academic Edition. Additional relevant articles were found through article introduction or reference sections. Each database was searched from 1994 to 2017 because the postpartum specifier was introduced in 1994 in the DSM-IV (Segre & Davis, 2013).

Selection Criteria

Articles were included if they were performed in the United States, in English, peer-reviewed, used human subjects and described original data. Intervention search terms were not included as to capture the broad scope of interventions. Search terms are shown in Table II.1. Articles were included if they screened or referred women for PMAD during pregnancy or up to 1 year postpartum. Studies were also included with any medical provider as the target audience of the intervention (e.g., nurse, nurse practitioner, obstetrician, family physician). See Table II.3 for a full list of target audiences of the interventions. Case studies and non-peer reviewed articles were excluded to ensure rigor. Studies performed outside of the United States were excluded.

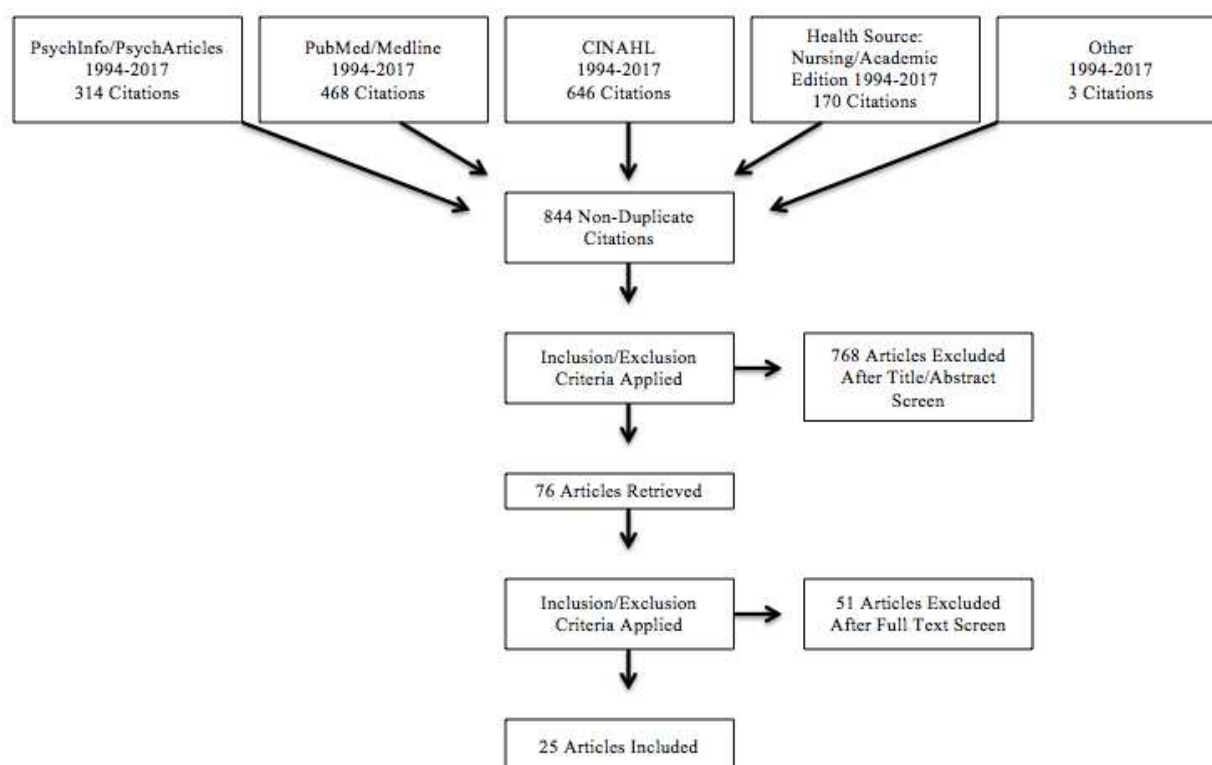
Table II.1. List of Search Terms

Topic	Keyword
Perinatal Disorder	postpartum depression* OR postpartum anxiety* OR perinatal mood anxiety disorder* OR peripartum depression* OR peripartum anxiety*
Healthcare Provider	physician* OR nurse* OR obstetrician* OR gynecologist* OR pediatrician* OR medical* OR healthcare professional*

Study Selection

PRISMA was utilized to guide search and reporting strategies of the current review (Moher et al., 2009). The flow chart of study selection resulting in the 25 articles is shown in Figure II.1.

Figure II.1. Flow Chart of Study Selection



Assessment of Perinatal Mood and Anxiety Disorders

PMAD was defined as any form of depression or anxiety during pregnancy or up to 1 year postpartum (Gaynes et al., 2005). Others have defined the onset of postpartum timeframe as short as 4 weeks postpartum (American Psychiatric Association 2013), but the current review takes a more conventional approach to the onset timeframe in order to provide a more

comprehensive review. PMAD ranged from symptom report instruments to clinical diagnosis. Any diagnostic version of perinatal mood and anxiety disorders was included (e.g., PPD, postpartum anxiety, peripartum depression).

Assessment of Intervention

An intervention was defined as any tool or method aimed at increasing provider screening rates, treatment and referral rates, knowledge of PMAD, or confidence in assessing and referring for PMAD. Interventions included, but were not limited to, educational interventions (e.g., presentation, conference), systematic changes in electronic medical records, and use of a standardized patient training exercise.

Assessment of Outcome

Outcomes included any variable addressing screening rates, treatment and referral rates, rates of positive PMAD screeners, and provider PMAD assessment-related knowledge, attitudes, and skills.

Quality Assessment

Based on prior assessment tools of quality (Downs & Black, 1998; Effective Public Health Practice Project, 1998), the quality of each article was assessed using a 26-question assessment tool created by the authors. The assessment tool is shown in Appendix A. Items are separated into three sections: introduction, methods, and results. A point system was used to assess the quality of each article. High scores indicate a higher quality study and possible scores range from 1 to 32. To ensure the reliability of ratings, the quality assessment tool was used by two authors (Jenkins and Long) to assess each of the final 25 selected articles. The two coders began by assessing 5 articles independently. Intraclass correlations were then conducted and any items with coefficients under .70 were revised for clarity in definition. Jenkins and Long then

completed the same process in three successive iterations to ensure the intraclass coefficients were above .70 (i.e., above acceptable inter-rater agreement values; Bakeman & Gottman 1997, Koo and Li, 2016). After each iteration of coding, the coders communicated regarding differences in results and clarified any discrepancies. By the last iteration of coding, all intraclass coefficients achieved .70 or above.

Results

Quality Assessment Summary

The results of the quality assessment tool are shown in Table II.2. Most studies provided comprehensive and clear information regarding the intervention for healthcare providers to improve PMAD screening and referral.

Table II.2. Quality Assessment Summary

		Yes (%)	No (%)			
Introduction						
1.	Is the hypothesis/aim/objective clearly stated?	24 (96%)	1 (4%)			
2.	Did the authors give appropriate rationale for the study?	24 (96%)	1 (4%)			
Methods						
3.	Is this study qualitative, quantitative, or mixed methods design?	Mixed Methods 10 (40%)	Quantitative 13 (52%)	Qualitative 1 (4%)	Cannot Tell, N/A 1 (4%)	
		Controlled Clinical Trial (placebo vs. intervention)	Cohort Analytic (two groups pre and post)	Cohort (one group pre and post)	Cohort (one group post test only)	Other/ Cannot tell
4.	Indicate the study design:	1 (4%)	1 (4%)	8 (32%)	14 (56%)	1 (4%)
		Yes (w/ numbers and alphas)	Yes, Text Only	No/Not applicable		
5.	Were data collection tools shown to be valid?	0 (0%)	9 (36%)	16 (64%)		
6.	Were data collection tools shown to be reliable?	4 (16%)	1 (4%)	20 (80%)		
		Yes (%)	No (%)			
7.	Did they address sample size/statistical power concerns?	5 (20%)	20 (80%)			
8.	Is the intervention clearly stated?	24 (96%)	1 (4%)			
9.	Is the intervention education based?	21 (84%)	4 (16%)			
10.	Is the intervention electronic medical records (EMR) based?	2 (8%)	23 (92%)			
11.	Is the intervention a combination of education and EMR?	1 (4%)	24 (96%)			
12.	Did authors examine a standardized patient?	2 (8%)	23 (92%)			
13.	Is the target population clearly described?	21 (84%)	4 (16%)			
14.	Did the authors target a singular population?	12 (48%)	13 (52%)			
15.	Did the authors target multiple populations?	13 (52%)	12 (48%)			

Table II.2. Quality Assessment Summary (continued)

	Yes (%)	No (%)
16. Did the authors clearly state cutoff points for measure of referral for PMAD?	16 (64%)	9 (36%)
Results		
17. Is the outcome variable percentage screened?	14 (56%)	11 (44%)
18. Is the outcome variable percentage referred?	10 (40%)	15 (60%)
19. Is the outcome variable percentage screened positive?	17 (68%)	8 (32%)
20. Is the outcome variable knowledge/attitudes/skills?	10 (40%)	15 (60%)
21. Is the outcome variable something other than listed above?	19 (76%)	6 (24%)
22. Are the demographics clearly described?	11 (44%)	14 (56%)
23. Did authors directly address hypotheses/aims?	23 (92%)	2 (8%)
Discussion		
24. Do the authors make appropriate conclusions based on results?	24 (96%)	1 (4%)
25. Do the authors discuss study limitations or potential bias?	17 (68%)	8 (32%)
26. Do the authors discuss interpretation or application of results?	21 (84%)	4 (16%)

Note. EMR= Electronic Medical Records.

Study Characteristics

Characteristics of the 25 selected studies are shown in Table II.3. Quality assessment total scores ranged from 6 to 23 among the 25 selected studies, indicating a broad scope of article quality in the literature regarding interventions for healthcare professionals to improve screening, treatment, and referral practices for PMAD.

PMAD Measurement Tool. The majority of studies (N=14, 56%) used the EPDS (Cox et al., 1987), to measure PMAD symptoms. Other PMAD measurement tools include the PHQ-2 (N=2, 8%) (Kroenke et al., 2003), PHQ-9 (N=3, 12%) (Kroenke et al., 2001), and the Structured Clinical Interview for the DSM (SCID; N=1, 4%) (First 1997). One study used a 2-question screen endorsed by the US Preventive Services Task Force (Olson et al., 2005). One study used the National Institute for Health and Clinical Excellence (NICE) 2-question screen. One study used the PPDS.

Intervention Type. All studies implemented an intervention to improve screening, treatment, or referral rates for PMAD. The majority of the studies (N=21, 84%) implemented an educational intervention. Two (8%) studies implemented a change in electronic medical records (EMRs) as the intervention. Two (8%) studies implemented a training program involving a standardized patient exercise. Two (8%) studies began using an established screening protocol with research nurses. One (4%) study sent out reminders of screening protocol to providers via email, meetings, and in-services as the intervention.

Intervention Target Audience. The target audience for the intervention was heterogeneous across studies. Seven (28%) interventions targeted providers in the obstetric field. Five (20%) interventions targeted providers in the pediatric field. Two studies (8%) were aimed at healthcare providers in both the obstetric and pediatric fields. Three (12%) interventions were

aimed at primary care or family practice healthcare professionals. Two (8%) were aimed at intervening with medical students while 1 (4%) was developed for research nurses. Two (8%) were targeted at all levels of professionals in the healthcare field while 1 (4%) was aimed at maternity unit health professionals. One (4%) intervention was aimed at nurses and healthcare providers in an adolescent maternity program and 1 (4%) was aimed at paraprofessionals and nurses.

Outcome Variable(s). Four key outcome variables, and a total of 63, were present among the 25 selected studies along with other study specific outcomes. The four main outcome variables were: percentage of women screened for PMAD (N=13, 20.63%), percentage of women referred for services (N=9, 14.29%), percentage of women screened positive for PMAD (N=16, 25.40%), and provider knowledge, attitudes, and/or skills (e.g., PMAD screening priority, PMAD screening burden level, knowledge of PMAD support groups and resources) (N=10, 15.87%). Other outcome variables presented were: staff and provider feedback of screening program (N=2, 3.17%), participant mental health service use (N=1, 1.59%), mother and healthcare provider satisfaction with program assistance and mental health advisors (N=1, 1.59%), staff and provider familiarity of screening program (N=1, 1.59%), detection of PMAD (N=2, 3.17%), qualitative data regarding acceptability of the screening approach to mothers and healthcare providers (N=1, 1.59%), risk factors for developing PMAD (N=2, 3.17%), comfort level with PPD and postpartum self-care (N=1, 1.59%), frequency of use of a web-based education tool for PMAD statistics (N=1, 1.59%), registered users of the education for PMAD tool (N=1, 1.59%), education tool user rating of modules (N=1, 1.59%), average EPDS score (N=1, 1.59%), depression diagnosis after a positive screen (N=1, 1.59%), type of treatment (N=2, 3.17%), and accuracy of EPDS scoring (N=1, 1.59%).

Overview of Intervention Impact.

The three main intervention types (i.e., education, EMR, standardized patient exercises) were reviewed for their impact on outcome variables. Twenty of the 25 articles included in the current review evaluated relative impact on some type of outcome. Studies that implemented an educational intervention reported screening completion rates ranging from 39% to 100% (Avalos et al., 2016; Chaudron et al., 2004; Gordon et al., 2006; Lind et al., 2017; Olson et al., 2005; Schaar & Hall, 2013; Segre et al., 2004; Yawn et al., 2012). Similarly, studies that implemented an educational intervention reported positive screening rates, indicating a potential depressive disorder range from 4.4% to 29.5% (Avalos et al., 2016; Baker-Ericzen et al., 2008; Chaudron et al., 2004; Gordon et al., 2006; Lind et al., 2017; Mancini et al., 2007; Olson et al., 2005; Schaar & Hall, 2013; Segre et al., 2004; Smith & Kipnis, 2012). Women who received referral or treatment from their healthcare provider ranged from 62% to 100% (Baker-Ericzen et al., 2008; Gordon et al., 2006; Olson et al., 2005). Of the 9 pre-post design studies (Avalos et al., 2016; Baker-Ericzen et al., 2008; Bauer et al., 2009; Chaudron et al., 2004; Olson et al., 2005; Schaar & Hall, 2013; Schillerstrom et al., 2013; Smith & Kipnis, 2012; Yonkers et al., 2009), detection of depression and referral for treatment increased from pre to post educational program. Thirteen studies used post intervention examination only (Feinberg et al., 2006; Gordon et al., 2006; Horowitz et al., 2011; Mancini et al., 2007; Osborn et al., 2012; Rowan et al., 2012; Segre et al., 2014; Sheeder et al., 2009; Talmi et al., 2009; Thomason et al., 2010; Tucker et al., 2004; Venkatesh et al., 2016; Wisner et al., 2008). There was positive receptivity to the screening protocol by both mothers (Olson et al., 2005) and providers (Baker-Ericzen et al., 2008; Feinberg et al., 2006; Schaar & Hall, 2013).

