

University of Mississippi

eGrove

Honors Theses

Honors College (Sally McDonnell Barksdale
Honors College)

Spring 5-9-2020

The Nightmare Before Delivery: A Study of Nightmares, Depressive Symptoms, and Suicidality in Pregnant Women

Denise Frantz

University of Mississippi

Follow this and additional works at: https://egrove.olemiss.edu/hon_thesis



Part of the [Mental Disorders Commons](#), and the [Psychological Phenomena and Processes Commons](#)

Recommended Citation

Frantz, Denise, "The Nightmare Before Delivery: A Study of Nightmares, Depressive Symptoms, and Suicidality in Pregnant Women" (2020). *Honors Theses*. 1570.

https://egrove.olemiss.edu/hon_thesis/1570

This Undergraduate Thesis is brought to you for free and open access by the Honors College (Sally McDonnell Barksdale Honors College) at eGrove. It has been accepted for inclusion in Honors Theses by an authorized administrator of eGrove. For more information, please contact egrove@olemiss.edu.

The Nightmare Before Delivery: A Study of Nightmares, Depressive Symptoms, and Suicidality
in Pregnant Women

by
Denise Ann Frantz

A thesis submitted to the faculty of The University of Mississippi in partial fulfillment of
the requirements of the Sally McDonnell Barksdale Honors College.

Oxford
June 2020

Approved by

Advisor: Danielle Maack, Ph.D.

Reader: John Young, Ph.D.

Reader: Rebekah Smith, Ph.D.

ACKNOWLEDGEMENTS

I would, first, like to thank the Sally McDonnell Barksdale Honors College for giving me the opportunity to complete this thesis, for providing me with this wonderful experience, and for connecting me with the most inspiring people I have ever met throughout my 4 years at the University of Mississippi. I would next like to thank my amazing advisor, Dr. Danielle Maack, for helping me every step of the way, for always being available when I needed, and for helping me learn so much more about these important topics that I will be able to take with me into the future and, hopefully, help others with. Next, thank you to my committee for being patient and willing to join me throughout this journey. Additionally, a special thank you to my fellow research assistant, Brittany Spence. You have truly been integral part of this thesis and a great resource to me, and I am very grateful for all of your help. Lastly, to my friends and family, thank you so very much for the endless support and love throughout this process. I could not have done it without all of you.

ABSTRACT

The Nightmare Before Delivery: A Study of Nightmares, Depressive Symptoms, and Suicidality in Pregnant Women
(Under the direction of Danielle Maack, Ph.D.)

Pregnancy is notoriously a time of immense changes. Some of which are characterized by disturbances in sleep such as trouble falling asleep, trouble staying asleep, waking after sleep onset, snoring, leg discomfort, and nightmares (Foley, Ancoli-Israel, Britz, and Walsh, 2004; Lee and Gay, 2004; Köthe & Pietrowsky, 2001). Nightmares specifically have been associated with depressive symptoms and suicidality in non-pregnant individuals (Cukrowicz et al., 2006; Tanskanen et al., 2001), but these relations are not as well understood in the pregnant population. The aim of this study was to assess any potential relation between nightmares and depressive symptoms and suicidality in a pregnant sample. In an OBGYN clinic in Mississippi, 440 pregnant women completed the Pittsburgh Sleep Quality Index to assess nightmares, the Depression Anxiety Stress Scale-21 to evaluate depressive symptoms, and the Edinburgh Postnatal Depression Scale for suicidality. Using correlation analyses, it was found that nightmares were significantly associated with depressive symptoms in a positive direction and that nightmares were not related to suicidality in the pregnant sample. These findings support the existing research and emphasize the importance of understanding how nightmares relate to depression and suicidality in order to improve treatment for pregnant women. Future research is imperative to understanding these relations even more.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	ii
ABSTRACT	iii
INTRODUCTION	1
METHODS.....	28
RESULTS	30
DISCUSSION.....	32
CONCLUSION.....	36
LIST OF REFERENCES.....	37

INTRODUCTION

Sleep

Sleep is a very important aspect of daily life. While sleeping may seem like a very dull time, the body is actually undergoing a lot of involuntary processes that have to do with regeneration, recovery, and realignment of other processes (Eidelman, 2002). Unfortunately, sleep in many people is disturbed. Disturbed sleep includes trouble falling asleep, trouble staying asleep, waking after sleep onset, snoring, leg discomfort, or nightmares (Foley, Ancoli-Israel, Britz, and Walsh, 2004; Lee and Gay, 2004; Köthe & Pietrowsky, 2001). Foley, Ancoli-Israel, Britz, and Walsh (2004) used data from the National Sleep Foundation's *Sleep in America* study assessing 1,506 men and women in the United States and observed that 33% of people with one or more sleep problems reported having overall fair or poor sleep. Various studies have suggested that poor sleep has negative repercussions such as decreased immunity, hormonal changes, mood changes, attention difficulties, and lower overall well-being (Köthe and Pietrowsky, 2001; Irwin, 2002; American Sleep Association, n.d.). Additionally, nightmares as a specific sleep disturbance have been known to have positive associations with depression and suicidality as well (Cukrowicz et al., 2006; Marinova et al., 2014; Tanskanen et al., 2001; Bernert et al., 2005). These reports all indicate that sleep and sleep disturbances are extremely important and are areas that need to be researched more.

Sleep disturbances in the general population must be assessed. In a research study by Grandner et al. (2012), the frequency of sleep complaints across various age groups, gender,

health statuses, and depressed moods was assessed. Participants (N = 155,877) were recruited from the Behavioral Risk Factor Surveillance System, an annual, state based, random digit dialed phone survey of all adults over the age of 18. All participants responded to questions about sleep disturbances (SLEEPDIST) and on their tiredness or lack of energy (TIREDNESS). In order to assess SLEEPDIST, participants were asked about experiencing any trouble falling asleep, staying asleep, or sleeping too much and about any tiredness or lack of energy to assess TIREDNESS. Additionally, depressive symptoms were assessed by asking about the frequency that the participants felt “down or depressed” within the last two weeks. Results showed that at ages 18-24, 25.1% women and 18.1% men reported sleep disturbances with 29.9% women and 19.6% men reported tiredness. At ages 50-54, 24.2% women and 16.1% men reported sleep disturbances with 26.4% women and 18.1% men reporting tiredness, and at ages 80+, 17.7% women and 15.4% men reported sleep disturbances with 25.3% women and 22.9% men reporting tiredness. It was also found that individuals with depressed mood were associated with higher levels of SLEEPDIST and TIREDNESS in both men and women compared to those without a depressed mood. Results from this study suggest that not only is sleep disturbance a fairly common experience in adulthood, but also demonstrate that women experience these rates at a higher level than men. Additionally, endorsement of depressed mood was seen in both men and women with higher sleep disturbance.

Another study of interest completed by Foley, Ancoli-Israel, Britz, and Walsh (2004) aimed to assess potential relationships between sleep problems and chronic disease (including depression) in older adults. Data were used from the National Sleep Foundation’s *Sleep in America* survey, a 20-minute telephone interview of 1,506 community-dwelling men and women ages 55-84 between September 17 – December 10, 2002. All participants were asked to answer

questions about the frequency that they experience any of the following sleep problems: difficulty falling asleep, being awake frequently in the night, waking up too early and difficulty falling back asleep, waking up feeling unrefreshed, snoring, pauses of breathing during sleep, unpleasant feelings in legs, and daytime sleepiness interfering with regular activities. Participants were also asked if they had ever been diagnosed with certain health conditions, including depression. The results reported that in participants with no reported medical conditions, 10% still perceived their sleep quality as “fair/poor”, 38% reported their sleep as “good”, and 52% reported “excellent/very good”. Further, those experiencing depression were 2.19 times more likely to report daytime sleepiness, 2.84 times more likely to report breathing pauses, and 1.64 times more likely to report unpleasant feelings in the leg. Depression was reported in 15.9% of all participants. Specifically, 11.4% of men and 19.3% of women reported depression. In both genders, the 55-64 year old age group reported highest rates of depression. Overall, it was found that 33% of people with one more sleep problems (difficulty falling asleep, waking in the night, waking too early, waking unrefreshed, daytime sleepiness, breathing pauses, snoring, unpleasant leg sensations, or sleeping less than 6 hours) reported having fair or poor sleep, suggesting that sleep disturbances can lower the perception of overall sleep quality. This study illustrated the ubiquity of the experience of disturbed sleep in general and how this experience is magnified with depressive symptoms.

