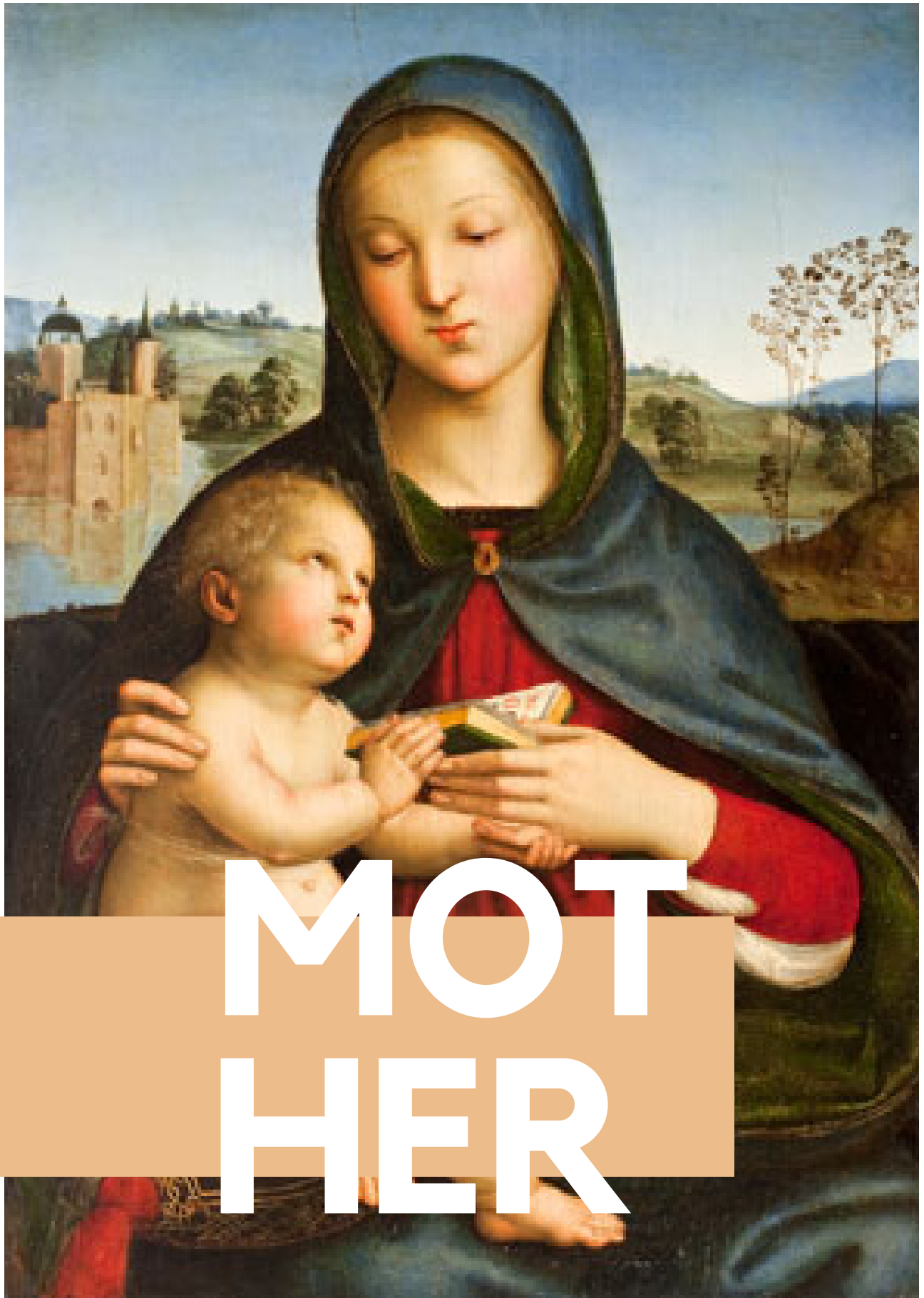


SOCIETY AND GENETICS



MARCH 2020

MOTHER

This zine is an exploration of the social, biological, and epigenetic ways in which a mother interacts with her child.

A primary focus of this exploration is how the mental health of a mother is influenced by the experience of pregnancy and motherhood, and in turn, how her mental health can impact her child's development and well-being.

Included with every article is an image of work by an artist depicting the complicated experiences of pregnancy and motherhood.

Cover Image: *Madonna and Child with Book* (c. 1502-03) by Raphael

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Society & Genetics 191S
Professor de Chadarevian
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CONTENTS

03 IMMIGRANT MOTHERS

Healthcare providers have the responsibility of facilitating access to services for immigrant mothers and their children.

