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MATERNAL DEPRESSION: INTIMATE PARTNER VIOLENCE, REPRODUCTIVE  
AUTONOMY, AND UTILIZATION OF PRENATAL CARE AS PREDICTORS FOR  
MATERNAL DEPRESSIVE OUTCOMES IN RURAL MALAWI

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## ABSTRACT

Maternal depression threatens the well-being of being of mothers around the world, yet mothers in developing nations have been shown to be at greater risk of developing depressive symptoms (Fisher et al., 2012; Rahman, Iqbal, & Harrington, 2003). Although maternal depression is prevalent worldwide, the factors that influence the development of depressive symptoms may vary. Previous research has identified intimate partner violence, lack of reproductive autonomy, and less utilization of prenatal care resources as significant factors contributing to the development of maternal depressive symptoms, although no previous research has explored these factors collectively (Abajobir, Maravilla, Alati, & Najman, 2016; Gauthier, Guay, Senécal, & Pierce, 2010; Mendonça & Ludermir, 2017).

The purpose of this thesis was to assess the relationship between physical intimate partner violence (IPV), reproductive autonomy, and utilization of prenatal care and maternal depressive symptoms for mothers living in rural Malawi.

As part of a larger cohort study, Umoyo wa Thanzi (UTHA) [Health for Life], 728 mothers with children under 5 years of age provided responses to survey questions regarding depressive symptoms, physical IPV, reproductive autonomy, and utilization of care. Hypotheses tests (chi-square and independent samples t-test) were performed in order to explore the relationship between physical IPV, reproductive autonomy, and utilization of prenatal care with depressive symptoms.

Slightly more than a third of participants (n=240, 34%) provided responses for positive maternal depressive symptoms. This study revealed that physical IPV was significantly associated with maternal depressive symptoms ( $X^2=24.46$ ,  $p<.001$ ). No significant relationships

were found between maternal depressive symptoms and reproductive autonomy or between depressive symptoms and utilization of prenatal care.

This study provides insight for potential targets to prevent the development of maternal depression for mothers living in rural Malawi and highlights the need for further research that may support the development of culturally-relevant mental health support systems.

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## Chapter 1

### INTRODUCTION

#### Maternal Depression

Maternal depression encompasses a wide range of depressive symptoms from mild to major severity that may occur in the antepartum (during pregnancy) period, postpartum (after childbirth) period, and throughout the child-rearing years (Gelaye, Rondon, Araya, & Williams, 2016). Depression among mothers with young infants and children not only places extreme burden on suffering mothers, but also threatens the development and well-being of their children, as affected mothers face significant impairments in maternal functioning (Ertel, Rich-Edwards, & Koenen, 2011). Among mothers, mothers of young children are at greatest risk of developing depression (Ertel et al., 2011). According to the World Health Organization, nearly 10% of pregnant women and 13% of women who have recently delivered a baby will develop a mental disorder, most commonly depression (“WHO | Maternal mental health,” n.d.). Over one third of women of child-bearing and child-rearing years have symptoms of depression (Pascoe, Stolfi, & Ormond, 2006). Studies have shown that a significant number of mothers who experience depression in the perinatal period will continue to experience depressive symptoms beyond the first postpartum year, throughout the critical developmental years of their children (Horwitz, Briggs-Gowan, Storfer-Isser, & Carter, 2009; Keyes & Goodman, 2006; McLennan, Kotelchuck, & Cho, 2001). In their study of American mothers, Horwitz et al., (2009) found that of the 17.4% of mothers exhibiting depressive symptoms when their children were 11 to 42 months of age, 35.6% of these mothers had elevated depressive symptoms when their children had reached

preschool age. Maternal depression affects mothers globally and stands as one of the leading causes of disability for women worldwide (Brummelte & Galea, 2016). Antepartum depression, depression experienced during pregnancy, has been associated with harmful health behaviors such as poor eating habits, heightened substance abuse, and insufficient use of prenatal care, as well as unfavorable outcomes such as preeclampsia, low birth weight, preterm delivery, and postpartum depression (Gelaye et al., 2016). Women who suffer from antepartum depression are likely to experience depressive symptoms after the birth of their child, known as postpartum depression (PPD). Studies evaluating PPD found that 54% of women with PPD had developed depressive symptoms during their pregnancy (Burt & Quezada, 2009; Stewart et al., 2003). Like antepartum depression, postpartum depression challenges a woman's ability to perform everyday tasks and may make them more susceptible to developing future mental and physical health problems, as their depressive symptoms may greatly reduce their quality of life (Abdollahi & Zarghami, 2018). As highlighted by Viinamäki, Niskanen, Pesonen, & Saarikoski (1997), women experiencing higher levels of depressive symptoms immediately following childbirth were significantly more at risk for experiencing chronic depressive symptoms throughout the lives of their children. Perhaps what is of greatest concern is that mothers facing depression are significantly more at risk for suicide (Meltzer-Brody, 2011). Suicide stands as the cause of nearly 20% of all postpartum deaths, acting as one of the leading causes of mortality in the postpartum period (Meltzer-Brody, 2011).

Although maternal depression impacts women globally, the circumstances that may increase the risk of developing depressive symptoms differ in various settings. In high-income countries, the prevalence of antepartum depression ranges from 7 to 15% and the prevalence of postpartum depression is approximately 10% (Evans, Heron, Francomb, Oke, & Golding, 2001;



Grote et al., 2010). Women in developing countries may be at greater risk of developing depressive symptoms with 19 to 25% and 20% experiencing depression during pregnancy and after childbirth, respectively (Fisher et al., 2012; Rahman et al., 2003). Several studies have estimated the prevalence of postnatal maternal depression to be two to three times higher in middle/low-income countries compared to high-income countries, with maternal depression impacting 5% of mothers in Ethiopia and 35% of mothers in low-income areas of South Africa (Baron et al., 2016; Fisher, de Mello, Izutsu, & Tran, 2011). Despite the high prevalence of maternal depression in low- to middle-income countries, a scarcity of mental health services further challenges suffering mothers and their families, as mothers may not be able to receive proper screening and/or treatment for their conditions (Jacob et al., 2007). A study performed by Jacob et al. (2007) found that nearly 90% of all African countries reported less than one psychiatrist for every 100,000 patients. Understanding the unique conditions that affect mothers in low-income settings may help to target modifiable risk factors that can both prevent the development of depressive symptoms, as well as provide suitable treatment for mothers experiencing maternal depression.