There are very serious negative implications associated with sleep disturbances, such as decreased immunity, hormonal changes, mood changes, and lower overall well-being (Köthe and Pietrowsky, 2001; Irwin, 2002). The American Sleep Association (n.d.) defines sleep deprivation as a shortage of sleep and mentions various negative effects that include excessive daytime sleepiness, accidents from lack of attention, moodiness, hunger, slowed growth, and decreased

memory. A literature review by Irwin (2002) assessed effects of sleep deprivation; particularly, factors that influence cytokine changes in those with disturbed sleep. In reference to cytokine changes and sleep, it was noted that interleukin-6 (IL-6) levels, a specific pro-inflammatory cytokine involved in various immune responses, become altered when sleep is disturbed. Normally, IL-6 levels increase upon sleep onset and peak around 2.5 hours after, but after just two nights of only partial sleep deprivation, it was observed that the levels of IL-6 peak 3 hours after sleep onset. Specifically, Irwin discusses how increased REM sleep is associated with increased sleep-related secretions of IL-6, which could lead to elevated inflammation or increased risk for cardiovascular disease. Interestingly, Irwin noted that individuals suffering from alcohol dependence and depression have been known to experience more REM sleep and could be at a higher risk for these negative inflammatory processes due to the sleep-related alterations in IL-6 levels. Another important highlight from the literature review was that research has shown that total sleep time, sleep efficiency, and amount of non-REM sleep are all positively correlated with natural killer (NK) cell activity, regardless of mood disorders. This means that when sleep is disturbed, there is less NK cell activity, which can decrease the efficiency of the immune system. This trend has been extended to sleep deprivation's effect on T-cells and monocyte functioning as well. This is relevant as all of these cells are necessary in the immune system defense and underscore the importance of restful sleep.

Related to disturbed sleep, Köthe & Pietrowsky (2001) sought to analyze the behavioral consequences the day after experiencing a nightmare. Nightmares were defined as frightening dreams characterized by “dread and terror” that are often recalled in detail upon awakening that may or may not have caused the dreamer to awaken in the middle of the night. This study utilized 41 participants (10 males and 31 females) who experienced at least 2 nightmares a

month and recorded their sleep quality and dreaming for 4 weeks via a series of self-report questionnaires. Every participant completed the Social Readjustment Rating Scale and the Freiburger Personality Inventory – Revised Version to assess life events and personality traits, respectively. Each morning the State-Trait-Anxiety-Inventory was used to assess anxiety symptoms, the “Befindlichkeitsskala” (a standardized German mood scale) was completed to assess mood, and participants logged their sleep patterns and dreams. The day after a nightmare, participants were asked to complete the Nightmare Behavior Questionnaire, a questionnaire designed for this study specifically that assessed “functional/dysfunctional cognitions, physical reactions, emotions and strategies of coping”. Results indicated that 57.6% of the participants responded that their quality of sleep after a nightmare was restless and uncomfortable, and subjects were more anxious and had a lower well-being compared to nights without nightmares. These results suggest that nightmares, as a form of sleep disturbances, can have large impacts on daily life and mood throughout the day.

As previously mentioned, nightmares and bad dreams can be considered forms of sleep disturbances. One definition of a nightmare is having a bad dream that caused the dreamer to awaken and disrupted sleep (Lara-Carrasco et al., 2014). In a study by Cukrowicz et al. (2006), the researchers aimed to determine the frequency of insomnia and nightmares and to assess potential relations between disturbed sleep, depressive symptoms, and suicidality in a general population. The study was conducted in a sample of 222 undergraduate, non-treatment seeking students at Florida State University. Participants were asked to complete the following computerized questionnaires during a lab visit: Insomnia Severity Index (for symptoms and consequences of insomnia), Disturbing Dreams and Nightmare Severity Index (assesses disturbing dreams and nightmares), Depression Severity Index – Suicide Subscale (for the

frequency and degree of suicidal ideation), Beck Depression Inventory (to identify depressive symptoms). Regression analyses were run to test if sleep problems were predictors of depressive symptoms or suicidality. Results indicated that disturbing dreams and nightmares were significant predictors of suicidality and of depression. Specifically, 8% of participants experienced disturbing dreams and 6% experienced nightmares and insomnia. With respect to suicidality, the group with no sleep problems average DSISS score was 0.3, the insomnia problems only group scored 0.8, the nightmare problems only group scored 1.9, and the group who experienced both nightmare and insomnia problems scored 1.5 on the DSISS. Thus, the group that scored the highest on the DSISS (assessment of suicidal ideation) was the group that experienced nightmares only and no insomnia. Also, it was found that nightmares were associated with higher suicidality than those who did not experience nightmares. These results suggest that nightmares alone are a unique predictor of suicidality, which indicates the need for further research to better understand why nightmares could have such a relationship with suicidality.

Similarly, Tanskanen et al. (2001) aimed to assess the relations between nightmare frequency and risk of suicide. Participants (N = 36,211; 17,700 men and 18,511 women) in Finland were recruited over a 20-year period, starting in 1972 and ending in 1992, as part of the National Finrisk Study. Participants were mailed a series of self-report questionnaires that asked about socio-economic factors, medical history, health behavior, and psychosocial factors. Additionally, all were asked to bring their responses to research sites where nurses examined height, weight, blood pressure, and took a blood sample. In this study, risk of suicide was calculated using a regression model that controlled for gender, age, marital status, employment status, smoking, alcohol intake, coffee drinking, physical activity, symptoms of insomnia, depressed mood, life stress and anxiety, psychotropic medication, serum cholesterol

concentration, and survey year. Results indicated that 45.6% of women and 37.1% of men experienced nightmares and that nightmare frequency was directly related to risk of suicide. Additionally, the results indicated that people who had nightmares occasionally demonstrated a 57% higher risk of death by suicide than people with no nightmares, and people who had frequent nightmares were 105% higher risk for suicidal death. These results suggest that disturbed sleep, especially nightmares, may be an especially important area of further research as it appears to be significantly related to suicidal behaviors.

Sleep in Pregnancy

Research has shown that nightmares and disturbed sleep have negative effects in the general population. In the pregnant population, there are negative outcomes for the mother due to disturbed sleep, such as poor sleep quality, waking after sleep onset/poor sleep continuity, and short sleep time (Lee and Gay, 2004; Okun, Roberts, Marsland, and Hall, 2009; Zafarghandi et al., 2012; Chang, Pien, Buntley, Macones, 2010). Lee and Gay (2004) investigated fatigue and sleep disturbances in late pregnancy and associations with labor duration and delivery type. A sample of 131 women in their third trimester was assessed. All participants wore a wrist actigraph for 48 hours in the last month of pregnancy in order to gather data on sleep quantity as a whole (TST) and to assess sleep quality as wake after sleep onset (WASO), an estimate of sleep deprivation that divides the number of minutes spent awake by the number of minutes spent in bed after falling asleep. Typically, WASO of 15% is generally one hour spent awake after sleep onset, and for this study, WASO of 15% was indicative of severe sleep disruption. Participants also kept a 48-hour sleep log documenting bed times, wake times, and ratings of sleep quality. The General Sleep Disturbance Scale was used to measure prenatal sleep disturbances, and the Visual Analog Scale for Fatigue was used to estimate participant's fatigue.

After delivery, women were asked to report on type of delivery, length of labor, and infant birth weight. From the sample of 131 pregnant women, 41 experienced 15%+ WASO. Additionally, 19 women indicated sleeping for less than 6 hours which is indicative of severe sleep restriction. Results suggested that women who experienced severe sleep disruptions and sleep restrictions experienced overall longer labor times than women who experienced little to no sleep disruptions. Further, women who experienced severe sleep restriction and disruptions were 5.2 times more likely to have cesarean deliveries than women who had little to no sleep disruptions and/or averaged 7 hours of sleep per night. These findings suggest that sleep can have serious influences on pregnancy outcomes and that proper sleep might help avoid a longer labor or surgical, cesarean delivery.