05 ABORTION & WOMEN'S MENTAL HEALTH

Denial of a wanted abortion takes a greater toll on a woman's mental health than receiving a desired abortion.

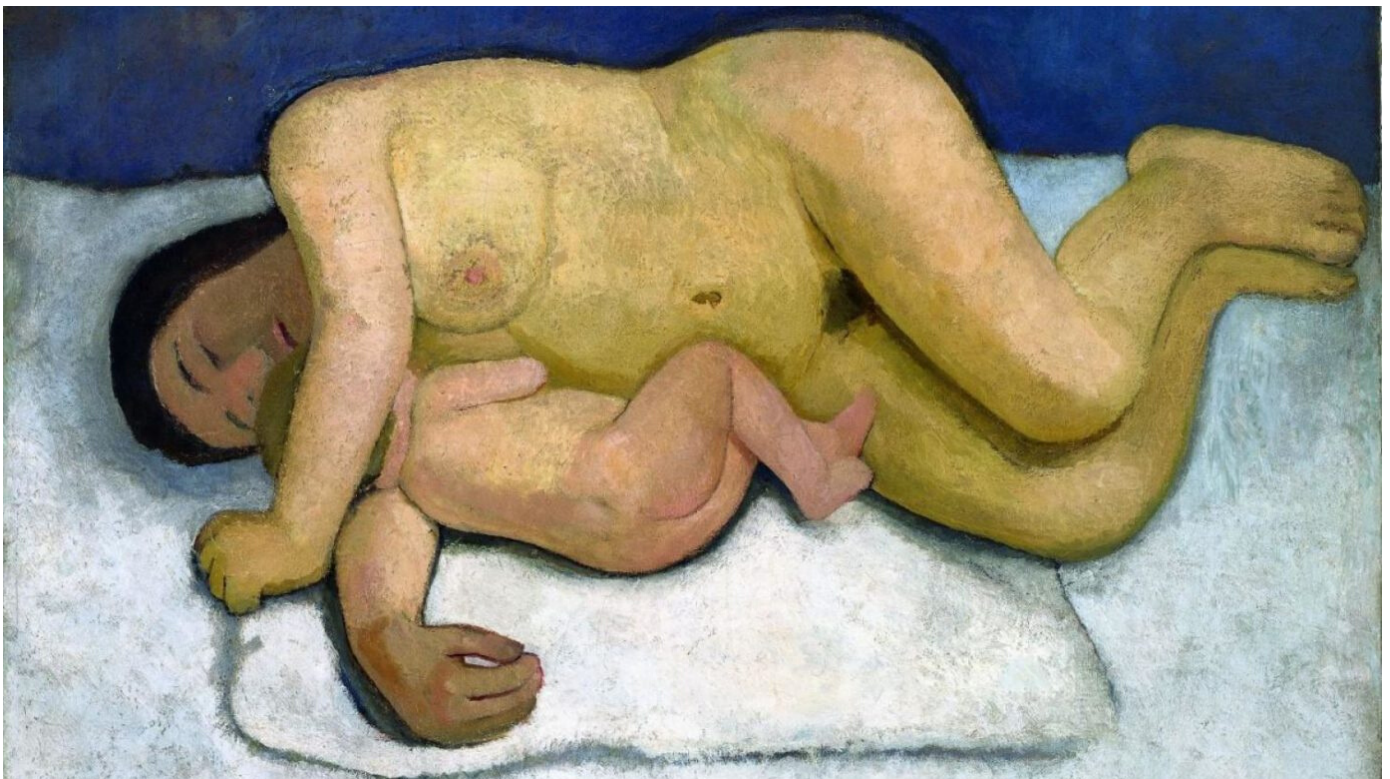
06 UNDERSTANDING POSTPARTUM DEPRESSION

PPD takes a toll on women and their newborn babies, but it is a treatable condition when recognized.

08 EPIGENETICS

The maternal body communicates with the fetus through epigenetic programming.

11 WORKS CITED



Reclining Mother and Child (1906) by Paula Modersohn-Becker

THE IMMIGRANT MOTHER EXPERIENCE



Mother and Child 01 by Nguyen Thanh Binh

The experience of migrating to a new country is laden with psychosocial stressors. Immigration stress is exacerbated by having to care not only for oneself, but also for one's children, especially an unborn fetus or a newborn infant. Navigating the healthcare system in a new country is a difficult task to face, but it is an essential one for pregnant mothers and mothers of infants.