Maternal depression is a debilitating condition that threatens the well-being of mothers worldwide, but may vary in terms of when it occurs in a woman's life. The perinatal period presents significant biological, social, and emotional changes in a woman's life—changes that may place women at even greater risk for developing depressive symptoms (Stellenberg & Abrahams, 2015). Approximately 33% of mothers will experience their first episode of depression during their pregnancy, known as antenatal depression, whereas an estimated 40% will have their first episode in the postpartum period, known as postpartum depression (Wisner et al., 2013). When considering postpartum depression, the Diagnostic and Statistical Manual of

Mental Disorders (DSM-5) does not recognize that depressive symptoms can develop beyond 4 weeks postpartum (Brummelte & Galea, 2016). However, many researchers hold the belief that a cutoff of 4 weeks postpartum is far too limited to characterize maternal depression, as the greatest incidence of depression during the postpartum period occurs 2-3 months after childbirth (Brummelte & Galea, 2016). As highlighted by Woolhouse, Gartland, Mensah, Giallo, & Brown (2016), maternal depressive symptoms may extend beyond the first year postpartum. Although few studies have assessed maternal depression past the first postpartum year, those investigating maternal mental health in the early parenting years have found similar or higher prevalence of maternal depression during these time periods (Woolhouse et al., 2016). For example, a recent cross-sectional analysis of maternal depression in the United States revealed that 15% of mothers with children under the age of 1 and 11% of mothers with children aged 1-4 met criteria for past-year major depression (Ertel et al., 2011).

Maternal depression may also vary in terms of severity (Alhusen & Alvarez, 2016). As highlighted by Biaggi, Conroy, Pawlby, & Pariante (2016), depressive symptoms such as fatigue, lack of energy, changes in sleep and appetite during pregnancy may be attributed to physical and hormonal changes from pregnancy, rather than to depression, thereby challenging the ability to diagnose depression during pregnancy. Postpartum depressive symptoms may range from what is commonly referred to as the “baby blues” to major depressive disorder and postpartum psychosis (Alhusen & Alvarez, 2016). Symptoms of maternity blues may arise within the first few days after childbirth and consist of crying, sadness, and mood swings that commonly resolve within 1 to 2 weeks (Alhusen & Alvarez, 2016). Symptoms of postpartum depression may include feelings of severe sadness or numbness, excessive crying, withdrawal from loved ones and pleasurable activities, consistent fatigue, excessive eating, or loss of appetite, intense worry

about the well-being of an infant or child, lack of interest in caring for the baby, thoughts of suicide, and fears of hurting the baby (Stevens, Lynm, & Glass, 2010). Such depressive symptoms may continue among mothers of young children, who may also experience feelings of disconnect, loneliness, dissociation from oneself and their children, and difficulty adjusting to the daily activities and roles associated with being a mother (Highet, Stevenson, Purtell, & Coo, 2014). Although more rare, postpartum psychosis causes severe symptoms including delusions, hallucinations, thoughts of harming the baby, and even more intense depressive symptoms (Stevens et al., 2010). At any rate, maternal depressive symptoms threaten the well-being and functioning of mothers and challenge them even further in a time of intense and sudden change in their lives.

### ***Maternal Consequences of Maternal Depression***

Maternal depression impacts many dimensions of a mother's life. As expressed by Highet et al., (2014), there are many societal expectations surrounding pregnancy, the birth of a baby, and raising children—expectations that may be challenged by a mother's inability to feel the joy and celebration surrounding the arrival of their newborn (Mason, Rice, & Records, 2005). Mothers who experience antenatal depression have been shown to neglect attending prenatal care visits, have poor weight gain, show increased use of harmful substances and experience elevated risk for self-harm and suicide (Davies, Schneider, Nyatsanza, & Lund, 2016). Mothers experiencing antenatal depression may begin to withdraw from activities with friends and family and battle poor concentration and forgetfulness—symptoms that may have serious implications for their jobs and parenting (Highet et al., 2014). Antenatal depression may further complicate a mother's ability to parent and perform other household activities, especially if they are taking

care of their other children (Mall et al., 2014). These maternal depressive symptoms may extend into the postpartum depression, further challenging suffering mothers.

As demonstrated by Slomian, Honvo, Emonts, Reginster, & Bruyère (2019), untreated postpartum depression was associated with increased weight problems, increased illicit drug use, lower mood scores, lower self-esteem, higher levels of anger, breastfeeding problems, and persistent depressive symptoms later in life. Researchers found that postpartum depression negatively impacted quality of life for mothers as greater depressive symptoms were associated with greater perceived stress, more negative life events, more financial problems, lower levels of relationship functioning, and other relationship difficulties (Slomian et al., 2019). Alonso et al. (2011) highlighted the concept of “days out of role” or the amount of time that people are unable to complete daily responsibilities and tasks due to mental or physical health problems. Researchers found that maternal depression accounted for an average of 35.8 and 33.7 days out of role per year for women in low-income countries and high-income countries, respectively (Alonso et al., 2011).

The majority of research surrounding maternal depression focuses on the antenatal and/or postpartum periods, but many of the symptoms experienced in the antenatal and postpartum periods may continue beyond the first year postpartum (Ertel et al., 2011). As highlighted by a large, longitudinal study, of the mothers with high levels of depressive symptoms early in their child’s life (11-42 months), nearly half continued to have elevated symptoms in the following year, and a considerable amount experienced high levels of symptomology as their children entered kindergarten (Horwitz et al., 2009; Horwitz, Briggs-Gowan, Storfer-Isser, & Carter, 2007). In their evaluation of mothers with moderate to severe depression two to eight months postpartum, Netsi et al., (2018), found that these mothers were more likely to have depression 11

years later. The children of these mothers were at increased risk for behavioral problems, trouble in school, and developing later depressive symptoms of their own (Netsi et al., 2018). Such research demonstrates the often-persistent nature of maternal depression and its ability to severely alter a mother's ability to function, creating consequences that may extend far into the lives of their children.

### ***Biological Implications of Maternal Depression***

Maternal depression places considerable burden on the proper biological functioning of affected mothers (Serati, Redaelli, Buoli, & Altamura, 2016). Pregnancy and child-rearing periods present a considerable amount of stress for new mothers. Although many physiological systems are active during the stress response, dysregulation of the hypothalamic-pituitary-adrenal (HPA) axis has been widely researched as a marker of depression in both men and women (Lara-Cinisomo, Girdler, Grewen, & Meltzer-Brody, 2016). When a stressor is perceived, the release of corticotropin-releasing hormone (CRH) from the hypothalamus prompts the release of adrenocorticotropic hormone (ACTH) into the blood stream (Lara-Cinisomo et al., 2016). Stimulated by the release of ACTH, the adrenal cortex then synthesizes and releases cortisol (Lara-Cinisomo et al., 2016). A negative feedback mechanism regulates the HPA axis when cortisol suppresses the release of CRH and ACTH by binding to glucocorticoid receptors in the pituitary gland and hypothalamus, thereby promoting the return to homeostasis (Lara-Cinisomo et al., 2016).

Maternal depression has been shown to dysregulate homeostasis and the HPA axis through negatively impacting the responses of cortisol and ACTH (Serati et al., 2016). Traumatic experiences such as physical trauma and poverty have also shown to heighten the dysregulation

of HPA axis in depressed mothers, highlighting the need to understand these processes in conjunction with psychosocial factors (Heim et al., 2000).