Pregnancy has been known to be a time of vast sleep changes (Facco, Kramer, Ho, Zee, and Grobman, 2010; Hertz et al., 1992). Facco, Kramer, Ho, Zee, and Grobman (2010) aimed to estimate the frequency and pattern of sleep disturbances in healthy, nulliparous pregnant women. Participants, 189 pregnant women, were asked to complete the Berlin Questionnaire to assess sleep disordered breathing, the Epworth Sleepiness Scale to determine level of daytime sleepiness, the National Institutes of Health/International Restless Legs Syndrome Question Set for symptoms of restless leg syndrome, Women's Health Initiative Insomnia Rating Scale to assess insomnia symptoms, and the Pittsburgh Sleep Quality Index to assess overall sleep quality and sleep disturbances over the last month. These self-report questionnaires were completed early in the pregnancy (6-20 weeks) and again in the third trimester in order to compare changes. Results illustrated that, from Time 1 to Time 2 the following: rates of snoring increased from 11% to 16%, the amount of women meeting criteria for restless leg syndrome increased from 17.5% to 31%, the frequency of women sleeping a short duration increased from 26% to 39.9%,

and, lastly, the amount of women reporting poor overall sleep quality jumped from 40% to 53.5%. These results greatly demonstrate that sleep disturbances are common in pregnancy and that sleep disturbances worsen as pregnancy continues.

Similarly, Hertz and associates (1992) aimed to study sleep patterns, respiration and leg muscle electromyography. In a sample including 12 pregnant women in their third trimester and a control group of 10 non-pregnant women, participants completed a pre-sleep questionnaire (rating the frequency experiencing restless sleep, snoring, lower back pain, leg cramps, bad dreams, and morning headaches) and were asked to rate their sleepiness with the Stanford Sleepiness Scale. Next, electrodes were applied to various body parts and participant breathing effort, oxygen saturation, and position changes while sleeping were all monitored in the sleep laboratory for one night. This procedure was repeated postpartum with seven of the original participants to compose the postpartum data. The results indicated that 33% of pregnant women reported that their sleep was “always” restless and disturbed and 50% reported that their sleep was “occasionally” disturbed (compared with 0% and 60%, respectively, for non-pregnant women). Additionally, 75% of pregnant women endorsed experience of leg cramps, 67% back pain, and 58% morning headaches (compared with 0%, 20%, and 10% in the non-pregnant sample, respectively). For follow-up, 7 of the 12 pregnant women returned to complete the study again postpartum. After delivery, several changes were noted in the postpartum group: 28% had leg cramps, 57% reported back pain, 72% headaches, and 57% experienced restless sleep. In terms of bad dreams, it was reported that 75% of pregnant women had them sometimes, 50% of non-pregnant women experienced them sometimes, and 57% of postpartum women reported them as well. These results demonstrate that late pregnancy is a time of multiple sleep disturbances and difficulties possibly due to discomfort and pains accompanied with pregnancy.

Since it has been established that nightmares are a form of sleep disturbance in the general population, it is important to analyze the prevalence of nightmares and bad dreams in the pregnant population as well. Lara-Carrasco and colleagues (2014) assessed nightmares in 116 healthy women (57 were pregnant and 59 were not) in Quebec, Canada in order to determine dream recall and disturbed dreaming in late pregnancy. All women were asked to complete demographics, the Spielberger State and Trait Anxiety Inventory to measure anxiety, the Sleep Disorders Questionnaire to assess dream recall, the Edinburgh Postnatal Depression Scale to assess depressive symptoms in pregnant women, and the Beck Depression Inventory for assessment of depressive symptoms in non-pregnant women. A 14 day dream log was also used to track up to 3 dreams per night including questions about the dreams and whether or not the dream resulted in awakening. Additionally, the participants reported how much they slept, overall sleep quality, and night interruptions. The researchers used the total number of negative dreams (bad dreams and nightmares) to get an estimate of overall “dream recall” and then separated this to obtain “bad dream recall” and “nightmare recall”. The results of this study indicated that in terms of normal dreaming, pregnant women recalled more dreams than non-pregnant women. In terms of general disturbed dreaming, 84.2% of pregnant women and 80% of non-pregnant women reported disturbed dreams in the 2-week period. Additionally, 21% of the pregnant women experienced a moderately severe nightmare pathology (>1 nightmares/week) as compared to 7% of the not pregnant women. The conclusions from this study suggest that pregnant women have more nightmares than women who are not pregnant which can negatively impact overall sleep.

The second study of interest was completed by Blake and Reimann (1993) in order to examine the frequency of pregnancy related dreams and to assess the extent that the dreams were

discussed with prenatal care providers. Pregnant women (N = 88), who were all receiving care at the University of Missouri – Columbia Family Medical Care Center, completed a 2 page self-report questionnaire including assessment of trouble sleeping and whether or not the mother discussed any bad/disturbing dreams with the father of the child or with a health care provider. Additionally, prenatal care providers at the Family Medical Care Center were also surveyed about whether or not they had discussed pregnancy related dreams with any patients, and if so, how many. The results of the study reported that 67% of women experienced at least one pregnancy related dream and 37% responded that they had at least one frightening pregnancy related dream, with 17 women reported being upset about such a dream. Also, it was found that the frightening pregnancy dreams were more common as gestational age increased. In terms of discussing their dreams, of the 59 women who had a pregnancy related dream, 20% told no one, 32% talked to their mother, 58% talked to the father of the baby, 34% talked to a friend, and 3% talked to their prenatal care provider. These data suggest that many pregnant women do experience dreams about their unborn child and that many can be frightening. These results help support that nightmares in pregnant women is an area that is in need of more research.

Lastly, Schredl et al. (2016) were interested in comparing nightmare frequency between pregnant and not pregnant women and to assess if daytime stress might also relate to nightmare frequency. Pregnant women in their last trimester (N = 406) were recruited from an obstetric hospital. They were asked to rate dream recall and nightmare frequency over the last few months and complete a packet of questionnaires including the Prenatal Attachment Inventory, German NEO Five-Factor-Inventory to measure trait neuroticism, the Perceived Stress Scale to measure daily life stress, the Edinburgh Postnatal Depression Scale for depressive symptoms, the Anxiety Screening Questionnaire to monitor anxious symptoms, and lastly, the Prenatal Distress

Questionnaire about pregnancy related distress. Data collected for this study were from a larger study called POSEIDON and were compared to a similar, representative sample of 496 women who were not pregnant. Results suggested that approximately 11% of pregnant women experienced at least one nightmare per week compared with approximately 2% of non-pregnant women. Also, pregnant women reported more dream recall than the representative sample of not pregnant women. Related to the distress measures, all seven of the stress measures reported a positive relationship with nightmare frequency in pregnant women. These results suggest that daytime stress is related to the frequency of nightmares experienced and that women in their last trimester experience more nightmares than the representative, non-pregnant sample.

A very interesting theory, the continuity hypothesis, has been proposed to help explain some of the increased nightmares or pregnancy related dreams. The continuity hypothesis posits the idea that dreams reflect daytime thoughts, concerns, and mood states in all populations (pregnant or not). In a study completed by Pesant and Zadra (2006), the researchers aimed to test the continuity hypothesis by assessing the relationship between individual's personal well-being and everyday dreams. Participants (24 female and 4 male) completed a Sleep/Dream Questionnaire and a series of self-report questionnaires about their psychological well-being. Additionally, participants were asked to keep a dream journal for 14 days where they logged any dreams they could remember, the feelings associated with it, the clarity of the dream, and the date. The traits of personal well-being assessed were neuroticism, trait anxiety, depression, and general psychopathology measured by the Neuroticism Scale of the Eysenck Personality Inventory, the State-Trait Anxiety Inventory scale, the Beck Depression Inventory, and the General Symptom Index of the Symptom Checklist-90-Revised, respectively. Dream recalled content was categorized by trained judges into groups based on "positive and negative affect",

“friendly and aggressive interactions”, and “successes and good fortune and failure and misfortune experiences”. It was ultimately determined that the greater one’s personal well-being was, the more positive their dream content was. Additionally, the greater one’s self-reported low affect was, the more their dreams tended to be negative (aggressive interactions v. friendly, negative emotions v. positive ones, failures and misfortunes v. successes) both at fixed points in time and over time as well. These results support the continuity hypothesis and suggest that dream content is influenced by the daytime overall well-being.

Okun, Roberts, Marsland, and Hall (2009) completed a literature review on disturbed sleep and adverse maternal pregnancy outcomes. The aim of this literature review article was to propose a model and hypothesis of how disturbed sleep during pregnancy could relate to adverse outcomes such as preeclampsia, intrauterine growth restriction, and preterm birth via increased inflammation. Disturbed sleep has been known to exacerbate cardiovascular risk factors such as obesity and insulin resistance, both of which are associated with adverse pregnancy outcomes. Body Mass Indices >30 have been associated with preeclampsia and preterm birth, and increased insulin resistance has been associated with increased preeclampsia and growth restricted babies. These adverse pregnancy outcomes are associated with increased inflammation and oxidative stress, which are also characteristic of cardiovascular disease. Okun and associates discuss how pregnant women commonly report poor sleep quality and poor sleep continuity while pregnant. These disturbances are all associated with the activation of the inflammatory response which can, in turn, disrupt sleep more. Additionally, disturbed sleep can activate the sympathetic nervous system which can produce even more inflammatory cytokines. These associations discussed suggest that pregnant mother who do not sleep properly can be at increased risk for cardiovascular disease, preeclampsia, obesity, insulin resistance, and increased inflammation.