Of the 2 studies that implemented a change in EMR as the intervention, results indicated that providers administered the EPDS 98% of the time and referred mothers with positive screens 100% of the time (Sheeder et al., 2009). Results also indicated that screening for PMAD was not burdensome and opened up new opportunities for discussion between patient and provider (Feinberg et al., 2006). Overall, of the two studies that implemented changes in EMR as the intervention, results indicate positive changes in patient-provider communication. Of the 2 studies that implemented a standardized patient exercise the percent of women screened for PMAD ranged from 39% to 100% (Baker-Ericzen et al., 2008). Also, students found the standardized patient session to be useful, it held their interest, and rated it as excellent or near excellent (Tucker et al., 2004). Overall, studies that implemented a standardized patient exercise as the intervention, results indicated positive receptivity to the exercise. Intervention findings need to be viewed with caution in light of the majority (e.g., Feinberg et al., 2006; Gordon et al., 2006; Segre et al., 2004; Tucker et al., 2004) only conducting post-intervention assessment (i.e., limited rigor), and that some outcomes still varied widely in terms of positive outcomes (e.g., rate of screening completion post-educational intervention).

Table II.3. General Characteristics of Selected Studies

Study	Quality Assessment Score	PMAD Measurement Tool	Design	Intervention Type	Intervention Target Audience	Outcome Variable(s)
Baker-Ericzen et al., (2008)	23	EPDS	1 Group, Pre and Post Test	Education	OB/GYN healthcare providers; Pediatric healthcare providers	Percentage of women screened Percentage of women referred for services Percentage of women screened positive for PMAD KAS Mental health service use Satisfaction with program assistance and mental health advisor Staff & provider familiarity and feedback of screening program
Bauer et al., (2009)	17	EPDS	1 Group, Pre and Post Test	Education, case-based didactic lectures, 11 hours	Pediatric Residents	KAS Percentage of women screened at 6 week visit
Chaudron et al., (2004)	23	EPDS	2 Groups, Pre and Post Test	Education	Pediatricians; pediatric nurse practitioners	Percentage of women screened Percentage of women referred for services Percentage of women screened positive for PMAD Detection of PMAD
Gordon et al., (2006)	20	EPDS	1 Group, Post Test Only	Education	Obstetric healthcare providers	Percentage of women screened Percentage of women referred for services Percentage of women screened positive for PMAD

Table II.3. General Characteristics of Selected Studies (continued)

Study	Quality Assessment Score	PMAD Measurement Tool	Design	Intervention Type	Intervention Target Audience	Outcome Variable(s)
Lind et al., (2017)	17	EPDS	1 group, Post Test Only	Education	Obstetric providers Pediatric providers	Percentage of women screened Percentage of women screened positive for PMAD Type of treatment Accuracy of EPDS scoring
Rowan et al., (2012)	15	EPDS	1 Group, Post Test Only	Reminders of protocol via email, meetings, in-services	Obstetric staff	Percentage of women referred for services Percentage of women screened positive for PMAD
Schaar & Hall (2013)	17	EPDS	1 Group, Pre and Post Test	Education, Standardized Patient Education	Obstetric/gynecology providers and staff	KAS
Segre et al., (2014)	21	EPDS	1 Group, Post Test Only	Education	Maternity unit nurses	Percentage of women screened Percentage of women screened positive for PMAD KAS
Sheeder et al., (2009)	21	EPDS	1 Group, Post Test Only	EMR	Providers in an adolescent-oriented maternity program; nurses	Percentage of women screened Percentage of women referred for services Percentage of women screened positive for PMAD
Smith & Kipnis (2012)	19	EPDS	1 Group, Pre and Post Test	Education	Healthcare providers of all levels	Percentage of women screened Percentage of women screened positive for PMAD KAS

Table II.3. General Characteristics of Selected Studies (continued)

Study	Quality Assessment Score	PMAD Measurement Tool	Design	Intervention Type	Intervention Target Audience	Outcome Variable(s)
Talmi et al., (2009)	14	EPDS	1 group, Post Test Only	Education	Pediatric primary care providers, pediatric residents	Average EPDS scores Percentage of women screened positive for PMAD
Venkatesh et al., (2016)	18	EPDS	1 group, Post Test Only	Implementation of a screening protocol	Obstetric providers	Percentage of women screened Percentage of women screened positive for PMAD Diagnoses after further evaluation Type of treatment
Yawn et al., (2012)	21	EPDS, PHQ-9	Controlled Clinical Trial, Placebo vs. Intervention	Education	Physicians and nurses at family medicine practices	Percentage of women screened Percentage of women referred for services Percentage of women screened positive for PMAD
Avalos et al., (2016)	19	PHQ-9	1 Group, Pre and Post Test	Education, distribution of regional materials about screening and treatment	Obstetricians, nurse practitioners, certified nurse-midwives	Percentage of women screened Percentage of women screened positive for PMAD Identification of depression

Table II.3. General Characteristics of Selected Studies (continued)

Study	Quality Assessment Score	PMAD Measurement Tool	Design	Intervention Type	Intervention Target Audience	Outcome Variable(s)
Yonkers et al., (2009)	19	BHQ	1 Group, Pre and Post Test	Education	Obstetric provider	Percentage of women screened Percentage of women referred for services Percentage of women screened positive for PMAD
Horowitz et al., (2011)	16	EPDS, SCID for DSM-IV	1 Group, Post Test Only	Implementation of established screening framework	Research nurses	Percentage of women screened positive for PMAD Risk factors for PPD
Olson et al., (2005)	21	PHQ-2, 2 question screen endorsed by The US Preventive Services Task Force	1 Group, Pre and Post Test	Education	Pediatricians	Percentage of women screened Percentage of women referred for services Percentage of women screened positive for PMAD Pediatric feedback on process of screening
Feinberg et al., (2006)	14	PHQ-2, PHQ-9	1 Group, Post Test Only	Education, EMR	Pediatricians; nurses	KAS Acceptability of the screening approach

Table II.3. General Characteristics of Selected Studies (continued)

Study	Quality Assessment Score	PMAD Measurement Tool	Design	Intervention Type	Intervention Target Audience	Outcome Variable(s)
Osborn et al., (2012)	15	National Institute for Health and Clinical Excellence (NICE) 2 question screen	1 group, Post Test Only	Education, 1 day training then mentoring program	Community health nurses, health visitors	KAS
Mancini et al., (2007)	20	PDSS	1 group, Post Test Only	Education	Obstetricians, certified nurse-midwives, medical assistants	Percentage of women screened positive for PMAD Predictors of depressive symptoms KAS
Baker et al., (2009)	6		Other/Cannot Tell	Education	Primary care providers	
Tucker et al., (2004)	15		1 Group, Post Test Only	Education, Standardized Patient	Medical students; faculty facilitators	KAS
Thomason et al., (2010)	17		1 Group, Post Test Only	Education	Nurses & paraprofessionals; social workers; early childhood teachers/teachers assistants	KAS

Table II.3. General Characteristics of Selected Studies (continued)

Study	Quality Assess ment Score	PMAD Measure ment Tool	Design	Interventio n Type	Intervention Target Audience	Outcome Variable(s)
Schillerstrom et al., (2013)	22		1 Group, Pre and Post Test	Education	Medical students	Comfort level with PPD and postpartum self- care discussions
Wisner et al., (2008)	13		1 Group, Post Test Only	Education	Healthcare providers of all levels	Web-based education tool statistics Registered users of the education tool Education tool user rating of modules

Note. Articles sorted by PMAD measurement tool. KAS=knowledge, attitude, skills; EPDS=Edinburgh Postnatal Depression Scale;

PHQ=Patient Health Questionnaire; BHQ=Brief Health Questionnaire; PDSS=Postpartum Depression Screening Scale.

Discussion

The aim of the current study was to summarize and describe studies that implemented an intervention for healthcare professionals to increase screening and referral rates for PMAD. The 25 selected studies demonstrated heterogeneous interventions to improve screening and referral for PMADs. While most interventions included an education piece, other interventions focused on changes in EMRs, standardized patients, established protocol with a research nurse, or healthcare provider reminders of the screening protocol. Educational intervention type also varied widely, including conferences, 45-minute meetings, educational website development, and seminars, among others. Educational material in the interventions included symptoms of PMAD, detection tools, treatment options, crisis situations, and impact of PMAD on mothers and children. There were also a variety of target audiences of the intervention including: obstetrician and pediatric healthcare professionals, primary care healthcare professionals, medical students, research nurses, maternity unit healthcare professionals, and paraprofessionals.

The PMAD measurement tool most often used was the EPDS. The four main outcome variables utilized in the 25 selected studies were: percentage of women screened, percentage of women referred for services, percentage of women screened positive for PMAD, and knowledge, attitudes, and/or skills. The quality of the articles varied widely from very high quality (e.g., Baker-Ericzen et al., 2008; Chaudron et al., 2004) to lower quality (e.g., Baker et al., 2009) based on our quality assessment tool. Several studies did not address the validity of the PMAD measurement tools used. It is important to address validity of measurement tools to reduce bias (Marshall et al., 2000).

One key methodological weakness of the current literature is the lack of pre-post intervention assessments. Fourteen of the 25 reviewed articles implemented no assessment or

post-intervention assessment only. Intervention findings need to be viewed with caution in light of the methodological weaknesses. The 3 main intervention types (i.e., education, change in EMR, standardized patient exercise) were evaluated for the intervention impact. Results from studies that implemented an educational intervention indicated modest positive effects on screening completion rates, referral rates, and receptivity to screening protocol by mothers and healthcare providers. Results from studies that implemented a change in EMRs indicated improvement in patient-provider communication. Results from studies that implemented a standardized patient indicate positive receptivity to the training tool. Overall, results suggest that screening is feasible and may have positive effects on screening completion rates, referral for treatment for PMAD, and improved patient-provider communication. Of course, such positive gains are tempered by the very small total number of studies (e.g., only 2 addressing EMR), and limited pre-post or randomized designs.

Current studies suggest PMAD is a substantial issue for expecting and new mothers. However, literature also suggests screening and referral rates are low for PMAD (Evans et al., 2015; Goodman and Tyer-Viola, 2010; Horowitz & Cousins, 2006) and the current review demonstrates a need for an effective and widely used intervention to improve PMAD screening and referral rates, as well as subsequent patient-oriented health outcomes. With only 25 articles aimed at interventions for healthcare professionals to increase screening and referral rates for PMAD, more studies are needed to assess the usefulness and feasibility of these types of interventions and others.

Limitations

There are three main limitations to the current review. First, PMAD definitions and assessment varied across studies. Some studies measured PMAD with self-report questionnaires

(e.g., Baker-Ericzen et al., 2008; Rowan et al., 2012) while others did not measure PMAD at all (e.g., Thomason et al., 2010; Tucker et al., 2004). Others used the PHQ-2 or PHQ-9 (e.g., Olson et al., 2005; Yawn et al., 2012) or clinical interview assessments (Horowitz et al., 2011). The variability between studies limits comparison of study results. Second, outcome variables were heterogeneous between studies. Sixty-three different indicators of outcome variables were presented in the 25 studies. Third, we were not able to assess the effectiveness of interventions due to the heterogeneity of PMAD definitions and lack of sufficient number of pre-post assessment designs.

Implications

There are several implications for future research that are informed by the current study. First, future studies should assess PMAD using validated and reliable screening tools designed for the perinatal population, such as the EPDS. Such psychometrically-supported tools would enhance both the rigor and convergence of future PMAD research. Second, studies should be inclusive of many healthcare professionals when implementing an intervention, potentially examining differences in PMAD-related competency and behaviors by type of professional. Third, studies should be inclusive and clear about the outcome variables. Given the prevalence and negative impact of PMAD on mother and child, further interventions to improve screening and referral are needed among all disciplines of healthcare. Fourth, given the methodological limitations of current literature, future studies should utilize pre and post intervention assessments to enhance the rigorous testing of available types of interventions. Future research should consider the use of education, change in EMR, and standardized patient exercises as potential interventions to improve screening and referral for PMAD. Finally, studies performed

in the United States should be compared to results found outside of the United States to evaluate our effectiveness and improve our current PMAD screening, referral, and treatment practices.

CHAPTER III

ARTICLE TWO

PERINATAL DEPRESSION SCREENING RATES, CORRELATES, & TREATMENT RECOMMENDATIONS IN AN OBSTETRIC POPULATION

Abstract

Background: Perinatal depression (PD) is a common disorder among perinatal women. PD has been shown to have negative effects on the mother and child. However, screening rates for PD are inconsistent and low among healthcare providers.

Methods: Retrospective record reviews (n = 557) evaluated the PD screening, referral, and treatment practices at an Obstetrician/Gynecology practice. This study assessed the frequency of screening for PD, rates of elevated Edinburgh Postnatal Depression Scale (EPDS) scores, treatment recommendations, demographic correlates and predictors of elevated EPDS scores.