Several genes have been implicated in the development of maternal depressive symptoms. For example, the gene encoding BDNF, has been identified as a strong predictor of depression pathogenesis (Figueira et al., 2010). In their observation of hippocampal BDNF levels, Martinowich, Manji, & Lu (2007) found an association between decreases in BDNF levels and stress-induced depressive behaviors. A genome-wide linkage study of postpartum depression found an increased vulnerability to postpartum mood symptoms for those with genetic variations on chromosomes 1q21.3-q32.1 and 9p24.3-p22.2 (Mahon et al., 2009). A longitudinal cohort study of mothers with PPD observed an increased sensitivity to estrogen signaling, strengthening the hypothesis that elevated sex-steroid sensitivity increased a woman's susceptibility to PPD (Mehta et al., 2014). Such findings suggest that the development of depressive disorders such as maternal depression may be predetermined by genetic factors.

### ***Consequences for Child Development***

Maternal depression not only threatens the proper biological functioning of mothers, but can also have serious implications for the physical, emotional, and psychological development of children of depressed mothers. This risk is heightened further when mothers experience chronic depressive symptoms throughout the early years of their children's lives (Ertel et al., 2011). Mothers of young children who experience depression face significant challenges for adequate maternal functioning (Ertel et al., 2011). Several studies have highlighted negative maternal behavior, decreased responsiveness and linguistic cues critical for mother-child bonding, and decreased interactive and matching behaviors in mothers with maternal depression (Bettes, 1988; Lovejoy, Graczyk, O'Hare, & Neuman, n.d.; Reck et al., 2004). Children of mothers suffering

from maternal depression have been found to show significantly higher levels of internalizing behavior, externalizing behavior, and negative affect compared to children with non-depressed mothers (Goodman et al., 2011). Such behaviors may impact the development of mental health problems, as children with depressed mothers have been shown to be more likely to experience their own mental health disorders (Hammen, Burge, Burney, & Adrian, 1990; Lieb, Isensee, Höfler, Pfister, & Wittchen, 2002). Untreated maternal depression may also put children at risk of poor cognitive functioning, irregular emotional regulations, violent behavior, and the development of their own mental disorders, as mothers suffering from maternal depression may not be able to provide the responsive and consistent care that would promote a secure attachment for their children (Meltzer-Brody, 2011; Slomian et al., 2019). Children of depressed mothers may also face considerable health problems such as suboptimal growth and weight gain, cognitive and language delays, and neuroendocrine dysregulation (Ertel, Koenen, Rich-Edwards, & Gillman, 2010; Goodman et al., 2011). Such consequences highlight the need to diagnose and properly treat mothers suffering from maternal depressive symptoms.

### ***Importance of Understanding Risk-factors for Maternal Depression in a Developing Setting***

Understanding the unique contextual factors that influence maternal depression in a low-income setting is imperative to developing efforts to prevent the development of maternal depression. Although mothers are affected by maternal depression worldwide, the psychosocial factors that may predispose mothers to develop depressive symptoms may differ widely depending on the setting (Gelaye et al., 2016). While there is great need to address the mental-health treatment gap occurring around the world, it is important to consider that many interventions developed in Western countries may not possess the cultural sensitivities necessary to sufficiently address mental health concerns in low-income countries (Davies et al., 2016).

Evaluating the relationship between potential risk factors and maternal depression, specifically in a resource-poor setting, may provide valuable insight for creating targeted prevention efforts for mothers in countries, like Malawi. Certain risk factors such as IPV, lack of reproductive autonomy, and poor utilization of prenatal care may pose greater risk for mothers in resource-poor settings (Agbaje et al., 2019; Gauthier et al., 2010; Mahenge, Stöckl, Mizinduko, Mazalale, & Jahn, 2018).

### **Intimate Partner Violence**

Intimate partner violence (IPV) may consist of physical violence, sexual violence, stalking, and aggressive psychological acts by a current or former intimate partner (Chisholm, Bullock, & Ferguson, 2017). An intimate partner can be defined as a person with strong emotional connectivity, consistent contact, continuing physical and/or sexual relations, one with whom another identifies as being a couple with, and possessing significant knowledge about one another's lives (Chisholm et al., 2017). Although IPV may impact men and women, women experience IPV far more frequently and more harshly than men (Chisholm et al., 2017). Global estimates suggest that nearly 30% of all women aged 15 and older have faced physical and/or sexual IPV over their lifetime (Chisholm et al., 2017). IPV poses severe risk for developing depressive symptoms or thoughts of suicide or attempted suicide (Chisholm et al., 2017).

Although all forms of IPV have been associated with adverse mental health outcomes for women, this thesis chose to solely evaluate physical intimate partner violence. Physical IPV is defined as the deliberate use of physical force with the possibility of producing death, disability, injury, or harm (Chisholm et al., 2017). Mothers experiencing IPV during pregnancy were at significantly greater risk of delivery babies with low birth weight. (Laelago, Belachew, & Tamrat, 2017). Systematic reviews of IPV on pregnant mothers have reported overall prevalence



of 2.3% to 57.1%, with prevalence of physical IPV specifically ranging from 23% to 40% (Laelago et al., 2017).

Despite the severe consequences of IPV, a study performed in Ethiopia revealed that 68% of the women in the study viewed this type of behavior as justified in certain situations (Laelago et al., 2017). Such sentiments may highlight the psychological challenges that IPV places on mothers. It has been suggested that women experiencing IPV are an estimated three times more likely to develop depression (Mendonça & Ludermir, 2017). Pregnant women victim to IPV were found to be at increased risk of developing mental health problems (Chisholm et al., 2017). A study performed by Valentine, Rodriguez, Lapeyrouse, & Zhang (2011) found that recent exposure to IPV was a strong independent predictor of maternal depression in the first year postpartum.

### **Reproductive Autonomy**

Reproductive autonomy is the ability to choose and control contraceptive use, pregnancy, and childbearing (“Measuring women’s reproductive autonomy | Bixby Center for Global Reproductive Health,” n.d.). Women possessing reproductive autonomy have the power to decide if and when to become pregnant, whether to use and choice of contraception, and whether and when to continue a pregnancy (“Measuring women’s reproductive autonomy | Bixby Center for Global Reproductive Health,” n.d.). In some low-income settings, external/societal pressures to have children may overwhelm a woman’s ability to control her own childbearing practices, limiting her reproductive autonomy (Kaplan et al., 2017). In a study analyzing parental autonomy and a mother’s decision to have a child, women who had low autonomous motivation to have children expressed greater postpartum depressive symptoms (Gauthier et al., 2010). Many women in sub-Saharan Africa fall victim to gender inequality, lacking the ability to

control their own childbirth practices (Kaplan et al., 2017). Kaplan et al. (2017) found that women lacking financial resources or who were not able to make their own decisions regarding contraception, utilization of antenatal care, and healthcare use during labor and delivery were at risk of experiencing poor health outcomes such as prolonged labor and obstetric fistulas due to their lack of reproductive autonomy. Research is limited regarding the link between reproductive autonomy and maternal depression in developing countries. However, a recent analysis among mothers in the United Kingdom found a significant causal relationship between unplanned caesarean section (a measure of autonomy) and depression in the next year (Tonei, 2019).

