



# PERINATAL SUPPORT WASHINGTON

## Maternal Depression and Fetal Brain Development

We know that there is an increased risk for depression in children of mothers who suffer from depression, and we know that this link is a complex combination of genetic and environmental factors.

"Fetal programming," the notion that what happens *in utero* may predispose a child to certain illnesses later in life, has been used to explain a host of physical ailments. There is considerably less information about fetal programming when it comes to psychiatric illness, but researchers suspect that high cortisol levels in the mother (a response to stress, anxiety or depression during pregnancy) may alter development of the fetal brain. A few recent studies have focused specifically on the amygdala, the part of the brain that helps regulate stress response and susceptibility to mood disorders. Development of the amygdala begins in the early embryonic stage, and is sensitive to elevated cortisol levels. Significantly, structural and functional MRI studies have shown enlarged and hyperactive amygdalae in adolescents and adults with major depression.

One study measured the cortisol levels of 65 healthy mothers and looked at the link between maternal cortisol in early, mid- and late- pregnancy and amygdala volume in their children at age 7. Higher maternal cortisol in early (but not middle or late) stages was associated with larger right amygdala volume in girls but not boys. Higher cortisol levels in early pregnancy were also associated with increased affective problems in girls.

Another study assessed 157 mothers for depressive symptoms at 26 weeks gestation, and performed structural MRIs on their newborns between 6 and 14 days postpartum. Comparing babies born to moms with higher levels of depressive symptoms to those with low-level or no symptoms, researchers did not detect differences in amygdala size. They did, however note subtle changes in the microstructure of the right amygdala in those infants.

Clearly, this is an area of research that needs further investigation. But, these studies show us that in addition to genetic and post-partum environmental factors, the fetal

environment is a key element in the transmission of mood vulnerability from mother to child.

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