Results: PD screening completion rates were: 60.1% (intake), 35% (glucola test), 85.5% (6-week follow-up). Rates of clinically significant depression were: 18.21% (intake), 17.43% (glucola test), 13.00% (6-week follow-up). Correlates of clinically elevated EPDS scores at intake and 6-week follow-up were history of depression, history of anxiety, and young age. History of depression and anxiety were associated with an increased likelihood of having a clinically significant EPDS score at intake. Intake EPDS score and history of depression were associated with an increased likelihood of having a clinically significant EPDS score at 6-week follow-up.

Conclusion: OB/GYN providers should screen for perinatal depression at every obstetrical appointment. It is important to thoroughly assess history of depression and anxiety. Education and training for health care providers and perinatal women may improve the mental health experience of perinatal women.

Introduction

Perinatal depression (PD) is a common disorder experienced by perinatal women. PD is a nonpsychotic depressive episode that occurs during pregnancy or postpartum (Gelaye et al., 2016). Symptoms include crying more often than usual, feelings of anger, withdrawing from loved ones, feeling numb or disconnected from the baby, feeling guilt about not being a good mom, loss of energy, irritability, and hopelessness (Centers for Disease Control and Prevention, 2017). From 8.4% to 12.7% of women experience PD while pregnant (Gavin et al., 2005; Vesga-Lopez, 2008). PD after delivery affects approximately 11% of women (Centers for Disease Control and Prevention, 2017). Some reports have estimated the prevalence of PD to be as high as 40-60% among low income and teenage mothers (Earls and Committee on Psychosocial Aspects of Child and Family Health, 2010). Self-reported postpartum depressive symptoms rates range from 8.0% to 20.1% (Ko et al., 2017). While some risk and protective factors for PD have been identified (Gaillard et al., 2014; Silverman et al., 2017), this paper is intended to identify additional factors mitigating or exacerbating risk for these conditions.

Impact of PD

PD has been shown to have negative effects on the mother, child, and the mother-child relationship. Women with PD are at an increased risk for preterm birth and low birth weight (Grote et al., 2010). PD has also been associated with decreased verbal IQ and child observed and parental reported aggression (Barker et al., 2011; Hay et al., 2011). Lovejoy and colleagues (2000) reported that mothers with PD exhibited more negative and disengaged behavior towards their children compared to their non-depressed counterparts. Also, mothers with PD touch their infants less and in a less affectionate manner than non-depressed mothers (Ferber et al., 2008). Depressed mothers are less likely to put their baby to sleep in the back position and have a lower

likelihood of ever breastfeeding (Paulson et al., 2006). Women with PD are more likely to have a delayed adaptation to the social role of becoming a mother, and delayed competency in parenting skills (Barr, 2008). Mothers with PD are more likely to lack a maternal-infant attachment but engage in “mechanical infant caring” (Barr, 2008). Despite this burgeoning literature on impacts of PD, a great deal remains uninvestigated with regard to risk and protective factors for PD.

Screening for PD

Screening for PD is generally recognized as a way to improve depression outcomes (Georgiopoulos et al., 2001). However, screening rates for PD are inconsistent and low among healthcare professionals (Evans et al., 2015). Women’s self-report data suggests that between 60.7% to 85.6% of women discussed PD with their health care provider before delivery (Farr et al., 2016). A systematic review by Evans and colleagues (2015) demonstrated that among 7 studies, an average of only 55% of healthcare professionals ever, sometimes, often, or always assess for PD. When healthcare professionals do assess women for PD, the most common method of assessment is clinical judgment (Connelly et al., 2007; Heneghan et al., 2007; Wiley et al., 2004). Moreover, 60% of Obstetricians/Gynecologists rely on clinical assessment (Chadha-Hooks et al., 2010; Leddy et al., 2011). This finding echoes a larger trend in documented over reliance on clinical judgment, in spite of limitations in the accuracy clinical judgment as the primary method of mental health assessment (Lopez et al., 2017; Neal and Brodsky, 2016).

The American College of Obstetricians and Gynecologists (ACOG) recommends screening for depression and anxiety symptoms at least once during the perinatal period using a standardized, validated tool (ACOG, 2015). Postpartum Support International (PSI) recommends universal PD screening using an evidence-based tool such as the Edinburgh Postnatal Depression

Scale (Cox et al., 1987) or Patient Health Questionnaire (Kroenke et al., 2001; PSI). PSI recommends a cut-score of 10 (i.e., 10 or above yields the need to take steps to treat) on either tool. PSI also recommends PD screening in the prenatal, postnatal, and pediatric settings. The American Academy of Pediatrics (AAP) recommends incorporating the Edinburgh Postnatal Scale into the 1, 2, 4, and 6 month visits (Earls and Committee on Psychosocial Aspects of Child and Family Health, 2010). The AAP also recommends using a cut score of 10 on the EPDS as an indicator of risk that depression is present (Earls and Committee on Psychosocial Aspects of Child and Family Health, 2010). These guidelines by leading professional organizations indicate the importance of screening by a variety of healthcare professionals.

Current Study

Given ACOG and PSI's PD screening recommendations, along with a general lack of screening for PD in practice, this study sought to assess PD demographic correlates, as well as the PD screening and treatment practices of obstetrical health care providers. The main aims of the study were to:

1. Assess the frequency of screening for PD, rates of elevated EPDS scores, and treatment recommendations.
2. Assess correlates of elevated EPDS scores and identify the strongest predictors of elevated EPDS scores among such correlates.

Methods

Design

This retrospective observational study evaluated the PD screening, referral, and treatment practices at an Obstetrician/Gynecology office in a suburban region of Virginia. Five hundred and fifty-seven medical records from 2015 to 2017 were reviewed. The current study was

approved by the Institutional Review Board. Data collection ran from May 2017 to August 2017. Medical records were reviewed if women had delivered a baby between December 1, 2015 and May 31, 2017. If a woman delivered more than 1 child during the noted time period, the earliest perinatal healthcare information was used for the current study. Identifiable information was not collected (e.g., name, date of birth, zip code), to ensure the confidentiality of participants.

Participants

Participants included 557 women who sought obstetrical health care from a local obstetrician/gynecology office. Women ranged from 17 to 44 years of age.

Measures

Demographics. The following demographic information was collected from the medical records: age, race, ethnicity, insurance type, education level, employment status, marital status, number of children, and number of pregnancies.

Mental Health History. Mental health history information was based on self-report on a medical form contained in the records. The following mental health history information was collected: mental health diagnosis history, treatment of mental health diagnosis, and timeframe of mental health diagnosis, if provided.

EPDS Screen. The Edinburgh Postnatal Depression Scale (EPDS) was used by healthcare providers to assess perinatal depression. The EPDS is a 10-item self-report questionnaire for perinatal women. Possible scores range from 0 to 30. The EPDS has been shown to have adequate reliability and validity (Cox et al., 1987). While a cutoff score of 12 or 13 was originally suggested by Cox and colleagues (1987), a cutoff score of 10 is used to identify clinically elevated depression due to psychometric properties such as accuracy of the cut-off score (Gibson et al., 2009). A cutoff score of 10 is also recommended by ACOG (ACOG, 2015).

Treatment Recommendations. Treatment recommendations were assessed at intake and 6-month follow-up. Treatment recommendations refer to the recommendation the woman's healthcare provider made directly after a positive EPDS screen, indicating potential depression. Recommendation options include: watchful waiting (i.e., ongoing clinical monitoring only), medication referral, therapy, and/or both medication referral and therapy.

Appointment Frequency. Follow-up appointment attendance is the prevalence of women who attended their 6-week follow-up appointment. This was assessed in order to contextualize consideration of timing of administering the EPDS.

Statistical Analysis

Demographic data is presented by use of sample size and percentage within the total sample. Bivariate correlates of clinically significant EPDS scores at intake and 6-week follow-up were assessed. That is, these findings are based on independent between-groups or Pearson Chi-square differences of non-clinical vs. clinical scores. Logistic regression (Hosmer and Lemeshow, 2005) was used to assess predictors of clinically significant EPDS scores at intake and 6-week follow up. Variables were included in the logistic regression if they were significantly correlated with the outcome variables in the bivariate correlate analyses. Overall model fit was assessed using the Hosmer Lemeshow goodness-of-fit test. Odds Ratios were used as a metric of effect size guided by interpretation in the statistical literature (Chen et al., 2010). For all statistical analyses, SPSS 21 was used and an alpha of less than .05 was considered statistically significant.

Results

Demographics

Participants were, on average, 29.47 years of age, and predominantly of White, and non-

Hispanic, Latino, or Spanish origin. Moreover, the persons in the sample were mostly educated (college degree or higher), employed, and in a long-term relationship. Detailed demographic information is shown in Table III.1.

Mental Health History

Overall, 21.9% of women reported having a mental health conditions at some point in their lives. Mental health conditions included depression, anxiety, panic disorder, adjustment disorder, attention-deficit hyperactivity disorder, bipolar disorder, autism, posttraumatic stress disorder, and anorexia. The most common mental health history condition was a depressive disorder (15%). Depressive disorders included major depressive disorder, postpartum depression, and adjustment disorder with depressed mood. Only 2% of women reported a history of postpartum depression. Overall, 14% of women reported some form of anxiety disorder at some point in their lives, including anxiety, generalized anxiety disorder, adjustment disorder with anxious mood, and panic disorder. Composite variables for all depressive and all anxiety disorders, respectively, were created to ensure sufficient sample sizes for further inferential analyses.

EPDS Screening Completion Rates

Screening completion rates refers to the number of women who were screened for PD using the EPDS compared to all women who could have been screened. Overall, 96.8% of women were screened at some time during their pregnancy or 6-week follow-up visit. Screening completion rates were as follows: 60.1% (intake), 35% (glucola test), 85.5% (6-week follow-up).

EPDS Scores

EPDS score information includes average, median, and standard deviations at each time point. EPDS scores are shown in Table III.2.

Rates of clinically significant EPDS scores refers to the percent of scores that was at or above a score of 10 as compared to all women who were screened for PD. The time point with the highest rate of clinically significant EPDS score was at intake. Of the 557 participants, 280 (50.3%) were screened for PD at both intake and 6-week follow-up visits. Of those 280 participants, 30 (10.7%) possessed a positive screen for clinical depression at intake but not at 6-week follow-up. However, of those 280 participants, 21 (7.5%) possessed non-clinical score ranges of depression at intake but displayed positive screens for clinical depression at 6-week follow-up. Of the 128 women who were given the EPDS at all three times points (i.e., intake, glucola test, 6-week follow-up), 18.8% possessed clinically significant scores at intake, 18% at the glucola time point, and 13.3% at 6-week follow-up. An EPDS score summary is presented in Table III.2.

Correlates of Clinically Elevated EPDS Scores

Intake. Correlates of clinically elevated EPDS scores at intake were Medicaid/Medicare insurance type, single marital status, history of depression, history of anxiety, and young age. EPDS scores were split into two categories: non-clinical vs. clinically elevated (i.e., EPDS ≥ 10) scores. Details of the bivariate correlates are shown in Appendix B.

Health Insurance. Women with Medicaid/Medicare were more likely to have clinically significant EPDS scores at intake as compared to women with no health insurance/self-pay, private insurance, or Tricare. Women with private insurance were less likely to have clinically significant EPDS scores at intake compared to women with no health insurance/self-pay, Medicaid/Medicare, or Tricare.

Marital Status. Single women were more likely to have clinically significant EPDS scores compared to women in long-term committed relationships.

History of Depression and Anxiety. Women with a history of depression were more likely to have clinically significant EPDS scores at intake compared to women without a history of depression. Likewise, women with a history of anxiety were more likely to have clinically significant EPDS scores compared to women without a history of anxiety.

Age. Women with clinically significant EPDS scores were, on average, younger than women without significant EPDS scores at intake.

6-Week Follow-Up. Correlates of clinically elevated EPDS scores at 6-week follow-up were intake EPDS score, history of depression, history of anxiety, and young age. Details of the bivariate correlates are shown in Appendix B.

Intake EPDS Score. Women with a clinically significant EPDS score (≥ 10) at intake were more likely to have a clinically significant EPDS score at 6-week follow-up than women with a nonclinical EPDS score at intake.

History of Depression and Anxiety. Women with a history of depression were more likely to have clinically significant EPDS scores at 6-week follow-up compared to women without a history of depression. Likewise, women with a history of anxiety were more likely to have clinically significant EPDS scores compared to women without a history of anxiety.

Age. Women with clinically significant EPDS scores were, on average, younger than women without significant EPDS scores at follow-up.

Treatment Recommendations

Treatment recommendations at intake are made only for women who had clinically significant EPDS scores at their intake appointment.

Intake. Treatment recommendations in descending order of frequency ranged from a combination of therapy and medicine (31%), no discussion (28%), therapy alone (22%), watchful waiting (13%), medicine alone (3%), and under the care of another provider (3%).

6-Week Follow-Up. Treatment recommendations in descending order of frequency ranged from a combination of medicine and therapy (49%), therapy alone (16%), no discussion (16%), medicine alone (8%), watchful waiting (6%), and under the care of another provider (5%).

Participant Follow-Up Appointment Attendance

Of the 557 participants, 89% attended their 6-week follow-up appointment post-delivery.

Predictors of Clinically Significant EPDS Scores

Health insurance, marital status, history of depression, history of anxiety, and age were included in the regression model at intake due to their bivariate association with clinically significant EPDS scores. Intake EPDS score, history of depression, history of anxiety, and age were included in the regression model at 6-week follow-up due to their bivariate association with clinically significant EPDS scores.

The overall model displayed adequate fit to the data at intake, Hosmer and Lemeshow (2005) Test $\chi^2(8) = 2.62, p = .96$ and 6-week follow-up $\chi^2(8) = 11.90, p = .16$. The predictors accounted for significant variance in the clinically significant EPDS scores at intake, $\chi^2(7) = 64.8, p < .001$, Cox & Snell $R^2 = .18$, Nagelkerke $R^2 = .29$ and 6-week follow-up, $\chi^2(4) = 34.12, p < .001$, Cox & Snell $R^2 = .12$, Nagelkerke $R^2 = .21$. The following variables were associated with having an increased likelihood of having a clinically significant EPDS score at intake (moderate-to-large effects): history of depression and history of anxiety. The following variables were associated with having an increased likelihood of having a clinically significant EPDS

score at 6-week follow-up (small-to-moderate effects): intake EPDS score and history of depression. Table III.3 contains the model statistics.