Unintended pregnancies may reflect a lack of reproductive autonomy for some mothers. In both high and middle/low-income countries, unintended pregnancies are widely prevalent (Faisal-Cury, Menezes, Quayle, & Matijasevich, 2017). As highlighted by several researchers, instances of unplanned pregnancy may more reliably predict maternal depression, as mothers with unplanned pregnancies were found to be 2.5 times more likely to experience depressive symptoms in both pregnancy and postpartum (Abajobir et al., 2016; Faisal-Cury et al., 2017).

### **Utilization of Prenatal Care**

Utilization of prenatal care may help to alleviate the burden of pregnancy-related complications. The World Health Organization recommends that women worldwide should have a minimum of 8 visits with a healthcare provider during their pregnancy (World Health Organization, 2016). Visits to a healthcare provider throughout the antenatal period may empower women to seek skilled delivery during childbirth, reduce the risk of complications and newborn deaths, and provide mothers with counseling for various conditions (World Health Organization, 2006). Seeking antenatal care may also provide mothers with helpful emotional support and advice that could aid them throughout their pregnancy (World Health Organization,

2006). As demonstrated by Bitew, Hanlon, Medhin, & Fekadu (2019), adequate antenatal care is essential for detecting and treating antenatal depression. Improving detection and treatment for antenatal not only has the potential to reduce maternal mortality and morbidity, but also to reduce the risk of labor-related complications (Bitew et al., 2019).

As suggested by Abajobir et al. (2016), perinatal services targeting family planning and mental health may serve to alleviate the risk of depression, especially in mothers lacking reproductive autonomy (Abajobir et al., 2016). A study of depressed mothers in East Nigeria highlights the importance of culturally-sensitive, affordable, patient-centered, and accessible healthcare. Some mothers in the study experienced maltreatment at the hands of healthcare facility workers during childbirth, resulting in higher associations of maternal depression (Agbaje et al., 2019).

### **The Current Study**

The purpose of this thesis is to evaluate the relationship between physical IPV, reproductive autonomy, and utilization of prenatal care and maternal depressive outcomes in a low-income setting. Although research has shown that low-income mothers worldwide may be more likely to develop maternal depressive symptoms, there is less research regarding the unique contextual factors that may put these mothers at greater risk (Herba, Glover, Ramchandani, & Rondon, 2016). Previous research has explored these factors in relation to maternal depression, however minimal research has considered these variables collectively. Less research has explored these factors in a low-resource setting like Malawi. Prior research evaluating these variables has typically focused on either the antepartum or postpartum periods. Although there is less research exploring maternal depressive symptoms for mothers with young children, several studies have found that rates of depression remain similar throughout the childbearing years

(Ertel et al., 2011; Horwitz et al., 2009; McLennan et al., 2001). Maternal depressive symptoms have been shown to develop in various points throughout motherhood, even extending into early childhood, therefore analysis for this thesis will evaluate mothers with children under five years of age (Woolhouse et al., 2016). Further, we focus on mothers of young children due to increasing evidence about developmental vulnerabilities in early childhood and the long-term consequences of maternal depression that can extend in to later childhood and adolescence (Essex, Klein, Miech, & Smider, 2001). By understanding the influence of these contextual factors on maternal depressive outcomes in developing nations like Malawi, this thesis may offer meaningful evidence for modifiable risk factors that could be addressed to prevent the development of maternal depression in Malawian mothers.

The following hypotheses have guided this examination of the relationship between these variables and maternal depressive outcomes.

***Hypothesis 1:*** Mothers of young children who have experienced physical intimate partner violence (IPV) will be more likely to show depressive symptoms than mothers who have not experienced physical IPV.

***Hypothesis 2:*** Mothers of young children who report a lack of reproductive autonomy during their last pregnancy will be more likely to experience maternal depressive symptoms, compared to mothers who report reproductive autonomy.

***Hypothesis 3:*** Limited prenatal healthcare will be related to increased prevalence of maternal depressive symptoms in mothers of young children.

## **Chapter 2**

### **METHODS**

#### **Data Collection**

This study relied on secondary analysis of data collected as part of a prospective cohort study, Umoyo wa Thanzi (UTHA) [“Health for Life”] research project exploring sexual and reproductive health practices in rural Malawi (Norris, 2019). This project was conducted between July 15, 2014, and February 25, 2015 within the Lilongwe District in Malawi. This 40-km<sup>2</sup> area encompasses 68 villages with a population of approximately 20,000 people (Norris, 2019). Stratified cluster sampling was utilized in order to randomly select potential participants. Women ages 15-29 and their male partners in selected villages, chosen via two-stage stratified cluster sampling, were eligible to participate. Interviews were conducted by trained research assistants and performed in Chichewa. Participants included in this analysis were females with children under 5 years of age at the time of data collection and who had provided responses to survey questions exploring exposure to physical IPV, reproductive autonomy, utilization of prenatal care, and depressive symptoms. The UTHA parent study received approval from the Ohio State University institutional review board, Columbus, Ohio, USA, and the University of Malawi College of Medicine Research and Ethics Committee, Blantyre, Malawi. All participants provided written informed consent.

## **Primary Exposures**

### ***Physical Intimate Partner Violence***

One of the primary exposures, physical IPV, was assessed by participants reporting whether they had experienced a history of their current spouse/partner hurting them on purpose (pushing, biting, punching, kicking, or slapping). Respondents were able to indicate either “yes” (coded as 1), “no” (coded as 2), or “I don’t know,” “I don’t want to answer,” or not applicable (all coded as missing). This variable was based on measures that were found to be reliable and valid for assessing physical IPV (García-Moreno et al., 2013).

### ***Reproductive Autonomy***

To assess reproductive autonomy, women were asked, “When you/your partner decided about where to deliver your (most recent) baby, who made the decision?” Participants were asked to specify whether they had made the decision by themselves, their partner/husband decided by himself, if they decided with their partner/husband, or if someone else (other than them or their spouse) decided. This variable was selected based on a study performed by Kaplan et al. (2017), which found that women in Malawi possessed limited reproductive autonomy. For the sake of this study, reproductive autonomy was coded as “yes” when participants made the decision by themselves or with their partner/husband. If a woman indicated that her partner/husband or someone else made the decision by themselves, reproductive autonomy was coded as “no”.

### ***Utilization of Prenatal Care***

Utilization of prenatal care was measured through the variable “How many visits in total did you make to any health facility during your last pregnancy, not including your delivery?” This variable was analyzed as a continuous variable based on the WHO recommendation that

women should have at least 8 visits to a healthcare facility throughout their pregnancy (World Health Organization, 2016).