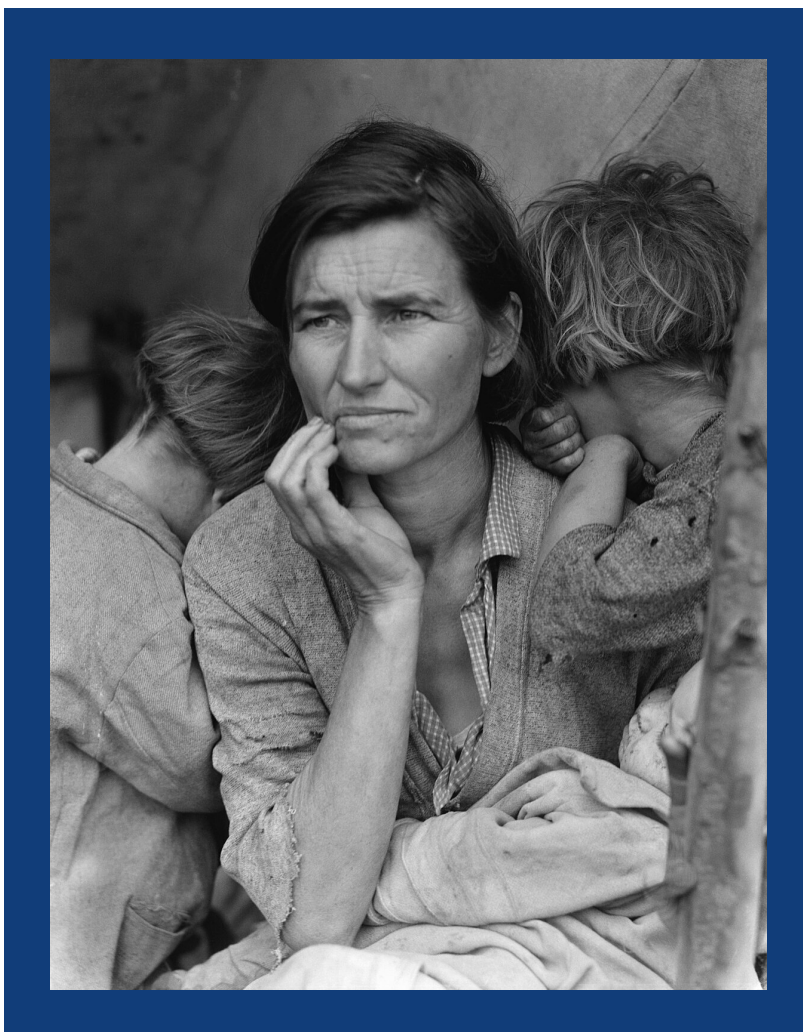
Struggles faced by immigrant mothers in seeking appropriate care for themselves and their children can be tempered by culturally competent, empathetic healthcare providers. In addition to providing aid for and lessening feelings of stress felt by these women, it is important for healthcare providers to gain the trust and respect of immigrant mothers so that they will be empowered to continue the utilization of available services, protecting their health and their children's health in the long term (Coley, 2012).

Pregnant immigrant mothers and their unborn children who do not receive care face grave risks that affect their future health outcomes. According to Coley, these vulnerable women are up to four times more likely to have infants with low birth weight and seven times more likely to have

NAVIGATING THE HEALTHCARE SYSTEM IN A NEW COUNTRY IS A DIFFICULT TASK TO FACE, BUT IT IS AN ESSENTIAL ONE FOR PREGNANT MOTHERS AND MOTHERS OF INFANTS.

preterm births if they do not receive prenatal care (2012). Birth weight is a predictor of a multitude of adult health outcomes, and low birth weight is associated with a higher risk for many common mental illnesses, such as schizophrenia and anxiety disorders, as well as impaired cognitive functioning (Raznahan et al., 2012). Thus, it is critical that immigrant mothers receive appropriate prenatal care so as to minimize health risks and disadvantages faced by their children in the future.

Immigrant new mothers' elevated risk of depression is intensified by barriers to care. Common barriers to care include "stigma, embarrassment, language, fear of being labeled an unfit mother" (Ahmed et al., 2008). Studies of immigrant mothers cite that they often lack an understanding of postnatal depression or fear that they will be stigmatized, perceived as a bad mother, and possibly have their child removed (Wittkowski, Patel, & Fox, 2016). In a study by Missal et al., a Somali woman who migrated to the United States noted that new mothers were able to get more rest and were more socially supported in her home country than in the U.S., leading to fewer incidences of depression in Somalia (2016).