Maternal disturbed sleep has also been associated with adverse effects for the infant as well. A cross-sectional study done by Zafarghandi et al. (2012) analyzed the effects of maternal sleep duration on labor and fetal outcomes. Primigravida women (N=457) who were at least in their 37th week of gestation and their subsequent newborns were assessed. The women were asked to complete a self-report questionnaire related to demographics and length and quality of sleep. Data pertaining to type and length of delivery, infant Apgar scores, and birth weight were gathered at the time of the delivery itself. General results were 66.4% of pregnant women reported having more than 8 hours of sleep with 66.9% reported feeling refreshed. In participants getting 8+ hours of sleep, 45% had a normal vaginal delivery with induction and 58% had babies with Apgar scores > 9. Comparatively, in the women who slept less than 8 hours, only 25% had a vaginal delivery with induction and 31% had babies with Apgar scores > 9. This suggests that more sleep is associated with more normal delivery types (as opposed to the invasive surgery method involved in cesarean deliveries) and better fetal outcomes, while more disturbed sleep is associated with more adverse fetal outcomes, such as lower Apgar scores.

Chang, Pien, Buntley, and Macones (2010) completed a literature review about consequences of maternal sleep disturbance for infants. The authors first discuss how women are generally very sleep deprived due to increased presence in the work force, without decreases in home responsibilities. Therefore, sleep is often not prioritized and these women experience more sleep deprivation. Further, it was noted that pregnant women generally report less sleep than what they need. Additionally, Chang and associates discussed how a lack of sleep can cause elevated levels of pro-inflammatory cytokines, such as IL-1, IL-2, and IL-6, as well as tumor necrosis factor and C-reactive protein that have been connected to postpartum depression and preterm deliveries. Sleep disturbances are also associated with increased risk due to the elevated

stress response and inflammation which has been known to trigger cervical ripening and promote uterine contractions (Goldenberg, Culhane, Iams, and Romero, 2008). This is a concern as preterm deliveries are a leading cause of infant mortality.

Depression

Kessler and Bromet (2013) define Major Depressive Disorder as a “commonly occurring, serious, recurrent disorder linked to diminished role functioning and quality of life, medical morbidity, and mortality” (p. 120). In order to qualify for a diagnosis of Major Depressive Disorder, one must have at least 5 of the symptoms nearly every day during a 2-week period (with one symptoms needing to be depressed mood and/or anhedonia), and the symptoms must be different than the individual’s usual functioning. Depressive symptoms include depressed mood, anhedonia (inability to experience pleasure), worthlessness or guilt, suicidal ideation, plan, or attempt, fatigue, losing sleep or sleeping too much, weight changes or increased or decreased appetite, decreased ability to concentrate, and psychomotor retardation or agitation.

Major Depressive Disorder is a very serious disorder that affects many people. In fact, Kessler and Bromet (2013) reviewed epidemiologic studies on major depressive disorders (MDD) and major depressive episodes (MDE). In a study noted in the article, 10 population-based surveys were administered in various countries using the Diagnostic Interview Schedule (DIS) and the DSM-III criteria for depression. It was found that in the United States, the lifetime prevalence for MDD IS 16.9% and 12-month prevalence is 10%. Various research has suggested that the rates of depression are different for men and women.

Pratt and Brody (2008) compiled data on the prevalence of depression in the United States from 2005-2006 using data from the National Health and Nutrition Examination Survey

(NHANES). In this article, depression was characterized by mood changes, alterations in self-attitude, cognitive functioning, sleep, appetite, and energy levels that leads to lower quality of life and impairment of regular functioning. Specifically, in the NHANES study, depression was defined by a score of 10 or higher on the Patient Health Questionnaire (PHQ-9). Results indicated that 5.4% of Americans (ages 12 and older) experienced depression. Specifically, 6.7% of women and 4.0% of men endorsed scores high enough to indicate depression. Additionally, around 80% of people with depression reported that their regular functioning was impaired due to the depression. These results suggest that, in the United States, women experience more depressive symptoms than men, and that those who do experience depressive symptoms are highly affected by them.

Similar to Pratt and Brody (2008), an editorial by Albert (2015) offered that the prevalence of depression in women in the United States was 5.5% and 3.2% in men in 2010. In this paper, Albert cited different reasons that could contribute to this sex difference. One of the suggestions discussed was that females tend to have more internalized focus (such as interpersonal relationships) and men have externalized focus (like concern for their job or goals). Additionally, he noted that female hormones could be a contributing factor as well citing that, in females, depression rates fluctuate the most with times of great hormonal changes (such as puberty, pregnancy, and perimenopausal periods). Overall, this editorial offers reasonable assertions for the statistic that women generally experience depression more often than men.

In a literature review discussion article, Nolen-Hoeksema (2001) discusses the gender differences in depression. First, she notes that the lifetime prevalence of major depressive disorder in women is 21.3% while in men it is 12.7%. She also indicates that women are twice as likely to develop depression than men regardless of cultural differences, different regions, and

ethnicities. She goes on to cite various reasons that could be involved in this gender difference. The first is that women are exposed to more stress than men throughout their lives from societal/cultural issues, and women handle stress in a different way than men, which is the second main point of the article. Various research suggests that women are more likely to have a dysregulated hypothalamic-pituitary-adrenal (HPA) response to stress; the HPA axis is a main part of the stress response and includes regulation of cortisol (Okun, Roberts, Marsland, and Hall, 2009). Cortisol is a hormone known to affect mood, and elevated levels of cortisol have been seen in people with depression. Additionally, Nolen-Hoeksema discusses how women are more likely to cope with stress with rumination, which puts people at a higher risk for developing depression and depressive symptoms. Overall, this article suggests that women are at higher risk for developing depression than men, and depression is more commonly seen in women than men.

Ertel, Rich-Edwards, and Koenen (2011) examined the trends of Major Depressive Disorder in women who are mothers. Data were used from the 2001-2002 National Epidemiologic Survey of Alcohol and Related Conditions survey that consisted of in-person semi-structured interviews with 43,093 participants. For this study, women who had at least one child, were at least 18 years of age, and lived with a child were considered “mothers” (N=8,916). The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV was used to assess psychiatric disorders, and the 12-item Short Form Health Survey was used to examine functioning and impairment. Results indicated that 10.2% of mothers experienced Major Depressive Disorder within the last 12 months. Additionally, depressed mothers reported more major life events (such as family issues, economic struggles, and social/marital problems). Since this study was a national study with a large sample size, these results are indicative of the rates of

depression in mothers in the United States as a whole. This study also helps to emphasize the importance of prevention and treatment, as depression is associated with negative effects like the interpersonal and financial issues previously mentioned.

Pregnancy is a time of many changes, and depression in pregnant women is an area of particular importance. In a study by Mikšić et al., (2018), a sample of 110 pregnant women was used in order to assess depressive symptoms and suicidality in the third trimester. All participants completed the Edinburgh Postnatal Depression Scale (EPDS), the Beck Depression Inventory, and the Beck Anxiety Inventory at a gynecology clinic in Đakovo, Croatia. Perinatal depression risk was based off of the participant scores on the EPDS. Women who scored below 10 were considered to not be at risk for perinatal depression, while those who scored 10 or higher were considered at risk. It was found that 26.36% of participants exhibited a risk for perinatal depression. Relating to suicidality (based on item endorsement on the EPDS), it was found that 97.27% of the women “never” had suicidal thoughts and 2.73% did. Of those 3 women who did report suicidal thoughts, they all reported that they “rarely” had them. Based on their EPDS scores, two of these women were at risk for perinatal depression, and the third woman’s score was on the cut-off for the risk of perinatal depression. These results suggest that depressive symptoms and suicidality are of major concern in pregnant women and that screening for these during pregnancy is a necessity.