### **Primary Outcome**

Maternal depressive symptoms were analyzed through a modified version of the Patient-Health Questionnaire 2 (PHQ-2). This two-question screener included two variables including “In the past month, have you often been bothered by feeling down, depressed, or hopeless?” and “In the past month, have you had little interest or pleasure in doing things?” The PHQ-2 serves as a “first-step” in screening for depressive symptoms (Kroenke, Spitzer, & Williams, 2003). It is important to note that patients who screen positive on the PHQ-2 should be further evaluated with the PHQ-9 and other diagnostic measures in order to confirm depressive symptoms.

Previous literature on the PHQ-2 scale suggests that the scale be administered with response options including the number of times one has felt “little interest or pleasure in doing things” and “feeling down, depressed or hopeless,” resulting in score ranges from 0-6, with a score of 3 or higher signifying likely major depressive disorder (“Patient Health Questionnaire-2 (PHQ-2)—Mental Disorders Screening—National HIV Curriculum,” n.d.). (See Appendix A). However, in this study, both questions were asked as “yes/no” questions, such that previous score suggestions could not be followed. Thus, for the purpose of this study, individuals endorsing both statements, “In the past month, have you often been bothered by feeling down, depressed, or hopeless?” and “In the past month, have you had little interest or pleasure in doing things?” were coded as having likely depression symptoms, whereas individuals only endorsing one or neither of the statements were coded as depression symptoms not likely. Given that our sample consists only of mothers of children aged 5 and younger, this assessment of depression symptomatology acts as a measure of maternal depression.

## **Statistical Analyses**

All data analyses were performed with IBM SPSS Statistics. Frequencies were obtained for major demographic data (age, education level, marital status, living with intimate partner, and income), as well as for endorsements to the depression screener, number of living children, existence of physical IPV, autonomy in choosing where to deliver children, number of visits to prenatal care, and delivery location.

A chi-square hypothesis test was used to evaluate the relationship between physical IPV and maternal depressive symptoms. Another chi-square hypothesis test was conducted in order to observe the relationship between reproductive autonomy and maternal depressive symptoms. An independent samples t-test was performed to analyze the relationship between number of prenatal care visits attended and depressive outcomes.



## **Chapter 3**

### **RESULTS**

The baseline wave of the UTHA cohort study included 1,034 women and their male sexual partners. Of the 1,034 women recruited in Wave 1, 728 (70.4%) had children under the age of 5 years of age at the time of data collection and provided responses to depressive symptoms, physical IPV, reproductive autonomy, and utilization of prenatal care variables. Current analyses for this study were based on this population (N=728).

#### **Study Population**

Table 1 shows the results of the descriptive statistics performed for this study. The average age of mothers was 27 years (SD=5.66). The majority of participants (n=680, 93%) were married. Ninety percent of the population was currently living with their partner at the time of the study (n=657, 90%). Only a small percentage (n=26, 3%) of participants endorsed completing Form 4 (the last year of secondary education) or above. Slightly more than a third of participants (n=254, 34%) claimed that they had an income of less than 5,000 Malawian kwacha (MK) per month (approximately \$13 US dollars at the time of data collection). Nearly a third of participants (n=197, 27%) had two living children at the time of the study. Nearly half of the participants (n=350, 48%) endorsed being “bothered by feeling down, depressed, or hopeless in the past month.” (See Table 2). Forty-five percent of participants (n=330, 45%) endorsed having “little interest of pleasure in doing things in the past month.” (See Table 2). A little more than a third of participants (n=256, 35%) endorsed attending four prenatal care visits, although no participants reported going to more than five visits. (See Table 4). The majority of participants

(n=568, 78%) reported delivering their most recent child in a clinic, hospital, or health facility. (See Table 4). Slightly more than a third of participants (n=249, 34%) endorsed deciding where to deliver their infant with their partner/husband. (See Table 4).

### **Physical Intimate Partner Violence (IPV)**

Slightly more than a fifth of participants (n=156, 21%) reported physical IPV (See Table 3). Sixteen percent of mothers with non-depressive symptoms reported experiencing physical IPV (n=78, 16.2%), whereas thirty-seven percent of mothers with depressive symptoms reported physical IPV (n=78, 31.7%). There is a significant relationship between physical IPV and depressive symptoms ( $X^2 = 24.46, p < .001$ ), with those having experienced physical IPV being more likely to experience depression. (See Table 6).

### **Reproductive Autonomy**

The majority of mothers endorsed having either made the decision of where to delivery by themselves or with their partner or spouse (n=437, 60%). (See Table 4). There was no significant association between reproductive autonomy (having say in where to deliver their child) and maternal depressive symptoms ( $X^2 = .279, p = .597$ ). (See Table 7).

### **Utilization of Prenatal Care**

Among all mothers in the sample, the average number of prenatal care visits was slightly under 4 ( $M=3.82, SD=1.09$ ). (See Table 5). Mothers with likely depression attended an average of nearly 4 prenatal visits ( $M=3.81, SD=1.09$ ). Similarly, mothers without likely depression attended an average of almost 4 prenatal visits ( $M=3.82, SD=1.09$ ). No mothers in the sample reported attending more than 5 prenatal care visits. No significant difference was found in the

number of prenatal care visits attended for participants with likely depression ( $M=3.81$ ,  $SD=1.09$ ) and without likely depression ( $M=3.82$ ,  $SD=1.09$ );  $t(491)=.082$ ,  $p=.93$ . (See Table 8).

## Chapter 4

### DISCUSSION

In this sample of Malawian mothers, reported physical IPV was significantly associated with likely maternal depressive symptoms, whereas a lack of reproductive autonomy and lower utilization of prenatal care were not significantly associated with maternal depressive symptoms.

Our initial hypothesis that physical IPV would be associated with higher rates of maternal depressive symptoms, was supported by our findings. Rates of *physical* IPV in this sample (Shown in Table 2) were somewhat lower than global estimates of overall (physical, sexual, verbal, psychological, etc.) IPV. However, it is possible that rates in this sample would have matched global rates if all types of IPV had been assessed. Considerable prior research has established a relationship between higher rates of IPV and increased maternal depressive outcomes in both high- and low-income settings, although none of these studies have focused on physical IPV, specifically (Chisholm et al., 2017; Laelago et al., 2017; Mendonça & Ludermir, 2017; Schraiber et al., 2010; Valentine et al., 2011).