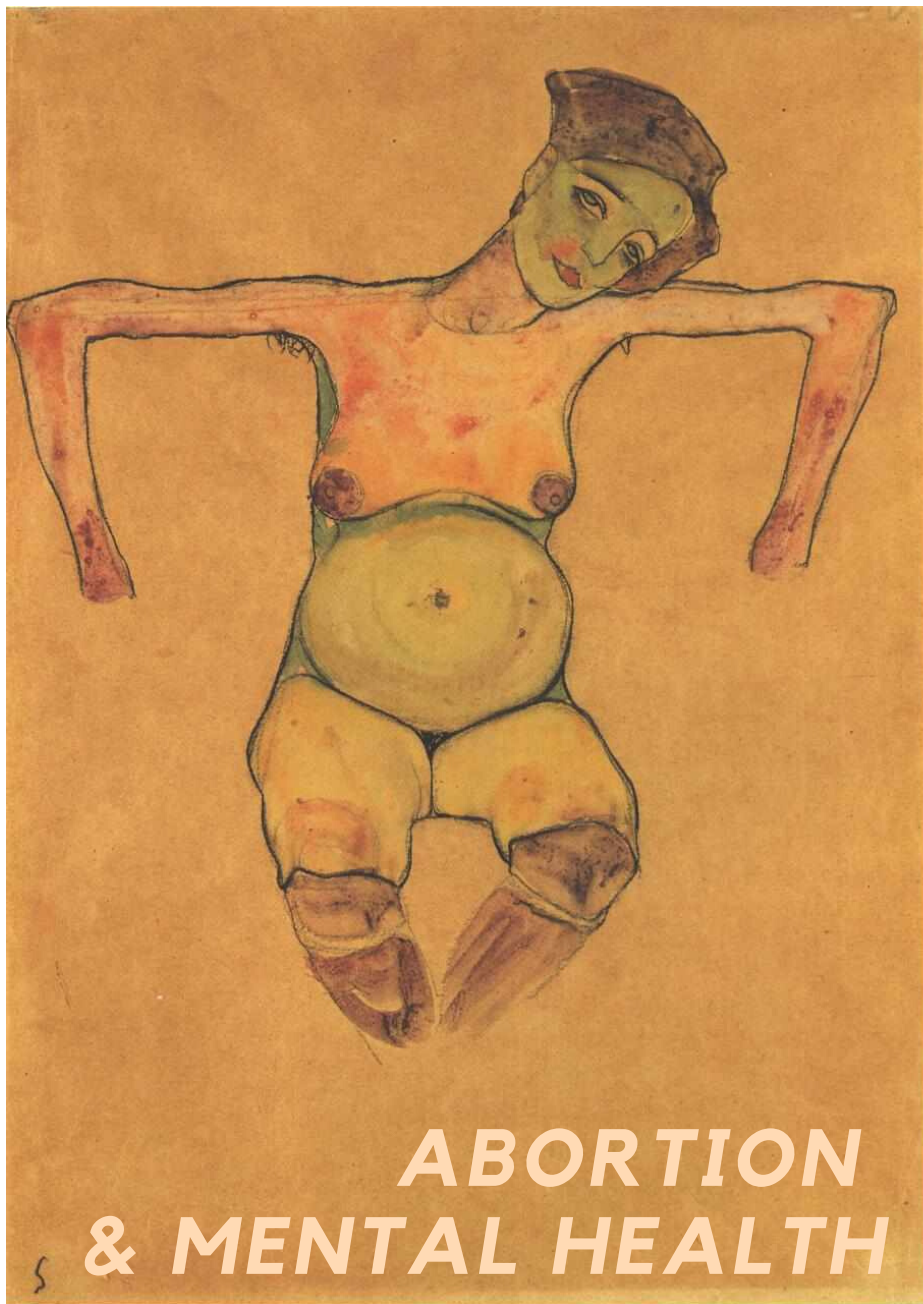
Migrant mother and children (1936) by Dorothea Lange

One consequence of the lack of cultural recognition of postpartum depression is nurses' inability to encourage women to seek the support of general practitioners or other appropriate providers to treat their depressive symptoms (Skoog et al., 2017). With a lack of understanding and trust of a healthcare system that is essentially foreign to them, it is easy to see why

immigrant women would struggle to get the help they need to overcome afflictions such as postpartum depression. Immigrant women need the reassurance that seeking help for feelings of sadness or isolation will not, by themselves, lead to their child being taken from them or any other kind of punishment (Ahmed et al., 2008).