Additionally, Park, Karmaus, and Zhang (2015) completed a research study that aimed to assess the prevalence and association of depressive symptoms in all 3 trimesters and postpartum period. This longitudinal study assessed depressive symptoms in 153 pregnant Korean women who all completed a sociodemographic questionnaire and the Edinburgh Postnatal Depression Scale to determine depressive symptoms. Participants completed the EPDS once every trimester

and again at 4 weeks postpartum. It was observed that depression scores increased by trimester and dropped in post partum period with elevated depressive symptoms endorsed by 40.5% in 1st trimester, 42.5% in 2nd, 61.4% in 3rd, and 42.5% in the postpartum period. By completing correlational analyses, it was determined that depression in the first trimester was associated with depression in the second and third trimesters. Depression in the second trimester was associated with depression in the third trimester and the postpartum period. Lastly, depression in the third trimester was associated with postpartum depression. This research, overall, suggests that prenatal depression is different each trimester and changes per trimester should be monitored as part of prenatal care. This is relevant because depressive symptoms are, generally, highest in the last trimester of pregnancy (Park et al., 2015), and this study suggests that depression in the third trimester might indicate postpartum depression as well.

With so many women impacted by depression in their pregnancy, it is vital to understand the implications of the depression on the mother and on the baby. One major consequence of maternal depression in pregnancy is the effect it has on the mother-baby relationship (Marcus, 2009). Marcus (2009) discusses some consequences of maternal depression noting that behavioral attachments with the child suffer if the mother experiences depressive symptoms. Depressed mothers are less likely to be responsive and sensitive with their child and are more intrusive in their interactions (Campbell, Cohn, and Meyers, 1995). These implications eventually can impair the child's well-being. The summary of findings across the literature review suggest that children of clinically depressed mothers might experience more negative affect, poor mood regulation, less cooperation, and poorer cognitive and language skills (DeMulder and Radke-Yarrow, 1991; Depression, 1999; Cohn and Campbell, 1992; Zahn-Waxler et al., 1990).

More specifically, Deave, Heron, Evans, and Emond (2008) found maternal depression to be associated with child development delays. Their prospective cohort study including 9,244 women and their children assessed if antenatal and postnatal depression in the mother impacted child development at 18 months of age. Data were collected using the Edinburgh Postnatal Depression Scale (EPDS) to assess depressive symptoms in the mother and the Denver Developmental Screening Test (DDST) to monitor cognitive and behavioral problems with the child. The EPDS was given at four timepoints (18 weeks and 32 weeks gestation and 8 weeks and 8 months postpartum), while the DDST was given at 18 months postpartum for the mother to answer questions about the child. Results indicated that at any one point, 14.1% of mothers were antenatally depressed, and 4.8% were postnatally depressed. It was also found that persistent depression during pregnancy (as measured by a EPDS score of 10 or more at both perinatal time points) was associated with a 50% increase in the odds of developmental delays in the child. These results suggest a relationship between maternal depression and child developmental delays does exist, although more research is needed to understand this relationship more completely.

Another study by Luoma et al. (2011) aimed to determine if high levels of maternal depressive symptoms were associated with child's psychosocial functioning and any behavioral problems. To test this, data on 147 mother and child pairs in Tampere, Finland were collected using the Edinburgh Postnatal Depression Scale (EPDS), the Child Behavior Checklist, and Teacher's Report Forms. The EPDS was delivered to mothers at six different timepoints: prenatally (T1), during the first week postpartum (T2), 2 months after delivery (T3), 6 months after delivery (T4), and again sometime in November 1997 – April 1998 when the child would be either 8 or 9 years old (T6). The EPDS cut point used for this study was 13 or higher in order to distinguish mothers with severe depressive symptoms. Additionally, the Child Behavior

Checklist was completed by mothers about the child's competencies and problems, and the Teacher's Report Forms were completed by the child's teacher about their competencies and problems as well. Both of these tests assessed the child's internalizing (withdraw and depressive symptoms), externalizing behaviors (aggression and delinquency), and total problems. The results indicated that highest scores on the EPDS were observed at T1 with 11% scoring 13 or higher on the EPDS, 9% at T2, 9% at T3, 10% at T4 and 7% at T6. It was also shown that when the mother experienced depressive symptoms, their child was more likely to exhibit more problematic functioning. Specifically, when the mothers were prenatally symptomatic, children scored higher on the CBCL externalizing behaviors and total problems. Specifically, 56% of children with depressive symptoms prenatally reported high amounts of total problems on the CBCL and 38% reported externalizing issues on the CBCL. It was discussed children of depressed mothers might be more likely to form aggressive or hostile coping mechanisms when dealing with other people, which helps explain the fact that the children of prenatally symptomatic mothers scored higher on CBCL externalizing behaviors and total problems. Overall, this study illustrates the importance of identifying maternal depressive symptoms as they adversely can impact both mother and child.

Suicidality

As described by O'Dea, Wan, Batterham, Calear, Paris, and Christensen (2015), suicidality is any behavior, thought, or intent related to suicide that includes completion or attempted suicide or any suicidal ideation (thoughts about suicide with or without intent to die). Hedegaard, Curtin, and Warner (2018) assessed data about the change in suicide rates in the United States from 2000 to 2016. Data were from the National Vital Statistics System that used ICD-10 cause-of-death codes to categorize and quantify suicide deaths. In 2000 the suicide rate

was 10.4 per 100,000 people. Comparatively, in 2016 it rose to 13.5 per 100,000 people, which is a 30% increase. While male and female suicide rates have increased over the years, it was noted that female suicide rates are increasing faster than male suicide rates. Specifically, male suicide rates have increased 21% (from 17.7 to 21.4) and female rates have increased 50% (from 4.0 to 6.0).

An article by the National Institute of Mental Health (n.d.) reported prevalence of suicide and suicidal ideation in the United States as of 2017. Overall, 47,173 people died by suicide in the U.S. in 2017. Suicide was ranked at one of the top 10 causes of death, ranking in at #10. Using the CDC Fatal Injury Data Visualization, it was reported that the suicide rate in the United States in 2017 was 14.0. This finding indicates that the suicide rate in the United States has been on the rise in the last few years. Additionally, data from the Substance Abuse and Mental Health Services Administration (SAMHSA) was reported that the prevalence of suicidal thoughts in America in 2017 was 4.3% overall (4.6% in females and 4.1% in males).

In the general population, it has been studied that, unlike depression, men typically have higher rates of suicidality than women. Hawton (2000) discusses, in a literature review, the gender differences in suicidality. Males generally have higher suicide rates than females overall mostly due to the more violent methods used, and females have higher rates of deliberate self-harm than males because females typically do not intend to commit suicide from their self-harm.

Specifically in Mississippi, suicide is still a major health concern. According to the American Foundation for Suicide Prevention (2020), Mississippi ranks 37th for suicide of all 50 states and Washington DC. Using the 2018 CDC Fatal Injury Reports, it was shown that the suicide death rate in Mississippi is 13.69. Comparatively, the United States death rate was 14.21

in 2018. This suggests that Mississippi might be better off than the country as a whole, but it still supports that suicide is a major concern.

Suicidality and pregnancy

Gavin, Tabb, Melville, Guo, and Katon (2011), examined the prevalence of suicidal ideation during pregnancy in order to identify risk factors. They recruited 2,159 women receiving care at a university obstetric clinic from January 2004 to March 2010. These women completed self-report questionnaires during the early second trimester (around 16 weeks) and again in the third trimester (approximately 36 weeks). The questionnaires included sociodemographic information, health history, past obstetrical issues, psychosocial stress via the Prenatal Psychosocial Profile, alcohol, drug, and tobacco use, as well as the Patient Health Questionnaire to assess suicidal ideation, antenatal depression, and panic disorders. Overall, results indicated that 2.7% of women reported suicidal ideation in their pregnancy. Of these women, 78% reported ideation “several” days in the last 2 weeks, 15.3% reported them “more than half of the days” in the last 2 weeks, and 6.7% responded experiencing thoughts of suicidal ideation “nearly every day”. Additionally, 5.3% of women scored for probable antenatal major depression. In reference to the risk factors, a multivariate logistic regression was used to determine that antenatal major depression and psychosocial stress were risk factors for antenatal suicidal ideation. Overall, the results suggest that suicidal ideation is a major concern for pregnant women and should be screened for suicidality during their pregnancy.

More recently, Mikšić et al. (2018) assessed depressive symptoms and suicidality in 110 pregnant women during the third trimester by using a sociodemographic questionnaire, the Edinburgh Postnatal Depression Scale (EPDS), Beck Depression Inventory (BDI), and the Beck

Anxiety Inventory (BAI). This cross-sectional study was conducted from April until August 2015 in Đakovo, Croatia. Endorsements indicated 97.27% of the women “never” had suicidal thoughts and 2.73% did. Of those 3 women who did report suicidal thoughts, their report was that they “rarely” had them. Both of the previously mentioned studies support that suicidality in pregnant women is approximately 3%.