Discussion

The current study aimed to assess PD screening and treatment practices of obstetrical health care providers. Our findings echo established literature in regards to PD screening rates before delivery (Farr et al., 2016). PD screening rates after delivery in the current study exceed rates found in established literature (Evans et al., 2015). The percentage of women with clinically significant EPDS scores is similar to those in the literature (Baker-Ericzén et al., 2008; Chaudron et al., 2004; Gordon et al., 2006; Rowan et al., 2012).

As noted in the recent literature (Gaillard et al., 2014), we found history of depression and anxiety to be risk factors for elevated EPDS scores during the antepartum and postpartum period. In addition to history of depression and anxiety, correlates of elevated EPDS scores included intake EPDS score, Medicaid/Medicare insurance type, single marital status, and young age. Notably, effect size statistics point to robust impacts of mental health history, highlighting the need for specific future work concerning trajectories of mental health among expectant mothers.

Treatment recommendations included combination of therapy and medicine, no discussion, therapy alone, watchful waiting, medicine alone, and under the care of another provider. At both intake and 6-week follow up appointments, a combination of therapy and medication was the most prevalent treatment recommendation for women with clinically elevated EPDS score, which is a supported treatment recommendation by ACOG (ACOG, 2015). A significant portion of women in the current study did not attend their 6-week follow up appointment, indicating a possible need to address barriers to appointment adherence through

motivational interviewing. The trend of lack of compliance with follow-up attendance is consistent with respect to this population (ACOG, 2016).

Implications for Practice

It is important to note the distinction between screening completion rates (i.e., highest at 6-week follow up appointment) and rates of clinically significant EPDS scores (i.e., highest at intake appointment). This indicates a need to screen for perinatal depression at every obstetrical appointment to avoid missing patients in need of medicinal or therapeutic mental health services. Likewise, we observed a portion of women whose depressive symptoms get worse over the course of their pregnancy and postpartum, as well as a portion of women whose depressive symptoms get better over the course of their pregnancy and postpartum. By screening for perinatal depression at each obstetrical visit, providers can properly treat and refer for services as early as possible. Improvement in rates of clinically significant EPDS scores over time may be the result of appropriate treatment, natural progression of PD, attrition, or some other unknown reason. The current study methodology does not allow for a causal understanding of improvements in clinically significant EPDS scores over time.

It is also important to ensure a cut score of 10 is used for the EPDS. PSI recommends a cut-score of 10 when using the EPDS, thereby allowing clinicians to thoroughly assess women with potential depressive symptoms (PSI, n.d.). This is a more conservative approach to screening for PD, but it captures more patients who may be in need of treatment. Given that intake EPDS score, history of depression and history of anxiety are robust predictors of elevated EPDS scores, it is important to thoroughly assess these items. A clinical interview would allow for a more thorough assessment of mental health history. This technique would allow for more enhanced clinical formulation for effective treatment for women who are risk for PD.

The final implication for practice concerns training for providers and perinatal women. Training in maternal mental health literacy for providers should include validated screening tools, appropriate cut-off scores, symptoms of PD, risk/protective factors, and evidence-based treatment options. Such educational content could be augmented by review of expert (e.g., PSI, ACOG) clinical practice recommendations. Training for perinatal women should include an overview of PD, symptoms, risk/protective factors, and treatment options. Operating from a health education purview, given the common terminology of “postpartum depression”, pregnant women should be educated on content such as depression and anxiety can occur anytime during the antepartum and postpartum period. By educating women on the symptoms and risk factors of PD, providers can prepare them for potential symptoms. This allows for early identification and treatment.

Conclusion

The current study underscores the prevalence of PD in an obstetric population. It also establishes screening rates, correlates, and risk factors for PD. Screening rates were highest at the 6-week follow up appointment but clinically elevated EPDS scores were highest at intake appointment. The most common treatment recommendation for women with clinically elevated EPDS scores was a combination of therapy and medication. The strongest predictors of elevated EPDS scores were intake EPDS score, history of depression and history of anxiety. Education and training for health care providers and perinatal women may improve the mental health experience of perinatal women. An area of future research is the implementation and assessment of educational interventions for health care providers and women regarding PD.

Three main limitations are present in the current study. First, the current study assessed PD screening and treatment practices at only one obstetric office. This limits the generalizability

to a wider population. Second, providers from the obstetric office used a range of cut scores for the EPDS while the researchers opted to use a cut score of 10. The range in cut scores may have affected the providers' treatment decisions. Third, EPDS scores were assessed but a clinical diagnosis of major depressive disorder with peripartum onset could not be confirmed. Therefore, we cannot make diagnostic assumptions about the women in the current study.

Table III.1. Participant Demographics

	N (%)
Race	
White	314 (56.4%)
Black	139 (25.0%)
Asian/Pacific Islander	41 (7.4%)
Other	38 (6.8%)
Refused	25 (4.5%)
Ethnicity	
Not of Hispanic, Latino, or Spanish Origin	495 (88.9%)
Of Hispanic, Latino, or Spanish Origin	36 (6.5%)
Refused	26 (4.7%)
Insurance Type	
Private	327 (58.7%)
Medicaid/Medicare	121 (21.7%)
Tricare	86 (15.4%)
None/Self-pay	23 (4.1%)
Education	
College	324 (58.2%)
High School or less	164 (29.4%)
Graduate Degree	62 (11.1%)
Refused	7 (1.3%)
Employment Status	
Employed	394 (70.7%)
Unemployed	74 (13.3%)
Homemaker	57 (10.2%)
Student	32 (5.7%)
Marital Status	
Long Term Committed Relationship	336 (60.3%)
Single	220 (39.5%)
Refused	1 (0.2%)

Table III.2. EPDS Score Summary

	Intake	Glucola test	6-Week Follow-Up
Mean	5.82	5.51	4.49
Median	5.00	4.00	3.00
Standard Deviation	4.97	5.09	4.72
Rates of Clinically Significant EPDS Scores	18.21%	17.43%	13.00%
Rates of Clinically Significant EPDS Scores for Participants with Complete EPDS Data	18.80%	18.00%	13.30%

Note: Clinically significant EPDS is defined as ≥ 10 ; Complete EPDS Data = Total Scores Available at Intake, Glucola test, and 6-Week Follow-Up Time Points.

Table III.3. Logistic Regression Model Predicting Clinically Significant EPDS Scores

Model Variable	B (SE)	Wald χ^2 (df)	<i>p</i>	OR (95% CI)
Intake				
Health Insurance (ref)	-	.88 (3)	.83	-
Medicaid/Medicare	.28 (.77)	.14 (1)	.71	1.33 (.29-6.03)
Private	-.01 (.79)	.00 (1)	.99	.99 (.21-4.68)
Tricare	.34 (.89)	.15 (1)	.70	1.40 (.25-7.96)
Marital Status	-.74 (.41)	3.20 (1)	.074	.48 (.21-1.07)
History of Depression	1.31 (.39)	11.07 (1)	.001	3.71 (1.72-8.04)
History of Anxiety	1.57 (.43)	13.21 (1)	<.001	4.8 (2.06-11.18)
Age	-.07 (.04)	3.63 (1)	.057	.94 (.87-1.00)
6-Week Follow-Up				
Intake EPDS Scores	1.22 (.43)	8.17 (1)	.004	3.40 (1.47-7.86)
History of Depression	.95 (.48)	3.93 (1)	.047	2.59 (1.01-6.61)
History of Anxiety	.59 (.51)	1.33 (1)	.25	1.79 (.67-4.84)
Age	-.04 (.04)	1.25 (1)	.26	.96 (.89-1.03)

Notes. SE=Standard error; df=Degrees of Freedom; OR=Odds Ratio; CI=Confidence Interval; ref=Reference Group; Bold font denotes significant predictor.

CHAPTER IV

ARTICLE THREE

IMPLEMENTATION AND EVALUATION OF A PERINATAL DEPRESSION EDUCATIONAL TRAINING FOR GRADUATE NURSING STUDENTS

Literature Review

In continuation of the Introduction section, a brief overview of the literature is provided. PD is a prevalent issue among pregnant women and new mothers in the United States. PD occurs in approximately 1 in 9 perinatal women (Ko et al., 2017). Despite the high prevalence, PD screening completion rates are inconsistent and low among healthcare providers (Evans, Phillippi, & Gee, 2015). An average of only 55% of healthcare professionals ever, sometimes, often, or always assess women for PD (Evans, Phillippi, & Gee, 2015). Few authors have implemented educational interventions with the goal of improving PD screening and treatment rates among healthcare providers (Long et al., 2018). Study quality, methodological rigor, target audience, and outcome variables have varied widely (Long et al., 2018). Given the variability in existing interventions to improve PD screening and treatment rates, further implementation and assessment of educational interventions to improve PD screening and treatment is needed.

The current study implemented and assessed an educational intervention for graduate nursing students pertaining to students' PD screening and treatment. The study implemented an established online educational intervention for graduate nursing students enrolled at Old Dominion University. Participants were examined by survey pre- and post-intervention to assess the effectiveness of the program. Specific aims and hypotheses are provided below.

Aims and Hypotheses of the Present Study

Aim 1. To evaluate the impact of an educational intervention on graduate nursing students pertaining to students' PD knowledge and attitudes

Hypothesis 1a. Graduate nursing students' knowledge of PD screening and treatment will improve from pre- to post-educational intervention.

Hypothesis 1b. Graduate nursing students' attitudes of PD screening and treatment will improve from pre- to post-educational intervention.

Aim 2. To assess intended PD screening and treatment practices before and after the educational intervention.

Hypothesis 2a. Intended PD screening and treatment practices will improve from pre- to post-educational intervention.

Hypothesis 2b. Perceived importance of PD screening and treating will improve from pre- to post-educational intervention.

Aim 3. To investigate whether pre-, post- changes in Theory of Planned Behavior constructs predict PD screening and treatment intention

Hypothesis 3a. Positive change scores in attitudes, perceived behavioral control, and subjective norms will significantly and positively predict intention to screen and treat PD.

Hypothesis 3b. Positive change scores in attitudes, perceived behavioral control, and subjective norms will significantly and positively predict perceived importance of screening and treating PD.

Methods

Study Design

This single group study utilized a quasi-experimental, repeated-measures design. Data was collected at two time points: pre-intervention and post-intervention. The pre-intervention

assessments occurred online directly prior to the participants engaging in the training. The post-intervention assessments occurred online directly after the participants engaged in the training. The independent variables were change in Theory of Planned Behavior (TPB) constructs (i.e., perceived behavioral control, attitudes, subjective norms) from pre- to post-intervention. Dependent variables included intended PD screening and treatment practices.

Participants

Participants included graduate nursing students enrolled at Old Dominion University in the spring semester of the 2018-2019 school year. There were no inclusion or exclusion criteria other than being an active ODU School of Nursing student. Power analyses were completed to estimate an appropriate sample size. A series of power analyses were run with the following parameters: t-tests for mean difference between two dependent means, $\alpha=.05$, 1-tail test, and power = 0.80, and moderate to large effect sizes were used in the analyses (Cohen, 1988). Moderate to large effect sizes were used due to previous literature yielding these effects (Cramer & Long, 2018; La Guardia et al., 2018). Results indicated a necessary sample size range of 12 to 27.

Participants (N=59) were, on average, 33.83 years of age ($SD = 7.35$). Participants were mostly female (91.5%), white (72.4%), not of Hispanic, Latino, or Spanish origin (96.6%), and had a Bachelors degree (83.1%). The majority of participants (87.9%) did not have prior PD training. Full participant demographics are presented in Table IV.1.

Table IV.1. Participant Demographics

	M (SD)
Age	33.83 (7.35)
Hours of Previous PD Training	0.39 (1.17)
Years of Clinical Obstetric Experience	1.90 (3.74)
	Frequency (%)
Gender	
Female	54 (91.5%)
Male	3 (5.1%)
Non-Binary/Genderqueer	1 (1.7%)
Do not wish to disclose	1 (1.7%)
Race	
White	42 (72.4%)
Black or African American	7 (12.1%)
Filipino	1 (1.7%)
Other Asian	1 (1.7%)
Other	2 (3.4%)
Multiple	5 (8.6%)
Ethnicity	
Not of Hispanic, Latino, or Spanish origin	57 (96.6%)
Of Hispanic, Latino, or Spanish origin	2 (3.4%)
Education	
Bachelor's degree	49 (83.1%)
Master's degree	9 (15.3%)
Doctorate degree	1 (1.7%)
Current Program	
Master of Science in Nursing	49 (89.1%)
Doctor of Nursing Practice	6 (10.9%)
Own Children	
No	24 (42.1%)
Yes	33 (57.9%)
Previous PD Training	
No	51 (87.9%)
Yes	7 (12.1%)
Previous Clinical Obstetric Experience	
No	28 (48.3%)
Yes	30 (51.7%)

Procedure

The current study was approved by the dissertation committee and Old Dominion University's Institutional Review Board. Participants were recruited through NURS 760 course

and the Old Dominion University graduate nursing student Blackboard site. Nursing faculty agreed to support the current project and provided a letter of support (Appendix C). Participants were given extra credit toward their course grade if they completed the training. Training material and assessments were completed fully online at the participants' pace. The assessments were anonymous and personally identifying information (e.g., name, date of birth, address) was not collected. Participants were given a random identification number in order to pair pre- and post-intervention assessments for analysis. Informed consent and debriefing forms were provided via the online training. The informed consent document (Appendix D) included a summary of the training and assessment questionnaires, researcher and advisor contact information, and potential benefits and risks of the study. Clicking through to the pre-intervention assessments indicated consent to participate in the study. The debriefing document (Appendix E) covered study aims, and researcher and advisor contact information. Data collection occurred between February and March 2019. Participants were informed of the research opportunity through Old Dominion University faculty members.