Furthermore, new mothers should be empowered by healthcare providers to engage in cultural practices surrounding childbirth. Immigrant mothers may feel a sense of loss and powerlessness when they are unable to care for their newborn in accordance with their cultural beliefs. For example, Somali women

eat special food during labor, have the call to prayer whispered in their baby's ears at the time of birth, and engage in a 40-day period of rest and care from others following birth (Missal et al., 2016). Immigrant mothers living in the western world may experience tension as they try to uphold their beliefs and childcare practices while navigating a new culture (Wittkowski, Patel, & Fox, 2016).



outcomes than women who were turned away from an abortion clinic (Biggs et al., 2017).

Though healthcare providers at abortion clinics are typically the primary points of contact for women seeking abortions, they do not have the full power to make the best decisions in caring for their patients. Providing accurate information to patients and offering appropriate services through abortion clinics is hindered by “anti-abortion harassment” and government regulations (Gould et al., 2012).

Analyses of women’s mental health following an abortion often fail to account for any mental disorders that women experienced prior to their unwanted pregnancy and abortion. Steinberg et al. found only an association between abortion and substance use when adjusting for mental health before pregnancy (2014). Associations between abortion and subsequent anxiety, mood, impulse-control, and eating disorders and suicidal thoughts became nonsignificant after this adjustment (Steinberg et al., 2014).

A major point made by those who argue against abortion is that women seeking an abortion are unaware of the psychological toll that aborting a fetus will take on them.

If so-called “pro-life” advocates are concerned with the mental health of women experiencing unwanted pregnancies, then they should acknowledge the lack of evidence for their claims in addition to the body of evidence demonstrating the negative effects of denying wanted abortions.

In 2017, nine states in the U.S. required that women who wanted an abortion receive counseling on the negative psychological consequences of undergoing this procedure (Biggs et al.). However, these regulations are based on unfounded claims. In fact, a study by Biggs et al. found that women who had an abortion showed better psychological and emotional outcomes initially than women who were denied a wanted abortion (2017). Over a five-year period, women who received wanted abortions had similar or better mental health

The authors of this study hypothesize that controlling for “risk-taking tendencies” would erase the association between abortion and substance abuse, since women who tend to take risks are more likely to experience an unwanted pregnancy in addition to their increased probability of developing a substance use disorder (Steinberg et al., 2014).

This study illustrates the importance of holistically evaluating the mental health of women before determining whether receiving a wanted abortion puts them at risk of poor mental health.

The background of the entire page is a reproduction of Gustav Klimt's painting 'The Three Ages of Woman' (1905). The painting depicts three female figures in a vertical arrangement. At the top is a young woman with long, wavy brown hair, shown from the back, embracing a woman in the middle. The middle woman has reddish hair and is looking down at a young girl at the bottom. The girl is shown from the back, wearing a blue and white patterned dress. The figures are surrounded by a dense, colorful pattern of circles, dots, and floral motifs. The background of the painting is a mix of red, yellow, and black. The overall style is characteristic of the Vienna Secession movement.

UNDERSTANDING

POSTPARTUM

DEPRESSION

The Three Ages of Woman (1905) by Gustav Klimt

Postpartum depression (PPD) poses a threat to a newborn infant's wellbeing since a mother is typically affected during critical periods of infant development (Silverman et al., 2017). More specifically, PPD can negatively affect infant-caregiver attachment and emotional, social, and cognitive development in the child (Stewart & Vigod, 2016).

The prevalence of PPD is estimated between 6.5 to 12.9% and is likely higher in underdeveloped countries (Stewart & Vigod, 2016). PPD is treatable, so it is important for healthcare providers to inquire about a new mother's mood during postpartum visits (Ahmed et al., 2008). Furthermore, new mothers should be asked by their physicians about social support, substance abuse, and intimate partner violence, which are all risk factors for developing PPD (Stewart & Vigod, 2016).