Although the scope of our analyses could not demonstrate a causal association between physical IPV and maternal depressive symptoms, several previously proposed mechanisms could explain the association between physical IPV and maternal depressive outcomes. A systematic review performed by Wichmann, Kirschbaum, Böhme, & Petrowski (2017) found that women suffering from depression exhibit a hyper-response to stressors. As a primary component of the HPA axis, cortisol is released in response to stress in order to activate body systems that aid the

body in managing various challenges (Kim et al., 2015) Although activation of the HPA axis is imperative to proper biological functioning, the prolonged activation of this system can prove destructive (Kim et al., 2015). Typical cortisol production follows a strong circadian rhythm (typically peaking shortly after waking, gradually declining throughout the day, and plateauing in the late evening), but chronic stress often results in a blunted cortisol response, as evidenced by lower waking-cortisol levels and heightened cortisol levels in the evening (Kim et al., 2015). HPA axis activity is susceptible to the influence of interpersonal stressors, such as romantic conflicts like physical IPV (Heffner, Kiecolt-Glaser, Loving, Glaser, & Malarkey, 2004; Kiecolt-Glaser & Newton, 2001). As highlighted by previous studies, acts of physical IPV may not be isolated events and the adverse effects of IPV may continue beyond the point of the when the abuse stops (Mendonça & Ludermir, 2017; Yim & Kofman, 2019). This “cycle of abuse” may create a chronic stress response that could lead to other harmful comorbidities, namely depression (Mendonça & Ludermir, 2017). In an already vulnerable biological state, physical IPV in the perinatal period may aggravate the effects of the stress response, as evidenced by higher levels of midday cortisol and higher hair-cortisol levels in mothers who were victim to physical IPV (Boeckel, Viola, Daruy-Filho, Martinez, & Grassi-Oliveira, 2017; Kim et al., 2015).

Contrary to our initial hypothesis, a lack of reproductive autonomy was not associated with increased likelihood of depressive symptoms. Previous research has found that women lacking the ability to choose their own child-birthing practices, such as where to deliver their infants, show poorer health outcomes compared to women with more autonomy (Kaplan et al., 2017). Research specifically analyzing the inability to choose whether or not to become pregnant and depressive outcomes has shown that women who experience unplanned pregnancies are

significantly more likely to experience depressive symptoms in during pregnancy and after the birth of their children (Abajobir et al., 2016; Gauthier et al., 2010). For this analysis, reproductive autonomy was measured by a mother's ability to decide where to deliver her most recent baby. Although this variable evaluated an important element of reproductive autonomy, perhaps it failed to capture more telling indicators of reproductive autonomy, such as being able to decide when or if to become pregnant. In future studies of maternal depression, it may be advantageous to evaluate other dimensions of reproductive autonomy such as contraceptive use, sexuality, and pregnancy intention.

No significant difference was found in maternal depressive outcomes between those with fewer prenatal care visits compared to those with more prenatal care visits. However, it is important to note that no women in the study reported attending the World Health Organization's recommended minimum amount of 8 prenatal care visits (World Health Organization, 2016), as the maximum number of prenatal care visits reported in this sample was five. As mentioned previously, attending prenatal care visits serves to prevent birth-related complications for mothers and their children, as well as to provide mothers with beneficial social support (World Health Organization, 2016). As highlighted by Bitew, Hanlon, Medhin, & Fekadu (2019), attending antenatal care visits is crucial for detecting and treating antenatal depression.

One hypothesis to explain the absence of association between prenatal care visits and maternal depression is that, perhaps, it is not an increased number of prenatal care visits attended, but perhaps the role of prenatal care visits in the prevention of adverse birth outcomes and complications such as obstetric fistulas, which have been associated with the development of depressive symptoms. It is probable that this sample was not homogenous. Thus, it is possible that while we did not see these relationships in the sample overall, they may be present in

subsamples of these women. For example, prenatal care may be significantly associated with depressive symptoms among women with poor birth outcomes related to underutilization of prenatal care. Future studies evaluating the relationship between birth-related injuries/complications and depressive outcomes could be useful in order to gain a better understanding of the role of prenatal care visits in preventing maternal depressive outcomes.

The absence of significant associations between reproductive autonomy and limited utilization of prenatal care and maternal depressive outcomes were unanticipated, but may still provide valuable insight into the development of maternal depressive symptoms in a sub-Saharan population like the Lilongwe district. Furnham & Brewin (1988) identified the experience of feeling different as a key factor in the development of depressive symptoms. As demonstrated by DeWilde et al., (2019), the experience of “othering”, feeling marginalized or excluded because of distinguishable differences from the majority of the population, is a crucial component of perceived stress and the stress response. Perhaps the limited heterogeneity of this analysis reflects that it is not the absence of reproductive autonomy or lack of prenatal care visits that determines the development of depressive outcomes, but rather feelings of “otherness” that may more reliably predict depressive outcomes.

In their exploration of the relationship between maternal depressive symptoms, social isolation, and maternal expectations, researchers found that mothers whose expectations of motherhood did not match the reality of their pregnancy and childrearing, as well as mothers who felt socially isolated were more likely to exhibit depressive outcomes (Eastwood et al., 2013). As discovered by Kaplan et al., (2017), some women in the Lilongwe district exhibited limited autonomy in several reproductive domains, including sexual and reproductive autonomy. Women in this study described several instances when the ability to choose where to deliver was

placed in the hands of their spouses or other elders, reflecting the gender inequalities still present in rural Malawi (Kaplan et al., 2017). If these mothers did not have the expectation that they would be able to choose the place of their delivery and/or did not feel unique in their inability to choose, perhaps this mindset was protective in the development of depressive symptoms. Although the WHO recommends attending at least 8 prenatal care visits, no women in our sample reported attending that minimum, therefore, attending fewer prenatal care visits would not be an “othering” event for women with or without depressive symptoms. Future studies exploring the concept of otherness in relation to maternal depressive outcomes in a rural setting like Malawi could be beneficial in better understanding the development of maternal depression.

This analysis is limited by the cross-sectional nature of the data. The scope of our analyses did not permit for the investigation of the directionality between variables or of the more complex relationships between the variables themselves. Previous research evaluating maternal depression has relied on the Patient-Health Questionnaire-9 (PHQ-9) or the Edinburgh Postnatal Depression Scale (EDPS) in order to perform their analyses. The current study relied on a modified version of the PHQ-2 screener, therefore only likely depressive symptoms could be deciphered from this analysis. Similarly, the modified nature of the PHQ-2 used for this analysis may not have accurately measured depressive symptoms as would the original PHQ-2 Screener, although structured clinical interviews would still be necessary to confirm depression diagnoses.

Our analysis focused on mothers with children under the age of 5 years old, which has been identified as a critical period for understanding maternal depression (Essex et al., 2001). However, this strategy did introduce some limitations in to our study. First, some studies have argued that although maternal depression may extend far beyond the time immediately following



the birth of a child, the symptoms of maternal depression may improve over time (Slomian et al., 2019). Given that we only assessed current depression symptomatology, we may have missed cases of depression that were present in the first five postpartum years, but had subsequently resolved prior to the study. It is also possible that some of the women who screened positive for maternal depressive symptoms developed these symptoms well after childbirth, therefore, utilization of prenatal care and reproductive autonomy may not have been directly related to the development of their symptoms at that point. However, while measures of reproductive autonomy and utilization of prenatal healthcare services may more directly influence the perinatal and immediate postpartum and the lingering effects of these stressors have not been well-studied. Further, it is possible that measures of reproductive autonomy and health care utilization during pregnancy act as a proxy for other measures of healthcare utilization and health autonomy, which may also have an impact on the mental health of mothers of young children (Kaplan et al., 2017).