Measures

The data collection tool incorporated the following topics: demographics, TPB constructs, intention to screen and treat PD, and a knowledge quiz. All assessments were created by the researcher with the inclusion of select questions from established scales, described in further detail below. All theory-based scales created by the author were assessed for internal consistency using Cronbach's alpha (Cronbach, 1951). A Cronbach's alpha of .70 or greater was considered acceptable. Prior literature on TPB scales has demonstrated adequate reliability (Gabriel, Hoch, & Cramer, 2018; Sassen, Kok, & Vanhees, 2011).

Demographics. The demographic questionnaire included the following items: age, gender, race, ethnicity, education level, presence or absence of own children, current degree program, previous maternal depression and anxiety training, and prior clinical experience in obstetrics.

Theory of Planned Behavior Scale. The Theory of Planned Behavior Scale (TPBS) (Appendix F) assessed the 3 main constructs of the TPB (i.e., perceived behavioral control, attitudes, and subjective norms). The TPBS consisted of 16 items on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), as indicated as a best practice recommendation by Fishbein and Ajzen (2011). Positive perceived behavioral control scores indicated a strong sense of control over screening and treating PD. Positive attitude scores indicated an advantageous view of screening and treating PD. Positive subjective norm scores indicated positive normative beliefs regarding screening and treating PD. Items 1 through 5 assessed the perceived behavioral control construct. Items 6 through 10 assessed the attitudes construct, and items 11 through 16 assessed the subjective norms construct.

Several items on the TPBS were derived from established scales. Items 1, 2, 7, 8, 9, and 10 were chosen from the Maternal Depression Management Inventory (MDMI; Leiferman et al., 2008). The MDMI has been shown to have sufficient content validity (Leiferman et al., 2008). Item 6 was modeled from a survey on primary care physicians' attitudes towards PD (Glasser et al., 2016). To the author's knowledge, the questionnaire by Glasser et al. (2016) has not been validated. The TPBS demonstrated adequate internal consistency at pre-intervention (Cronbach's $\alpha=.92$) and post-intervention (Cronbach's $\alpha=.93$).

Intention to Screen and Treat Perinatal Depression. Participants' intention to screen and treat PD was assessed by two 5-item scales (Appendix G). For the first scale, response

options ranged from 0 (Never) to 4 (Always). Higher scores indicated a greater intention to screen and treat patients for PD. Intention to screen and treat PD scales demonstrated adequate internal consistency at pre-intervention (Cronbach's $\alpha=.93$) and post-intervention (Cronbach's $\alpha=.97$). The second scale assessed the perceived importance of screening and treating PD. Response options ranged from 0 (Not at all important) to 4 (Extremely important). Higher scores indicated a greater perceived importance of screening and treating patients for PD. Perceived importance of screening and treating PD scales demonstrated adequate internal consistency at pre-intervention (Cronbach's $\alpha=.96$) and post-intervention (Cronbach's $\alpha=.87$). Since participants consisted of graduate students, it was assumed that they did not all have prior obstetric practice experience. Due to this, intention to screen and treat for PD was assessed rather than actual current screening and treatment practices. These scales assessed the perceived behavioral intention construct of the TPB.

Knowledge Quiz. Participants' knowledge of PD was assessed by way of a 10-item quiz (Appendix H). All questions were multiple choice in nature with 4 response options. Questions covered the following topics regarding PD: symptoms, safe treatment options, governing organization recommendations, implications, proper patient counseling practices, and prevalence rates. Items 1 through 4 were derived from a pre-test questionnaire created from the MDMI (Leiferman et al., 2008). All other items were created by the researcher based directly on intervention material.

Intervention

The intervention under assessment is an established training (Leiferman, 2015). The intervention, "Management of Perinatal Mood Disorder During Pregnancy" is designed for all health care professionals providing obstetric care. The online training provides an overview of

PD symptoms, harmful effects of untreated PD, proper patient-provider communication, assessment and screening techniques, safe treatment options, and follow up practices. The training has 5 main competencies: (1) identify current guidelines for prenatal depression and anxiety assessment and treatment, (2) locate and utilize screening assessment tools for perinatal mood disorders, (3) develop knowledge on available evidence-based treatments for prenatal mood disorders, (4) develop skills to increase self-efficacy and intent to manage prenatal mood disorders, and (5) locate local and national resources for perinatal mood disorders. The training utilizes the 5As model (i.e., assess, advise, agree, assist, arrange) to inform patient-provider communication (Whitlock et al., 2002). Perinatal depression and anxiety are the main content focus of the training.

For the purposes of the current study, training content directly targets TPB constructs. Perceived behavioral control is targeted in the following topics in the training: interview skills, screening tools, and treatment options. By providing the participants with interview skills such as sample questions to ask and symptoms to address for depression and anxiety, the training may break down barriers that participants previously had for asking patients about depression and anxiety. This information may improve the participants' perceived control over how to ask about depression and anxiety and types of questions they can pose to patients. By providing a list of common anxiety and depression tools and links to the tools themselves, the training may improve the participants' perceived control over screening. The participants are given 4 common screening tools for anxiety and 6 common screening tools for depression to choose from to fit their patients' specific needs. By providing free screening tools, the training may help break down the financial and access barrier to screening. Participants are given a variety of evidence-based treatment options to choose from based on their education, comfort, experience, and

patient's needs. By providing a variety of treatment options (e.g., psychotherapy, medicine, alternative medicine), the training may improve participants' perceived control over how they choose to treat their patients for depression and anxiety. The training also covers the option to refer women for treatment outside of the participants' office. This option may give participants with less experience or confidence in treating depression and anxiety an alternative method to help their patients, thereby improving their confidence of screening and treating depression and anxiety.

Attitudes towards screening and treating PD were targeted in the training through the referral checklist and referral resources section. By following up with patients and providers after a referral is given, the participant may see the benefit of screening and treating for PD and anxiety through patient improvements. This may, in turn, improve the participants' attitudes about screening and treating for perinatal depression and anxiety.

Subjective norms towards screening and treating PD were targeted in the following section of the training: guidelines for anxiety and depression screening and treatment during pregnancy. The training content includes screening and treatment recommendations from American College of Nurse Midwives, American Academy of Family Physicians, American College of Obstetricians and Gynecologists, and American Psychology Association. By providing this information, participants may better understand what their governing bodies recommend and how their colleagues are screening and treating for PD and anxiety disorders. This information may broaden understanding of how other professionals (e.g., pediatrics, family medicine) screen and treat PD and anxiety, therefore improving their understanding of norms surrounding perinatal depression and anxiety.

Statistical Analyses

Preliminary Analyses

All statistical analyses were completed with SPSS Version 21. To examine statistical assumptions, skewness and kurtosis were assessed. To examine independence of the predictors, bivariate tests were used to examine how the predictor variables (i.e., change scores of perceived behavioral control, attitudes, subjective norms) relate to one another. An alpha level of .05 was used for all appropriate analyses.

Twenty-six items of interest had missing data. Variables with missing data included TPB items, intention to screen and treat maternal depression items, and knowledge quiz items. Item-level data missingness ranged from 1.69% to 5.08%. Multiple imputation was used to account for missing data as is consistent with recommended approaches in the statistical and clinical research literatures (e.g., Enders, 2017; van Ginkel et al., 2019). Specifically, missing values were imputed based upon existing responses to the variables of interest (i.e., TPB items, intention to screen and treat maternal depression items, and knowledge quiz items). The model was run with a total of 10 imputations; imputed values were checked to ensure they fell within appropriate item response ranges.

Primary Analyses

Aim 1. To evaluate the impact of an educational intervention on graduate nursing students pertaining to students' PD knowledge and attitudes.

Analyses: To assess Aim 1, summary data for each measure (i.e., PD knowledge, PD related attitudes) was evaluated. Paired samples *t*-tests were used to examine changes from pre- to post-intervention. In addition to *p* values, Cohen's *d* was assessed and reported (Cohen, 1988). Effect size cut scores were as follows: .2 (small), .5 (moderate), and .8 (large; Cohen, 1988).

Aim 2. To assess intended PD screening and treatment practices before and after the educational intervention.

Analyses: To assess Aim 2, summary data for intended PD screening and treatment practices at pre- and post-intervention was evaluated. Paired samples *t*-tests were used to assess changes in participants' intention to screen and treat for PD from pre- to post-intervention. In addition to *p*-values, Cohen's *d* was assessed and reported (Cohen, 1988).

Aim 3. To investigate whether pre-, post- changes in Theory of Planned Behavior constructs predict PD screening and treatment intention

Analyses: To assess Aim 3, summary data for all constructs of the Theory of Planned Behavior (i.e., perceived behavioral control, attitudes, subjective norms) was evaluated. Change scores (i.e., post-intervention scores minus pre-intervention scores) were examined as predictors of participants' intention to screen and treat PD at post-intervention in the multiple regression models (controlling for pre-intervention intent values). Two multiple regression analyses were used: one with intention to screen and treat PD as the outcome variable and one with perceived importance of screening and treating PD as the outcome variable. Change scores of perceived behavioral control, attitudes, subjective norms, and pre-intervention perceived importance and intention to screen and treat PD were entered as the independent variables. Perceived importance and intention to screen and treat for PD at post-intervention were entered as dependent variables. Effect sizes are reported using partial eta-squared. Multicollinearity was assessed using the variance inflation factor (VIF) statistic as an indicator (O'Brien, 2007).

Results

Preliminary Results

Results of the assessment of independence of predictor variables are presented in Table IV.2. While most predictor variables were unrelated, two predictor variables of interest (i.e., perceived behavioral control change score, attitudes change score) were significantly correlated with subjective norms change score. Correlations were not above .70; therefore, all predictor variables remained in the multiple regression models. Results of the assessment of correlations between TPB constructs and intention to screen and treat for PD are presented in Table IV.3. Results of the assessment of correlations between TPB constructs and intention to screen and treat for PD change scores from pre- to post-intervention are presented in Table IV.4.

Table IV.2. Correlates of Multiple Regression Predictor Variables

Variables	1	2	3	4	5
1. PBC Change Score	-				
2. Attitudes Change Score	.25	-			
3. Subjective Norms Change Score	.42**	.53***	-		
4. Intention to Screen and Treat PD at Pre-intervention	-.22	-.07	-.08	-	
5. Perceived Importance of Screening and Treating PD at Pre-intervention	-.10	-.21	-.03	.44**	-

Notes: PBC = Perceived Behavioral Control; * $<.05$; ** $<.01$; *** $<.001$.

Table IV.3. Correlates of TPB Constructs and Intention to Screen and Treat for PD

Variables	1	2	3	4	5	6	7	8	9
1. PBC at Pre-Intervention	-								
2. PBC at Post-Intervention	.42**	-							
3. Attitudes at Pre-Intervention	.32*	.41**	-						
4. Attitudes at Post-Intervention	.14	.53***	.52***	-					
5. Subjective Norms at Pre-Intervention	.54***	.36**	.63***	.36**	-				
6. Subjective Norms at Post-Intervention	.22	.44***	.37**	.61***	.52***	-			
7. Intention to Screen and Treat PD at Pre-Intervention	.50***	.45***	.26*	.27*	.41**	.39**	-		
8. Intention to Screen and Treat PD at Post-Intervention	.27*	.53***	.34**	.37**	.39**	.30*	.33*	-	
9. Perceived Importance of Screening and Treating PD at Pre-Intervention	.36**	.40**	.43**	.33*	.36**	.38**	.44**	.45***	-
10. Perceived Importance of Screening and Treating PD at Post-Intervention	.19	.52***	.26	.31*	.22	.26*	.24	.55***	.54***

Notes: PBC = Perceived Behavioral Control; * $<.05$; ** $<.01$; *** $<.001$.

Table IV.4. Correlates of TPB Constructs and Intention to Screen and Treat for PD Change Scores from Pre- to Post-Intervention

Variables	1	2	3	4
1. PBC Change Score	-			
2. Attitudes Change Score	.25	-		
3. Subjective Norms Change Score	.42**	.53***	-	
4. Intention to Screen and Treat PD Change Score	.27*	.02	-.03	-
5. Perceived Importance of Screening and Treating Change Score	.23	.23	.04	.22

Notes: PBC = Perceived Behavioral Control; * $<.05$; ** $<.01$; *** $<.001$.

Aim 1

The results of Aim 1 are presented in Tables IV.5 and IV.6. Paired-samples *t* tests showed moderate-to-large gains in all 3 subscales of the Theory of Planned Behavior (i.e., perceived behavioral control, attitudes, subjective norms) and the total score. Item-level knowledge quiz results are presented in Table IV.4. Results showed improvement on 80% of the knowledge quiz items from pre- to post-intervention. There was a significant improvement in the total correct quiz responses from pre- to post-intervention. Hypotheses 1a and 1b are supported as graduate nursing students' knowledge and attitudes of PD screening and treatment significantly improved from pre- to post-educational intervention.

Table IV.5. Pre-Post Intervention Impact on Theory of Planned Behavior Outcomes

	Pre-Intervention M (SD)	Post-Intervention M (SD)	<i>t</i> (df)	<i>p</i> - value	Cohen's <i>d</i>
PBC	18.10 (6.69)	26.71 (4.37)	-10.57 (58)	<.001	1.37
Attitudes	28.59 (5.75)	31.00 (4.30)	-3.62 (58)	.001	0.47
Subjective Norms	29.04 (7.68)	33.66 (6.67)	-5.03 (58)	<.001	0.65
Total Score	75.73 (16.51)	91.37 (12.75)	-8.35 (58)	<.001	1.08

Notes: PBC = Perceived Behavioral Control; M = Mean; SD = Standard deviation; *t* = Within-subjects T-test statistic; df = Degrees of freedom; N =59.