Appleby (1991) aimed to determine mortality ratios for suicide in pregnant women and women who are one year postpartum. Appleby used death registries from England and Wales that provided information on annual number of deaths due to suicide and deaths due to accident or self-harm. While the actual number of suicides were not reported, mortality ratios were calculated by comparing the actual number of suicides observed in pregnant and postpartum women to the estimated expected number of suicides based off of data from the general, not pregnant population. It was found that the mortality ratio for suicides in the 1st postnatal year was 0.17 ($\frac{1}{6}$ of expected) and 0.05 while pregnant ($\frac{1}{20}$ of expected). As a whole, mortality rate was 6 times lower than expected. These results indicate that in pregnancy, suicidality rates are generally low and lower than the non-pregnant population. One interesting idea to explain the lower trends of suicidality in pregnant women was proposed by Appleby (1991) who suggested that pregnancy might be considered a protective factor against suicidality due to “child related concerns” and “concern for dependents”.

While it is promising that suicidality in pregnancy is relatively low, suicidality in pregnant women is a very serious concern with large impacts on the mother and baby. A study completed by Gandhi et al. (2006) aimed to determine maternal and neonatal outcomes in mothers who attempt suicide while pregnant. Based off of labor and delivery and death certificate database information in California from 1991-1999, it was found that of the 4,833,286

deliveries, 2,132 of them were complicated by an attempted suicide. The group of women who attempted suicide was the “study group” and the rest of the 4,831,154 deliveries made up the control group. Upon further inspection, it was reported that the women who had attempted suicide had increased risk for premature labor, cesarean delivery, and need for blood transfusions (possibly due to poor nutrition and resulting anemia). It was also reported that the infant had increased risk for respiratory distress syndrome or low birth weight if the mother had attempted suicide, which could be due to placental insufficiency in mothers who have experienced such trauma. These results suggest that there are very serious implications of suicidality in pregnant mothers and that prevention efforts should be working to target these women as well.

Nightmares and Suicidality

Interestingly, there has been some research on the relationship between nightmares and suicidality in the general, non-pregnant population. Marinova et al. (2014) examined whether nightmares had a relationship with suicidal risk in a clinical sample. Psychiatric inpatients, (N=52; 24 male and 28 female) with diagnosed Recurrent Depressive Disorder (RDD) or Bipolar Disorder (BD) who were receiving inpatient psychiatric treatment in Sofia, Bulgaria were recruited. Individual clinical interviews were administered for psychiatric diagnosis. Additionally, the Hamilton Depression Rating Scale (HDRS) was completed to assess participant’s current depressive symptoms. Patients were also asked about the frequency, content, and emotional charge of their dreams. Suicidal risk was assessed by item 3 of the HDRS. Results showed that 64% of RDD patients and only 25% of BD patients experienced nightmares. This is the only variable with significant difference between the two groups. Additionally, RDD patients with nightmares scored 2.36 times higher on the suicide risk item on the HDRS than those who did not experience nightmares. Therefore, patients with RDD who

experienced nightmares generally had higher suicidal risk. The results from this study suggest that the presence of nightmares in the depressive sample was a factor related to suicidal risk compared to non-nightmare counterparts. Similarly, Tanskanen et al.'s 2001 study that assessed the relation between nightmare frequency and suicide risk (N=36,211) found that people who had nightmares occasionally demonstrated a 57% higher risk of death by suicide than people with no nightmares, and people who had frequent nightmares were 105% higher risk for suicidal death. The relationship between nightmares and suicidality was a direct, linear relationship.

Lastly, Bernert et al. (2005) aimed to determine the interrelationships between depressive symptoms, suicidality, and sleep complaints. In order to complete this study, Bernert and associates gathered data from 176 participants (104 women and 72 men) in an outpatient mental health clinic in Florida. Each person completed the Insomnia Severity Index for insomnia symptoms, the Disturbed Dreams and Nightmare Severity Index (DDNSI) on nightmare frequency, the Beck Depression Inventory for depressive symptoms, the Beck Suicide Scale for suicidality, and responded to questions about sleep-related breathing problems. Approximately 15% of participants reported at least one prior suicide attempt. Based off responses to the Beck Suicidality Scale, 10.2% of participants fell in the moderate range for suicide risk, and 5.7% were in the moderate to severe range during the time of the study (January 2003 through November 2003). Based off of responses to the DDNSI, 27.8% of participants scored in the range for clinical levels of disturbing dreams and nightmares (>10). A multiple regression indicated that all sleep variables were individually associated with depressive symptoms. It was found that nightmares were significantly related to suicidal ideation. This trend held true even when controlling for depression. Further, the relationship between nightmares and suicidality was shown to be stronger in women than it is in men. The results of this study suggest that

nightmares are very important in terms of suicide prevention and should be considered in future suicide and sleep research.

Present Study

Most people have experienced a sleep disturbance in their life, whether difficulty falling or staying asleep, a bad dream or nightmare, or environmental variables. Various research studies have suggested that nightmares, specifically, have relationships with depression and suicidality in the general population (Cukrowicz et al., 2006; Tanskanen et al., 2001). It is interesting to note how some of the relationships between nightmares, depression, and suicidality can change during pregnancy. Sleep disturbances are a very common experience in pregnancy and are well studied (Lara-Carrasco et al., 2014; Schredl et al., 2016). The various interactions that nightmares have with depression and suicidality are beginning to be studied in the general, non-pregnant population. However, there has been minimal research on nightmares, suicidality, and depression in pregnancy. The present study aimed to begin addressing this literature gap and assess the potential effects of nightmares on depressive symptoms and suicidality in a sample of pregnant women. More specifically, the study hypotheses are as follows:

1. Nightmares will have a positive relation with depressive symptoms in pregnant women.
2. Nightmares will also have a positive relation with suicidality in pregnant women.

METHODS

Participants

The present study was part of a larger study that was conducted at an OBGYN clinic in Tupelo, Mississippi. Women who were pregnant ($N=516$) were asked to complete a series of self-report questionnaires. Participants' ages ranged from 18 to 45 ($M=28.34$, $SD=5.21$) with number of weeks pregnant ranging from 1-41 weeks ($M=25.98$, $SD=9.61$). The ethnic breakdown of the participants are as follows: 76.4% White, 19.2% Black, 3.1% Hispanic, 1.2% Asian, and 1.6% Multiracial.

Measures

Pittsburgh Sleep Quality Index (PSQI; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989)

The PSQI is a 19 item self-report measure that assess sleep disturbances and overall sleep quality over the period of one month. The 19 questions result in 7 individual scores (0-3) on the following: sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, sleep medication use, and daytime dysfunction. An overall score (0-21) results from the sum of the 7 previously mentioned scores. For the PSQI, a higher overall score indicates worse sleep quality. Specifically, question #5 on the PSQI assesses the frequency of bad dreams. To assess the presence of nightmares, participants reported the extent to which they experienced nightmares within the past month (i.e., 0 - “not during the past month”, 1 - “less than once a week”, 2 - “once or twice a week”, or 3 - “three or more times a week”).

Depression, Anxiety, and Stress Scale – 21 Items (DASS-21; Lovibond and Lovibond, 1995)

The DASS-21 is a 21-item self-report questionnaire measure of depression, anxiety, and stress symptoms experienced over the past week. Respondents endorse items on a Likert-type scale ranging from 0 “Did not apply at all”, to 3 “Applied very much or most of the time”. For the purpose of this study, only the depression scale was used.

Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, and Sagovsky, 1987)

The EPDS (Cox, Holden, and Sagovsky, 1987) is a 10-item self-report questionnaire designed to screen for postnatal depression. Specifically, this measure assesses certain depressive symptoms that tend to be more specific for pregnant and postpartum women. For this study, only item 10 of the EPDS was used, which assesses the presence of suicidal ideation. Using a 4-point Likert-type scale, respondents indicate the extent to which they had thoughts of suicidality (i.e., 0 – “Yes, quite often;” 1 – “Sometimes;” 2 – “Hardly ever;” 3 – “Never”).

Procedure

At an OBGYN clinic in Tupelo, MS, women identified as pregnant were approached in a waiting room area by trained research assistants. Following informed consent, pregnant women completed a packet of questionnaires, including a demographics form. For the purposes of this study, only data from the demographics form, PSQI, DASS-21, and EPDS were used for analysis.