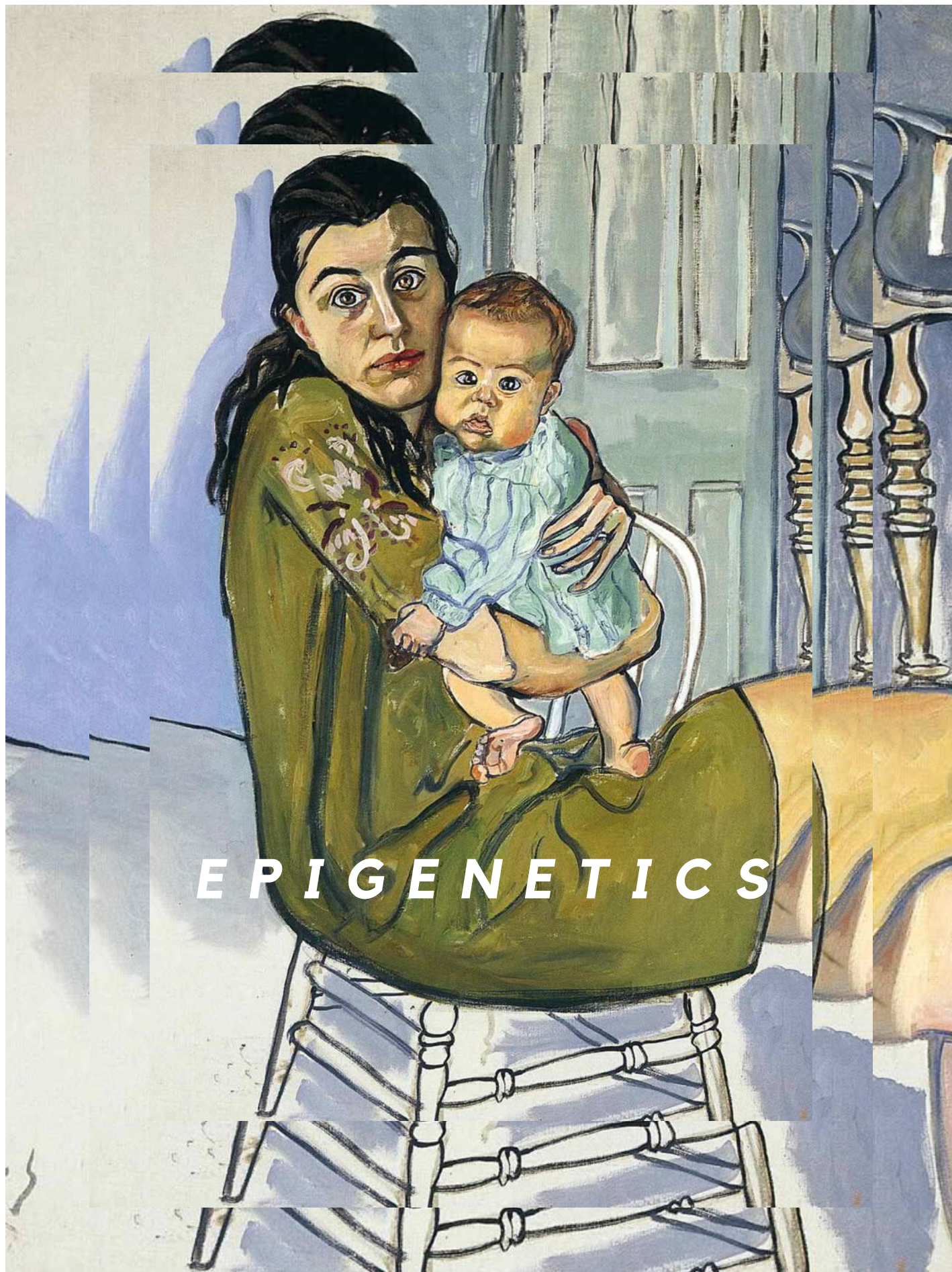
Psychosocial interventions such as counseling can be effective for treating PPD, depending on the severity of a woman's symptoms (Stewart & Vigod, 2016). Moreover, it is safe to prescribe antidepressants to mothers who are breastfeeding, as most SSRIs pass into breast milk at a dose that is less than 10% of the maternal dose (Stewart & Vigod, 2016).

Concerns about infant well-being are warranted, since exposure to maternal depression increases the risk of impaired psychophysiological functioning in their young children; however, mothers with depressive symptoms who are responsive and physically engaged in interactions with their infants are able to protect against the negative effects of their mental illness on their babies (Conradt et al., 2016).

Like any mood disorder, the list of risk factors is lengthy, and it is difficult to determine the exact causes of PPD in a given patient. Women with a history of depression prior to pregnancy have up to a 20-fold increased risk of developing postpartum depression (Silverman et al., 2017). Mothers with a depression history over the age of 35 have an increased risk compared to mothers between the ages of 25 and 29 (Silverman et al., 2017). Among mothers with no history of depression, young mothers had an increased risk for PPD compared with mothers aged 25 to 29 (Silverman et al., 2017).