Table IV.6. Pre-Post Intervention Impact on PD Knowledge Outcomes

	Pre- Intervention % Correct	Post- Intervention % Correct			
1. What are some of the common symptoms of depression during pregnancy?	98.3%	96.6%			
2. What treatment options may be acceptable for pregnant women experiencing depression?	91.5%	100%			
3. Which of the following are NOT one of the 5 As for patient centered counseling:	22.0%	84.7%			
4. If patients are not ready to participate in treatment, providers can use the 5 R's. Which of the following is not one of the 5 R's?	16.9%	69.5%			
5. All of the following are recommendations from The American College of Obstetricians and Gynecologists, EXCEPT:	91.5%	94.9%			
6. Approximately how many women experience major depression during pregnancy in the general population?	30.5%	78.0%			
7. Antenatal depression has been associated with all of the following EXCEPT:	64.4%	76.3%			
8. Perinatal depression symptoms may appear during pregnancy, after birth, or within how long after giving birth?	66.1%	69.5%			
9. To meet DSM-5 criteria for major depressive disorder or a major depressive episode, all of the following must be true EXCEPT:	74.6%	72.9%			
10. According to the American College of Obstetricians and Gynecologists and the American Psychiatric Association, prescribing medication for pregnant women depends on all of the following EXCEPT:	79.7%	91.5%			
	M (SD)	M (SD)	<i>t</i> (df)	<i>p-value</i>	Cohen's <i>d</i>
Total Score Correct	6.36 (1.60)	8.34 (1.82)	-7.95 (58)	<.001	1.16

Notes: M = Mean; SD = Standard deviation; *t* = Within-subjects T-test statistic; df = Degrees of freedom; N=59.

Aim 2

The results of Aim 2 are presented in Table IV.7. Results demonstrated moderate-to-large gains in intention to screen and treat for PD and perceived importance of screening and treating PD from pre- to post-intervention. Participant responses, on average, improved from “rarely” to “always” in regard to the intention to screen and treat PD. Participant responses, on average, improved from “very important” to “extremely important” in regard to perceived importance of

screening and treating PD. Hypotheses 2a and 2b are supported because perceived importance and intention to screen and treat PD significantly improved from pre- to post-educational intervention.

Table IV.7. Pre-Post Intervention Impacts on Intention to Screen and Treat Maternal Depression

	Pre- Intervention M (SD)	Post- Intervention M (SD)	<i>t</i> (df)	<i>p</i> - value	Cohen's <i>d</i>
Intention to Screen and Treat PD	11.21 (5.87)	22.29 (4.55)	-13.92 (58)	<.001	1.81
Perceived Importance of Screening and Treating PD	21.67 (3.95)	23.69 (2.18)	-4.69 (58)	<.001	0.61

Notes: M = Mean; SD = Standard deviation; *t* = Within-subjects T-test statistic; df = Degrees of freedom; N = 59.

Aim 3

The results of Aim 3 are presented in Tables IV.8 and IV.9. The collection of predictor variables accounted for significant variance in intention to screen and treat PD at post-intervention, $F(4,54) = 2.86, p = .03, \text{Adj. } R^2 = .11$. Intention to screen and treat PD at pre-intervention demonstrated a moderate-to-large association with intention to screen and treat PD at post-intervention. The subscales of the Theory of Planned Behavior (i.e., perceived behavioral control, attitudes, subjective norms) change scores from pre- to post-intervention did not predict intention to screen and treat PD at post-intervention when controlling for pre-intervention intention to screen and treat PD. Hypothesis 3a was not supported because positive change scores in attitudes, perceived behavioral control, and subjective norms did not significantly predict intention to screen and treat PD at post-intervention.

The collection of predictor variables accounted for significant variance in perceived importance of screening and treating PD at post-intervention, $F(4,54) = 7.34, p < .001, \text{Adj. } R^2 =$

.30. Perceived importance of screening and treating PD at pre-intervention demonstrated a large positive association with perceived importance of screening and treating PD at post-intervention. Perceived behavioral control change scores from pre- to post-intervention demonstrated a small-to-moderate positive association with perceived importance of screening and treating PD at post-intervention when controlling for pre-intervention perceived importance of screening and treating PD. Hypothesis 3b was partially supported because only positive change scores in perceived behavioral control significantly predicted perceived importance of screening and treating PD at post-intervention.

Table IV.8. Linear Regression Model Predicting Intention to Screen and Treat Maternal Depression

Predictor	β (se β)	<i>t</i>	<i>p</i> -value	η_p^2
Intercept	22.29 (.56)	39.95	<.001	.97
Intention at Pre-Intervention	1.70 (.58)	2.94	.005	.14
Perceived Behavioral Control	1.14 (.64)	1.80	.08	.06
Attitudes	.06 (.66)	.10	.92	<.001
Subjective Norms	-1.04 (.71)	-1.46	.15	.04

Table IV.9. Linear Regression Model Predicting Perceived Importance of Screening and Treating Maternal Depression

Predictor	β (se β)	<i>t</i>	<i>p</i> -value	η_p^2
Intercept	23.69 (.24)	100.29	<.001	1.00
Perceived Importance at Pre-Intervention	1.27 (.25)	5.18	<.001	.33
Perceived Behavioral Control	.54 (.27)	2.03	.047	.07
Attitudes	.21 (.29)	.72	.48	.01
Subjective Norms	-.28 (.30)	-.91	.37	.02

Discussion

The current study implemented and assessed an educational intervention for graduate nursing students pertaining to participants' PD screening and treatment. The current intervention is consistent with previous interventions (e.g., Chaudron et al., 2004; Gordon et al., 2006; Lind et

al., 2017) in that it is educational in nature. However, meeting one of the gaps identified in a recent review of the PD training literature (Long et al., 2018), the current intervention improved upon previous educational interventions by directly targeting TPB constructs in the educational material based on best practice recommendation by Ajzen (2006). The findings echo the few studies that demonstrate improvements in PD-related attitudes (Baker-Ericzén et al., 2008), knowledge, and importance of PD screening and treatment (Smith & Kipnis, 2012) after an intervention. However, the current study provided advancement for both the intervention and assessments by utilizing the Theory of Planned Behavior (Ajzen, 1985; Ajzen, 2017). The current study tested the following PD-related constructs of the Theory of Planned Behavior: perceived behavioral control, attitudes, subjective norms, and perceived behavioral intention. Each aim will be discussed below.

PD Knowledge and Attitudes

Results of Aim 1 demonstrate improvements in participants' perceived behavioral control, attitudes, subjective norms, and knowledge from pre- to post-intervention, which improve upon previous literature by applying an established theory. By testing an established theory, an explanation for change in response to the current intervention may be observed (Krieger, 2016). Both the training material and assessment measures are a direct test of the Theory of Planned Behavior. While others have assessed PD-related knowledge, attitudes, and skills (e.g., Baker-Ericzen et al., 2008; Smith & Kipnis, 2012), the current study assessed PD-related perceived behavioral control, attitudes, subjective norms, and knowledge pre- and post-intervention. The overall impact of training suggests improvements in PD-related knowledge and attitudes from pre- to post- intervention. The current study builds upon previous literature (e.g.,

Horowitz et al., 2011; Mancini et al., 2007), which assessed educational PD training at post-intervention only by examining all measures at both pre- and post-intervention.

There are several education and policy implications for the results of Aim 1. First, future policy regarding PD training and screening should mandate PD-related training for all healthcare professionals providing services to perinatal women. Mandated training may be in the form of continuing education credits for healthcare professionals working in their respective fields. The nursing discipline recognizes the importance of evidence-based practice, which should include care for patients with PD (Stevens, 2013). By mandating PD-related training, improvements may be seen in evidence-based practice surrounding PD screening and treatment. The current study demonstrates the usefulness of PD-related training by showing improvements in key domains, such as PD-related perceived behavioral control, attitudes, subjective norms, and knowledge. Implementing such training for students and early career practitioners has the added advantage of promoting evidence-based practice early, which may positively influence practice throughout a career. Literature suggests that by promoting evidence-based practice in graduate training, students become less concerned about the limitations related to evidence-based practice (e.g., too narrowly focused, too simplistic) and more confident in their ability to use evidence-based techniques (Bearman et al., 2015).

Second, future educational interventions and assessment tools should target the Theory of Planned Behavior constructs (i.e., perceived behavioral control, attitudes, subjective norms). The use of established theories allows for accumulation of evidence surrounding a given topic such as PD (Prestwich, Webb, Conner, 2015). Also, the use of theory as a basis for developing health interventions generates larger changes in the health behavior than interventions that are not based on theory (Avery et al., 2013; Protogerou & Johnson, 2014; Webb et al., 2010). Only through

additional application of TPB can clarity be gained on the accumulation of evidence for the utility of TPB in such training.

Intended PD Screening and Treatment Practices

Results of Aim 2 demonstrate significant improvements in participants' intention to screen and treat for PD, as well as perceived importance of screening and treating PD from pre- to post-intervention. The design of Aim 2 assessments is consistent with the contemporary Theory of Planned Behavioral model, which assesses intention to perform a behavior of interest (Fishbein & Ajzen, 2010). Previous literature suggests that perceived behavioral control and subjective norms may positively predict intention to screen for post-stroke depression (Hart & Morris, 2008). However, the current study offers a unique framework of assessment of intention to screen and treat for PD by including perceived importance of screening and treating PD.

Several clinical and educational implications exist based on the results of Aim 2. First, improvements in intention to screen and treat PD may lead to improvements in the behavior of screening and treating PD (Webb & Sheeran, 2006). Therefore, intention to screen and treat PD should be a target of future intervention material and assessment tools. As suggested by Ajzen (2006), if a certain construct is more likely to influence intention than others, then that construct should be targeted in both the intervention and assessment tools. For example, if perceived behavioral control is known to influence intention to screen and treat PD, perceived behavioral control should be targeted in both the intervention and assessment tools. Methods of enhancing perceived behavioral control in the health behavior literature include, but are not limited to, addressing barriers and facilitators of performing a behavior, targeting the belief strength of a behavior, and targeting the scale value of a target behavior (Ajzen, 2006). Such methods can be applied in future tailoring of PD-specific training for healthcare professionals.

Prediction of PD Screening and Treatment Intention

Results of Aim 3 show that perceived behavioral control change scores from pre- to post-intervention demonstrated a small-to-moderate positive association with perceived importance of screening and treating PD at post-intervention when controlling for pre-intervention perceived importance of screening and treating PD. Partial support for the Theory of Planned Behavior was established in the current study because only 1 construct (i.e., perceived behavioral control) predicted participants' perceived importance of screening and treating PD. Results may indicate that the areas in which perceived behavioral control were targeted in the intervention (i.e., interviewing skills, screening tools, treatment option) resonated with participants. The participants may have spent more time reviewing the interviewing skills, screening tools, and treatment options sections of the intervention than other sections.

None of the main constructs of the Theory of Planned Behavior predicted intention to screen and treat PD. Therefore, more work is needed on the understanding of theory-tested interventions for PD. The TPB may not be the best fit for understanding PD in the current study population. Also, the current study regression model included pre-intervention intention to screen and treat PD, which may have affected the amount of potential variance explained by the other predictor variables (i.e., change scores in perceived behavioral control, subjective norms, attitudes). Future research may consider factors that moderate intention to screen and treat and other health behavior theories.

Despite a lack of support for TPB in identifying mechanisms predicting intent and importance of screening and treating, methods implications include the value of theory-based measurement. It demonstrated an implementation assessment of the Theory of Planned Behavior (Nilsen, 2015) by offering an understanding of a PD-related intervention in regard to Theory of

Planned Behavior constructs. The development of instruments allowed for the assessment of major concepts (i.e., perceived behavioral control, attitudes, subjective norms, perceived behavioral intention) within the theory (Im, 2015). Several other topic-specific TPB measurement tools exist in the literature (e.g., Cheon et al., 2012; Davis et al., 2002), demonstrating the utility of a PD-specific TPB measurement tool. Fishbein and Ajzen (2011) provide guidelines for constructing a Theory of Planned Behavior questionnaire, which include guidelines such as: define the behavior, specify the research population, and formulate items for direct measures. Fishbein and Ajzen's (2011) guidelines were utilized in the current development of a PD-specific TPB assessment tool. The current study assessed a specific target population of graduate nursing students for the PD intervention, as it common in theory evaluation (Im, 2015).

There is general support in the literature for the usefulness of the Theory of Planned Behavior in understanding other health concerns such as post-stroke depression (Hart & Morris, 2008), smoking cessation (Puffer & Rashidian, 2004) and pain assessments (Nash, Edwards, & Nevauer, 1992). However, many issues exist in the testing of theory, such as poor reporting, blunt comparisons of theories, theory combination without basis, and reluctance to refine a theory (Prestwich, Webb, Conner, 2015). According to Prestwich and colleagues (2015), possible solutions to issues that influence the use of theories in intervention include developing a system to track tests of theories, standardizing guidelines for reporting theories, considering the risk of confounds, and base interventions on a single theory. One educational implication of Aim 3 includes adapting solutions as posited by Prestwich and colleagues (2015). For example, researchers assessing PD interventions for healthcare providers may assess only a single theory (e.g., Theory of Planned Behavior, Health Belief Model) per intervention rather than combining

multiple theories in the assessment of one intervention. Likewise, researchers may utilize an established theory-coding scheme to guide the standardization of reporting theories (Michie & Prestwich, 2010).

Limitations & Future Directions

Several limitations exist in the current study, which necessitate improvements in future research. First, only one sample was included in the study. The current sample included only graduate nursing students currently enrolled at Old Dominion University. The single sample limits generalizability to current healthcare providers offering services to perinatal women, healthcare providers in other geographic regions, and other disciplines and levels of healthcare providers (e.g., obstetricians, nurse midwives, pediatricians, mental health care providers). Future studies of PD-related educational interventions should assess a more inclusive sample. Examples of potential disciplines for study include pediatrics, family medicine, and mental health care.

Methodologically, the single-group design provides no true comparison or control. This precludes the possibility of understanding potential causal relationships as a result of the current intervention. Future studies should include a comparison or control group to assess potential causal relationships that occur in response to the intervention.

The intervention was educational in nature and did not include alternative training strategies (e.g., role plays, standardized patients), which may prove to be useful in PD-related training. By assessing multiple behavior change techniques or training strategies, researchers may arrive at judgments on the effect sizes of combined or singular techniques (Michie et al., 2018). This may lead to more effective interventions for healthcare providers (Michie et al., 2018). For instance, the use of standardized patients in PD training has demonstrated positive

outcomes in participants' views of the usefulness, interest, and overall rating of the training (Tucker et al., 2004). The use of electronic cues in medical records has also shown to be useful in the improvement of screening for PD and referring for treatment when positive screeners were observed (Sheeder et al., 2009). Future studies should include a variety of training strategies to enhance the understanding of effective treatments to improve PD-related knowledge, attitudes, and skills.