RESULTS

Preliminary Analysis

Data for this study were collected from an initial sample of 516 patients. Following data cleaning, 14.7% of participants ($N = 76$) were found to have missing data and were excluded from the analysis using listwise deletion. Therefore, only those participants with complete responses for items on the DASS-21 depression scale, item 5h of the PSQI (i.e., presence of nightmares), and item 10 of the EPDS (i.e., presence of suicidality) were included, leaving a remaining total of four hundred forty participants included in the correlational analysis ($N = 440$).

Primary Analyses

Frequencies for the number of pregnant women who endorsed elevations related to variables of interest (i.e., nightmares, suicidality, depressive symptoms) can be found in Table 1. Spearman's correlations were run to assess whether the experience of nightmares were positively associated with depression (hypothesis 1) and/or suicidality (hypothesis 2). Nightmares were found to be significantly associated with depressive symptoms ($r = .08, p = .04$) in a positive direction. Contrary to hypothesis two, nightmares were not significantly associated with suicidality ($r = -.07, p = .08$). A summary of these results can be found in Table 2.

Table 1. *Summary of Frequencies*

	# Endorsing	M	SD
Nightmares	247	.89	1.04
Suicidality	34	2.87	.54
Depressive Symptoms	91	4.54	4.98

Note: N = 440; # endorsing = number of women endorsing any elevated symptoms

Table 2. *Summary of Correlational Analyses.*

	Depressive Symptoms	Suicidality
Nightmares	.08*	-.07
Depressive Symptoms	1	.21**
Suicidality	.21**	1

Note: (N = 440); $p < .001$ ***; $p < .01$ **; $p < .05$ *

DISCUSSION

The overall aim of the present study was to assess potential relations between nightmares, depression, and suicidality in pregnant women. Related to the association between nightmares and depression, nightmares were found to have a positive, significant relationship with depressive symptoms similar to previous literature in non-pregnant (Bernert et al., 2005; Cukrowicz et al., 2006) and pregnant samples (Schredl et al., 2016). This finding from the present study adds support to the limited research on nightmares and depressive symptoms in the pregnant population. Further understanding the role that this specific type of sleep disturbance (i.e. nightmares) plays in depression, especially in this vulnerable population, could prove beneficial for overall treatment considerations.

Contrary to expectations based on the relationship between nightmares and suicidality in the non-pregnant population, the second hypothesis was not supported. The results indicated that, in this pregnant sample, nightmares were not related to suicidality. In the non-pregnant population, various articles have suggested that nightmares are associated with suicidality. Cukrowicz et al. (2006) found that nightmares were significant predictors of suicidality in a sample of non-pregnant individuals. They also found that in the group of people who only experienced nightmares and no insomnia symptoms generally scored the highest on the DSISS (assessment of suicidality). Additionally, Tanskanen et al. (2001) also found that the experience of nightmares was associated with higher risk of suicide in a sample of non-pregnant individuals. Lastly, Bernert et al. (2005) assessed 176 people and found that nightmares were significantly

related to suicidal ideation, even when controlling for depression. Unfortunately, there is very limited research on nightmares and suicidality in the pregnant population with the present study being one of the first to examine these constructs together in a pregnant sample. It could be, as Appleby (1991) suggested, that pregnancy is a protective factor against suicidality due to concern for the child adding that pregnant mothers know that their life is needed for the prosperity of the unborn child and that the baby is dependent on them. Additionally, Lindahl et al. (2005) suggested that pregnant women have more social support and interaction with health care providers generally which might help lower suicidality in pregnant women. This could be the explanation for lower suicidality in pregnant mothers despite experience of nightmares. Alternatively, in the current sample only 34 out of 516 participants indicated any level of elevated suicidality. Perhaps a larger sample would better detect any relationships between nightmares and suicidality.

Another important finding from the present study was that depressive symptoms were positively correlated with suicidality in the pregnant sample. Literature has supported this association in prior research. For example, Gelaye et al. (2017) assessed 1,298 pregnant women and found that the women who were experiencing depressive symptoms had increased odds of suicidal ideation. While this finding was not included in the hypotheses or initial aims of the study, it is important to note that the relationship between depressive symptoms and suicidality has been repeatedly supported. This study further supports the importance of routine mental health screenings at OB visits for early detection and treatment if/when needed.

Limitations

Although there were strengths in this study, including assessing pregnant women at a specialty OB clinic, and novel questions, there are limitations to note. In this study, nightmares were assessed using only one item on a self-report questionnaire (the PSQI) and were not specifically defined for the participants. Perhaps it would have been more beneficial to differentiate nightmares from bad dreams for the participants in order to remove the subjective aspect of nightmares. Additionally, it might have been beneficial to assess more than just the presence of nightmares (e.g. content, intensity) to capture a broader understanding of the nightmares the participants were experiencing.

Suicidality was measured using item 10 of the Edinburgh Postnatal Depression Scale, a self-report questionnaire that assesses only the presence of suicidal ideation. While suicidal ideation is a serious issue, especially for pregnant women, it is not the only aspect of suicidality that is concerning. The use of a broader assessment for suicidality that incorporates past suicide attempts, self-harm, and suicidal ideation might have been more advantageous to grasp a larger and more complete understanding of what each participant was experiencing.

Finally, this study utilized a cross-sectional design from women at any point in their pregnancy. Had a more complex longitudinal design been used, changes in nightmare frequency, depressive symptoms, and suicidality could have all been monitored across each trimester.

Future Directions

The relationship between nightmares and suicidality in pregnant women is vastly understudied. Future research should examine nightmare frequency in addition to examining distress associated with the nightmare. As Levin and Fireman (2002) found, the distress associated with a nightmare contributed more to the elevated psychological disturbances, seen in

participants who were having nightmares, than the actual experience of a nightmare itself, indicating that future studies in pregnant women should have a more specific assessment of nightmares. As sleep disturbance in pregnancy is common, understanding potential additional impact of nightmares on functioning is important.

Regardless of relation to nightmares, it is extremely important to further the understanding of suicidality, especially pregnant women. Although pregnancy may be considered a protective factor for suicidality, the fact that some pregnant women still endorse this experience is alarming. Having research to support best practices for screening and intervention is essential.

Lastly, future studies using a longitudinal study design should be completed in order to track whether or not nightmares, depressive symptoms, and suicidality change overtime during the course of a pregnancy. Literature suggests that dreaming, depression, and suicidality change during each trimester of pregnancy. Therefore, future studies might find something interesting while examining the relationship between nightmares and depression and suicidality throughout each trimester, such as times of higher or lower risk, age related differences in nightmares, depression, and suicidality across the trimesters, or perhaps unknown interactions of nightmares and depression or suicidality as they change throughout the length of a pregnancy.

CONCLUSION

Pregnancy is a time of marked changes for women. Sleep, or disturbances in such, can be detrimental to overall well-being and has been implicated in depressive symptoms and suicidality. The present study assessed the potential relations between the experience of nightmares, suicidality, and depressive symptoms. Overall, results from the present study demonstrated a significant relationship between nightmares and depressive symptoms in pregnant women. However, experiencing nightmares was not related to suicidality. As research in this area is limited, studies furthering the understanding of nightmares and suicidality in pregnant women are needed.

LIST OF REFERENCES

- Albert, P. R. (2015). Why is depression more prevalent in women?. *Journal of psychiatry & neuroscience: JPN*, 40(4), 219.
- American Foundation for Suicide Prevention. (2020). *Suicide facts & figures: Mississippi 2020*. Retrieved April 28, 2020 from <https://afsp.org/state-fact-sheets>
- American Sleep Association. (n.d.). *Sleep deprivation: symptoms, causes, and treatment*. Retrieved January 15, 2020 from <https://www.sleepassociation.org/sleep-disorders/sleep-deprivation/>
- Appleby, L. (1991). Suicide during pregnancy and in the first postnatal year. *Bmj*, 302(6769), 137-140.
- Bernert, R. A., Joiner Jr, T. E., Cukrowicz, K. C., Schmidt, N. B., & Krakow, B. (2005). Suicidality and sleep disturbances. *Sleep*, 28(9), 1135-1141.
- Blake, R. L., & Reimann, J. (1993). The pregnancy-related dreams of pregnant women. *The Journal of the Board of Family Practice*, 6(2), 117-122.
- Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry res*, 28(2), 193-213.
- Campbell, S. B., Cohn, J. F., & Meyers, T. (1995). Depression in first-time mothers: mother-infant interaction and depression chronicity. *Developmental Psychology*, 31(3), 349.