Women are at a risk of experiencing prolonged periods of PPD when they birth preterm infants, low birth weight infants, or infants with illnesses or disabilities (Vigod et al., 2010). Another particularly vulnerable group is immigrant new mothers, who are five times more likely than non-immigrant mothers to suffer from PPD (Wittkowski, Patel, & Fox, 2016).

Women face many barriers to care for PPD, including "shame, stigma, and practical problems such as finances, transportation, and child care" (Stewart & Vigod, 2016). Shame and stigma are particularly strong barriers to care in populations of immigrant women, whose cultures often do not recognize PPD as a real illness and prefer to rely on family or community members rather than physicians as sources of psychological care (Skoog et al., 2017).



EPIGENETICS

Mother and Child (Nancy and Olivia) (1982) by Alice Neel

MATERNAL BEHAVIORS AND EXPOSURES TRIGGER EPIGENETIC CHANGES IN HER UNBORN CHILD THAT AFFECT HEALTH OUTCOMES INTO ADULTHOOD.



The infant epigenome is sensitive to its environment, which includes not only the maternal body, but also the environment in which a mother finds herself. Maternal behaviors and exposures trigger epigenetic changes in her unborn child that affect health outcomes into adulthood. For example, maternal obesity and diabetes can lead to epigenetic changes that are associated with poor intellectual and psychomotor development in their children (Barua & Junaid, 2015).

Additionally, maternal stress, including depression, during pregnancy is associated with a fourfold risk of her child developing depression later in life (Barua & Junaid, 2015). Maternal depression is related to an increased methylation of genes involved in the neuroendocrine response to stress, meaning that a child's stress response is altered as a result of prenatal exposure to a mood disorder (Conradt et al., 2016). Prenatal exposure to environmental toxins such as BPA is linked to behavior problems such as anxiety, depression, and hyperactivity in children (Barua & Junaid, 2015). Researchers have discovered countless links between a mother's environment during pregnancy and the epigenome of their infants.

Psychosocial stress is of particular interest to epigenetics researchers because it seems to be transmitted from mother to child through epigenetic mechanisms. Early life stress faced by the mother can impact her child by altering her own levels of hormones such as oxytocin, which shapes maternal caregiving and activates brain regions involved in empathy, thereby affecting her interactions with her child and her child's own psychophysiological functioning (Toepfer et al., 2016).

Furthermore, children of depressed mothers exhibit lower baseline oxytocin levels and lower oxytocin levels following social interaction, like their mothers; this is evidence for an intergenerational transmission of an oxytocin deficiency between mother and child (Toepfer et al., 2016). Maternal behaviors during the prenatal and postnatal periods result in programming of their child's genes, permanently altering their child's neuroendocrine outcomes.

In a study by Lester et al., maternal breastfeeding was used as a proxy to measure maternal nurturing and its ability to program the infant epigenome (2018). The authors found that increased breastfeeding resulted in decreased methylation of a gene coding for glucocorticoid receptors, which was associated with decreased cortisol stress reactivity (Lester et al., 2018). They concluded that differences in maternal care of infants alters the infants' epigenome, in turn altering stress reactivity (Lester et al., 2018).

An example of the long-lasting positive epigenetic effects of maternal physiology is demonstrated in a study by Davis et al. (2016). Elevated levels of maternal cortisol during late gestation were shown to be associated with increased cortical thickness of the child's brain in addition to enhanced cognitive abilities for at least six to nine

years after birth (Davis et al., 2016). The authors noted that timing and concentration of cortisol exposure are important to the consequences for neurodevelopment (Davis et al., 2016). In this study, maternal cortisol levels represent an environmental factor that programs genes which are related to the development of the brain's cortices.

INTERVENTIONS AIMED AT IMPROVING THE MENTAL AND PHYSICAL HEALTH OF WOMEN WILL ALSO PREVENT NEGATIVE HEALTH OUTCOMES IN THEIR CHILDREN.

The aforementioned examples of the effects of maternal behaviors and exposures on the infant epigenome imply that the health of future generations is constantly being impacted by the current environment. Psychosocial stressors, availability of nutrients, and hormone levels affecting mothers are also affecting their unborn infants. Interventions aimed at improving the mental and physical health of women will also prevent negative health outcomes in their children.