Finally, the current study did not include a follow-up assessment to examine possible changes in behavior. The lack of behavior change assessment limits a complete assessment of the Theory of Planned Behavior. The current study was unable to assess the potential relationship between PD-related perceived behavioral intention and the behavioral outcome. Future studies should apply the established educational training in a hospital or office system and assess behavior outcomes over time.

CHAPTER V

CONCLUSIONS

The overall purpose of this dissertation was to better understand rates, correlates, and an educational training for healthcare providers regarding PD. The purpose of this dissertation was accomplished through a series of three studies. Study one of this dissertation was a systematic review examining interventions aimed at improving screening and referral for PD for all disciplines of healthcare providers (e.g., students, pediatricians, nurses, obstetricians). Study two of this dissertation assessed PD screening and treatment practices of obstetrical health care providers in one clinic. Study three of this dissertation implemented and assessed an educational intervention for graduate nursing students pertaining to students' PD screening and treatment. To provide an overview of the results within this dissertation, a summary of the results of each hypothesis is provided:

Hypothesis for Aim 1 (A): Graduate nursing students' knowledge of PD screening and treatment will improve from pre- to post-educational intervention.

Findings: The hypothesis was supported as results showed improvement on 80% of the knowledge quiz items from pre- to post-intervention. There was also a significant improvement in the total correct quiz responses from pre- to post-intervention.

Hypothesis for Aim 1 (B): Graduate nursing students' attitudes of PD screening and treatment will improve from pre- to post-educational intervention.

Findings: The hypothesis was supported as results showed moderate-to-large gains in all 3 subscales of the Theory of Planned Behavior (i.e., perceived behavioral control, attitudes, subjective norms) and the total score.

Hypothesis for Aim 2 (A): Intended PD screening and treatment practices will improve from pre- to post-educational intervention.

Findings: The hypothesis was supported as moderate-to-large gains in intention to screen and treat for PD from pre- to post-intervention were demonstrated.

Hypothesis for Aim 2 (B): Perceived importance of PD screening and treating will improve from pre- to post-educational intervention.

Findings: The hypothesis was supported as moderate-to-large gains in perceived importance of screening and treating PD from pre- to post-intervention were demonstrated.

Hypothesis for Aim 3 (A): Positive change scores in attitudes, perceived behavioral control, and subjective norms will significantly and positively predict intention to screen and treat PD.

Findings: The hypothesis was not supported as positive change scores in attitudes, perceived behavioral control, and subjective norms did not significantly predict intention to screen and treat PD at post-intervention when controlling for pre-intervention intention to screen and treat PD.

Hypothesis for Aim 3 (B): Positive change scores in attitudes, perceived behavioral control, and subjective norms will significantly and positively predict perceived importance of screening and treating PD.

Findings: The hypothesis was partially supported because only positive change scores in perceived behavioral control significantly predicted perceived importance of screening and treating PD at post-intervention when controlling for pre-intervention perceived importance of screening and treating PD.

Summary and Clinical Implications

The review of literature within this dissertation provided a synthesis of the findings related to PD screening and treatment rates, and the Theory of Planned Behavior. Study one

identified current interventions aimed at improving screening and referral for PD for all disciplines of healthcare providers (e.g., students, pediatricians, nurses, obstetricians). None of the interventions included in study one tested a theory or were based on theory. Most of the interventions were educational in nature. Results indicated that screening is feasible and may have positive effects on screening completion rates, referral for treatment for PD, and improved patient-provider communication. Study one identified the need for a methodologically sound implementation and assessment of a PD-related education intervention that directly tests an established theory.

Study two was designed to assess PD screening and treatment practices of obstetrical health care providers in one local clinic. Results indicated that screening for PD was highest at participants' 6-week follow up appointment, yet highest rates of clinically significant PD were noted at the intake appointment. Correlates of clinically elevated EPDS scores at intake and 6-week follow-up appointments were history of depression, history of anxiety, and young age. Study two identified the need for a PD-related intervention for healthcare providers covering the following topics: validated screening tools, appropriate cut-off scores, symptoms of PD, risk/protective factors, and evidence-based treatment options.

Study three was designed to implement and assess an established PD-related educational training. Results showed promise for an educational intervention based on the TPB to improve PD-related perceived behavioral control, attitudes, subjective norms, knowledge, and intention to screen and treat PD. Statistically significant improvements were found from pre- to post-intervention in PD-related perceived behavioral control, attitudes, subjective norms, knowledge, intention to screen and treat PD, and perceived importance of screening and treating for PD. Perceived behavioral control change scores from pre- to post-intervention demonstrated a small-

to-moderate positive association with perceived importance of screening and treating PD at post-intervention when controlling for pre-intervention perceived importance of screening and treating PD.

Future studies of PD-related educational interventions should assess a more inclusive sample and a comparison or control group to assess potential causal relationships that occur in response to the intervention. Additionally, future studies should include a variety of training strategies to enhance the understanding of effective treatments to improve PD-related knowledge, attitudes, and skills. Future studies should also apply the established educational training in a hospital or office system and assess behavior outcomes over time for a more complete assessment of the TPB.

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APPENDICES

Appendix A. Quality Assessment Tool

Introduction:

1. Is the hypothesis/aim/objective clearly stated?
Yes-1
No-0
2. Did the authors give appropriate rationale for the study?
Yes-1
No-0

Methods:

3. Is this study qualitative, quantitative, or mixed methods design?
Mixed method-3
Quantitative only-2
Qualitative only-1
Cannot tell, N/A-0
4. Indicate the study design:
Randomized control trial (intervention 1 vs. intervention 2)-5
Controlled clinical trial (placebo vs. intervention)-4
Cohort analytic (two groups pre + post)-3
Cohort (one group pre + post)-2
Cohort (one group post test only)-1
Other-0
Cannot tell-0
5. Did they address sample size/statistical power concerns?
Yes-1
No-0
Cannot tell-0
6. Is the intervention clearly stated?
Yes-1
No-0
7. Is the intervention education based?
Yes-1
No-0
8. Is the intervention electronic medical records (EMR) based?
Yes-1
No-0

9. Is the intervention a combination of education and EMR?
Yes-1
No-0
10. Did authors examine a standardized patient?
Yes-1
No-0
11. Is the target population clearly described? (e.g., obstetrician, gynecologist, family practice, pediatrician)
Yes-1
No-0
12. Did the authors target a singular population (e.g., pediatricians only)?
Yes-1
No-0
13. Did the authors target multiple populations (e.g., pediatricians and obstetricians)?
Yes-1
No-0
14. Were data collection tools shown to be valid?
Yes (numbers/alpha)- 2
Text only- 1
No-0
Not applicable-0
15. Were data collection tools shown to be reliable?
Yes (numbers/alphas)-2
Text only-1
No-0
Not applicable-0
16. Did the authors clearly state cutoff points for measure of referral for PMAD?
Yes-1
No-0
Not applicable-0

Results:

17. Is the outcome variable percentage screened?
Yes-1
No-0
18. Is the outcome variable percentage referred?
Yes-1
No-0

19. Is the outcome variable percentage screened positive?
Yes-1
No-0
20. Is the outcome variable knowledge/attitudes/skills?
Yes-1
No-0
21. Is the outcome variable something other than listed above?
Yes-1
No-0
22. Are the demographics clearly described?
Yes-1
No-0
23. Did authors directly address hypotheses/aims?
Yes-1
No-0
Not applicable-0

Discussion/Conclusion:

24. Do the authors make appropriate conclusions based on results?
Yes-1
No-0
25. Do the authors discuss study limitations or potential bias?
Yes-1
No-0
26. Do the authors discuss interpretation or application of results?
Yes-1
No-0

Appendix B. Demographic Correlates of Nonclinical and Clinical Edinburgh Scores at Intake and Follow-up

	Intake			6-Week Follow-Up				Nonclinical vs. Clinical
	Total Sample	Nonclinical	Clinical	Nonclinical vs. Clinical	Total Sample	Nonclinical	Clinical	
Intake EPDS Score								$X^2 = 29.09^{***}$
Nonclinical					231 (82.5%)	210 (87.5%)	21 (52.5%)	
Clinical					49 (17.5%)	30 (12.5%)	19 (47.5%)	
Race				$X^2 = 7.35$				$X^2 = .65$
White	194 (57.9%)	162 (59.1%)	32 (52.5%)		277 (58.2%)	242 (58.5%)	35 (56.5%)	
Black	90 (26.9%)	72 (26.3%)	18 (29.5%)		111 (23.3%)	96 (23.2%)	15 (24.2%)	
Asian/Pacific Islander	19 (5.7%)	18 (6.6%)	1 (1.6%)		36 (7.6%)	30 (7.2%)	6 (9.7%)	
Other	19 (5.7%)	12 (4.4%)	7 (11.5%)		32 (6.7%)	28 (6.8%)	4 (6.5%)	
Refused	13 (3.9%)	10 (3.6%)	3 (4.9%)		20 (4.2%)	18 (4.3%)	2 (3.2%)	
Ethnicity				$X^2 = .98$				$X^2 = .76$
No, not of Hispanic, Latino, or Spanish origin	300 (89.6%)	244 (89.1%)	56 (91.8%)		422 (88.7%)	365 (88.2%)	56 (91.9%)	
Yes, of Hispanic, Latino, or Spanish origin	20 (6.0%)	18 (6.6%)	2 (3.3%)		33 (6.9%)	30 (7.2%)	3 (4.8%)	
Refused	15 (4.5%)	12 (4.4%)	3 (4.9%)		21 (4.4%)	19 (4.6%)	2 (3.2%)	
Insurance				$X^2 = .003$				$X^2 = 1.46$
Yes	319 (95.2%)	261 (95.3%)	58 (95.1%)		454 (95.4%)	393 (94.9%)	61 (98.4%)	
No	116 (4.8%)	13 (4.7%)	3 (4.9%)		22 (4.6%)	21 (5.1%)	1 (1.6%)	
Insurance Type				$X^2 = 7.87^*$				$X^2 = 4.25$
None/self-pay	15 (4.5%)	12 (4.4%)	3 (4.9%)		21 (4.4%)	20 (4.8%)	1 (1.6%)	
Medicaid/Medicare	91 (27.2%)	66 (24.1%)	25 (41.0%)		98 (20.6%)	80 (19.3%)	18 (29.0%)	
Private	177 (52.8%)	153 (55.8%)	24 (39.3%)		284 (59.7%)	251 (60.6%)	33 (53.2%)	
Tricare	52 (15.5%)	43 (15.7%)	9 (14.8%)		73 (15.3%)	63 (15.2%)	10 (16.1%)	
Education				$X^2 = 5.16$				$X^2 = 2.06$
High School or Less	121 (36.3%)	92 (33.7%)	29 (48.3%)		130 (27.5%)	109 (26.5%)	21 (34.4%)	
Some College/College Completed	189 (56.8%)	160 (58.6%)	29 (48.3%)		286 (60.6%)	254 (61.8%)	32 (52.5%)	
Graduate Degree	23 (6.9%)	21 (7.7%)	2 (3.3%)		56 (11.9%)	48 (11.7%)	8 (13.1%)	
Employment				$X^2 = 5.07$				$X^2 = 2.07$
Unemployed	51 (15.2%)	38 (13.9%)	13 (21.3%)		52 (10.9%)	46 (11.1%)	6 (9.7%)	
Homemaker	32 (9.6%)	25 (9.1%)	7 (11.5%)		51 (10.7%)	46 (11.1%)	5 (8.1%)	

Student	21 (6.3%)	15 (5.5%)	6 (9.8%)		29 (6.1%)	23 (5.6%)	6 (9.7%)	
Employed	231 (69%)	196 (71.1%)	35 (57.4%)		344 (72.3%)	299 (72.2%)	45 (72.6%)	
Marital Status				$X^2 = 8.84^{**}$				$X^2 = 1.70$
Single	146 (43.6%)	109 (39.8%)	37 (60.7%)		182 (38.3%)	154 (37.2%)	28 (45.9%)	
Long Term Committed	189 (56.4%)	165 (60.2%)	24 (39.3%)		294 (61.7%)	260 (62.8%)	33 (54.1%)	
Relationship								
History of Depression				$X^2 = 49.22^{***}$				$X^2 = 23.09^{***}$
Yes	57 (17.0%)	28 (10.2%)	29 (47.5%)		67 (14.1%)	46 (11.1%)	21 (33.9%)	
No	278 (83.0%)	246 (89.8%)	32 (52.5%)		409 (85.9%)	368 (88.9%)	41 (66.1%)	
History of Anxiety				$X^2 = 44.92^{***}$				$X^2 = 20.19^{***}$
Yes	47 (14.0%)	22 (8.0%)	25 (41.0%)		66 (13.9%)	46 (11.1%)	20 (32.3%)	
No	288 (86.0%)	252 (92.0%)	36 (59.0%)		410 (86.1%)	368 (88.9%)	41 (67.7%)	
Number of Children				$X^2 = 1.05$				$X^2 = 3.60$
One	149 (44.5%)	120 (43.8%)	29 (47.5%)		210 (44.1%)	183 (44.2%)	27 (43.5%)	
Two	109 (32.5%)	90 (32.8%)	19 (31.1%)		158 (33.2%)	135 (32.6%)	23 (37.1%)	
Three	51 (15.2%)	41 (15.0%)	10 (16.4%)		74 (15.5%)	63 (15.2%)	11 (17.7%)	
Four+	26 (7.8%)	23 (8.4%)	3 (3.9%)		34 (7.1%)	33 (8.0%)	1 (1.6%)	
Current Pregnancy, First Child				$X^2 = .28$				$X^2 = .009$
Yes	149 (44.5%)	120 (43.8%)	29 (47.5%)		210 (44.1%)	183 (44.2%)	27 (43.5%)	
No	186 (55.5%)	154 (56.2%)	32 (52.5%)		266 (55.9%)	231 (55.8%)	35 (56.5%)	
Mean Age (years)		29.19 (SD=4.92)	27.07 (SD=5.27)	$t = 3.01^{**}$		29.78 (SD=5.11)	28.27 (SD=5.61)	$t = 2.12^*$

Note. $^* < .05$; $^{**} < .01$; $^{***} < .001$; EPDS=Edinburgh Postnatal Depression Scale.