Although no significant associations were found between the perinatal variables (reproductive autonomy and healthcare utilization) and depression in this analysis, exploring variables that are relevant to the childbearing period as predictors of future health is critical because the perinatal period serves as an opportune time for intervention, as women tend to have more contact with healthcare professionals during this time (Wisner et al., 2013). There is still great need to recognize mothers suffering from maternal depression as early as possible. Antenatal care visits and postpartum check-ups remain opportune timepoints to detect maternal depression (Josefsson & Sydsjö, 2007).

Although our findings are only generalizable to mothers in the Lilongwe District, this research is meaningful for understanding the unique contextual factors that influence the

development of depression in mothers of young children in rural sub-Saharan settings. Nearly 1 in 5 low-income mothers will suffer from maternal depression, but due to an extreme lack of mental health resources, these women may not be able to receive adequate support to heal and manage their symptoms. Future research exploring risk factors and culturally-competent treatments will be critical in preventing the development of maternal depressive symptoms, as well as to support currently struggling mothers.

In summary, physical IPV was significantly associated with maternal depressive symptoms. This finding could have important implications for the development of preventative measures that screen for and support mothers victim to physical IPV. Although no significant association was found between reproductive autonomy and depressive outcomes, future research evaluating other dimensions and measures of reproductive autonomy could be beneficial in understanding the role of reproductive autonomy and maternal depressive outcomes. In an area where few mothers attend the recommended amount of prenatal care visits, number of visits was not associated with maternal depressive symptoms. However, prenatal care remains a critical target for prevention programming regardless of its relationship with maternal depression.

**TABLES**

Table 1. Demographic Information

Variable	Total Sample N=728	Positive Depressive Symptoms n=240 (34%) M (SD) or n (%)	Negative Depressive Symptoms n=477 (66%) M (SD) or n (%)
Age	27 (5.66)	28 (5.6)	27 (5.62)
Education			
Never went to school (None)	46 (6.3%)	17 (6.9%)	29 (6.0%)
1-3 y	207 (28.4%)	68 (27.6%)	139 (28.9%)
4-8 y	367 (50.4%)	116 (47.1%)	251 (52.6%)
Secondary or above	106 (14.6%)	45 (18.8%)	61 (12.7%)
Missing	1 (0.1%)		2 (0.4%)
Household Income			
Less than 5,000 per month	254 (34.9%)	103 (41.9%)	151 (31.3%)
5,000-9,999 per month	97 (13.3%)	32 (13.0%)	65 (13.5%)
10,000—19,999 per month	137 (18.8%)	38 (15.4%)	99 (20.5%)
20,000-29,999 per month	67 (9.2%)	19 (7.7%)	48 (10.0%)
30,000-39,999 per month	37 (5.1%)	15 (6.1%)	22 (4.6%)
40,000-49,999 per month	42 (5.8%)	10 (4.1%)	32 (6.6%)
More than 100,000 per month	43 (5.9%)	14 (5.7%)	29 (6.0%)
Missing	51 (7.0%)	15 (6.1%)	
Marital Status			
Married	680 (93.4%)	229 (93.1%)	451 (93.6%)
Single (living with family)	7 (1.0%)	2 (0.8%)	5 (1.0%)
Single (living alone)	4 (0.5%)	1 (0.4%)	3 (0.6%)
Engaged	1 (0.1%)	0 (0%)	1 (0.2%)
Divorced	31 (4.3%)	11 (4.5%)	20 (4.1%)
Widowed	5 (0.7%)	3 (1.2%)	2 (0.4%)
Living with romantic partner/spouse			
Yes	657 (90.2%)		439 (91.1%)
No	57 (7.8%)	218 (88.6%)	33 (6.8%)
Don't have Partner	7 (1.0%)	24 (9.8%)	6 (1.2%)
Have partner but don't live with them	4 (0.5%)	1 (0.4%)	3 (0.6%)
Missing	3 (0.4%)	1 (0.4%)	1 (0.2%)
Number of living children			
1	176 (24.2%)	57 (23.2%)	119 (24.7%)
2	197 (27.1%)	62 (25.2%)	135 (28.0%)
3	141 (19.4%)	56 (22.8%)	85 (17.6%)
4	115 (15.8%)	39 (15.9%)	76 (15.8%)
5	64 (8.8%)	21 (8.5%)	43 (8.9%)
6	28 (3.8%)	7 (2.8%)	21 (4.4%)
7	5 (0.7%)	2 (0.8%)	3 (0.6%)
8	2 (0.3%)	2 (0.8%)	

*Table 2. Depression Screener Question Outcomes*

Depression Screener Questions	Total Sample N=728
“ In the past month, have you often been bothered by feeling down, depressed, or hopeless?”	
Yes	350 (48.1%)
No	377 (51.8%)
Missing	1 (0.1%)
“ In the past month, have you had little interest or pleasure in doing things?”	
Yes	330 (45.3%)
No	395 (54.3%)
Missing	3 (0.4%)

*Table 3. Physical IPV Responses for Mothers with Positive Depressed vs. Negative Depressive Symptoms*

Variable	Total Sample N=728	Positive Depressive Symptoms n=240 (34%)	Negative Depressive Symptoms n=477 (66%)
Physical Intimate Partner Violence			
Yes	156 (21.4%)	78 (31.7%)	78 (16.2%)
No	561 (77.1%)	162 (65.9%)	399 (82.8%)
Missing	11 (1.5%)	6 (2.4%)	5 (1.0%)

*Table 4. Delivery Decision Descriptives for Mothers with Depressive vs. Non-Depressive Symptoms*

Variable	Total Sample N=728	Positive Depressive Symptoms n=240 (34%)	Negative Depressive Symptoms n=477 (66%)
<b>Place of Delivery Decision</b>			
By myself	188 (25.8%)	65 (26.4%)	123 (25.5%)
Partner/husband decided by himself	170 (23.4%)	55 (22.4%)	115 (23.9%)
Decided with partner/husband	249 (34.2%)	78 (31.7%)	171 (35.5%)
Someone else decided	69 (9.5%)	28 (11.4%)	41 (8.5%)
Missing	52 (7.1%)	20 (8.1%)	32 (6.6%)
<b>Reproductive Autonomy**</b>			
Yes	437 (60%)	143 (58.1%)	294 (61%)
No	239 (32.9%)	83 (33.8%)	156 (32.4%)

\*\* Reproductive autonomy was coded as “yes” when participants made decision by themselves or with their partner/spouse