WORKS CITED

- Ahmed, A., Stewart, D. E., Teng, L., Wahoush, O., & Gagnon, A. J. (2008). Experiences of immigrant new mothers with symptoms of depression. *Women's Mental Health*, 11, 295-303. doi:10.1007/s00737-008-0025-6
- Barua, S., & Junaid, M. A. (2015). Lifestyle, pregnancy and epigenetic effects. *Epigenomics*, 7(1), 85-102. doi:10.2217/epi.14.71
- Biggs, M. A., Upadhyay, U. D., McCulloch, C. E., & Foster, D. G. (2017). Women's mental health and well-being 5 years after receiving or being denied an abortion. *JAMA Psychiatry*, 74(2), 169-178. doi:10.1001/jamapsychiatry.2016.3478
- Coley, S. L. (2012). New baby in a new country: Supporting local immigrant pregnant mothers through "Moms Matter". *International Journal of Childbirth Education*, 27(2), 57-62.
- Conradt, E., Hawes, K., Guerin, D., Armstrong, D. A., Marsit, C. J., Tronick, E., & Lester, B. M. (2016). The contributions of maternal sensitivity and maternal depressive symptoms to epigenetic processes and neuroendocrine functioning. *Child Development*, 87(1), 73-85. doi:10.1111/cdev.12483
- Davis, E. P., Head, K., Buss, C., & Sandman, C. A. (2017). Prenatal maternal cortisol concentrations predict neurodevelopment in middle childhood. *Psychoneuroendocrinology*, 75, 56-63. doi:10.1016/j.psyneuen.2016.10.005
- Gould, H., Perrucci, A., Barar, R., Sinkford, D., & Foster, D. G. (2012). Patient education and emotional support practices in abortion care facilities in the United States. *Women's Health Issues*, 22(4), 359-364. doi:10.1016/j.whi.2012.04.003
- Lester, B. M., Conradt, E., LaGasse, L. L., Tronick, E. Z., Padbury, J. F., & Marsit, C. J. (2018). Epigenetic programming by maternal behavior in the human infant. *Pediatrics*, 142(4), 1-8. doi:10.1542/peds.2017-1890
- Missal, B., Clark, C., & Kovaleva, M. (2016). Somali immigrant new mothers' childbirth experiences in Minnesota. *Journal of Transcultural Nursing*, 27(4), 359-367. doi:10.1177/1043659614565248
- Raznahan, A., Greenstein, D., Lee, N. R., Clasen, L. S., & Giedd, J. N. (2012). Prenatal growth in humans and postnatal brain maturation into late adolescence. *PNAS*, 109(28), 11366-11371. doi:10.1073/pnas.1203350109
- Silverman, M. E., Reichenberg, A., Savitz, D. A., Cnattingius, S., Lichtenstein, P., Hultman, C. M., ... Sandin, S. (2017). The risk factors for postpartum depression: A population-based study. *Depression and Anxiety*, 34, 178-187. doi:10.1002/da.22597
- Skoog, M., Hallstrom, I., & Berggren, V. (2017). 'There's something in their eyes' -- Child Health Services nurses' experiences of identifying signs of postpartum depression in non-Swedish-speaking immigrant mothers. *Scandinavian Journal of Caring Sciences*, 31, 739-747. doi:10.1111/scs.12392

WORKS CITED (CONT.)

Steinberg, J. R., McCulloch, C. E., & Adler, N. E. (2014). Abortion and mental health: Findings from the National Comorbidity Survey-Replication. *Obstetrics & Gynecology*, 123, 263-270. doi:10.1097/aog.0000000000000092

Stewart, D. E., & Vigod, S. (2016). Postpartum depression. *New England Journal of Medicine*, 375, 2177-2186. doi:10.1056/NEJMcpl607649

Toepfer, P., Heim, C., Entringer, S., Binder, E., Wadhwa, P., & Buss, C. (2017). Oxytocin pathways in intergenerational transmission of maternal stress. *Neuroscience and Biobehavioral Reviews*, 73, 293-308. doi:10.1016/j.neubiorev.2016.12.026

Vigod, S. N., Villegas, L., Dennis, C. L., & Ross, L. E. (2010). Prevalence and risk factors for postpartum depression among women with preterm and low-birth-weight infants: A systematic review. *British Journal of Obstetrics and Gynecology*, 540-550. doi:10.1111/j.1471-0528.2009.02493.x

Wittkowski, A., Patel, S., & Fox, J. R. (2017). The experience of postnatal depression in immigrant mothers living in western countries: A meta-synthesis. *Clinical Psychology and Psychotherapy*, 24, 411-427. doi:10.1002/cpp.2010