Appendix C. Letter of Support from Dr. Karen Higgins



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(757) 683-4297 • Fax (757) 683-5253 • WWW.HS.ODU.EDU/NURSING

Oct. 21, 2018

Dear Ms. Molly Long,

I am the instructor for Nurs 760 Pharmacology for Advanced Practice Nursing in the Spring 2018. There will be 65-75 students in the class. In this course, I will offer your learning module as an extra credit assignment.

Thank you for sharing this opportunity with our students! I wish you all the best with your research!

Karen Higgins, DNP, FNP-BC
Instructor, School of Nursing

Khiggin@odu.edu
757-683-5255

Appendix D. Informed Consent to Participate in Research

Informed Consent to Participate in Research

You are being asked to participate in a research study. This form provides you with information about the study. Your participation is entirely voluntary. You can refuse to participate at any time.

All individuals who are: a) 18 or older and, b) taking part in the NURS 760 course may participate.

Title of Research Study: Implementation and Evaluation of a Perinatal Depression Educational Training for Healthcare Professionals

Responsible Project Investigator: Robert J. Cramer, Ph.D., Old Dominion University

Supporting Research Investigators: Molly Long, M.A., Old Dominion University

Purpose of this study: We are interested in learning more about effective ways of training graduate nursing students on perinatal depression and anxiety screening and treatment. Specifically, the survey you will complete asks for: a) demographic information and b) professional attitudes and knowledge about health care professional practices. Integration of such information will be used to understand and develop better perinatal depression and anxiety training for students and healthcare providers. The maximum number of subjects in the study is 200.

Time: The total online training will take approximately **one hour** to complete.

Your role: If you decide to participate in this study, you will be asked to complete a brief questionnaire both before and after the perinatal depression and anxiety training. After completion of the post-training questionnaire, you will be debriefed. You may choose to opt out of the data collection portion of the study and still receive extra credit for your course. Students will receive the same amount of credit for only watching the video or watching the video and completing the survey. After the training, you will also have the option of providing your email address to be contacted in about 3 months for a follow-up survey. Your email address is automatically loaded into a separate database from your survey responses; therefore, your survey responses cannot be linked to identify you.

Possible discomfort or risk: The questionnaire asks you to provide information about your beliefs about perinatal depression and anxiety. Therefore, you may experience mild discomfort from some of the questions. If these questions make you feel uncomfortable, you may withdraw from participation at any time. Should you need assistance with your mental health, you can locate psychological services in your area via the American Psychological Association's Psychologist Locator (<http://locator.apa.org>). In case of emergency, call 911. Alternatively, as students at Old Dominion University, you may call the ODU Counseling Services (Webb

University Center, 1526 W 49th St, Norfolk, VA 23529; (757) 683-4401) or ODU Women's Center (1000 Webb University Center, Norfolk, VA 23529; (757) 683-4109).

There are no additional foreseeable risks to you. If you wish to discuss the information above or any other risks you may experience, you may ask questions now or contact the principal investigator.

Benefits: No direct benefits will be provided. You may gain insight into your own beliefs, knowledge and skill concerning perinatal depression and anxiety. Group data from this study will help establish new approaches to perinatal depression and anxiety training, thereby contributing to improvement of care of perinatal women.

Compensation: Completion of this training brings the compensation of free training. For students currently enrolled in NURS 760, it will also bring the compensation of course extra credit.

Costs: There are no costs to you for participating.

Rights as a Research Participant: You are free to withdraw your consent and stop participation in this research study at any time without penalty.

Privacy and confidentiality: Your answers will be completely confidential. Students will be assigned a random ID number; these coded ID numbers will be used to match pre-post test results in an anonymous, de-identified database. The questionnaires further do not request any personally identifying information (i.e., name, email address, SSN, zip code), ensuring anonymity and confidentiality.

Your confidentiality will also be protected to the degree permitted by the technology being used. Data may exist on backups or server logs beyond the time frame of this research project.

Nobody beyond the research team will have access to your data. However, authorized persons from Old Dominion University and members of the Protection of Human Subjects Committee have the legal right to review your anonymous research records, but will protect the confidentiality of those records to the extent permitted by law.

If the results of this research are published or presented at scientific meetings, no identifying information will be disclosed, as none will be collected.

Contact Information: If you have questions about your rights as a research participant, please contact Dr. Tancy Vandecar-Burdin, Ph.D., IRB Chair, at (757) 683-3802 or tvandeca@odu.edu. You may also contact the Old Dominion University Office of Research at (757) 683-4293.

If you have any questions about the details of this research study, contact Molly M. Long, at mlong002@odu.edu.

We also recommend you print or save a copy of this consent form for your records.

If you do not have any questions and would like to participate in this study, please click the button below to indicate your consent. Clicking through to the next page (i.e., study survey) implies your consent.

Appendix E. Debriefing Form

Dear Participant,

You have just participated in the Management of Perinatal Mood Disorder During Pregnancy training examining the impact of an online training program on perinatal depression and anxiety related knowledge, intended screening and treatment practices, perceived behavioral control, attitudes, and subjective norms. Your valuable contribution is appreciated and will go a long way in aiding the understanding of effective education of students in perinatal depression and anxiety.

As a back-up, we recommend you save a screen shot or other electronic version of this debriefing form. To gain course extra credit, you will need to send the screen shot to your professor. Should you have other questions, please contact one of the primary investigators below.

If you would like to be contacted for data collection time point 3, please fill in your contact email address here: [LINK](#)

You still retain the right to refuse participation even if contacted. As a reminder, the time point 3 data collection will be conducted approximately 3 months after training completion.

Should you need assistance with your mental health, you can locate psychological services in your area via the American Psychological Association's Psychologist Locator (<http://locator.apa.org>). In case of emergency, call 911. Alternatively, as students at Old Dominion University, you may call the ODU Counseling Services (Webb University Center, 1526 W 49th St, Norfolk, VA 23529; (757) 683-4401) or ODU Women's Center (1000 Webb University Center, Norfolk, VA 23529; (757) 683-4109).

Thank you for your time and assistance.

Sincerely,
Molly M. Long, M.A.
Ph.D. Candidate, Health Services Research
Old Dominion University
mlong002@odu.edu

Robert J. Cramer, Ph.D.
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Appendix F. Theory of Planned Behavior Scale

Please rate your level of agreement with each statement below:

	Strongly Disagree	Disagree	Somewhat Disagree	Neither agree nor disagree	Somewhat Agree	Agree	Strongly Agree
1. I feel confident in my ability to diagnose maternal depression	1	2	3	4	5	6	7
2. I feel confident in my ability to treat (e.g., counseling, prescribing medication) maternal depression	1	2	3	4	5	6	7
3. I feel confident in my ability to screen for maternal depression	1	2	3	4	5	6	7
4. I feel confident in my ability to treat maternal depression through alternative medicine options (e.g. bright light therapy, massage).	1	2	3	4	5	6	7
5. I feel confident in my ability to refer a patient for further assessment and treatment outside of my office for maternal depression.	1	2	3	4	5	6	7
6. It is important that obstetric healthcare providers be able to recognize the signs of maternal depression	1	2	3	4	5	6	7
7. Recognizing maternal depression is my responsibility	1	2	3	4	5	6	7
8. Recognizing maternal depression is my office/practice's responsibility	1	2	3	4	5	6	7
9. Treating (e.g., counseling, prescribing medication) maternal depression in my patients is my responsibility	1	2	3	4	5	6	7
10. It is my responsibility to refer depressed mothers for further mental health treatment	1	2	3	4	5	6	7
11. My colleagues think it is important to screen for maternal depression and anxiety.	1	2	3	4	5	6	7
12. My colleagues often screen for maternal depression and anxiety.	1	2	3	4	5	6	7
13. My colleagues think it is important to treat maternal depression and anxiety.	1	2	3	4	5	6	7
14. My colleagues often treat maternal depression and anxiety.	1	2	3	4	5	6	7
15. The American College of Obstetricians and Gynecologists recommends I screen for maternal depression and anxiety.	1	2	3	4	5	6	7
16. The American College of Obstetricians and Gynecologists recommends that I treat maternal depression and anxiety in my patients when they screen positive.	1	2	3	4	5	6	7

Appendix G. Intended PD Screening and Treatment Practices Scale

Pre-Intervention:

You may have worked with obstetric populations in the past. If so, please rate how often you perform each item below:

If you have not, please respond with how your previous training and/or professional experience has prepared you to do the following:

	Never	Rarely	Sometimes	Often	Always
1. Screen my patients for perinatal depression and anxiety.	0	1	2	3	4
2. Treat my patients for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
3. Use validated screening tools to screen for perinatal depression and anxiety.	0	1	2	3	4
4. Educate my patients on medication options for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
5. Educate my patients on psychotherapy for perinatal depression and anxiety when they screen positive.	0	1	2	3	4

Thinking about your professional role as a nurse, how important is it to you to:

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1. Screening my patients for perinatal depression and anxiety.	0	1	2	3	4
2. Treating my patients for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
3. Using validated screening tools to screen for perinatal depression and anxiety.	0	1	2	3	4
4. Educating my patients on medication options for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
5. Educating my patients on psychotherapy for perinatal depression and anxiety when they screen positive.	0	1	2	3	4

Post-Intervention:

Thinking about your future practice as a nurse, please rate how often you intend to perform each item below:

	Never	Rarely	Sometimes	Often	Always
1. I intend to screen my future patients for perinatal depression and anxiety.	0	1	2	3	4
2. I intend to treat my future patients for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
3. I intend to use validated screening tools to screen for perinatal depression and anxiety.	0	1	2	3	4
4. I intend to educate my patients on medication options for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
5. I intend to educate my patients on psychotherapy for perinatal depression and anxiety when they screen positive.	0	1	2	3	4

Thinking about your professional role as a nurse, how important is it to you to:

	Not at all Important	Slightly Important	Moderately Important	Very Important	Extremely Important
1 Screening my patients for perinatal depression and anxiety.	0	1	2	3	4
2 Treating my patients for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
3 Using validated screening tools to screen for perinatal depression and anxiety.	0	1	2	3	4
4 Educating my patients on medication options for perinatal depression and anxiety when they screen positive.	0	1	2	3	4
5 Educating my patients on psychotherapy for perinatal depression and anxiety when they screen positive.	0	1	2	3	4

Appendix H. Knowledge Quiz

Knowledge Quiz

1. What are some of the common symptoms of depression during pregnancy?
 - A. sad or depressed mood
 - B. fatigue or loss of energy
 - C. having trouble thinking, concentrating or making decisions
 - D. all of the above
2. What treatment options may be acceptable for pregnant women experiencing depression?
 - A. Cognitive Behavioral Therapy (CBT)
 - B. Interpersonal Therapy (IPT)
 - C. Antidepressant medication
 - D. All of the above
3. Which of the following are NOT one of the 5 As for patient centered counseling:
 - A. Assess
 - B. Advise
 - C. Articulate
 - D. Agree
4. If patients are not ready to participate in treatment, providers can use the 5 R's. Which of the following is not one of the 5 R's?
 - A. Relevance
 - B. Risks
 - C. Receptiveness
 - D. Roadblocks
5. All of the following are recommendations from The American College of Obstetricians and Gynecologists, EXCEPT:
 - A. Medical practices should have a referral process for mental health and psychiatric specialists if needed.
 - B. The Edinburgh Postnatal Depression Scale (EPDS) should be the only tool used to screen women for maternal depression.
 - C. Women with current depression or a history of depression should be closely monitored during pregnancy.
 - D. Women with a positive screen require further evaluation and treatment.
6. Approximately how many women experience major depression during pregnancy in the general population?
 - A. 5%
 - B. 12%
 - C. 25%
 - D. 45%

7. Antenatal depression has been associated with all of the following EXCEPT:
- A. Increased medical care
 - B. Compromised fetal outcomes
 - C. Increased birth weight
 - D. Pregnancy complications
8. Perinatal depression symptoms may appear during pregnancy, after birth, or within how long after giving birth?
- A. 1 year
 - B. 6 months
 - C. 3 years
 - D. 3 months
9. To meet DSM-5 criteria for major depressive disorder or a major depressive episode, all of the following must be true EXCEPT:
- A. Symptoms cause clinically significant distress or impairment in social, occupational, or other areas of functioning
 - B. Symptoms are due to the effects of a substance or another medical condition
 - C. Occurrence is not better explain by another psychotic disorder
 - D. Patient has never experienced a manic or hypomanic episode
10. According to the American College of Obstetricians and Gynecologists and the American Psychiatric Association, prescribing medication for pregnant women depends on all of the following EXCEPT:
- A. Safety profile of the medication
 - B. State of Gestation
 - C. Patient's specific symptoms
 - D. Patient's age

VITA
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Health Services Research
Cognate: Applied Methods in Health Sciences
Dissertation: Depression Among Expectant and New Mothers: A Multi-Study Investigation of Rates, Correlates, and Training for Healthcare Providers

Master of Arts, University of Indianapolis, Indianapolis, IN August 2016
Clinical Psychology
Thesis: Community-Based Exercise Intervention for Depression in Diabetes

Bachelor of Arts, Ohio University, Athens, OH May 2014
Psychology
Thesis: Behavioral and Mood Changes in Response to Cardiac Rehabilitation

Publications:

- Cramer, R.J., Ireland, J.L., Hartley, V., **Long, M.M.**, Ireland, C.A., & Wilkinson, T. (In Press). Coping, Mental Health, and Subjective Well-being among Mental Health Staff working in Secure Forensic Psychiatric Settings: Results from a Workplace Health Assessment. *Psychological Services*.
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