*Table 5. Place of delivery and number of prenatal care visits for mothers with depressive vs. non-depressive symptoms*

Variable	Total Sample N=728	Positive Depressive Symptoms n=240 (34%)	Negative Depressive Symptoms n=477 (66%)
<b>Number of Prenatal Care Visits</b>			
None	12 (1.6%)	4 (1.6%)	8 (1.7%)
1	11 (1.5%)	5 (2.0%)	6 (1.2%)
2	50 (6.9%)	15 (6.1%)	35 (7.3%)
3	170 (23.4%)	57 (23.2%)	113 (23.4%)
4	256 (35.2%)	91 (37.0%)	165 (34.2%)
5	219 (30.1%)	72 (29.3%)	147 (30.5%)
Missing	10 (1.4%)	2 (0.8%)	8(1.7%)
<b>Place of Delivery (Most Recent Infant)</b>			
Home	83 (11.4%)	25 (10.2%)	58 (12.0%)
Traditional Birth Attendant's Home	66 (9.1%)	24 (9.8%)	42 (8.7%)
On the Road to Hospital	10 (1.4%)	4 (1.6%)	6 (1.2%)
Clinic/Hospital/Health Facility	568 (78%)	193 (78.5%)	375 (77.8%)
Missing	1 (0.1%)		

*Table 6. Chi-Square of Physical Intimate Partner Violence and Depressive Symptoms*

Category	Positive Depression Symptoms	Negative Depression Symptoms	X <sub>2</sub>
Physical Intimate Partner Violence	78	78	24.46**
No Physical Intimate Partner Violence	162	399	
Total	240	477	

\*\*p<.001

*Table 7. Chi-Square of Reproductive Autonomy and Depressive Symptoms*

Category	Positive Depression Symptoms	Depression Unlikely	X <sub>2</sub>
Autonomy in delivery decision	143	294	.279
No autonomy in delivery decision	83	156	
Total	226	450	

*Table 8. Independent Samples T-Test of Prenatal Care Utilization and Depressive Symptoms*


	Depressed outcome	N	Mean	Std. Deviation	Std. Error
Prenatal care visits	0	474	3.82	1.09	.050
	1	244	3.81	1.09	.070
		t	df	Std. Error Difference	
Prenatal care visits		.082	491	.086	

Note: (Depressed Outcome 1=Positive Depressive Symptoms, 0=Negative depressive symptoms)

## Appendix A

### Patient Health Questionnaire (PHQ-2)

#### Patient Health Questionnaire-2 (PHQ-2)

 Share

The PHQ-2 inquires about the frequency of depressed mood and anhedonia over the past two weeks. The PHQ-2 includes the first two items of the PHQ-9.

- The purpose of the PHQ-2 is to screen for depression in a “first-step” approach.
- Patients who screen positive should be further evaluated with the PHQ-9 to determine whether they meet criteria for a depressive disorder.

Over the **last 2 weeks**, how often have you been bothered by the following problems?

Not at all

Several days

More than half the days

Nearly every day

1. Little interest or pleasure in doing things

0

+1

+2

+3

2. Feeling down, depressed or hopeless

0

+1

+2

+3

PHQ-2 score obtained by adding score for each question (total points)



#### Interpretation:

- A PHQ-2 score ranges from 0-6. The authors identified a score of 3 as the optimal cutpoint when using the PHQ-2 to screen for depression.
- If the score is 3 or greater, major depressive disorder is likely.
- Patients who screen positive should be further evaluated with the [PHQ-9](#), other diagnostic instruments, or direct interview to determine whether they meet criteria for a depressive disorder.

(“Patient Health Questionnaire-2 (PHQ-2)—Mental Disorders Screening—National HIV Curriculum,” n.d.)



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**ACADEMIC VITA**  
Madisyn Barnes  
madisyn.barnes@gmail.com

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**EDUCATION**

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**The Pennsylvania State University** **University Park, PA**  
*College of Health and Human Development, Schreyer Honors College* *December 2019*  
Bachelor of Science, Major in Biobehavioral Health, Minors in Global Health & Human Development and Family Studies

*Global Health Minor –Fieldwork: Iringa, Tanzania* *May 2018-June 2018*

- ◆ Critically analyzed health outcomes in a global setting by visiting hospitals, health clinics, non-governmental organizations, and non-profits
  - ◆ Worked in a team to create a mobile health intervention, SMS, aiming to assist Tanzanian mothers with monitoring pre- and post-labor health and presented intervention to university staff and students at Ruaha Catholic University in Iringa
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**LEADERSHIP/SCHOLARSHIP EXPERIENCE**

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**Penn State Dance Marathon | THON** **University Park, PA**  
*Dancer Relations Captain-Training & Development* *September 2018-February 2019*

- ◆ Led a committee of 35 Dancer Relations volunteers in weekly committee meetings in preparation to provide emotional and physical support to dancers during THON weekend
- ◆ Directed the Weekend Warrior Program, a coalition of 40 Dancer Relations Committee Members with specialized training to assist 700 dancers during the Final Four hours of THON
- ◆ Planned and oversaw Dancer Exit Strategy, the process of leading 700 dancers out of the BJC after THON to the Multi-Sport Facility to be reunited with their rides

**Schreyer Honors College** **University Park, PA**  
*SHO TIME Freshman Orientation Leader: Move-In and Arrival & Entertainment Committee* *February 2018-August 2018*

- ◆ Led a group of 30 mentors to execute move-in and arrival procedures to assist incoming Schreyer freshmen and their families, as well as to plan major entertainment events such as Playfair, The Brain Show, and the SHO TIME Finale

*“My Backyard” Service Project Manager* *August 2016*

- ◆ Organized, delivered instructions, and provided assistance to 50 students in tree planting service project to plant 20 trees around Old Main

**Penn State Homecoming** **University Park, PA**  
*Royalty Captain-Student Court* *February 2017-November 2017*

- ◆ Promoted student court nominations through posters and social media campaigns, oversaw application and interview process, participated in court selection
  - ◆ Planned and assisted Student Court with public events, choreographed Talent Show performance, managed voting booths
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**WORK EXPERIENCE**

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**Penn State** **University Park, PA**  
*Department of Biology-Undergraduate Teaching Assistant-Anatomy Laboratory* *August 2017-December 2018*

- ◆ Directed study of anatomy for a class of approximately 25 students through the use of organ specimens, cadaver lab teachings, and human anatomy models

**Nanny** **Littleton, CO**  
 *February 2014-August 2017*

- ◆ Provided care for five children for two families
  - ◆ Prepared meals, drove children to various activities, helped with homework, and maintained daily routines
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**VOLUNTEER SERVICE**

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**THON | For the Kids!** **University Park, PA**  
*Dancer Relations Committee Member THON 2017 & 2018*

- ◆ Happy Quarters Chair: led committee in gratitude activities that would also serve as a donation to THON
- ◆ Yellow Shirt University Chair: choreographed dance routine for Dancer Relations community event