- Chang, J. J., Pien, G. W., Duntley, S. P., & Macones, G. A. (2010). Sleep deprivation during pregnancy and maternal and fetal outcomes: is there a relationship?. *Sleep medicine reviews*, 14(2), 107-114.
- Cohn, J. F., & Campbell, S. B. (1992). Ill Influence of Maternal Depression on Infant Affect Regulation. *Developmental perspectives on depression*, 4, 103.
- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: development of the 10-item Edinburgh Postnatal Depression Scale. *The British journal of psychiatry*, 150(6), 782-786.
- Cukrowicz, K. C., Otamendi, A., Pinto, J. V., Bernert, R. A., Krakow, B., & Joiner Jr, T. E. (2006). The impact of insomnia and sleep disturbances on depression and suicidality. *Dreaming*, 16(1), 1.
- Deave, T., Heron, J., Evans, J., & Emond, A. (2008). The impact of maternal depression in pregnancy on early child development. *BJOG: An International Journal of Obstetrics & Gynaecology*, 115(8), 1043-1051.
- DeMulder, E. K., & Radke-Yarrow, M. (1991). Attachment with affectively ill and well mothers: Concurrent behavioral correlates. *Development and psychopathology*, 3(3), 227-242.
- Depression, M. (1999). Chronicity of maternal depressive symptoms, maternal sensitivity, and child functioning at 36 months. *Developmental Psychology*, 35(5), 1297-1310.
- Eidelman, D. (2002). What is the purpose of sleep?. *Medical hypotheses*, 58(2), 120-122.
- Ertel, K. A., Rich-Edwards, J. W., & Koenen, K. C. (2011). Maternal depression in the United States: Nationally representative rates and risks. *Journal of Women's Health*, 20(11), 1609-1617.

- Facco, F. L., Kramer, J., Ho, K. H., Zee, P. C., & Grobman, W. A. (2010). Sleep disturbances in pregnancy. *Obstetrics & Gynecology*, 115(1), 77-83.
- Foley, D., Ancoli-Israel, S., Britz, P., & Walsh, J. (2004). Sleep disturbances and chronic disease in older adults: results of the 2003 National Sleep Foundation Sleep in America Survey. *Journal of psychosomatic research*, 56(5), 497-502.
- Gandhi, S. G., Gilbert, W. M., McElvy, S. S., El Kady, D., Danielson, B., Xing, G., & Smith, L. H. (2006). Maternal and neonatal outcomes after attempted suicide. *Obstetrics & Gynecology*, 107(5), 984-990.
- Gavin, A. R., Tabb, K. M., Melville, J. L., Guo, Y., & Katon, W. (2011). Prevalence and correlates of suicidal ideation during pregnancy. *Archives of women's mental health*, 14(3), 239-246.
- Gelaye, B., Addae, G., Neway, B., Larrabure-Torrealva, G. T., Qiu, C., Stoner, L., ... & Williams, M. A. (2017). Poor sleep quality, antepartum depression and suicidal ideation among pregnant women. *Journal of affective disorders*, 209, 195-200.
- Goldenberg, R. L., Culhane, J. F., Iams, J. D., & Romero, R. (2008). Epidemiology and causes of preterm birth. *The lancet*, 371(9606), 75-84.
- Grandner, M. A., Martin, J. L., Patel, N. P., Jackson, N. J., Gehrman, P. R., Pien, G., ... & Gooneratne, N. S. (2012). Age and sleep disturbances among American men and women: data from the US Behavioral Risk Factor Surveillance System. *Sleep*, 35(3), 395-406.
- Hawton, K. (2000). Sex and suicide: Gender differences in suicidal behaviour. *The British Journal of Psychiatry*, 177(6), 484-485.

- Hedegaard, H., Curtin, S. C., & Warner, M. (2018). *Suicide rates in the United States continue to increase*. US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics.
- Hertz, G., Fast, A., Feinsilver, S. H., Albertario, C. L., Schulman, H., & Fein, A. M. (1992). Sleep in normal late pregnancy. *Sleep*, 15(3), 246-251.
- Irwin, M. (2002). Effects of sleep and sleep loss on immunity and cytokines. *Brain, behavior, and immunity*, 16(5), 503-512.
- Kessler, R. C., & Bromet, E. J. (2013). The epidemiology of depression across cultures. *Annual review of public health*, 34, 119-138.
- Köthe, M., & Pietrowsky, R. (2001). Behavioral effects of nightmares and their correlations to personality patterns. *Dreaming*, 11(1), 43-52.
- Lara-Carrasco, J., Simard, V., Saint-Onge, K., Lamoureaux-Tremblay, V., & Nielsen, T. (2014). Disturbed dreaming during the third trimester of pregnancy. *Sleep Medicine*. 15(6), 694-700.
- Lee, K. A., & Gay, C. L. (2004). Sleep in late pregnancy predicts length of labor and type of delivery. *American journal of obstetrics and gynecology*, 191(6), 2041-2046.
- Levin, R., & Fireman, G. (2002). Nightmare prevalence, nightmare distress, and self-reported psychological disturbance. *Sleep*, 25(2), 205-212.
- Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress Scales (DASS)*. New South Wales: Psychology Foundation Monograph
- Luoma, I., Tamminen, T., Kaukonen, P., Laippala, P., Puura, K., Salmelin, R., & Almqvist, F. (2001). Longitudinal study of maternal depressive symptoms and child well-being. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40(12), 1367-1374.

- Malhi, G. S., & Mann, J. J. (2018). Seminar Depression.
- Marcus, S. M. (2009). Depression during pregnancy: rates, risks and consequences. *Journal of Population Therapeutics and Clinical Pharmacology*, 16(1).
- Marinova, P., Koychev, I., Laleva, L., Kancheva, L., Tsvetkov, M., Bilyukov, R., ... & Koychev, G. (2014). Nightmares and suicide: predicting risk in depression. *Psychiatria Danubina*, 26(2), 0-164.
- Mikšić, Š., Miškulin, M., Juranić, B., Rakošec, Ž., Včev, A., & Degmečić, D. (2018). Depression and suicidality during pregnancy. *Psychiatria Danubina*, 30(1), 85-90.
- National Institute of Mental Health. (n.d.). *Suicide*. Retrieved April 25, 2020 from <https://www.nimh.nih.gov/health/statistics/suicide.shtml>
- Nolen-Hoeksema, S. (2001). Gender differences in depression. *Current directions in psychological science*, 10(5), 173-176.
- O'Dea, B., Wan, S., Batterham, P. J., Calear, A. L., Paris, C., & Christensen, H. (2015). Detecting suicidality on twitter. *Internet Interventions - the Application of Information Technology in Mental and Behavioural*, 2(2), 183-188. doi:10.1016/j.invent.2015.03.005
- Okun, M. L., Roberts, J. M., Marsland, A. L., & Hall, M. (2009). How disturbed sleep may be a risk factor for adverse pregnancy outcomes a hypothesis. *Obstetrical & gynecological survey*, 64(4), 273.
- Park, J. H., Karmaus, W., & Zhang, H. (2015). Prevalence of and risk factors for depressive symptoms in Korean women throughout pregnancy and in postpartum period. *Asian nursing research*, 9(3), 219-225.
- Pesant, N., & Zadra, A. (2006). Dream content and psychological well - being: A longitudinal study of the continuity hypothesis. *Journal of clinical psychology*, 62(1), 111-121.

- Pratt, L. A., & Brody, D. J. (2008). Depression in the United States household population, 2005-2006.
- Schredl, M., Gilles, M., Wolf, I., Peus, V., Scharnholz, B., Sütterlin, M., & Deuschle, M. (2016). Nightmare frequency in last trimester of pregnancy. *BMC pregnancy and childbirth*, 16(1), 346.
- Tanskanen, A., Tuomilehto, J., Viinamäki, H., Vartiainen, E., Lehtonen, J., & Puska, P. (2001). Nightmares as predictors of suicide. *Sleep*, 24(7), 845-848.
- Van Orden, K. A., Lynam, M. E., Hollar, D., & Joiner, T. E. (2006). Perceived burdensomeness as an indicator of suicidal symptoms. *Cognitive Therapy and Research*, 30(4), 457-467.
- Zafarghandi, N., Hadavand, S., Davati, A., Mohseni, S. M., Kimiaimoghadam, F., & Torkestani, F. (2012). The effects of sleep quality and duration in late pregnancy on labor and fetal outcome. *The Journal of Maternal-Fetal & Neonatal Medicine*, 25(5), 535-537.
- Zahn-Waxler C, Ianotti R, Cummings EM, et al. Antecedents of behavior problems in children of depressed mothers. *Developmental Psychology* 1990; 26:271-291